METAL-FACH

ROLLER-AND-CHAIN BALER

Z602

INSTRUCTION MANUAL

TRANSLATION OF THE ORIGINAL INSTRUCTION MANUAL

REV. II

SEPTEMBER 2018

Instruction manual No. Z602-02-167/2013

EC DECLARATION OF CONFORMITY

The undersigned	Jacek Kucharewicz, Chairman of the Board	
hereby declares, with full responsibility, that the complete machine		
ROLLER-AND-CHAIN BALER		
1.1.	Brand (trading name of the manufacturer)	Metal-Fach
1.2.	Type:	Z345
1.2.1.	Variant:	
1.2.2.	Version:	
1.2.3.	Name(s) (if any)	Z602
1.3.	Category, subcategory and vehicle speed indicator:	S1a
1.4.	Company name and manufacturer's address:	Metal-Fach sp. z o.o. ul. Kresowa 62 16-100 Sokółka, Poland
1.4.2.	Name and address of the authorised representative of the manufacturer (if applicable):	N/A
1.5.1.	Location of the rating plate of the manufacturer:	On the front part of the main frame of the machine
1.5.2.	Method used to fix the rating plate of the manufacturer:	Bonded
1.6.1.	Location of the vehicle-identification number on the chassis	On the front part of the main frame of the machine
2.	Machine-identification number:	

complies with all the relevant regulations of Directive 2006/42/EC and Regulation of the Minister of the Economy dated 21 October 2008 on the principal requirements for machines (Journal of Laws of 2008, No. 199, item 1228, as amended).

The following harmonised standards were applied to assess the compliance

PN-EN ISO 4254-11 : 2012, PN-EN ISO 4254-1 : 2013, PN-EN ISO 12100 : 2012, PN-EN ISO 13857 : 2010

and standards PN-ISO 11684 : 1998, and Regulation of the Minister of Infrastructure dated 31 December 2002 on the technical condition of vehicles and the range of their essential equipment (Journal of Laws of 2003, No. 32, item 262, as amended).

Safety Testing Report No. LBC/04/15

This EC declaration of conformity shall cease to be valid if the machinery is altered or rebuilt without the manufacturer's approval.

Sokółka
(Place)

01/07/2015
(Date)

Jacek Kucharewicz
(Signature)

Chairman of the Board
(Position)

Machine data

Type of machine		Roller-and-chain baler
Trade name:		Z602
Serial Number[1]		_____
Machine manufacturer		METAL-FACH Sp. z o.o. ul. Kresowa 62 16-100 Sokółka Phone (0-85) 711 98 40 Fax (0-85) 711 90 65
Seller		_____
	Address	_____
		_____
	Phone/Fax	_____
		_____
Delivery date		_____
Owner or user	Name	_____
	Address	_____
		_____
	Phone/Fax	_____

[1] This data is located on the machine rating plate located on the front part of the machine main frame

Table of contents

INTRODUCTION

The information included in the instruction manual is valid as of the date of issue. The manufacturer reserves the right to introduce design changes to the machines, in connection with which some values or illustrations might not correspond to the actual state of the machine as supplied to the user. The manufacturer reserves the right to introduce design changes without making any changes to this manual. The instruction manual is included as the basic equipment of the machine. The user is obliged to read the contents of this manual before commencing operation and to meet the recommendations included in it. It will ensure safe operation and trouble-free machine operation.

The machine was constructed in compliance with the standards in force and the current legal provisions. The manual describes the basic safety and operation principles of the baler made by Metal-Fach Z602.

The manufacturer's relevant obligations are set out in the warranty certificate, which contains the complete and binding regulations of the warranty services.

If the information included in the instruction manual proves to be incomprehensible, you should address queries to the office of the distributor where the machine was purchased, or contact the Manufacturer directly for assistance.

The spare-parts catalogue functions as a separate list and is attached in the form of a CD accompanying the machine purchase; and is also available on the Manufacturer's website www.metalfach.com.pl .

The warranty card, together with the warranty terms, is attached to this Instruction Manual as a separate document.

Manufacturer’s address

Metal-Fach sp. z o.o.

ul. Kresowa 62

16-100 Sokółka

Telephone

Phone (0-85) 711 98 40

Fax (0-85) 711 90 65

The symbols used in the instruction

DANGER

This hazard-warning symbol Indicates a potentially hazardous situation, which, if not avoided, can lead to death or disability. The symbol warns against the most-dangerous situations.

NOTE

This symbol points to especially important information and recommendations. Non-compliance with the described recommendations threatens a serious damage to the machine resulting from its incorrect operation.

WARNING

This symbol indicates a potentially hazardous situation, which, if not avoided, can lead to death or disability. This symbol indicates a lower level of risk of injury than the symbol including the word “DANGER”.

The symbol indicates useful information.

This symbol indicates a lower level of risk of injury than the symbol including the word “DANGER”.

1 General description

1.1 Introduction

THIS USER MANUAL IS PART OF THE BASIC ACCESSORIES OF THE BALER

The machine can be operated only by qualified persons who have become acquainted with this instruction manual, and the construction and operation of the baler,

To operate the machine safely, adhere to and follow all the instructions set out in this Instruction Manual. Observance of the instructions in the instruction manual guarantees safe operation for the User, and also extends the service life of the machine.

1.2 Baler Identification

The identification data is located on the rating plate located on the front part of the frame. The data used to identify the machine, i.e. the symbol, factory number, year of manufacture, and hitch pressure, can be found on the rating plate.

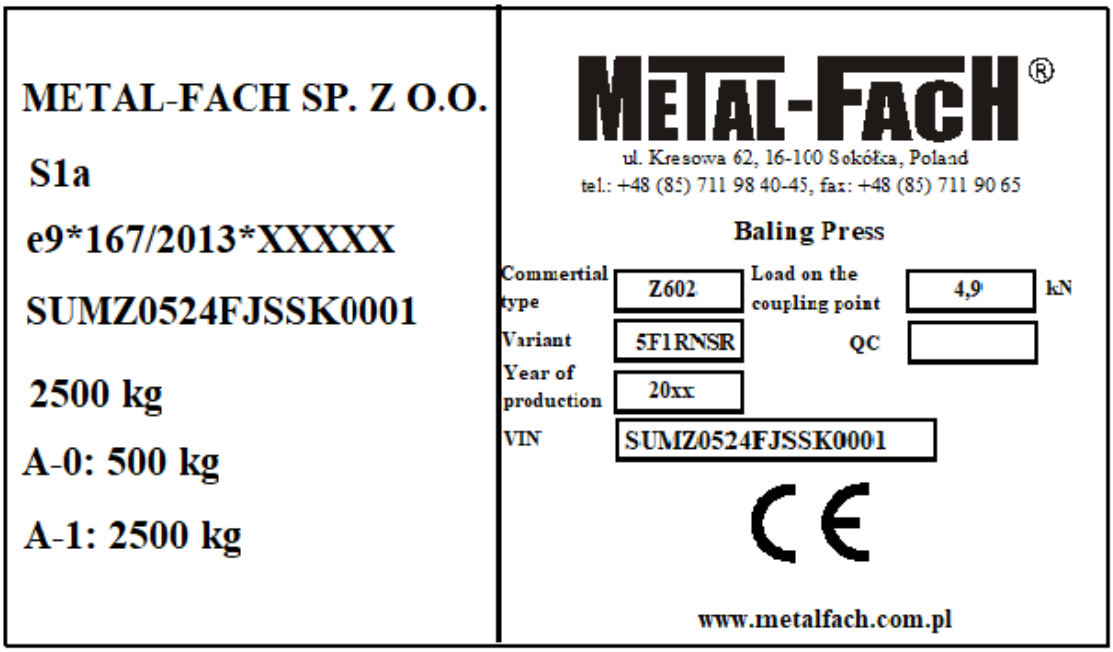


Figure 1 Example of a rating plate

NOTE

NOTE!
It is prohibited to enter public roads with a baler without the rating plate or with an illegible rating plate.

NOTE

NOTE!
Check the condition and legibility of the rating plate. If it is destroyed or damaged report at the service.

On purchase, check the compliance of the serial number located on the nameplate of the machine with the number provided in the user manual and warranty card.

The manual should be preserved for future users.

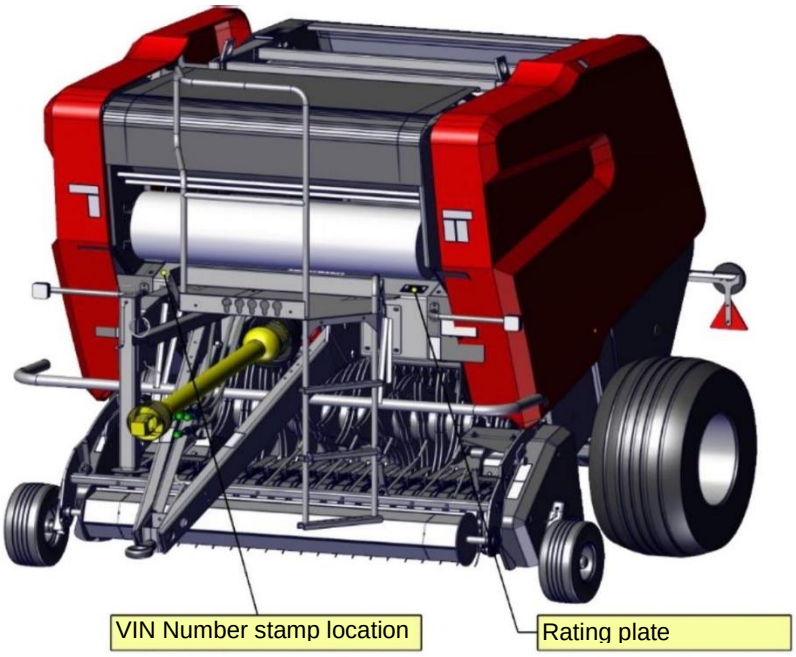


Figure 2 VIN Number stamp location and rating plate affixed to the machine

On purchase, check the compliance of the serial number located on the nameplate of the machine with the number provided in the user manual and warranty card.

In the case of selling the machine to another user, it is obligatory to provide the instruction manual. It is recommended the baler supplier archive the buyer's acknowledgement of the receipt of the instruction manual, handed over to a new user together with the machine.

Keep this manual in a safe place, where it should be available to the user and service technician through the entire life cycle of the machine.

If the instruction manual is damaged or lost, notify the service centre and state the manual number or the data from the rating plate to receive a new copy of the baler operation

manual. You can also download the instruction manual from the website www.metalfach.com.pl.

Before you start the machine after a longer period of stoppage, read carefully information on the use and safety contained in this manual.

You must read all the parts of the instruction manual, and, if necessary, contact your local Metal-Fach distributor. The contact details of the distributors and service centres are published on www.metalfach.com.pl. The machine should be operated, serviced and repaired by people familiar with its specific characteristics and acquainted with the rules of conduct in terms of occupational safety.

The manufacturer of the machine shall not be held liable for any damage arising from non-compliance with the principles contained in this instruction manual!

USE ORIGINAL SPARE PARTS ONLY!

If you need any spare parts, call your local Metal Fach distributor or directly Metal Fach in Sokółka.

1.3 The baler's intended use

The Z602 baler is designed for picking up material raked into windrows by rolling them into bales of hay with a humidity of up to 20%, and green fodder with a humidity of up to 60%, and straw.

All working actions must be carried out by one person, i.e. an operator who is in the tractor cab.

Using the baler for any purpose other than the intended use shall be considered an improper use, contrary to the intended use. Metal Fach shall not be liable for damage caused to persons or animals, or for other damage resulting from the improper use of the machine.

1.4 Baler design

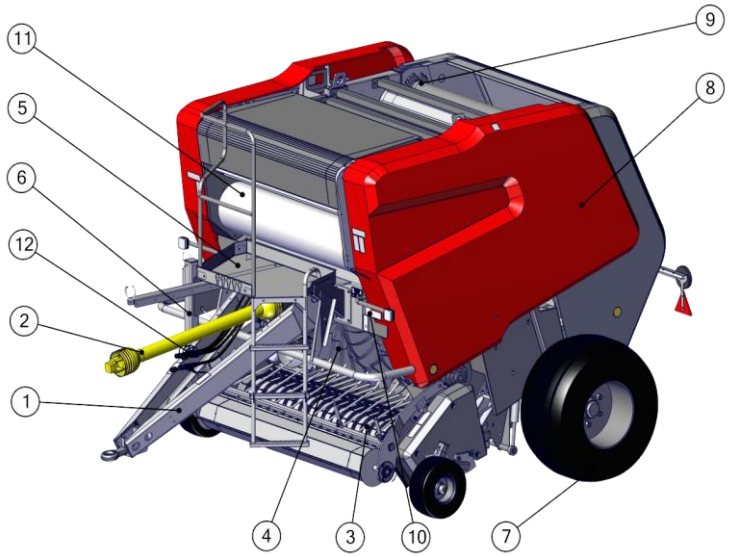


Figure 3 Z602 baler design

1 - Drawbar, 2 - PTO shaft, 3 - Pick-up, 4 - Rotor, 5 - Platform, 6 - Support foot, 7 - Ground wheel, 8 - Guard, 9 - Chain and rod conveyor set, 10 - Control panel, 11 - Net binding unit, 12 - Supply hydraulic hoses

The front section of the baler features the pick-up (3) which collects the windrows. The material collected by the rotor (4) is delivered to the rolling chamber in the form of a roll. There are rollers revolving around their axes in the front section of the rolling chamber. In the rear section of the chamber, there is a pair of chains which drive the rollers. The motion of the rollers and chains propels the material's rolling and compaction. Achieving a pre-set degree of compaction is signalled by the control panel (10) in the operator's cab. After the pre-set compaction degree is achieved, the binding unit (11) ties the bale with net.

The baler's coupling with the tractor is achieved by means of the drawbar (1), the PTO shaft (2), and hydraulic hoses (12). The support foot (6) is used for propping the machine in the stationary position. It must be lifted by means of the crank provided for the time of the operation. The machine has a platform (5) with a folding ladder, which should be folded down during operation. The baler is fitted with ground wheels (7) for riding behind the tractor.

1.5 Technical specification of the baler

Table 1. Technical specification of the baler

No.	Contents	
General information		
1.	Machine Type	Baler
2.	Manufacturer	METAL-FACH Sp. z o.o. Kresowa 62, 16-100 Sokółka
3.	Nameplate Location	Front bar
4.	Number Stamp Location	Front body, right side
5.	Trade name	Z602
Dimensions		
6.	Maximum length [mm]	4260
7.	Maximum width [mm]	2540
8.	Maximum height [mm]	2425
Weights		
9.	Maximum weight [kg]	3050
Technical Data		
10.	Maximum hitch pressure [kN]	5.1
11.	Rolled-bale dimensions (diameter/width) [mm]	1200/1200
12.	Bale weight [kg]	100-600
13.	Efficiency [bales/h]	max. 35
14.	Rolling assembly – chamber type	Roller and chain, fixed chamber
15.	Bale density	Variable
16.	Drawbar-eye diameter [mm]	44
17.	Number of operators	1 (tractor operator)
Requirements for tractor		
18.	Power demand [kW/HP]	60/81
19.	Power demand on the power take on [kW/HP]	50/68
20.	PT Off rotational speed [rpm]	540
21.	Connected to the tractor by	Lower transport hitch
22.	Hydraulic system	2 unidirectional manifold, 1 dual direction manifold
23.	Required pressure in the tractor's hydraulic	140/14

	system [Atm./MPa]		
24.	Electrical system [V]	12	
25.	Socket	3-Pin COBO	
26.	Transport speed [km/h]	40	
Feeding and cutting unit			
27.	Pick-up type	Drum and finger, 4-beam	
28.	Pick-up width [mm]	1800	
29.	Max. distance between the extreme pick-up tines [mm]	1520	
30.	Number of pick-up tines	44	
31.	Working-height adjustment	Mechanical, 5 settings	
32.	Cutting assembly	13 blades	
Binding			
33.	Number of net rolls	2	
Tyres			
34.	Size	400/60 – 15.5	
35.	Load-capacity and velocity index	(14PR) 145 A8	
36.	Pressure in tyres [kPa]	250	
Power take-off shaft (PTO)*			
37.	Type	Standard	Automatic
38.	Transferred torque [Nm]	1860	1700
39.	Minimum length [mm]	1210	1110
40.	Type of coupling	Shear	Automatic
41.	Catalogue No.	60064/S602.K61-1/5NW	CS6R111CEWR717A

* The automatic shaft is an optional accessory for the baler

1.6 General safety principles

In order to avoid hazards, read the contents of this instruction manual prior to operating the baler. As well as the information included in the instruction manual, all the principles and the local legal regulations related to safety of work and machine disposal should be met.

The baler has been designed and constructed in such a way as to ensure maximum safety during use.

Before the first start-up, read all the sections of the instruction manual carefully.

Metal-Fach shall not be held liable for any damage arising from non-compliance with the principles contained in this baler instruction manual.

The Company shall also waive all responsibility for any damage arising from the improper use of the machine or any unauthorised changes made to the machine.

Check the condition of the machine regularly. Pay special attention to the correct functioning of all safety components. All protective guards must be installed according to the manufacturer's instructions.

WARNING

WARNING!

The baler can be operated only by qualified persons who have read this instruction manual.

WARNING

WARNING!
Before starting working, check that the machine is functioning correctly, it is complete, and the moving parts are properly secured.

You should take note of all the warning signs indicated in the manual and present on the machine. All signs which warn about risks present on the machine must be visible at all times.

Please make sure that the safety signs are kept clean at all times, and, if damaged or barely legible, they are replaced. You can find the list of safety signs with their locations in Chapter 1.6.1. “Safety signs”

WARNING

WARNING!

Never leave the machine unattended during operation.

WARNING

WARNING!
Do not leave the baler unattended when the engine is running.

DANGER

DANGER!
Take particular care while getting into and out of the tractor.

DANGER

DANGER!
It is absolutely forbidden to approach rotating parts during their operation, touch the moving parts, or reach between them.
Keep the face, hands and legs away from all rotating parts. Keep at a safe distance at all times.
Do not use tubes, hoses or other parts of the machine as handrails.
Carrying persons or animals on the machine or tractor is strictly forbidden.

WARNING

WARNING!
Protective clothing - safety gloves, safety boots and safety goggles - must be worn during maintenance and repair work.

WARNING

WARNING!
Work on pressurised hoses is not permitted, as it can cause stains or even serious injuries.

WARNING

WARNING!
Always keep the oils and lubricants out of the reach of children. Always read carefully the warnings and precautions placed on packaging. Do not allow contact of the skin with any hazardous substances. Wash yourself thoroughly after you have used the above-mentioned hazardous substances.

DANGER

DANGER!
The machine working area is considered a danger zone. Before starting the machine, make sure that there are no persons or animals in the immediate vicinity, or around it. In the event of anyone appearing near the machine the baler must be stopped immediately and you must make all unauthorised persons leave the zone. Never stop in close proximity to or under terraces, balconies, in front of open rooms or any other platform where persons or animals might be present. The baler operator is responsible for any kinds of damage caused by the machine during operation.

WARNING

WARNING!
Wear well-fitting clothing which cannot be caught by movable elements, and boots with non-slippery soles. In the case of the hazard of item ejection wear a protective helmet with eye protection.

NOTE

NOTE!
It is not allowed to leave farming equipment on slopes or other inclines without securing the vehicle against accidental rolling away.

WARNING

WARNING!
The operation of the baler without mounted and closed guards which protect the moving parts is strictly prohibited.

