METAL-FACH

SELF-LOADING BALE WRAPPER
Z598

INSTRUCTION MANUAL – PART II

TRANSLATION OF THE ORIGINAL INSTRUCTION MANUAL

REV. I

AUGUST 2017

Instruction manual No. Z598-01-167/2013

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PART I

PART II

4. First starting up

ATTENTION

ATTENTION!
The tractor operator must read the instruction manual and follow the guidelines contained therein.
The wrapper must be combined only with a tractor which is in good working order and which is fitted with an operational hitch, hydraulic system, 12V electrical and signalling and warning systems.

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, accompanied by the user (buyer) is to perform the following:

1. Inspect accessories and functioning of the wrapper:
   - Check the machine for completeness and condition,
   - Check the lighting system and horn,
   - Check the electrical system:
     - Connect the communication cable with the control panel,
     - Connect the supply conductor to the tractor socket,
     - Check the control panel for communication with the output module,
     - Check the functioning of the activated limit sensor,
     - Check the functioning of the limit switches by starting the planet arm limit stops manually,
   - Check the hydraulic system:
     - Connect the hydraulic hoses to the tractor, determine the correct direction of the oil flow,
     - Move the working components of the wrapper, set the machine in the transport, working and standby positions,
     - Inspect the functioning of the limit switches,
     - Start and check the 2D and 3D automatic mode,
2. Train the user on the correct wrapper operation:
   - Discuss the rules of the wrapper operation,
   - Film installation,
   - Discuss the design and functioning of the control panel,
   - Discuss the risks which may arise from improper wrapper operation,
   - Wrapper adjustable components:
     - Adjusting the hitch height,
     - Setting the passive drum of the service table for work with large bales,
     - Adjusting the inclination of the service table side cones,

- Adjusting the sensor positions,
- Adjusting the drive chain tensioning of the service table,
- Adjustment of the hydraulic components,

- Discuss the method of lubrication and ongoing wrapper maintenance,
- Perform a full cycle of the bale film wrapping by the user (buyer) assisted by the service technician.

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

In the event of any uncertainties regarding safety, contact the dealer/manufacturer.

5. Current adjustment elements

5.1 Adjusting the height of the wrapper hitch eye

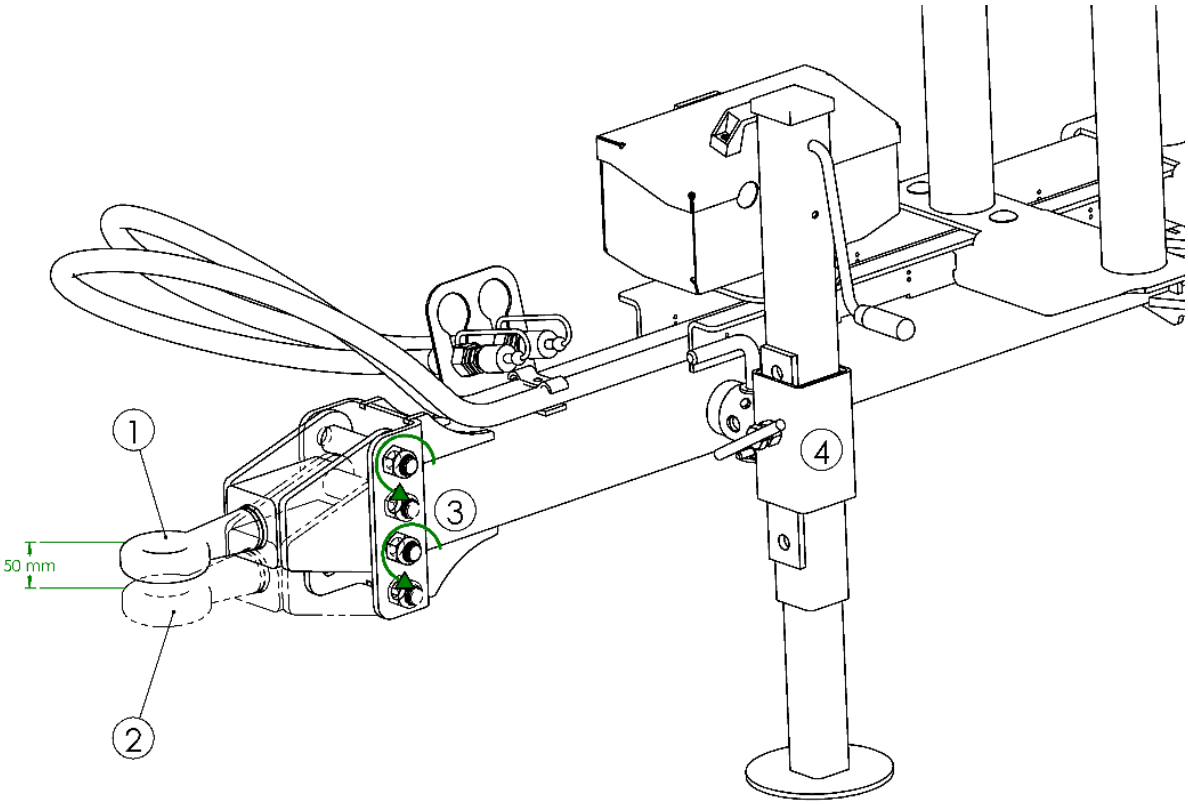


Figure 28. Adjusting the height of the hitching eye

Before coupling the wrapper with the tractor, ensure that the machine is levelled. Apart from adjusting the hitch height in the tractor, you can also adjust the height of the hitch eye on its fixing to the wrapper drawbar. The incorrect wrapper levelling may lead to ripping turf off the surface during the bale loading and cause difficulty in the bale loading and unloading.

Hitch adjustment procedure (**Fig. 28**):

- The wrapper must be set on a level ground, propped by a support foot (4