WARNING

WARNING!
Check the condition of the baler before start-up, its completeness, and the attachment of guards.

NOTE

NOTE!
Hydraulic connections must be always kept clean. After use reinstall the plastic cover supplied at the machine purchase.

Check and if necessary replace any damaged tube guards and fixings. All moving tube guards must be replaced every 5 years. Hydraulic lines must be replaced every 6 years. You must record the date of the latest replacement. Before putting pressure in the hoses, check if all the hoses and their fixings are air-tight. In order to check that there are no leaks from the hoses use blotting paper or paper.

NOTE

NOTE!
Prior to each start-up and journey on public roads check the correctness of the machine's connection with the tractor, the tightness of the wheels, and the correct drawbar and tractor connections.

DANGER

DANGER!
Any adjustment, repair and maintenance work must be performed when the tractor engine is turned off, after making sure that it is adequately protected against accidental starting.

DANGER

DANGER!
Prior to starting and while collecting windrows, make sure that there are no bystanders

WARNING

WARNING!
Take special care during operation on inclined areas. Pay special attention to the possibility of bales' rolling down.

NOTE

NOTE!
It is strictly forbidden to operate the baler under raised and unprotected machine units.

DANGER

DANGER!
It is strictly forbidden for any person to stay between the tractor and the baling press during tractor-engine operation.

NOTE

NOTE!
Take particular care when connecting and disconnecting the baler from the tractor. The machine must be connected to a tractor equipped with a lower transport hitch withstanding a higher vertical load than the vertical load on the baler drawbar (Section 1.5).

WARNING

WARNING!
During operation, use appropriate work clothing and footwear with non-slip soles.

DANGER

DANGER!
Load the binding net when the tractor engine is switched off and protected against accidental starting up (with the key removed from the ignition and the parking brake engaged).

WARNING

WARNING!
Particular caution should be exercised when standing on the platform. It is forbidden to stand on the platform during the machine's operation.

WARNING

WARNING!
Noise – ensure the equivalent A-weighted emission sound-pressure level (LpA) is not above 78 dB;

WARNING

WARNING!
Control the power hydraulic system of the baler from the tractor operator's cab only.

NOTE

NOTE!
Before each new passage, check the position of the support foot. The support foot must be in the transport position.

WARNING

WARNING!
Traffic laws and the manufacturer's recommendations must be observed during transport on roads (Chapter 1.7.2).

NOTE

NOTE!
Prior to joining public roads carry out a visual inspection of the transported machine.

WARNING

WARNING!
It is forbidden to climb onto the baler during its transport and operation.

WARNING

WARNING!
During transport on public roads, it is forbidden to transport rolled bales in the baler chamber.

WARNING

WARNING!
Persons under the influence of medication or other substances which impair their driving abilities or general physical and mental fitness, medicines which cause concentration problems, or delays in response times, and people who have consumed alcohol, are prohibited from operating the machine,

WARNING

WARNING!
It is forbidden to drive the baler near an open fire.

WARNING

WARNING!
Always observe the fire regulations and immediately eliminate any hazards occurring in the course of operating the baler or when parked.

WARNING

WARNING!
During the operation of the baler, do not approach it with an open flame and do not smoke near the machine.

WARNING

WARNING!
Prior to each departure to work check if there is a dry-powder fire extinguisher included in the tractor's equipment. If missing, the tractor must be provided with one.

WARNING

WARNING!
During the baler's operation, there is a risk of lightning strikes.

NOTE

NOTE!
When parked, the machine must be secured with a chain which runs through the hitch eye.

1.6.1 Safety signs

The safety signs located on the baler contain important notices for the operator's safety. Their purpose is to draw the operator's attention to the safety accident-prevention principles and to possible risks during machine operation and servicing.

The safety signs are black and red symbols on yellow background.

Keep the signs clean and legible at all times. They should be replaced immediately if lost or damaged. You can buy them from the manufacturer.

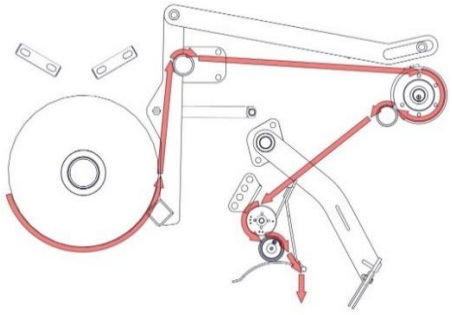
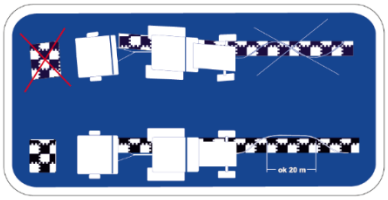
1.6.2 Warning signs

Table 2. Warning signs

	Safety symbol (mark)	Meaning of the symbol (mark) or content of the inscription
1		Warning – read the user manual before performing this operation.
2		Switch off the engine and remove the ignition key and read the instruction manual before any maintenance or repair works.
3		Keep a safe distance from the lifted cover during baler operation.
4		Secure the lifting cylinder before entering the danger zone.

5		Do not reach into the pick-up zone when the tractor engine or PTO shaft is working.
6		Do not stand under the lifted cover if not secured against accidental drop.
7		Danger of being crushed by bales' rolling out. Keep a safe distance from the working machine.
8		Do not open and remove protective guards during machine operation.
9		Do not open and remove protective guards during machine operation.
10		Notice about the PTOff rotational speed and rotation direction.

11		Do not ride on platforms or ladders.
12		Do not go near any moving swivel joints of the hitches when the engine is working.
13		Do not stand between the machine and the tractor when the tractor engine is running. This area is particularly dangerous.
14		Keep away from the revolving PTOn shaft.
15		Information pictogram.
16		Information pictogram.
17		Keep a safe distance from the working machine.

18		Main lubrication points of the baler.
19		Lifting points for loading on a means of transport.
20		Speed limit 40 km/h.
21		The method of installing the net.
22		Information pictogram.
23		Information pictogram.
24		Lift placement points.
25		Warning pictogram.

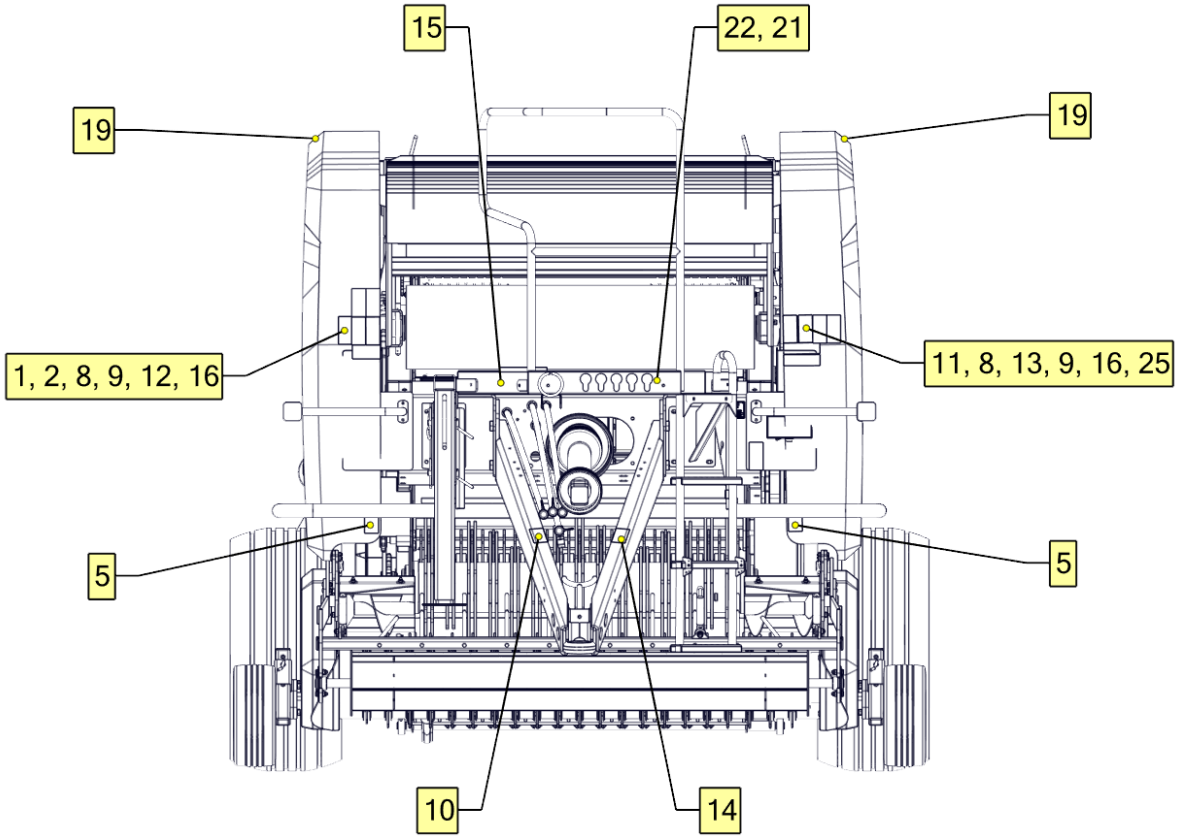


Figure 4 The arrangement of warning symbols on the machine - front side

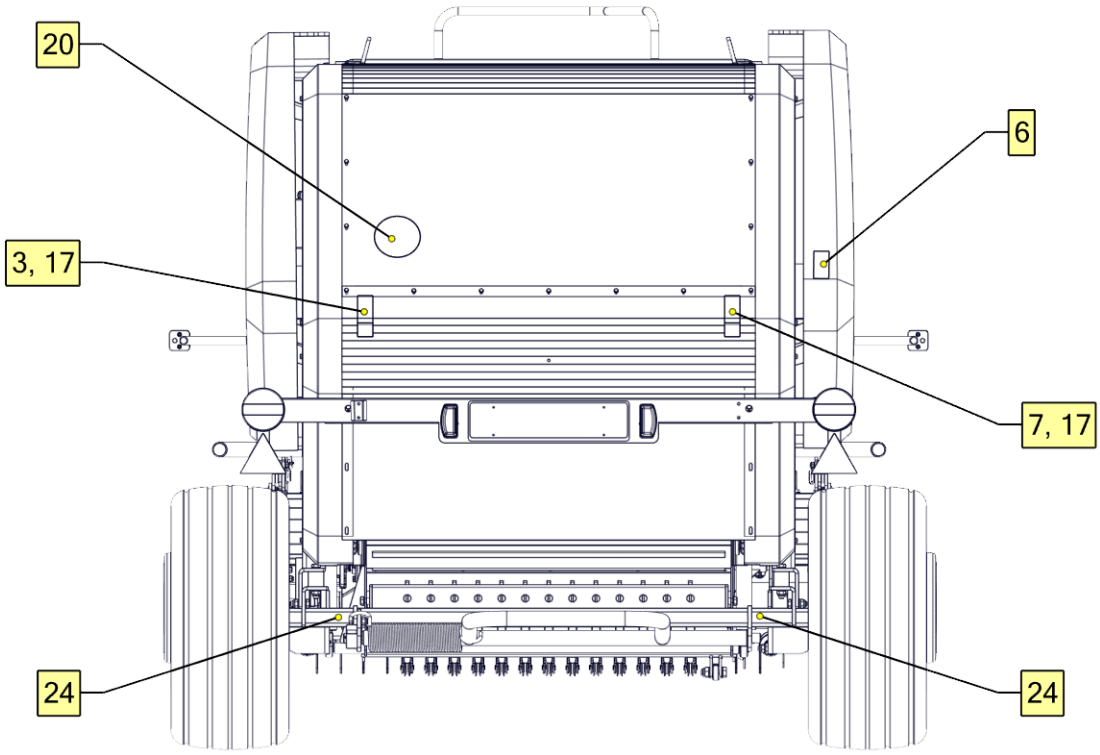


Figure 5 The arrangement of warning symbols on the machine - rear side

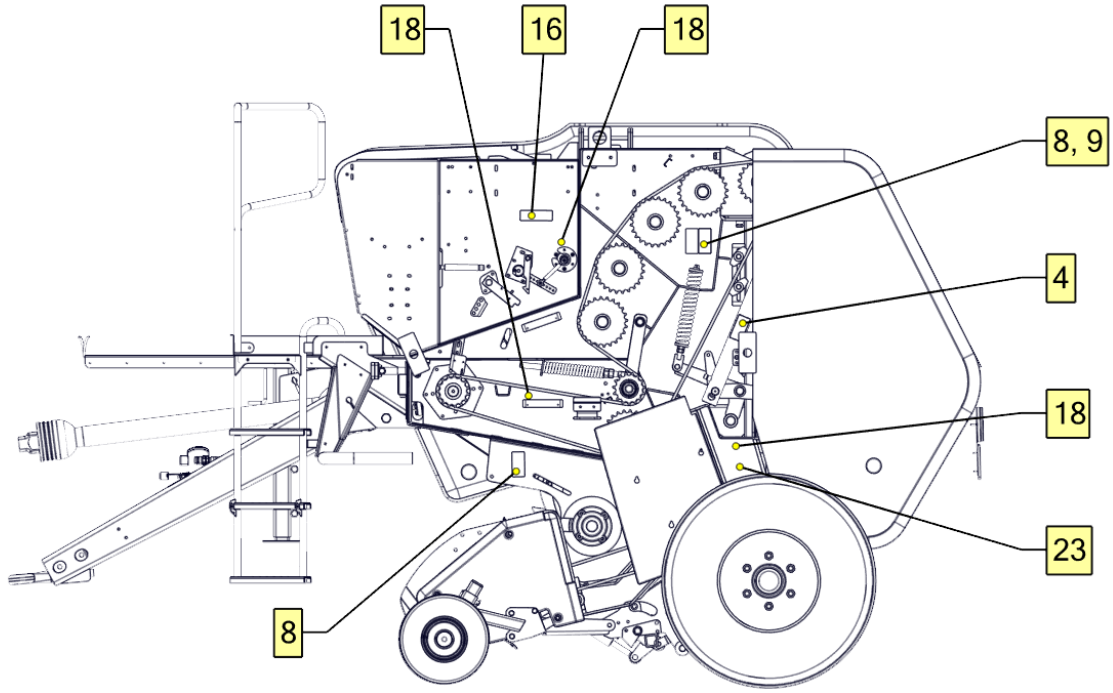


Figure 6 The arrangement of warning symbols on the machine - left side

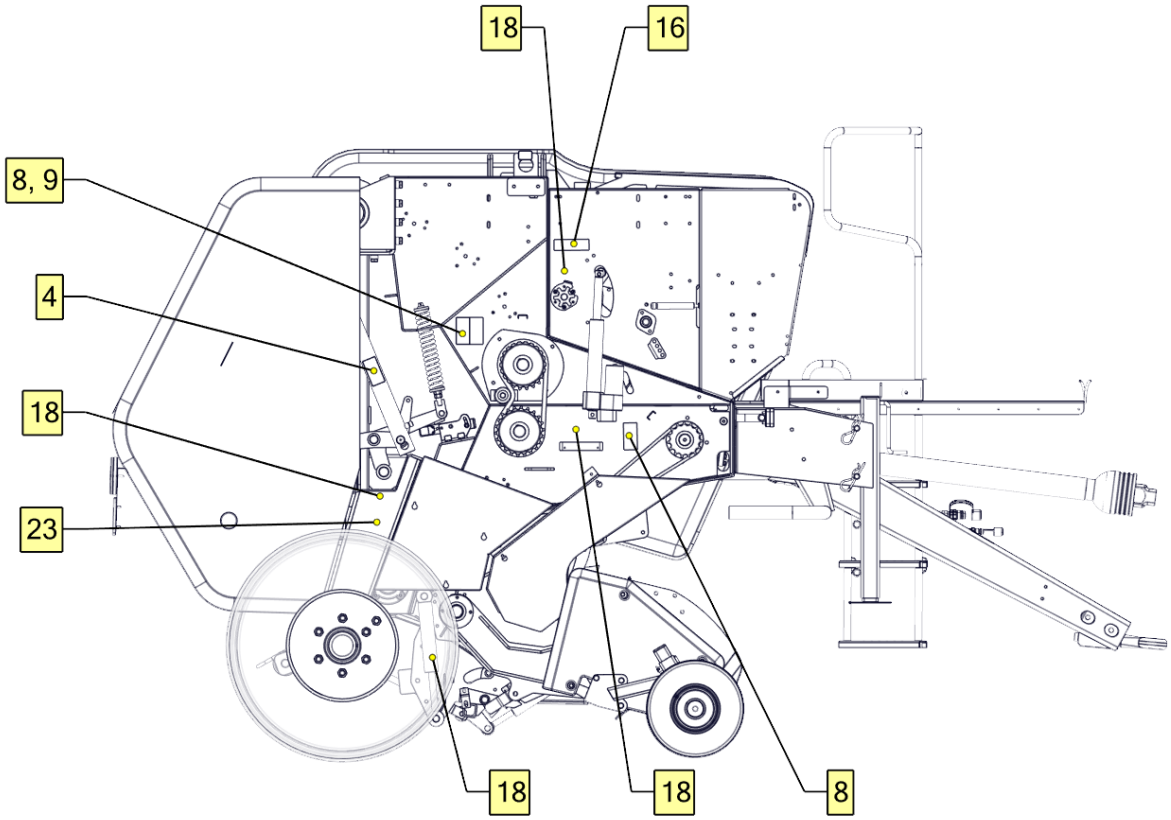


Figure 7 The arrangement of warning symbols on the machine - right side

1.7 Baler transporting

1.7.1 Load transporting

The baler is designed for rail and road transport with the respective payload capacity.

Lifting equipment may be operated by trained operators holding the relevant qualifications.

The suspension sling attachment points for the transport of the baler are shown in Fig.8

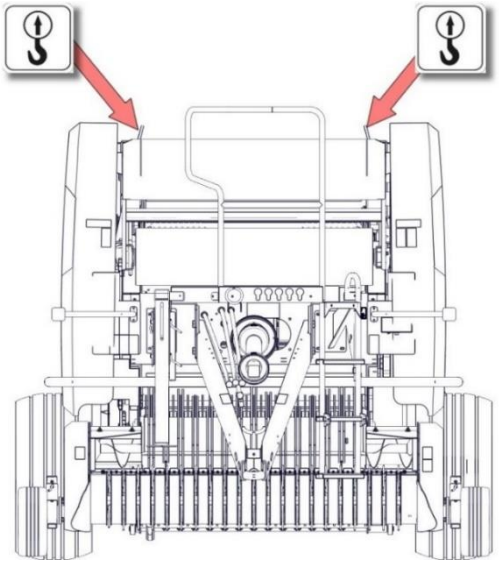


Figure 8 Suspension-sling attachment points

The placement points of the lift are shown in Fig. 9.

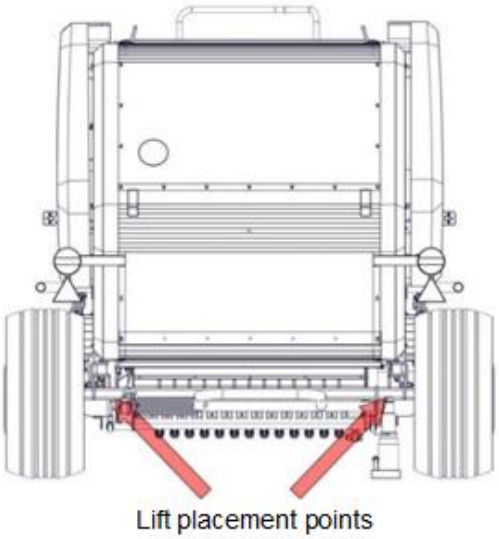


Figure 9 Lift placement points

Transporting the baler with a bale in the chamber is prohibited.

During the time of transport, the transported baler should be permanently and reliably attached to the floor.

A special transport support foot (Fig. 10) can be used for transporting the machine on the trailer. This support is distinguished by its yellow colour. When the machine is delivered, remove the transport support by unscrewing the 4 screws (Fig. 10) and replace it with the standard support in the colour of the baler body. The yellow transport support must not be used during normal machine operation.

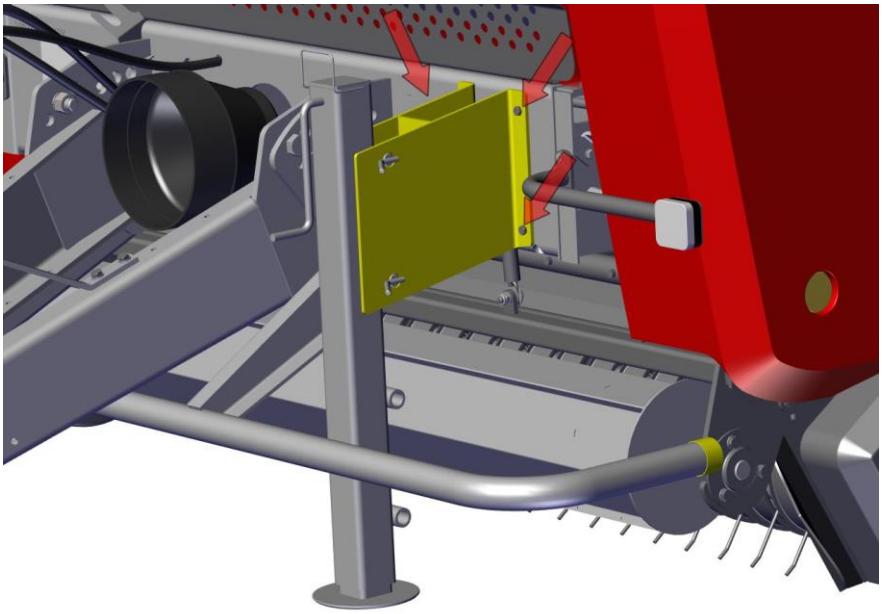


Figure 10 Transport support foot

1.7.2 Road-Traffic Participants

The baler is designed for public-road traffic as a machine attached to the farming tractor's lower hitch.

Only agricultural tractors with a power output of not lower than 60 kW and a drawbar pull class of not lower than 1.4, fitted with the lower transport hitch, may be used for transporting on public roads.

Prior to joining public roads you should

- Disable the PTO shaft
- The hydraulic hoses should be disconnected and fixed in the appropriate way
- Disable the counter and leave it in the cab
- Put a notice saying "slow-moving vehicle" in the holder on the rear section of the machine (Fig.11)
- Check the good working order of the lighting and signalling systems
- Check tyre pressures
- Check that the rear chamber and guards are closed
- Check that the press is fitted with the support foot in the colour of the body (section 1.7.1).

WARNING

WARNING!
It is forbidden to carry persons on the machine during operation or transport.

WARNING

WARNING!
Transporting a rolled bale in the baler chamber is forbidden.

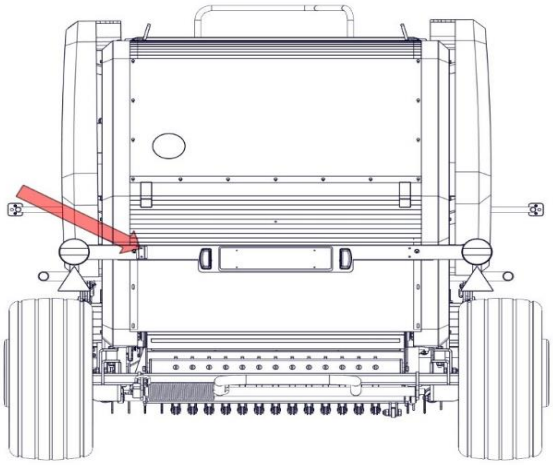


Figure 11 The location of the board indicating slow-moving vehicle

Before entering a public road-traffic lane, ensure that the tractor is fully manoeuvrable. The front axle load of the tractor must be at least 20% of the tractor weight. If this condition is not fulfilled the front axle of the tractor must be loaded accordingly.

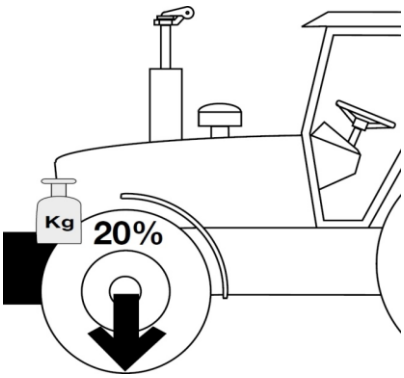


Figure 12 Minimum front- axle load of the tractor

WARNING

WARNING!
During transport of the machine on the public roads adapt the speed to the traffic conditions and do not exceed the speed of 40 km/h.

During the transporting of the baler on public roads follow the traffic-law regulations. In the event of an emergency stop of the tractor with the baler attached, on stopping on a public road, the driver should

- Stop the vehicle avoiding causing any hazard to safety on the road
- Park the vehicle as close to the road edge as possible, parallel to the lane axis
- Switch off the engine, remove the key from the ignition switch, switch on the auxiliary brake, and block the baler wheels with wheel chocks
- Outside the built-on a warning, reflective triangle should be place at a distance of 30 to 50 m behind the vehicle, and the hazard light should be on
- In a built-up area, switch on the hazard lights and place a warning triangle behind the vehicle, if it is not installed in a bracket on the rear of the machine. Make sure that it is easily visible for other traffic participants;
- In the case of a breakdown, undertake the appropriate steps in order to secure the place of the breakdown.

1.8 Baler cleaning

WARNING

WARNING!
Before cleaning the baler, make sure that the baler is switched off, the PTO drive is disconnected, and the tractor engine is switched off (ignition key removed). Disconnect the power, lighting and control panel cords.

After every working day, remove the dust layer, accumulated harvest residues, etc. with a brush.

We do not recommend cleaning the baler with a high-pressure water stream. Directing the stream of water at hydraulic, electrical and bearing components is prohibited.

Prior to a longer stop, dust the baler and remove the harvest residue with compressed air. Directing the stream of compressed air at hydraulic and electrical components is forbidden.

After water cleaning, and prior to a longer stop, it is recommended to lubricate all the lubrication points and to apply a suitable protective agent on all drive chains.

1.9 Baler storage

Store the baler-control panel in a dry room protecting the terminals against dirt and humidity using delivered guarding covers.

Store the baler on flat, level, and paved surface.

It is recommended to store the machine in a dry room, protecting against UV rays and other harmful factors.

Protect the baler stored outside with no roofing with a water proof canvas or film.

After the season is over, clean the baler and check the condition of the protective layers. When needed, fill any gaps.

NOTE

NOTE!
Check the condition and legibility of the rating plate. If it is destroyed or damaged report to services.
Check the condition and legibility of the pictograms. If they are destroyed or damaged replace them with new ones.

1.10 Risk

1.10.1 Residual-risk description

Residual risk stems from improper procedures implemented by baler operators. The following prohibited actions cause the highest level of risk

- coupling the balers with tractors which fail to meet the requirements given in the manual
- standing under the raised machine chamber which is not secured against accidental drop
- standing on the baler during transporting
- checking the technical condition and cleaning the machine when the tractor engine is running and the machine drive is on
- operating with the guards opened
- servicing or repairing the PTO shaft when the tractor engine is on
- using faulty hydraulic hoses
- controlling the baler by an operator who is outside the tractor cab
- operating the machine under the influence of alcohol or drugs
- operating a damaged machine or operation with the guards removed
- transporting a rolled bale in the baler chamber
- using the baler for other than its intended purpose
- leaving the unsecured machine on slopes
- standing between the tractor and the machine while the engine is running.

In describing the residual risk, the Z602 baler shall be treated as a machine designed and built according to the current state of the art up to the production start.

1.10.2 Residual-Risk Assessment

By observing recommendations such as

- reading carefully the guidelines of the instruction manual and adhering to them
- standing under raised machine units is forbidden
- not allowing persons in the area of baler operation
- maintaining and repairing the machine at authorised servicing stations
- operating the baler by trained and authorised operators,

- protecting the baler from children and bystanders

it is possible to eliminate residual risk associated with machine operation, and as a result, the machine may be operated without any risk to persons and the environment.

DANGER

DANGER!
If the listed instructions and guidelines of the manufacturer are not followed, the risk of an accident rises.

1.11 Dismantling and Disposal

Disassembly and disposal should be performed by specialised service centres which are familiar with the design and operation of the baler. Only specialised service centres have the full and up-to-date knowledge on the applied materials and the risks associated with the hazards of improper storage and transport. The authorised services offer both counselling and performance of complete services concerning the disposal of the machine.

Use the proper tools and auxiliary equipment for disassembly (hoist, wheel puller).

Store the used oil in air-tight containers. Take it immediately to a petrol station which collects used oil.

Disassemble the machine. Sort the disassembled parts. Send them to the appropriate companies which collect such materials.

During the disassembly of the baler, use the proper protective clothes and protective boots.

1.12 Accessories

The user can purchase the following optional and additional equipment additionally at the dealer or at the manufacturer

- a hard copy of the spare-parts catalogue
- a triangular plate indicating slow-moving vehicles.

2 First start-up

The first start-up of a newly purchased baler should be performed by an employee of the dealer's or manufacturer's authorised service centre in the presence of an operator (user/buyer).

WARNING

WARNING!
Read this instruction manual carefully before starting the press for the first time, paying particular attention to the sections devoted to the safety of the operator and bystanders.

In the event of any doubt regarding safety, contact the seller or the manufacturer.

Before each starting of the baler, install the control panel in the tractor's operating cab.

2.1 First start-up of the baler

WARNING

WARNING!
Use special care during the first start-up. Any bystanders in the working area of the machine compromise safety.

During the first start-up, an employee of the dealer's or manufacturer's licensed service centre, accompanied by the user (buyer) is to perform the following

- Inspect the accessories and functioning of the baler
  - Check the machine for completeness and condition
  - Check the lighting system and horn
  - Check the hydraulic system
    - Raising and lowering the pick-ups
    - Raising and lowering the rear chamber
  - Checking the pick-up functioning
  - Checking the net binding process function
  - Checking the function of the central lubrication system
- Training the user on the correct baler operation
  - Discuss the design and principle of operation of the pick-up
    - Setting the spring-impact angle

  - Facilitating the overload coupling
  - Installing the coupling after bolt breakages
  - Replacing the entire coupling
  - Lubrication the roller runners
- Discuss the design and principles of operation of net binding
  - Discussing the principles of operation
  - Net installation
  - Adjusting the bind counter
  - Adjusting the spring tension for blade-frame tensioning
- Discuss the design and principles of operation of the central lubrication system
  - Discussing the principles of operation
  - Adjusting pump consumption
- Discuss the design and the principles of operation of the control panel
- Discussing the principles of operation of the tractor and baler unit during baling
  - Operating the tractor when picking up windrows on a straight
  - Operating the tractor when picking up windrows in curves and sharp turns
  - Discussing risks
- Performing a full cycle of the net bale binding by the user (buyer) assisted by the service technician
- Discussing and adjusting the tension of the chains
- Discussing the method of lubrication and ongoing baler maintenance,

The first start-up is done by the service centre free of charge.

The service technician's signature on the guarantee certificate shall be the proof of the first start-up as described in this section. The customer's signature on the guarantee certificate shall prove the first start-up of the baler in the presence of the user (buyer).

3 Using the machine

3.1 Preparing the machine for operation

All activities should be carried out by a single person who has read this instruction manual carefully, and in particular the section on occupational safety.

Before starting work, check

- That the machine is in good working condition
- That all the guards are in place and closed
- That the oil level in the gear units is sufficient
- The condition of parts, whether or not they are not worn
- The condition of hydraulic lines

Hydraulic lines must be replaced every 6 years.

- The tyre pressures; the recommended tyre pressure is 2.5 bar
- That the baler has a body-coloured support foot (section 1.7.1) fitted.

Adjustments and preparation for work, unless otherwise stated in the instruction manual, must be always carried out when

- The engine is disabled and ignition key is removed,
- All machine components have stopped,
- The machine is standing on stable ground,
- Before starting field work

3.2 Attaching the baler to a tractor

Couple the baler with an agricultural tractor with a power of not less than 60 kW and a tractive force of not less than 1.4 tonnes, equipped with a hydraulic-power-output coupling and a 1 3/8" Z6 rear PTO with a nominal speed of 540 rpm.

Connect the baler to the tractor's lower transport hitch, which allows the transmission of a vertical load of 5.1 kN.

3.2.1 Connecting to the lower tractor transport hitch

Make sure that in the area of the baler's coupling with the tractor and in the near vicinity there are no bystanders present, especially children.

Prior to the coupling activity, align the tractor's centre line with the machine axis on even and level ground. Switch off the tractor engine, remove the key from the ignition, and engage the tractor auxiliary's brake.

First, unlock the protective chain running through the hitch eye and remove it. Then, set the correct height of the baler hitch by choosing the correct adjustment eye of the hitch, as shown in Fig. 13.

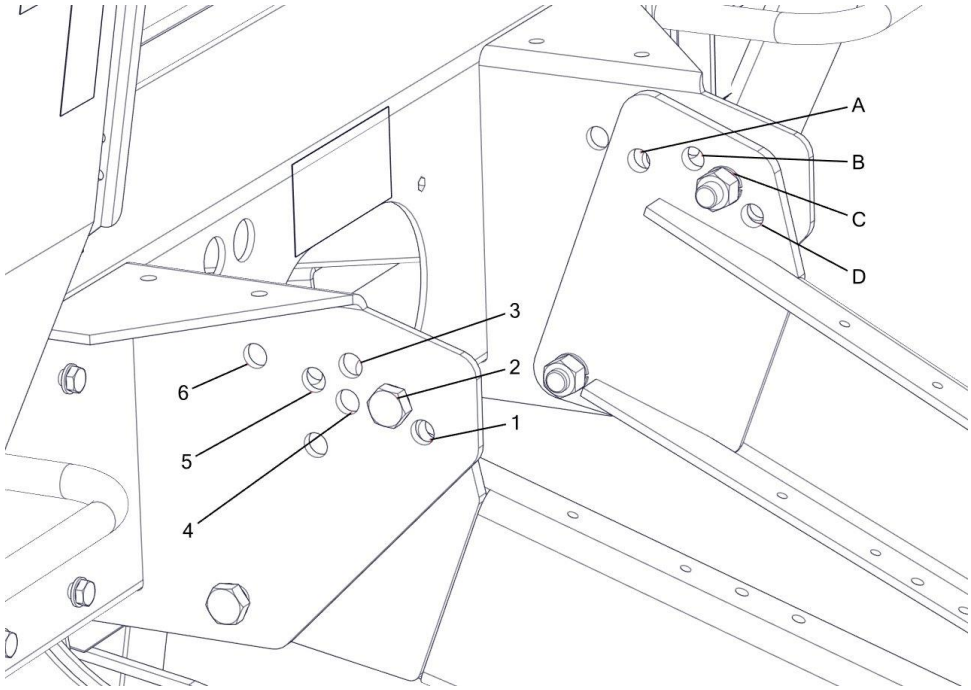


Figure 13 Setting the drawbar height

The table below gives the height of the drawbar eye above the ground.

Table 3. The height of the drawbar eye above the ground

No. of the drawbar hole	A	B	C	D
1	-	-	45	65
2	-	47	67	88
3	-	70	91	-
4	37	-	-	-
5	58	-	-	-
6	95	-	-	-

Perform the levelling of the hitch eye. Couple the drawbar eye with the tractor's transport hitch and check the connection for correctness, and the protections for accidental disconnection.

Only tractors with a weight equal to at least the weight of the baler to be coupled with are allowed.

Then, you can continue connecting the devices to the baler

- Connect the PTO shaft
- Connect the hydraulic system
- Connect the lighting
- Connect the control system.

3.2.2 Coupling the baler with the rear PTOff shaft

Before you connect the PTO shaft, check the direction and rotational speed of the PTOff.

Switch off the tractor's engine, remove the key from the ignition, and engage the tractor's auxiliary brake.

Using the PTO shafts with specifications other than those indicated by the manufacturer is forbidden.

The PTO shaft is a CE labelled drive-transmission component.

Each shaft comes with an instruction manual. You must read the instruction manual for the PTO shaft, adhere to the safety rules, and follow the guidelines contained in the manual.

Connect the PTO shaft supplied with machine between the tractor shaft and the gearbox in the machine.

The method of connecting the shaft to the tractor is shown on the shaft.

Check that, when turning (at the shaft's shortest span), the minimum distance shown in the figure below is not exceeded. **Minimum distance is 4 cm.**

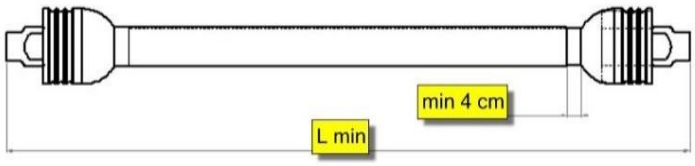


Figure 14 PTO length

Make sure that the shaft length is correct. At the shaft's longest span, the shaft tubes must overlap by at least 1/3 of their length.

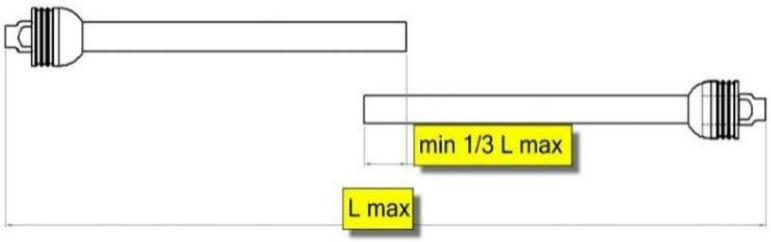


Figure 15 PTO housing lengths

Make sure that the components protecting the PTO shaft from sliding off are located in their correct positions. Check that the guards can rotate freely in relation to the shaft.

Install the chain securing the tubes.

Read the manual for the shaft to find detailed information on the use of the PTO shaft.

WARNING

WARNING!
It is strictly forbidden to operate the PTO shaft with its tube damaged or not in place, or without additional canopy guards on the tractor PTOff side or the machine PTOn side.

3.2.3 Hydraulic-system installation

Connect the hydraulic hoses

- Connect the hose used to lift the pick-up with the cut-off valve to the unidirectional manifold
- Connect the supply hose for the chamber to the unidirectional manifold
- Connect the hoses controlling the cutter to the dual-direction manifold.

Before lifting the pick-up

- Move the lever on the shut-off valve to the "OPEN" position, and lift the pick-up (transport position)
- After you have lifted the lever, set it in the “CLOSED” position to lock the system. The pick-up should remain in the upper position.

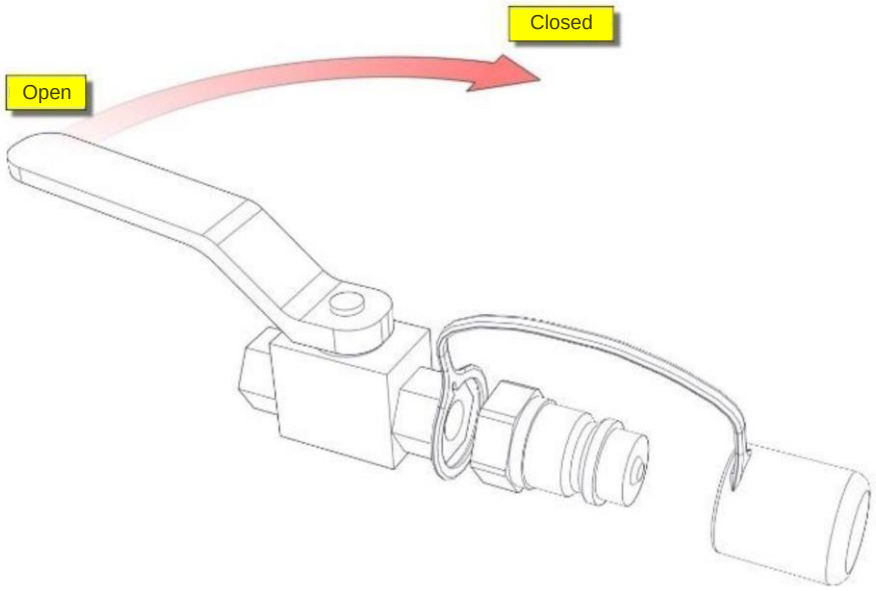


Figure 16 Cut-off valve

Connect the hydraulic hoses in pairs to one control section; the pairs of hoses in one hydraulic section are marked with the same colour.

Do not move the machine with the pick-up lowered, supported by wheels on the ground.

3.2.4 Lighting connection

Connect the lighting system and check that all control lamps and lights work correctly.

Always use the correct fuses, do not change the lines, do not change the plugs or sockets which do not correspond to the originals.

Put the caps for protecting the electrical pins during operation in the tractor cab. After completing the work, re-install the caps on the pins.

3.2.5 Connecting the control system

The baler electrical system requires a power supply of 12 V. The procedure for connecting the control system:

- Mount the control panel (SS) in the tractor car so that it is clearly visible and available to the operator

- Connect the power supply cord (PZ)
- Connect the data-transmission cable (PS)
- If the control cabinet is activated after pressing the switch, and If the cables are properly connected, the control panel lights up and data loading starts.

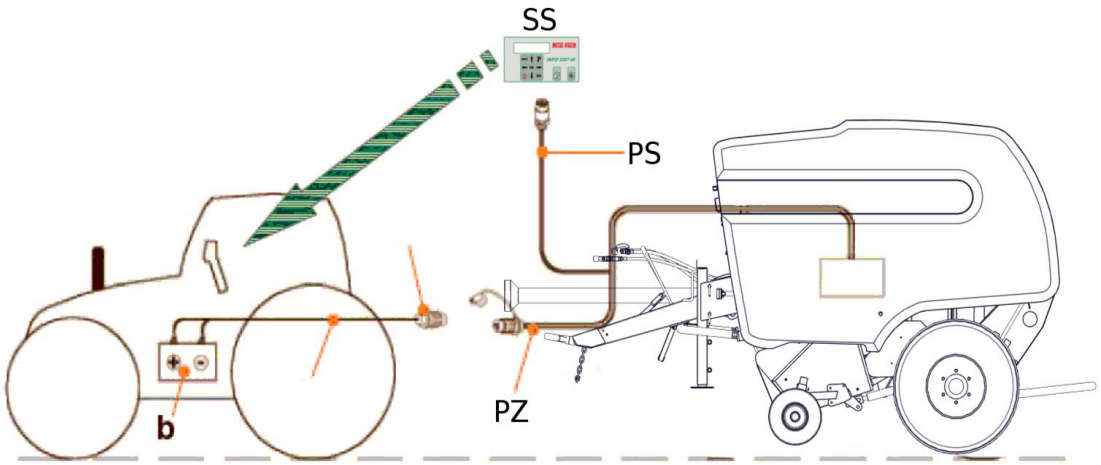


Figure 17 Connecting the control system

3.2.6 Drive disconnection

Make sure that no bystanders, especially children, are present in the baler area and its immediate vicinity. Procedure

- Position the baler on its storage place on an even and level ground. Switch off the tractor engine, remove the key from the ignition and engage the tractor auxiliary brake
- Disconnect the electrical-supply system
- Disengage the power hydraulics
- Lower the support foot. Disconnect the drawbar eye from the tractor hitch. Make sure that there is no risk of accidental machine displacement. Draw the protecting chain through the hitch eye and lock it
- Disable and disassemble the PTO shaft. Put the disassembled shaft on the support designed to store it. Protect the terminations of PTOff and PTOn with covers
- Install the hydraulic- and electric-connection caps.

4 Operational check

After attaching the baler to a tractor

- Start the tractor without starting the PTOff shaft and check that all the movement features of the baler work correctly.
- Check that the hydraulic system is operational; check that the rear cover can be opened and closed; lift and lower the pick-up (remember to set the cut-off valve in the “OPEN” position so that the pick-up can be lifted).
- Check that the electrical connections of the control unit work correctly.
- Check the electrical connections, indicators and lighting.
- Close the rear cover and start the PTOff shaft.
- Before starting the PTO shaft, make sure that there are no bystanders in the vicinity. Be particularly careful when checking that all mechanical and drive components are functioning correctly.

4.1 Preparing the machine for operation

Carry out all necessary machine adjustments before starting work to prepare it for your working requirements.

4.1.1 Mounting and operating the net binding unit

The baler is pre-configured for work with standard net rolls. To obtain satisfactory results, it is recommended to use nets of 14-16 g/m.

DANGER

DANGER!
Load the binding net when the tractor engine is switched off and protected against accidental starting up (key removed from the ignition and parking brake engaged).

For easy installation of the net, unlock the grid brake as described in section 4.2.7. Before you start installing the net, unfold the platform ladder.

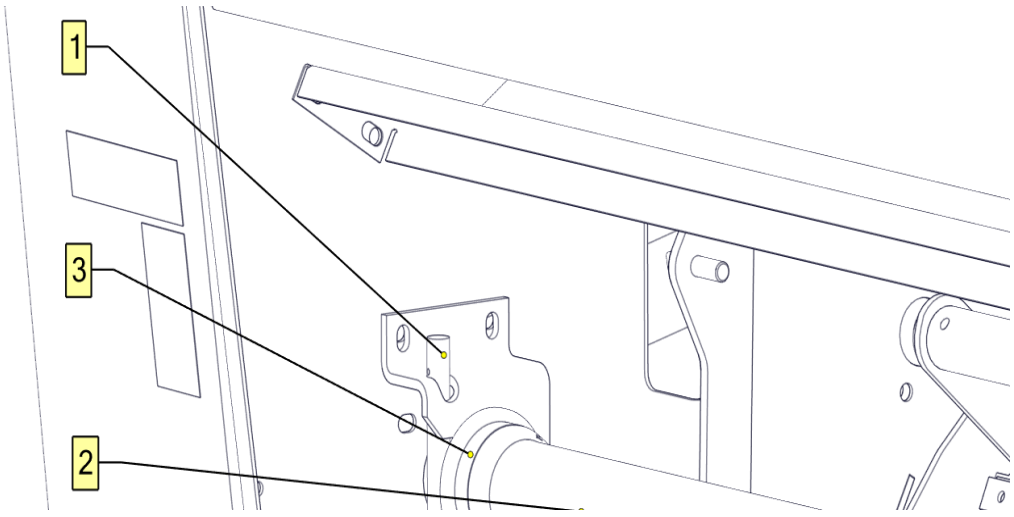


Figure 18 Installing the net

The procedure forinstalling the net, as specified in Fig. 18, is as follows

- Remove the rod (1)
- Remove the tube (2)
- Remove the plastic sleeve (3)
- Put the net roll onto the tube (2) and replace the sleeve (3)
- Place the tube with net in the holder and secure with the previously removed rod (1).

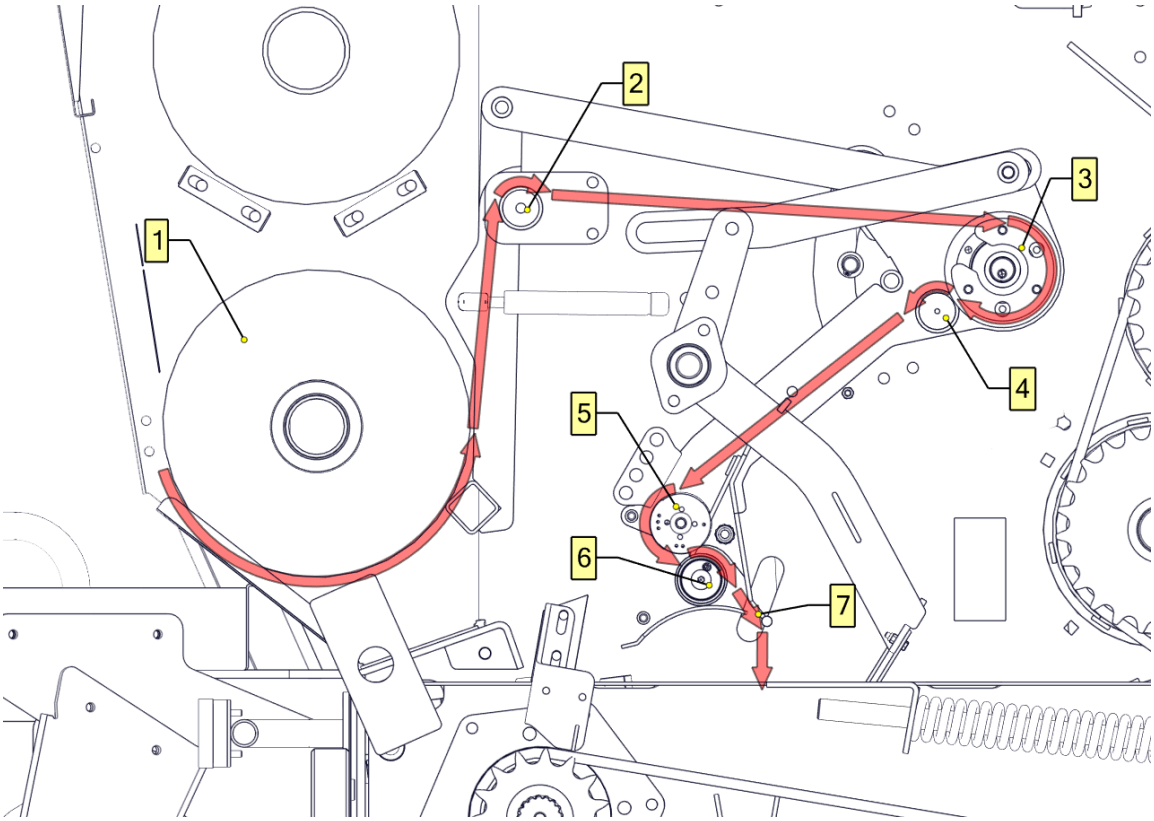


Figure 19 Distributing the net

As shown in Fig. 19, follow the procedure below to guide the net

- Expand the previously installed net and spread it as shown in the diagram, guiding it through the shafts in sequence (2, 3, 4, 5, 6) and the gap (7)
- An approx. 15cm-long end of the net should hang freely behind the gap (7)
- Remember to fold the platform ladder after you have installed the net.

WARNING

WARNING!
Particular caution should be exercised when standing on the platform.
It is forbidden to stand on the platform during machine operation.

4.2 Control-panel operation

The control panel is fixed in the tractor cab by means of magnetic components. It allows access to various features of the baler, described below.

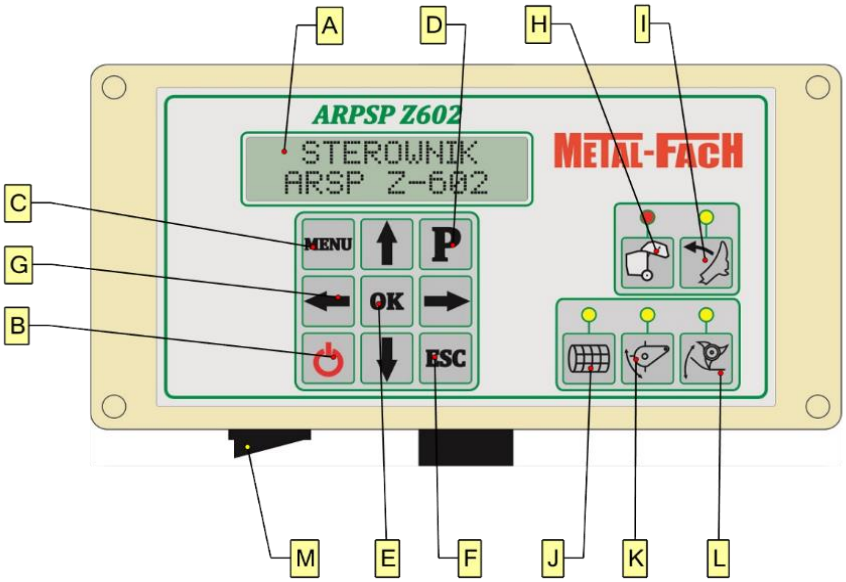


Figure 20 Control panel

A - LCD display indicates the operating status of the baler and facilitates communication during programming;

B – key for switching the control panel on;

C – “MENU” key for entering the menu

- Working mode
- Zeroing the workday counter
- Net installation
- Cylinder calibration

D – “P” key field selection

E – “OK” key confirmation

F – “ESC” key exiting the menu

G – menu navigation keys 

H – Chamber opening indicator lamp

I – Blades activation indicator lamp

J – Key feeding the binding material in the manual mode

K – Inactive key

L – Solenoid valve activation key

M – Main switch for switching on the control-panel supply.

4.2.1 Switching on the panel

Procedure:

- Connect the plug of the baler to the tractor socket 12V
- Connect the panel to the control module
- Push the panel main switch (M) from position 0 to I. The switch is on the bottom wall of the panel
- If the chamber opening LED flashes, it means that the panel power is being supplied correctly
- Use the key (B) to activate (switching the control panel on).

4.2.2 Switching off the panel

Procedure

- Use the key (B) to switch off the panel
- Push the switch (M) from position I to 0 to switch off the panel supply.

4.2.3 Main screen description

Main screen description

- Area 1 – displays the current field for bale counter
- Area 2 – displays the number of bales for a field
- Area 3 – mode of operation.

Figure 21 Main screen of the control panel

4.2.4 Baler manual control

In manual mode after forming bales, i.e. after sufficient compaction degree has been obtained (value displayed on the panel), the manual operation of bale binding may be started (key “J” on the panel). Using the manual bale-binding key enables the feeding of net to the bale chamber. When binding, the display shows a message about net binding and the indicator light above “J” key flashes. After binding completed, the display shows the message *“Bale ready”.*

4.2.5 Baler automatic control

When the bale has been formed, i.e. after a sufficient, pre-set, compaction degree has been obtained, the net feeding process will start, which will be indicated by an acoustic signal, the message *"Net feeding has started",* and a blinking light above the net-feeding button. Then, the process of binding starts, which is indicated by the message “*Binding running”.* The end of this process is signalled by the message *“Bale ready”.* In the automatic mode, you can also feed the net manually.

Stop after the message *“Net feeding started”.*

4.2.6 Solenoid-valve control

The key “L” is used to activate the solenoid valve. After you push the key, the solenoid valve is activated to control the rotor floor. When the solenoid valve is switched on, the LED above the button flashes. A lowered floor is indicated by a continuous light.

4.2.7 Net loading

This feature activates the net-motor control to facilitate the installation of a new net reel in the cartridge. After you select this feature in the MENU and push the  key, the net brake is released. Next, push the  key to close the net brake. After you have installed the net in the cartridge, set the motor in the home position.

4.2.8 Cylinder calibration

This feature sets the cylinder of the net control in the home position.

4.2.9 Adjusting the degree of compaction

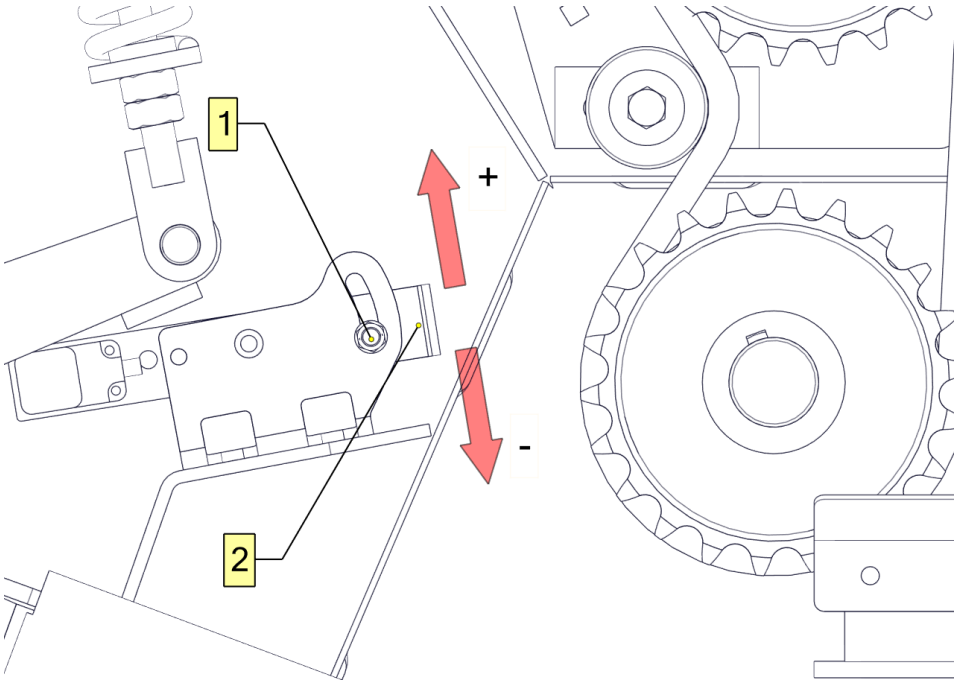


Figure 22 Adjusting the degree of compaction

Adjust the degree of compaction on the right-hand side of the machine. To change the setting of the compaction degree, loosen the nut (1) as shown in Fig. 22, and then adjust the compaction degree using lever (2). Moving the lever (2) up decreases the press force, while moving it down increases the press force. After the adjustment has been completed, tighten the nut (1).

NOTE

NOTE!
Operating at too high a compaction degree can cause damage to the machine. Adjust the compaction degree to the harvest conditions.

4.3 Hydraulic Installation

WARNING

WARNING!
Ensure the full working order of the hydraulic system. Oil working under high pressure heats up to a temperature which poses a threat to health.

NOTE

NOTE!
Check the oil purity in the tractor-power hydraulic system. The purity of oil must be compliant with condition 20/18/15 of ISO 4406-1996.

NOTE

NOTE!
Worn or defective hoses on the power hydraulics must be replaced with new ones.

NOTE

NOTE!
For replacements it is recommended to use original spare parts which will ensure the maintaining of the baler at full efficiency for a long time into its operation.

The baler's hydraulic system is supplied from the hydraulic system of the tractor, which must be equipped with a 3-section hydraulic manifold. The rear chamber system is connected to the first section, to the second the pick-up system, to the third the rotor floor and blade system. Connect the opening/closing of the rear cover and the raising/lowering of the pick-up to the tractor power hydraulic system by means of a connection line supplying the chamber opening cylinders and the pick-up cylinders, as shown in Fig. 23 and 24.

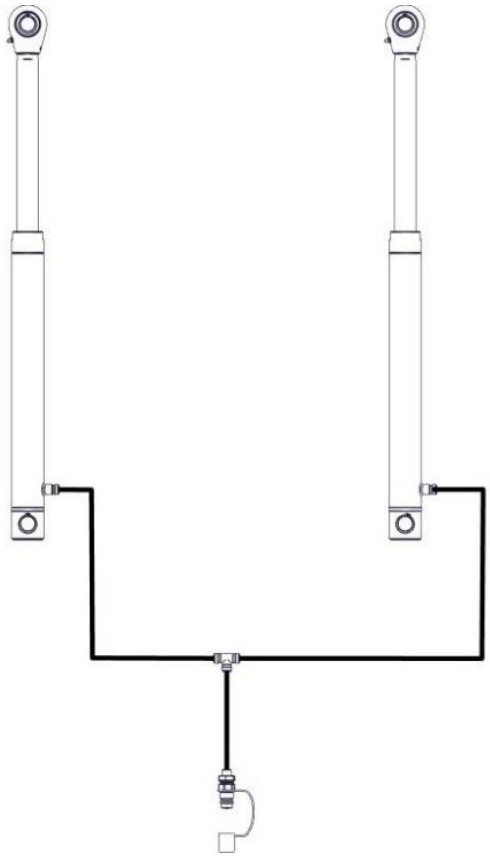


Figure 23 Diagram of the hydraulic system – rear chamber

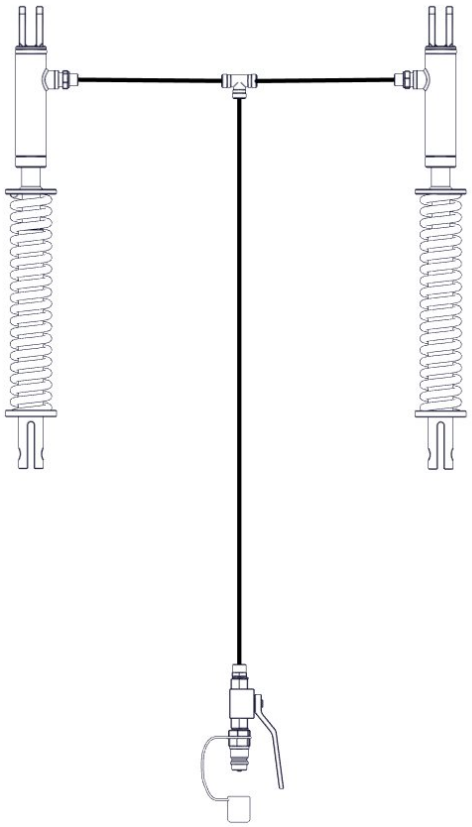


Figure 24 Diagram of the hydraulic system – pick-up

Connect the raising/lowering of the rotor floor and blades to the tractor-power hydraulic system by means of a connection line supplying the rotor floor and blades cylinders, as shown in Fig. 25. Switch over between the rotor floor, and the blades on the control panel (section 4.2.6)

The manifold is pre-configured to the blade control.

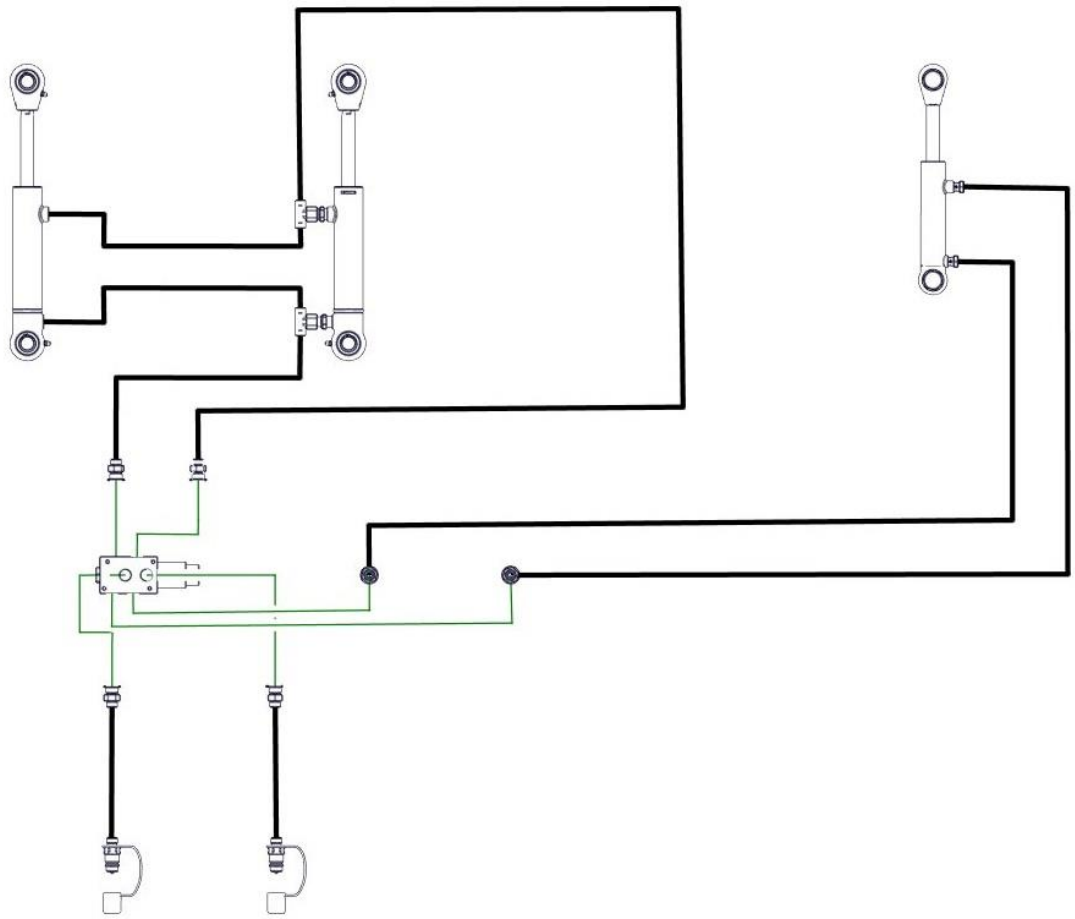


Figure 25 Diagram of the hydraulic system – rotor floor and blades

4.4 Electrical system

The baling press electrical system is supplied from the electrical system of the tractor. Connect the baler to the tractor electrical system circuit by means of the 7-pin connection cord, as shown in Fig. 26.

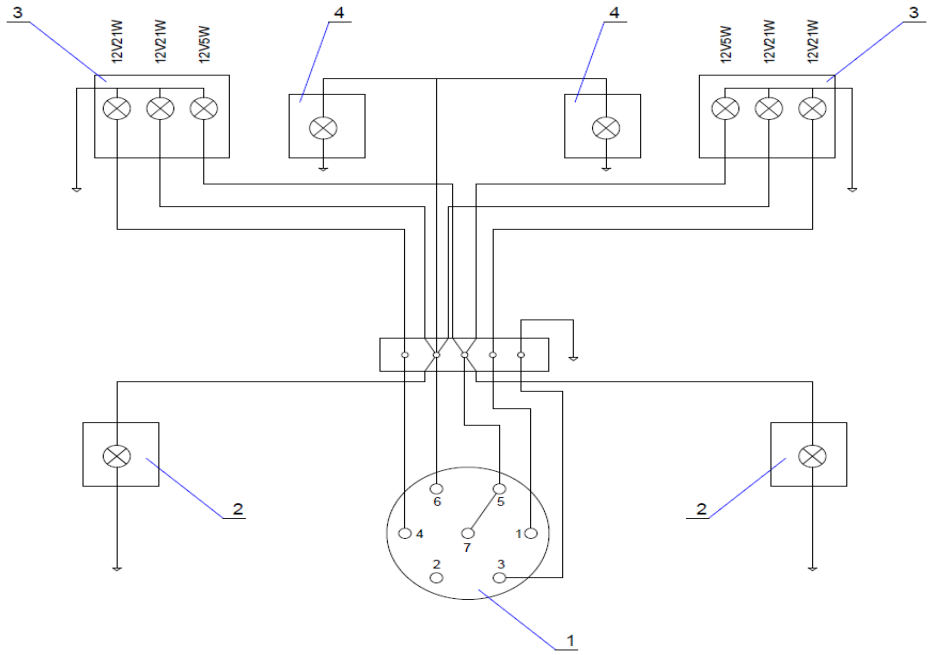


Figure 26 Electrical-system diagram (1 - connection plug, 2 – front lamp, 3 – rear lamp, 4 - registration plate lamp)

WARNING

WARNING!
Check the functioning of the electrical system and lighting every time before you drive the baler onto public roads.

4.5 Windrow collection

4.5.1 Principles of operation

Make the windrows into 1.6 m wide rolls. The baler collects material from the fields by means of a hydraulically lifted pick-up. The collected raw material is pressed and rolled into a cylindric roll, and next it is tied with a net, and then ejected from the rolling chamber as shown in Figure 27.

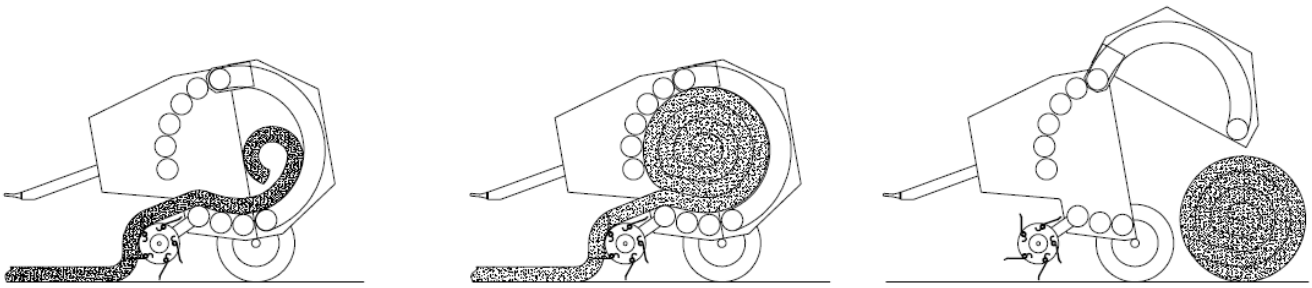


Figure 27 Forming bales

4.5.2 Operation description

The picked-up material is fed into the rolling chamber, where the rolling rollers and the chain conveyor move to compact and roll it into a pressed roll. The pressing action is indicated by the acoustic signal on the control panel.

After the binding material is fed and the tractor has stopped (the tractor-stop instruction is displayed on the control panel), the acoustic signal stops.

The end of the net is fed into the binding-press chamber. After the bale-binding cycle has been completed, the binding material is cut off, which is indicated by the *"Bale ready"* message on the control panel.

After that, open the press chamber to allow the bale to roll out along the discharge deck to the ground and away from the working baler.

Adjust the tractor's driving speed to the windrow pick-up conditions.

The recommended driving speed for the tractor is up to 10 km/h.

Prior to harvesting, material must be properly prepared by raking. Subsequently, form the windrows into shafts not wider than 1.1 m in width. Collect the shaped windrow shafts as shown in the following diagram. Adjust the length of the straight sections to the particular conditions. To prevent clogging the baler, the width and height of the windrows should be equal throughout their lengths. Slow down at wider windrow sections.

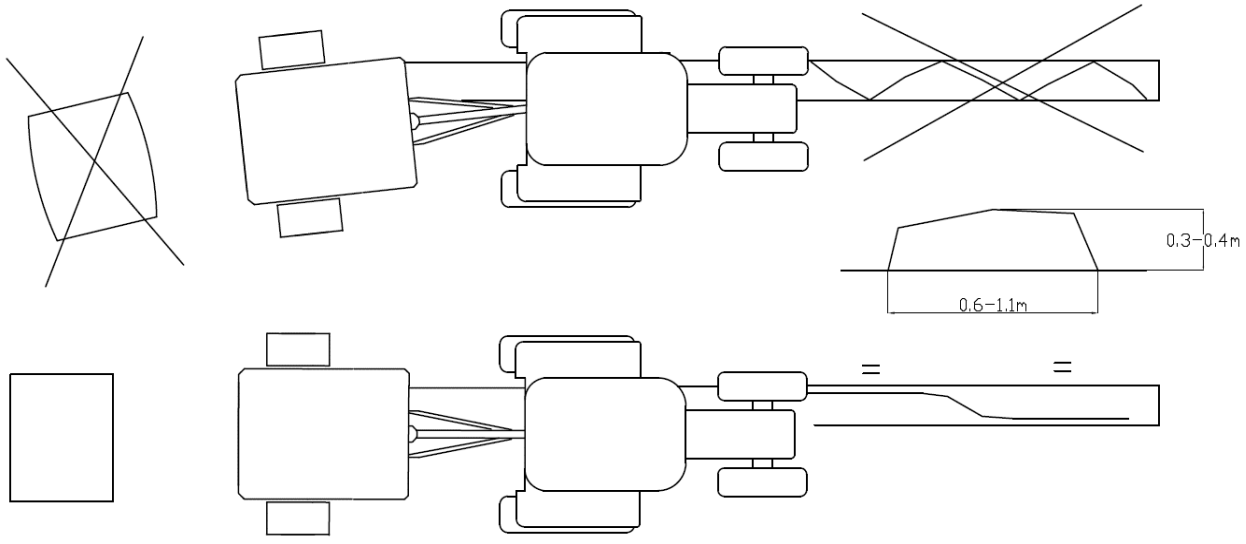


Figure 28 Windrow collection

Mow grass and other papilionaceae intended for ensilaging and wrapping in the first phase of earing (preferably in the afternoon). The next day, after a few hours of drying, collect the cut material using the balers. Keep the highest-possible bale-compaction degree.

4.6 Removing the accumulated material

During material pick-up, it is possible that it will accumulate on the pick-up and rotor. Clogging is the result of improper adjusting the speed to the harvest conditions and improperly formed windrow.

DANGER

DANGER!
Removing accumulated material during machine operation is forbidden.

DANGER

DANGER!
Particular caution should be exercised when removing the accumulated material, as the rotor zone is dangerous due to the sharp blades.

4.6.1 Removing the accumulated material

Do the following before you remove the material accumulated on the pick-up

- Switch off the control panel
- Stop the tractor, remove the keys from the ignition, and wait until all the moving parts of the machine have come to a complete standstill.

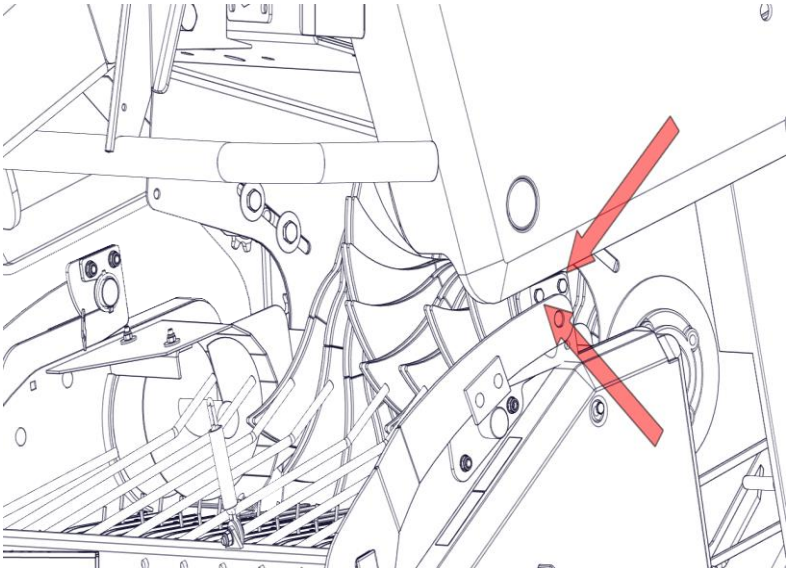


Figure 29 Windrow-clamp disassembly

Procedure:

- Remove the windrow clamp to remove the material in the front section. To do so, loosen the bolts which lock the windrow clamp and remove the chain (Fig. 29)
- Manually remove the accumulated material
- Reinstall the windrow clamp.

4.6.2 Removing accumulated material on the rotor

To remove the material accumulated on the rotor, do the following

- Stop the tractor, remove the keys from the ignition and wait until all the moving parts of the machine have come to a complete standstill.
- Check the bolt locks on the rotor, as specified in section 5.5
- Using the control panel, as specified in section 4.2.6, lower the rotor floor
- If there is heavy jam of accumulated material, remove the first part of it manually.
- Start the tractor and switch on the PTOff at idle, visually observing the removal of the accumulated material from the operator's cab
- After the blockage has been removed, lift the floor, as specified in 4.2.6.

4.7 End of Operation

Always, after you finish working,

- De-activate the counter and protect it from moisture
- Park the baler on flat, a level and paved surface
- Disconnect the hydraulic system and electric-circuit supplies
- Prop the baler with the use of the support foot
- Disconnect the machine drawbar from the transport hitch of the tractor
- De-activate the PTO shaft and leave it on the support. Fit the caps onto the PTOff and PTOn terminations
- Disconnecting the baler from the tractor with the bale in the rolling chamber is forbidden
- Clean the machine, and carefully check its condition, paying attention to the quality of the protective coating, and if necessary, fill any gaps in it
- Protect the rubber components, such as hydraulic hoses and baler tyres, from exposure to sunlight.

During longer stoppage periods, the manufacturer recommends storing the baler in a dry room or under roofing, which protects the baler from the effects of weather conditions.

5 Maintenance and adjusting

Before you commence any maintenance work, follow the safety rules set out in Section 1.6 “General safety principles”.

DANGER

DANGER!
All activities related to maintenance and adjusting must be carried out during machine stoppage and when all the moving parts of the machine have stopped.

If the baler is connected to the tractor, engage the parking brake, switch off the engine, and remove the key from the ignition switch. Remember to also switch off the control panel.

During maintenance work, when the chamber is open, use the locks to secure the cylinders.

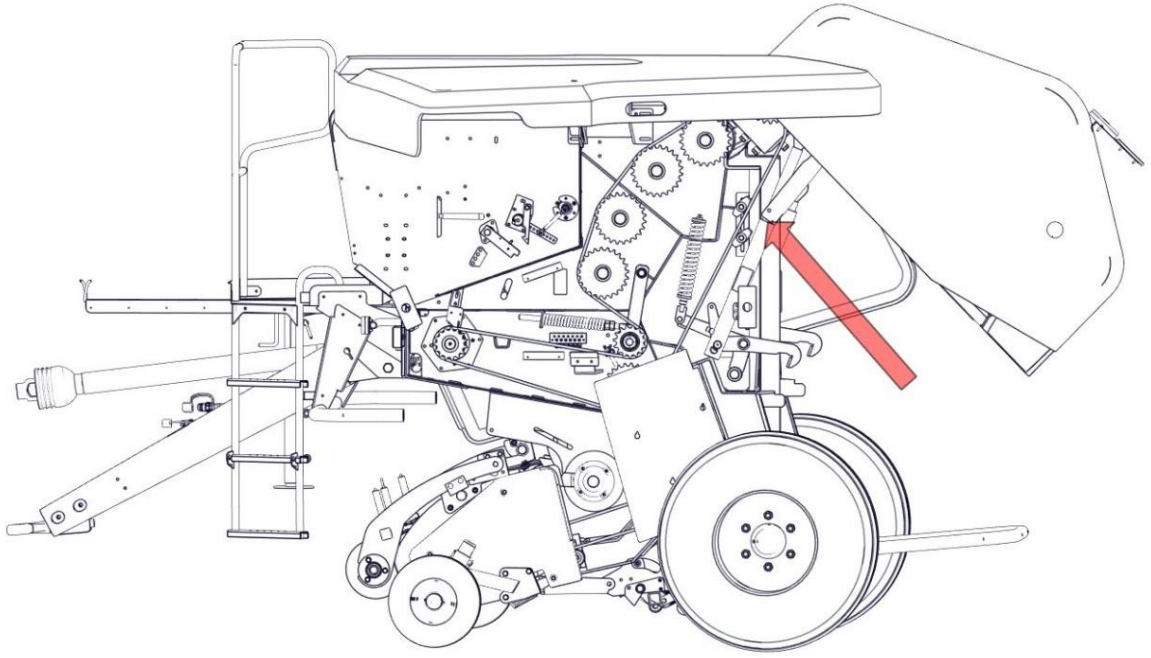


Figure 30 Locks for securing the cylinders

NOTE

NOTE!
Use original spare parts only.

Original spare parts by Metal Fach are made to match the specific needs of the devices produced by Metal Fach.

Other manufacturers’ parts have neither been inspected nor approved by Metal Fach. To avoid risks, use original spare parts from Metal Fach only.

Table 4. Tightening-torque values for bolts

Bolt-tightening torques - metrical bolts in Nm							
Size ∅ mm	**Pitch mm**	**Bolt variant - strength classes**					**Wheel nuts, wheel bolts**
		4.8	**5.8**	**8.8**	**10.9**	**12.9**	
3	0.50	0.9	1.1	1.8	2.6	3.0	
4	0.70	1.6	2.0	3.1	4.5	5.3	
5	0.80	3.2	4.0	6.1	8.9	10.4	
6	1.00	5.5	6.8	10.4	15.3	17.9	
7	1.00	9.3	11.5	17.2	25	30	
8	1.25	13.6	16.8	25	37	44	
8	1.00	14.5	18	27	40	47	
10	1.50	26.6	33	50	73	86	45
10	1.25	28	35	53	78	91	
12	1.75	46	56	86	127	148	
12	1.50						80
12	1.25	50	62	95	139	163	
14	2.00	73	90	137	201	235	
14	1.50	79	96	150	220	257	140
16	2.00	113	141	214	314	369	
16	1.50	121	150	229	336	393	220
18	2.50	157	194	306	435	509	
18	1.50	178	220	345	491	575	300
20	2.50	222	275	432	615	719	
20	1.50	248	307	482	687	804	400
22	2.50	305	376	502	843	987	
22	2.00						450
22	1.50	337	416	654	932	1090	500
24	3.00	383	474	744	1080	1240	
24	2.00	420	519	814	1160	1360	
24	1.50						550
27	3.00	568	703	100	1570	1840	
27	2.00	615	760	1200	1700	1990	
30	3.50	772	995	1500	2130	2500	
30	2.00	850	1060	1670	2370	2380	

5.1 Pick-up wheels adjustment

The working position of the pick-up can be adjusted. Procedure

- Set the proper height of the pick-up operation by changing the support wheel setting
- Use the cotter pin to lock the setting

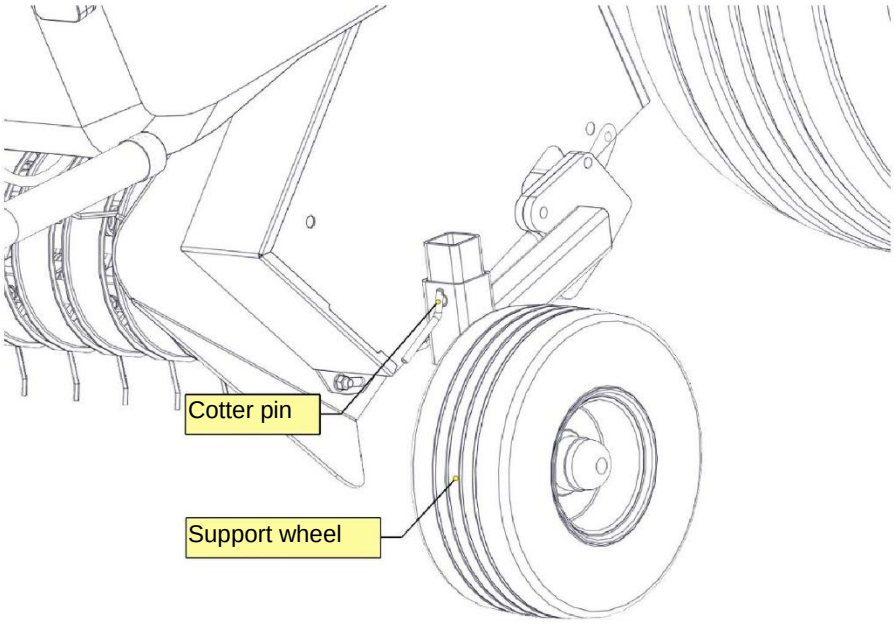


Figure 31 Adjusting the working height of the pick-up

The manufacturer recommends setting the tines of the pick-up at a height of 2-3 cm over surface.

5.2 Windrow-clamp adjustment

The height of roller-clamp position should suit the thickness of windrow. When the windrow size is large, raise the windrow-roller clamp, and for small windrow sizes, lower it.

The procedure for adjusting the roller-clamp height

- Switch off the PTOff and the tractor engine, remove the key from the ignition switch
- Disconnect the chain (1)
- While holding the roller clamp at the desired height, secure the appropriate chain link at the point indicated by the arrow

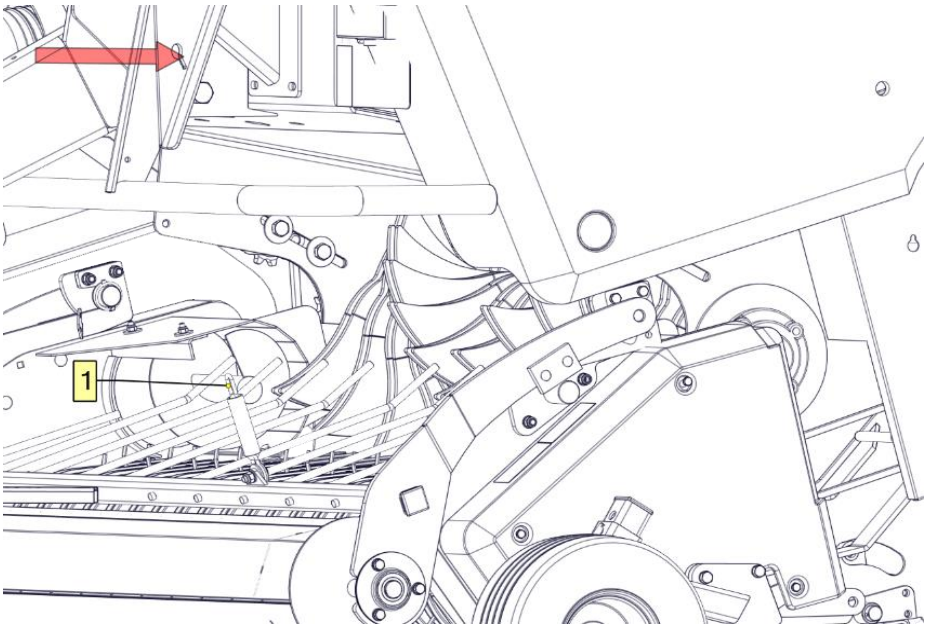


Figure 32 Windrow-clamp adjustment

5.3 Adjusting the drive-chain tensioning (every 10 hrs of working)

Check the chain tension and the operation of the automatic tensioners at regular intervals (if the machine is equipped with them).

The tension value of the chain “F” must be within 3-5 mm. It can also be determined using the following formula

$$F=0.1a$$

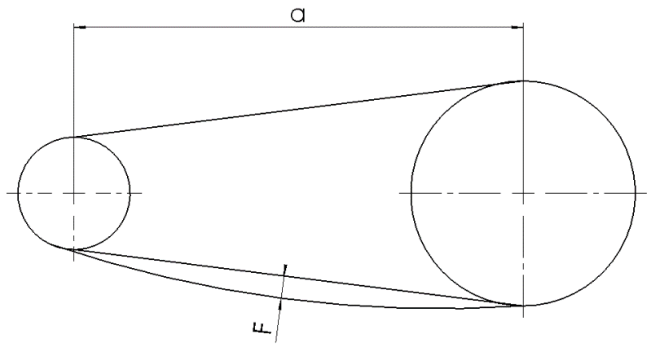


Figure 33 Chain tension

5.3.1 Adjusting the automatic tensioners

The machine chains are tensioned automatically by spring tensioners. Check the chain tension at regular intervals and adjust as required.

The procedure for checking and adjusting the chain tension (Fig. 34)

- Open the left-hand side guard
- Loosen the nuts (1) and (2)
- Use the nut (1) to adjust the chain tension
- Secure by tightening the jam nut (2)
- Close the left-hand-side guard

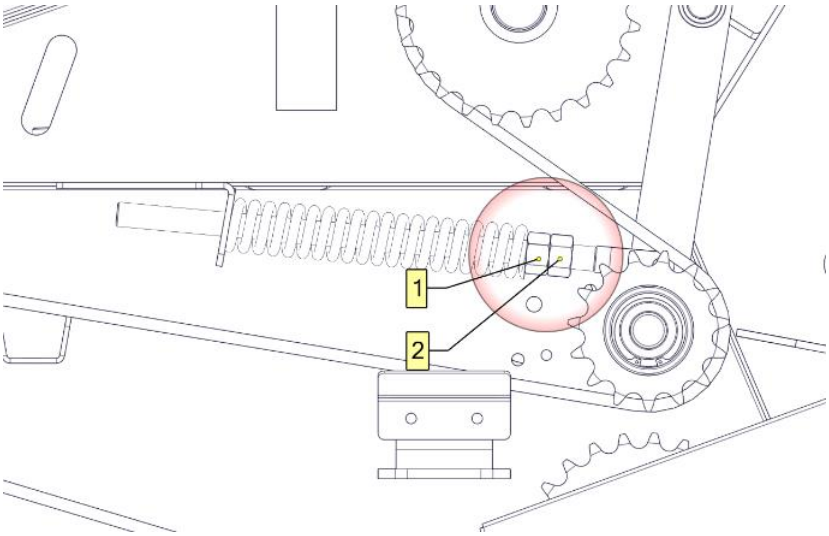


Figure 34 Adjusting the automatic chain tensioners

5.3.2 Adjusting the manual tensioners

Most of the pin chains in the machine require the manual adjustment of tension. Check the tension regularly, and adjust if necessary.

Adjusting the pick-up-chain tension (left-hand side)

The procedure for adjusting the pick-up-chain tension (left-hand side)

- Loosen the bolts and remove the side guard from the left side of the pick-up
- Loosen the bolt (1) and adjust the chain tension by gently hitting the tensioner with a hammer to move it downwards
- After you obtain the proper chain tension, re-tighten the bolt (1)
- Then, loosen the bolt (2) and turn the eccentric tensioner to adjust the tension of the other chain
- After you obtain a proper chain tension, re-tighten the bolt (2)
- Replace the guard and secure it with the screws.

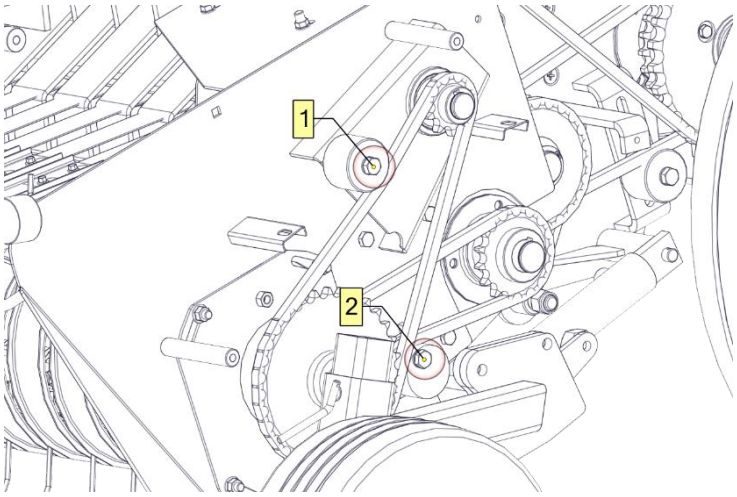


Figure 35 Adjusting the tension of the pick-up chains

To tension the right-hand side pick-up chain, follow the steps for the left-hand side one in a similar manner.

Adjusting the chain tension on the left-hand side of the baler

The steps for adjusting the chain tension on the left-hand side of the baler

- Remove the lower guard on the left-hand side of the baler
- Loosen the bolt (1) or (2) (depending on the chain to be tensioned)
- Adjust the chain tension by gently hitting the tensioner with a hammer to move it downwards
- After you obtain the proper chain tension, re-tighten the bolt
- Replace the guard and secure it with the screws.

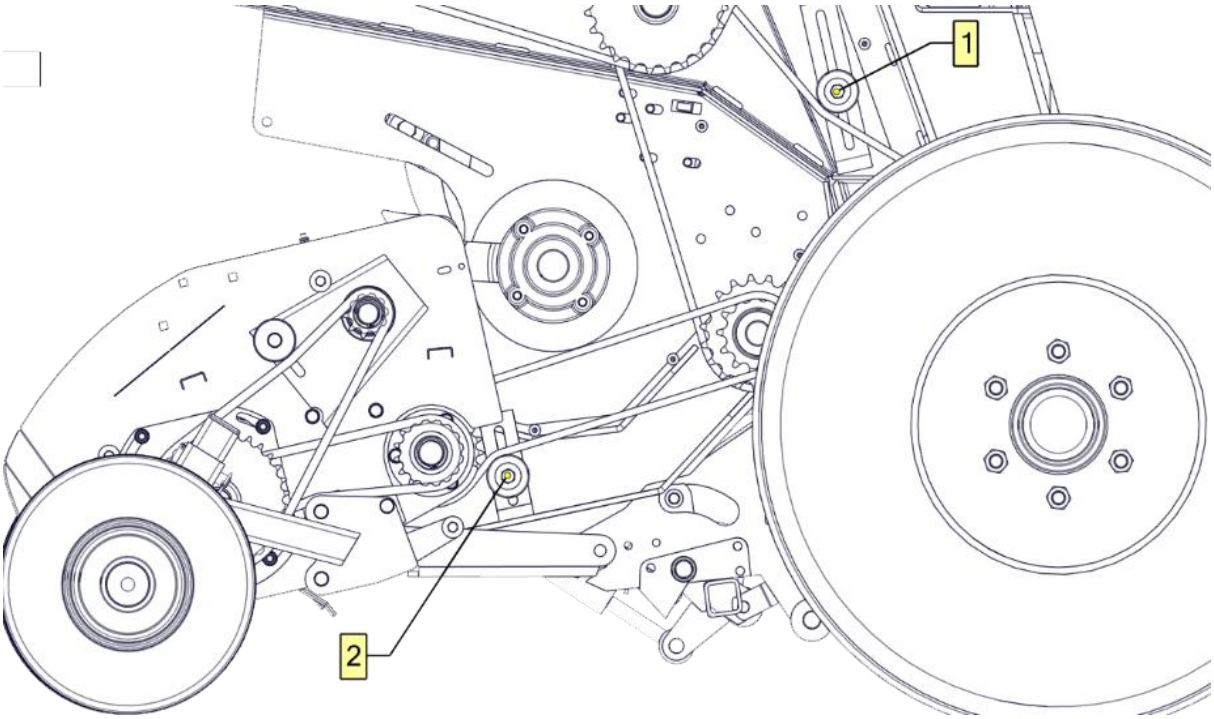


Figure 36 Adjusting the chain tension on the left-hand side of the baler

To guide the chain, the tensioners have been fitted with special slides. The steps for adjusting the chain guiding performance

- Open the left-hand side guard
- Loosen the bolt (1) or (2), as required
- Move or turn the tensioner
- Re-tighten the bolt
- Close the baler guard.

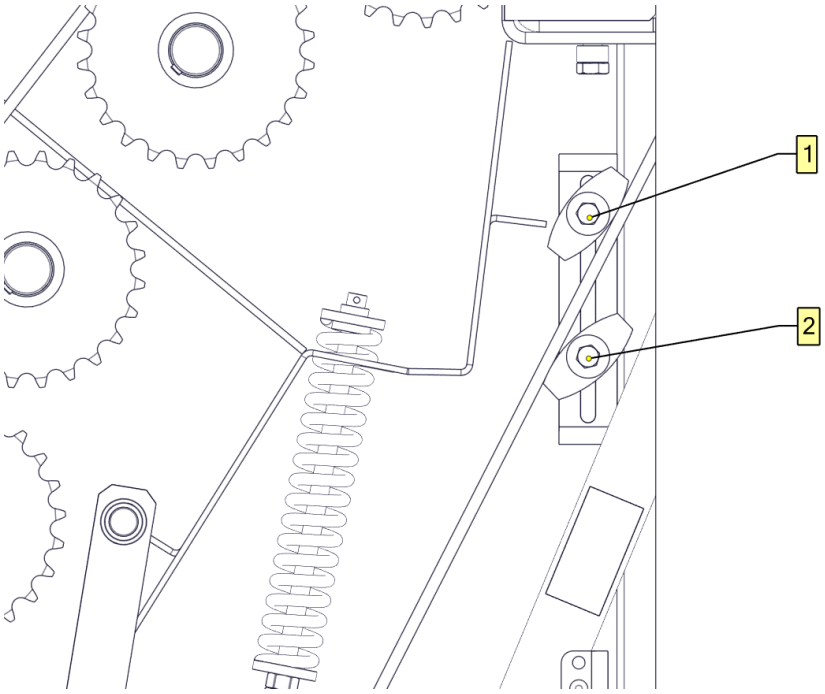


Figure 37 Adjusting the chain tension on the left-hand side of the baler

Adjusting the chain tension on the right-hand side of the baler

The steps for adjusting the chain tension on the right-hand side of the baler

- Open the guard on the right-hand side of the baler
- Loosen the bolt (1)
- Adjust the chain tension by gently hitting the tensioner with a hammer to move it downward
- After you obtain the proper chain tension, re-tighten the bolt
- Close the baler guard.

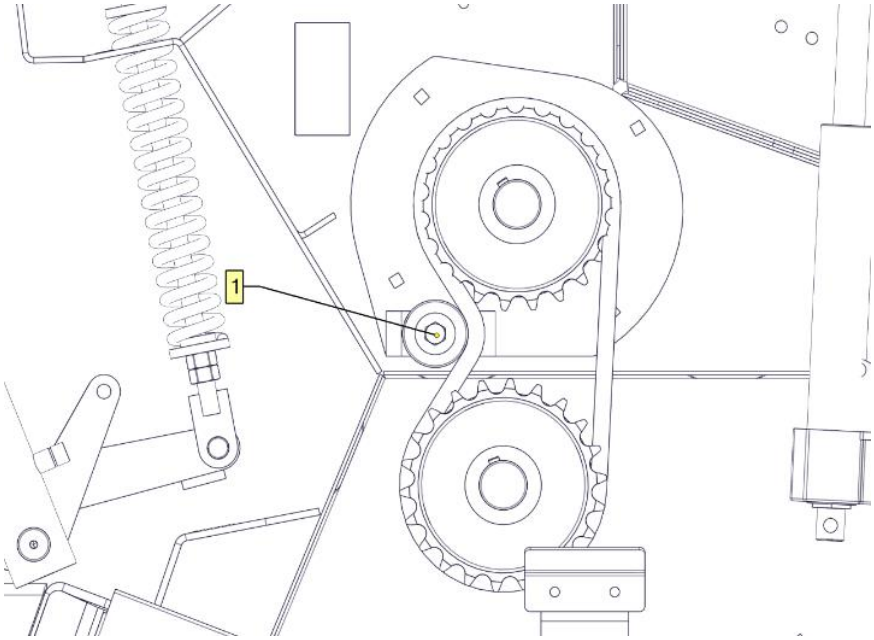


Figure 38 Adjusting the chain tension on the right-hand side of the baler

Adjusting the tension of the rotor chain

The procedure for adjusting the rotor-chain tension

- Open the guard on the right-hand side of the baler
- Remove the rotor guard
- Loosen the bolts (1)
- Loosen the nut (2) and (3),
- Tighten or loosen the bolt (4) to adjust the chain tension
- Re-tighten the nuts (2) and (3)
- Re-tighten the bolts (1)
- Replace the rotor guard and secure it with the screws;
- Close the cover.

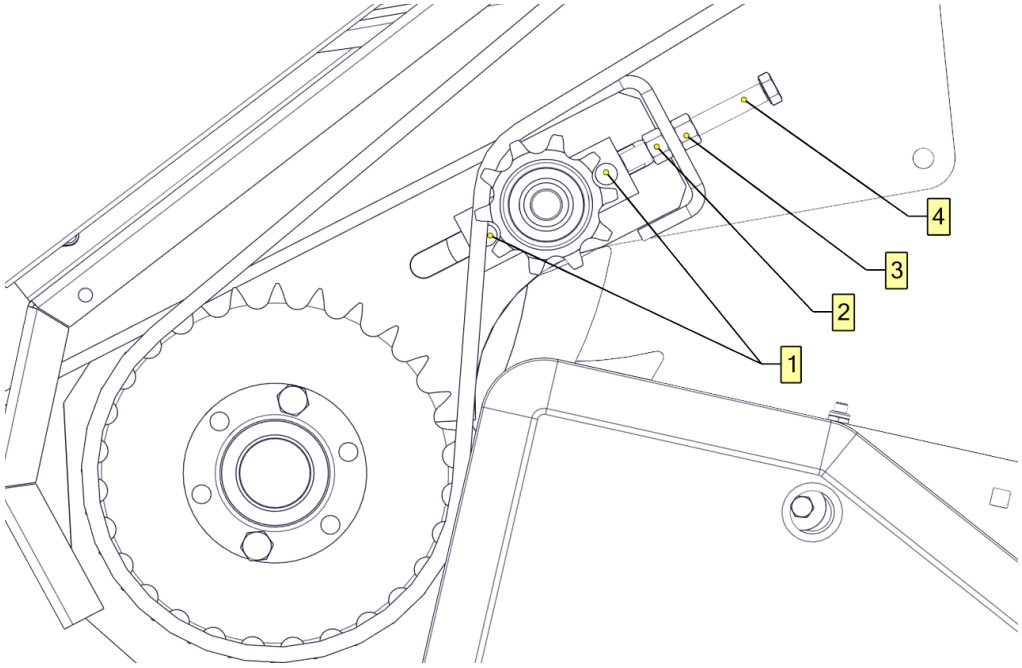


Figure 39 Adjusting the tension of the rotor chain

Adjusting the tension of the chain and rod conveyor set

In order to adjust the tension of the chain and rod conveyor set, loosen the jam nut (3), and then tighten or unscrew the nut (2). After the required clamp has been reached, the jam nut should be tightened (3). The length of the spring should be 100 mm, as shown in Fig. 40. Repeat the steps the same way on the other side, so that the length of the spring is the same on the left and the right.

NOTE

NOTE!
The degree of spring tension must be equal on both left- and right-hand sides.

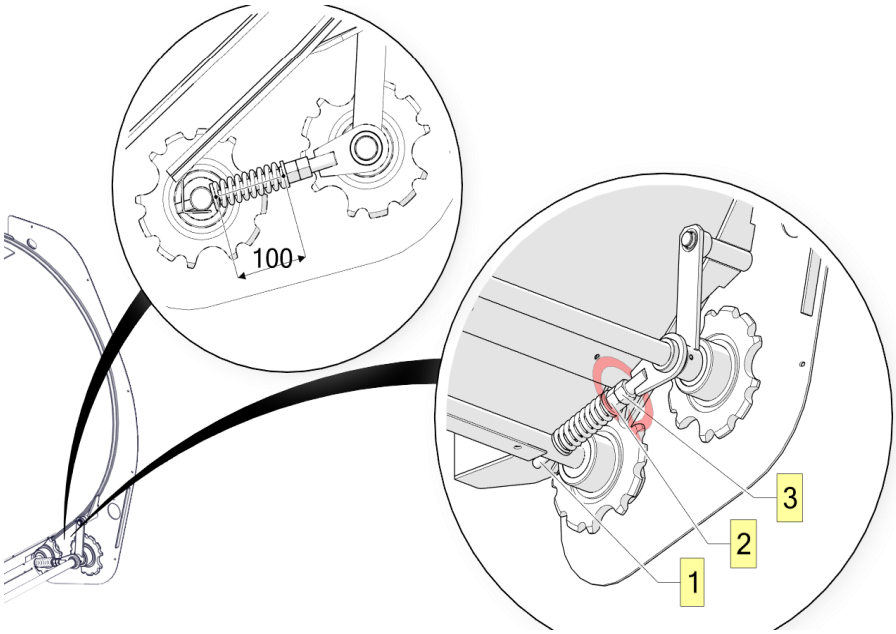


Figure 40 Adjusting the tension of the chain and rod conveyor set

5.4 Pick-up cam adjustment

Depending on the type of collected material and the working conditions, adjust the cam so that it does not pull the material. Procedure

- Loosen the bolts and remove the guard from the left side of the pick-up
- Loosen the 4 nuts which hold the cam

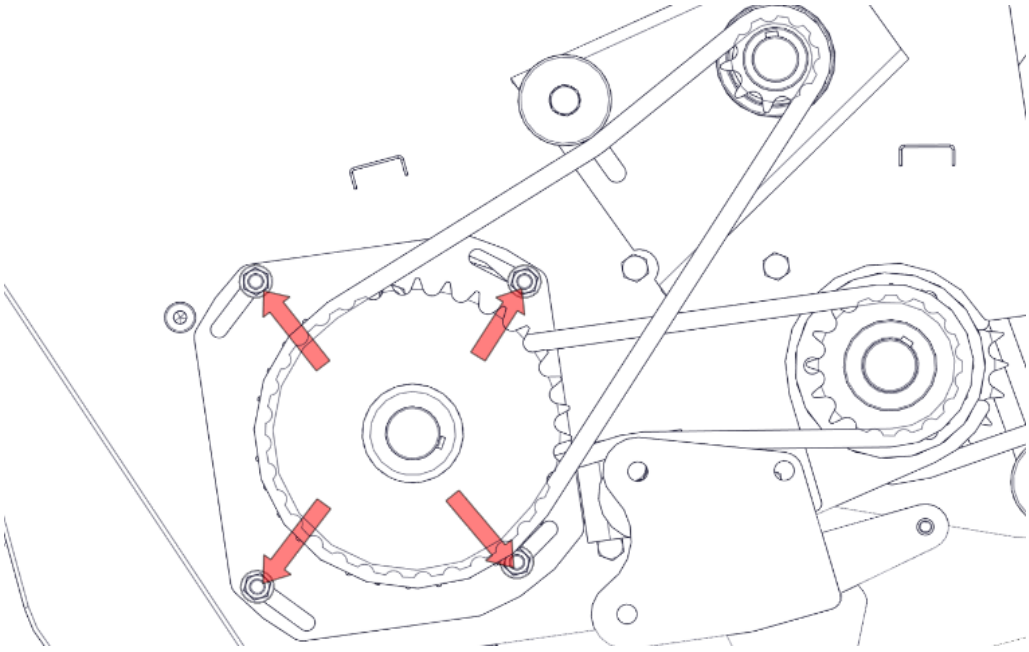


Figure 41 Pick-up cam adjustment

- Adjust the cam position; turn it to move the pick-up tine closer to or further from the transmission device. Rotate the cam
  - In direction “A” – to move the pick-up tine further from the pick-up unit
  - In direction “B” – to move the pick-up tine closer to the pick-up unit

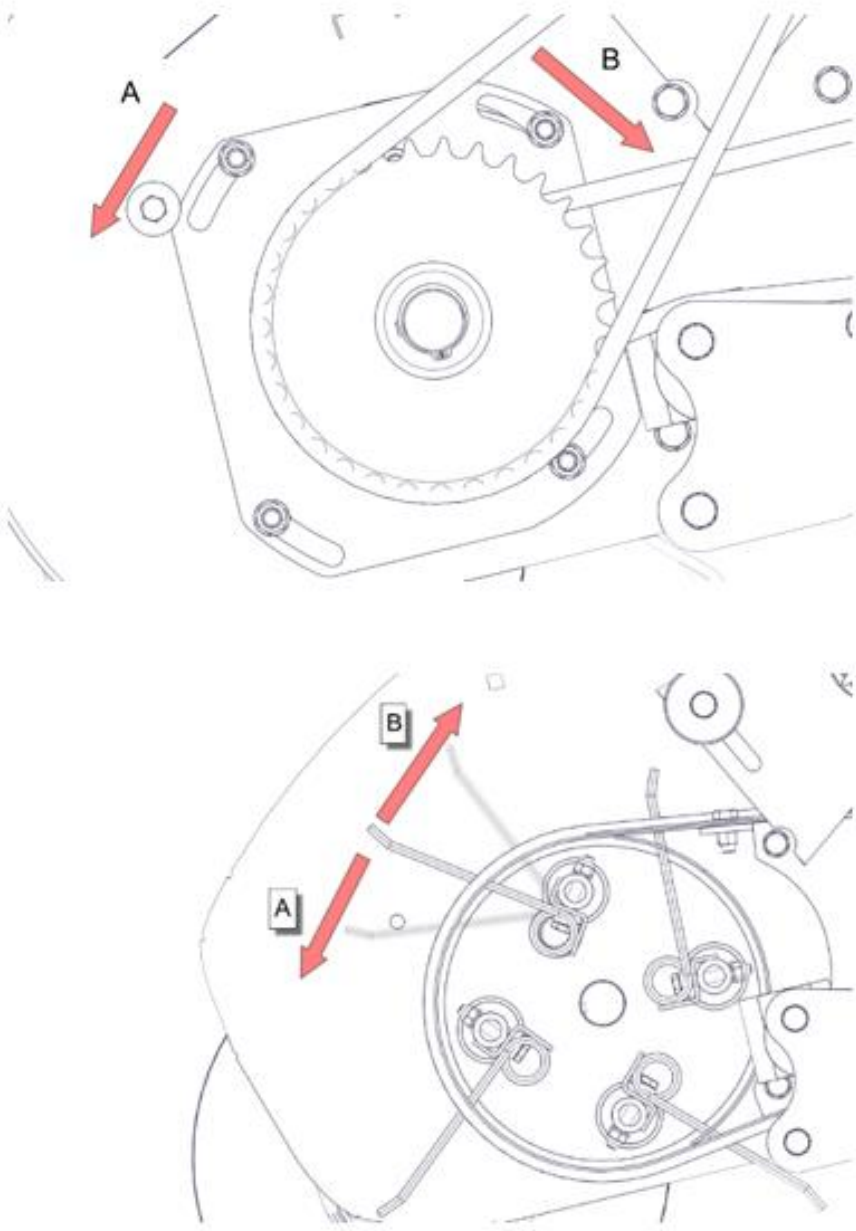


Figure 42 Pick-up cam adjustment

5.5 Replacing the locking bolt in the pick-up

If the locking bolt is cut in the pick-up protective device, replace it with a bolt of the same specification – **Allen-head bolt M6x40-10.9 PN-EN ISO 4762** (without zinc plate, with partial thread). Procedure

- Remove the guard on the left-hand side of the baler
- Remove the chamfered locking bolt and make sure that no parts of the damaged bolt are located between the drive components
- Align the holes in the safety component manually by turning the screw power supply, insert a new locking bolt, and tighten it
- Re-install the protective guard.

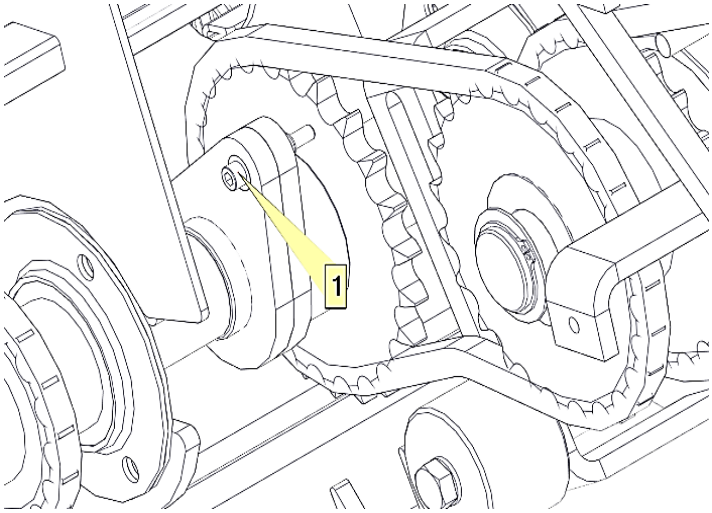


Figure 43 Replacing the locking bolt

5.6 Replacing the locking bolt in the supplying unit

If the locking bolts are cut in the rotor's protective device, replace them with bolts of the same specification - **M12x50oc 8,8 PN-EN ISO 4017.** Procedure

- Open the right-hand side guard
- Unscrew the lower rotor guard
- Remove the chamfered locking bolts (1) and make sure that no fragments of damaged bolts are present in the drive
- Turn the rotor using a wrench and set the holes of the safety component so as to insert the new locking bolts (1), and tighten them
- Re-install the protective guard
- Close the side cover.

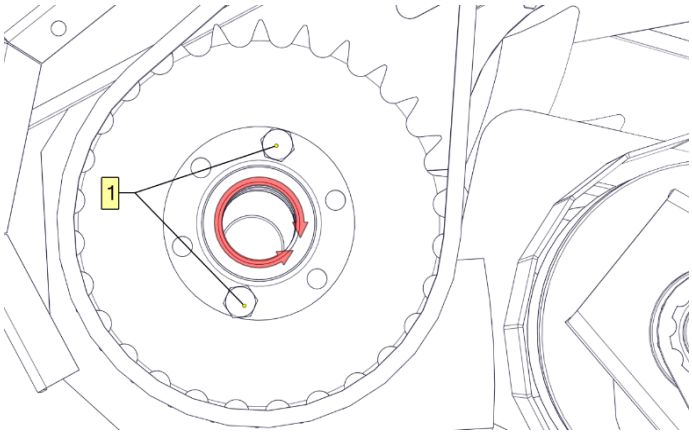


Figure 44 Replacing the locking bolts in the rotor's protective device

Net binding device adjustment

The procedure for adjusting the bale net binding

- Open the left-hand side guard
- Select a hole on the arm (A) which corresponds to the number of binding turns which you require (Fig. 45 indicates the number of net-binding turns for each hole)
- Secure the rod in the selected hole
- Close the side cover.

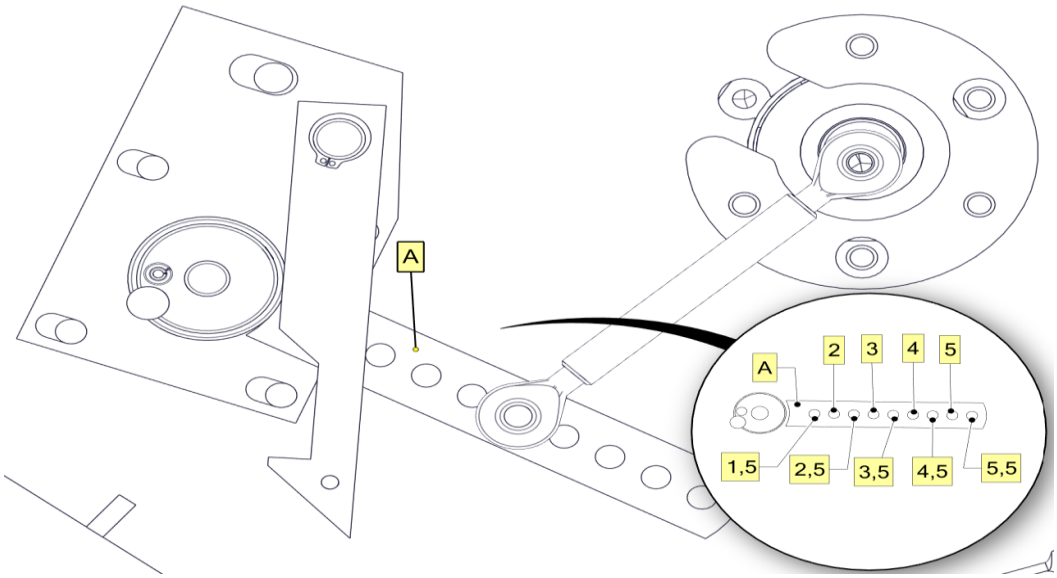


Figure 45 Net-binding device adjustment

5.7 Transmission-oil exchange (once a year)

The oil in the transmission box should be exchanged after the first 50 hours of operation, and then at the beginning of each season.

NOTE

NOTE!
Do not overfill the gearbox with oil. It can result in overheating or oil leakage. The oil should be exchanged while it is still warm (e.g. immediately after using the machine).

Oil draining

- Prepare a container to take used oil
- Unscrew and remove the cap located at the bottom of the transmission box - you can access it through the hole in the bottom part of the front bar, over the pick-up
- Drain the oil into the previously prepared container;
- After emptying the box, replace the cap.

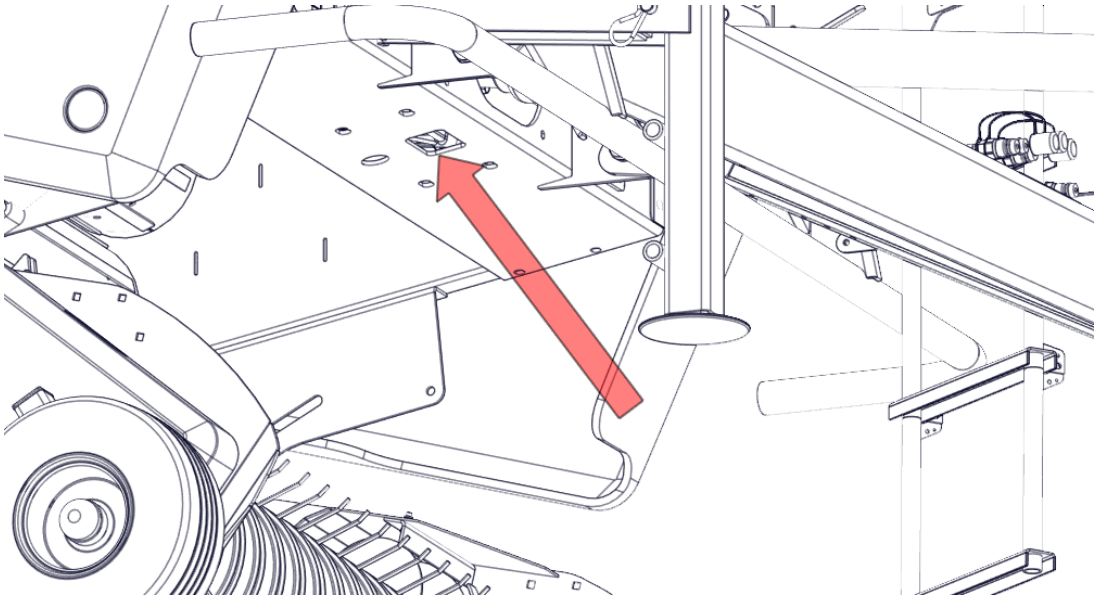


Figure 46 Drain cap

Refilling oil (the required oil volume in the box is 3l)

- Unscrew and remove the cap in the top section of the transmission box
- Replenish the oil
- After refilling oil, clean and replace the cap.

Important. Use transmission-oil type 80W90.

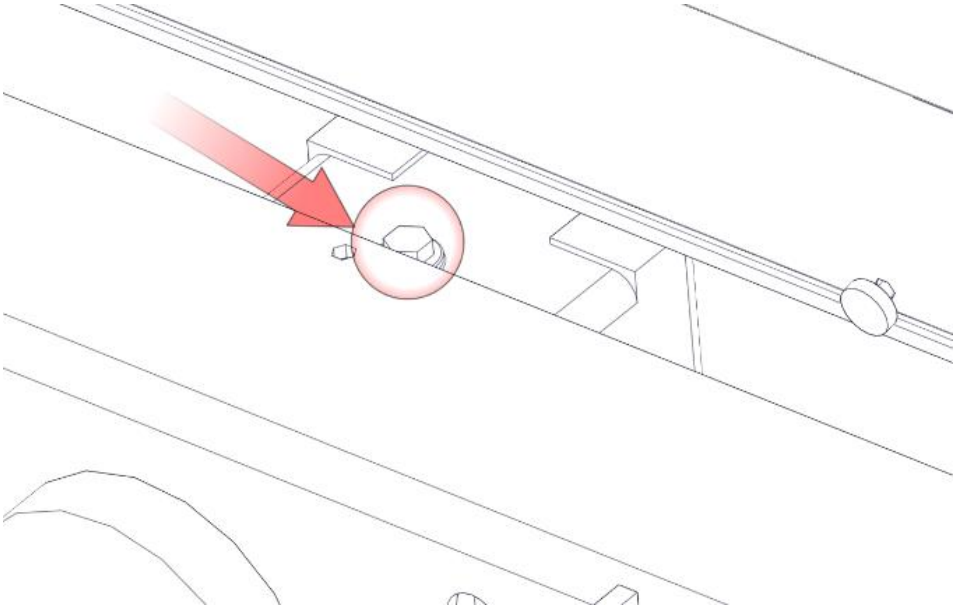


Figure 47 The oil level in the gearbox

5.8 Lubrication (every 250 bales)

NOTE

NOTE!
All the items listed below must be lubricated at the beginning and at the end of each season.

The marking presented in Figure 48 indicates the points which are to be lubricated.

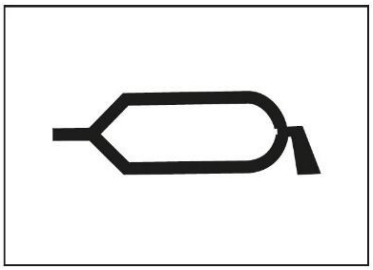


Figure 48 The marking of the main baler-lubrication places

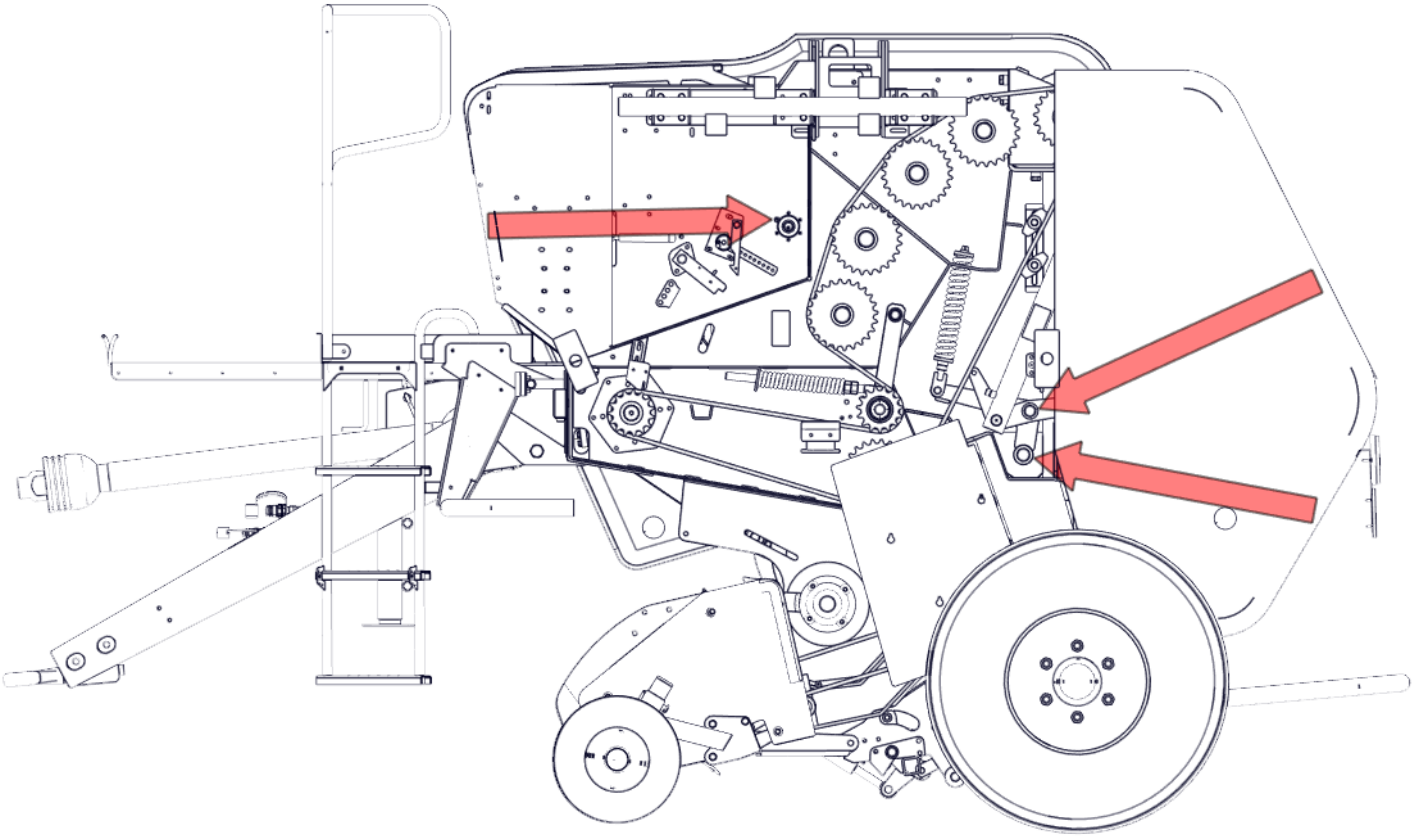


Figure 49 Lubrication points (left side)

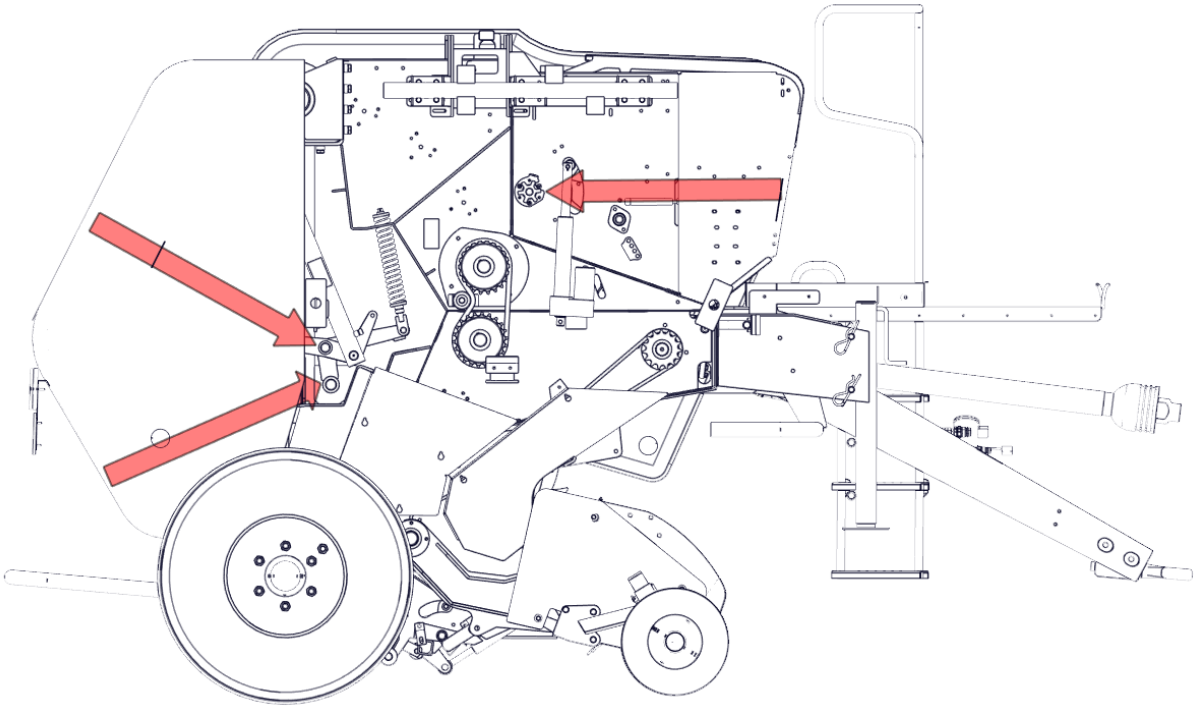


Figure 50 Lubrication points (right side)

Manual chain lubrication (every 10 hrs of work)

If no automatic chain-lubrication system is present, carry out this activity manually by using special greases for chain maintenance and lubrication.

5.9 The automatic lubrication system for chains

The Z602 baler is fitted with an integrated chain-lubrication system. The pump (P) provides a stepless adjustment of the portion of oil. To adjust the oil amount, unscrew the nuts (N) on the cam (K) and turn part of the cam so that the indicator (W) shows the required number from 1 to 8, with 1 being the lowest dose of oil, and 8 the largest.

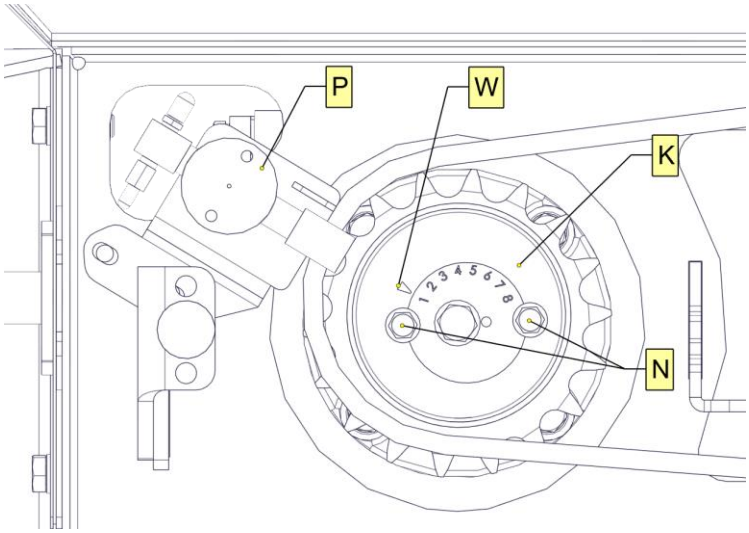


Figure 51 Adjusting the oil portion in the automatic lubrication system

Tank

Carry out routine checks and replenish the oil in the tank of the automatic chain-lubrication system. Procedure

- Open the left-hand side protective guard
- Unscrew the cap, refill oil and re-tighten the cap.

The tank volume is 3 litres.

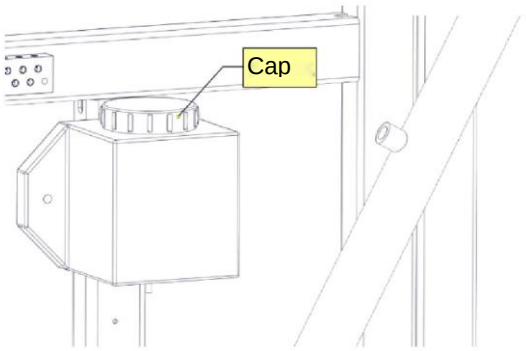


Figure 52 The oil tank of the automatic chain-lubrication system

Filter replacement (once a year)

The filter is in the oil tank. It is recommended to replace it once a year. Procedure

- Open the left-hand side guard
- Drain the tank
- Open the automatic lubrication oil tank
- Replace the filter
- Refill the tank with oil
- Close the oil tank
- Close the cover.

5.10 Lubricating bearings

The Z602 baler is fitted with an integrated bearing-lubrication system. Strips (1) with grease nipples (2) allow the machine bearings to be greased. The strips are located on the left- and right-hand sides of the baler.

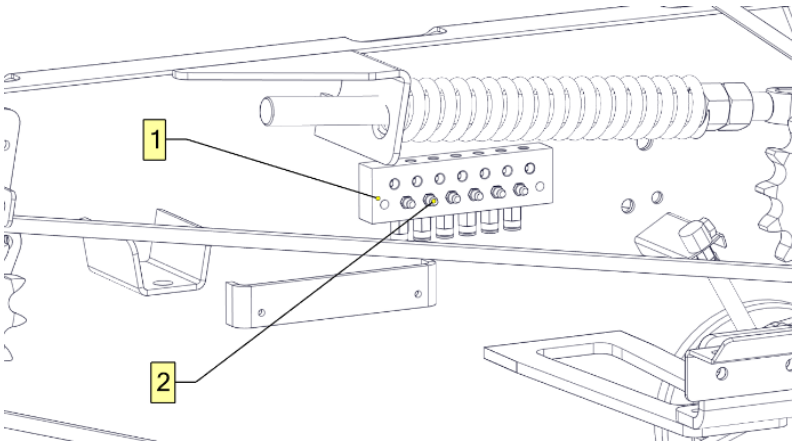


Figure 53 Central lubrication of bearings on the left-hand side of the baler

5.11 Tyre inspections (every 30 days of working)

NOTE

NOTE!
Wheel and tyre repairs may be performed only by skilled staff using sufficient equipment.

Check the tyre pressures regularly and make sure that it they correct for the given tyre.

NOTE

NOTE!
Check the tightening of the wheel bolts regularly. The tightening torque should be in accordance with Table 4.

6 Possible faults

The table below shows the most-common faults and problems which can occur during the operation of the machine. In the event the solutions suggested not having the desired effect, contact your Metal Fach representative or service centre.

Table 5. Possible faults

Pick-up

Problem	Possible cause	Solution
Clogging the inlet of the chamber.	Too-large and/or irregular windrows or too-high working speed.	Form the windrows of the right size and/or work with lower pick-up speeds.
	Excessive picking up of windrow on one of the sides of the pick-up.	Drive the baler equally from one side to the other.
	Too-low rotational speed (rpm).	Work with a rotational speed of 540 rpm.
No lifting or lowering action of the pick-up unit.	Ball-valve closed.	Follow item 3.2.3 to check the setting of the valve.
The pick-up tines tear the material	Too-high rotational speed of the pick-up compared to the working speed.	Increase the working speed.
		Decrease the PTOff rpm
The pick-up tines miss parts of the windrow.	Too-low rotational speed of the pick-up compared to the working speed.	Decrease the working speed.
		Increase the PTOff rpm.
The pick-up does not collect all the windrow.	Too-large windrow width.	Create a new, narrower, windrow shaft.
The pick-up does not collect windrow from level ground.	The pick-up is set too high.	Lower the pick-up position.
		Set the pick-up wheels correctly.
The pick-up lets the material pass, and stops.	The protection component is defective.	Halve the volume of the windrow.
		Adjust the wheel position to lift the pick-up.
		Remove the accumulated plant material and replace the protective component.
Insufficient windrow pick-up.	The pick-up tines have been lost or damaged.	Replace the pick-up tines.

Forming bales

Problem	Possible cause	Solution
Too-noisy transmission.	Loose or not-lubricated chains.	Lubricate the chains or adjust their tensioners.
Bales are formed incorrectly or has a conical shape.	Picking up the windrow mainly on one side of the pick-up.	Drive the baler equally from one side to the other.
The chain skips the teeth of the toothed wheels.	Worn-out-toothed wheels or chain.	Replace the toothed wheels or chain.
	Loose chain.	Tension the loose chains.

Net binding

Problem	Possible cause	Solution
The net is not distributed well on a bale.	Too-large mesh of the net.	Use a standard net.
	Incorrect path of net flow.	PTO shaft

PTO shaft

Problem	Possible cause	Solution
Defective locking bolt.	Too-big a bale diameter or weight.	Decrease the bale diameter or weight.

Hydraulic system

Problem	Possible cause	Solution
The rear cover will not close.	The closing of the rear cover blocked by a bale.	Remove the bale.
	The hydraulic hose disconnected from the tractor.	Check the connection and connect the hoses if necessary.
The hydraulic system does not work.	No supply of hydraulic outputs.	Activate the hydraulic outputs from the tractor.
	The hydraulic hoses are not connected correctly to the external sockets of the tractor's hydraulic circuit.	Check, and, if necessary, seal carefully the quick-fit coupling of the external sockets of the tractor hydraulic circuit.
	Insufficient fluid supply.	Check, and, if necessary, replenish the fluid in the relevant tank of the tractor's hydraulic system.
	The pump is worn out or damaged (low pressure).	Repair or replace the hydraulic pump.
	Dirt inside the hydraulic circuit.	Blow, and, if necessary, clean the hydraulic filters.
	Fluid leak in cylinders (fluid goes past the piston).	Replace the seals in the cylinders.
	Fluid leaks from the hydraulic system.	Check the hoses of the hydraulic circuit and seal the connections, if necessary.

Control panel

Problem	Possible cause	Solution
Message *"Binding error"* and acoustic signal.	No binding material (net)	Replenish the net cartridges
	The sensor distance to the bolt adjusted incorrectly.	Set the sensor 2-3 mm from the bolt.
Despite the chamber's being closed, the panel displays *"Open chamber".*	The sensor distance to the lever adjusted incorrectly.	The sensor should be 2-3mm from the lever.

NAME AND ABBREVIATION INDEX

BHP - occupational health and safety

dB (A) - A-weighted decibel, unit of sound pressure

kg - kilogram, unit of mass

km/h - kilometre per hour, unit of linear speed

kPa – kilo Pascal, unit of pressure

kW - kilowatt, unit of power

m - metre, unit of length

min - minute, an auxiliary time unit corresponding to 60 seconds

mm - millimetre an auxiliary length unit corresponding to the length of 0.001 m

r (obr) - a description of a type of movement

rpm (obr/min) - rotation per minute unit of rotary speed

Pictogram - an information plate

Rating plate – a manufacturer's plate unambiguously identifying the machine

UV – ultraviolet radiation, invisible electromagnetic, invisible electromagnetic radiation with negative effects on human health, and UV radiation has a negative effect on rubber parts

PTOff - rear Power-Take-Off shaft - a part of the agricultural tractor

PTOn - Power-Take-On shaft - a part of the baler

PTO shaft - telescopic joint shaft - a shaft transmitting torque

V - Volt, unit of voltage

Hitch, lower transport hitch – hitch components of an agricultural tractor (see the tractor instruction manual).

ALPHABETICAL INDEX

NOTES

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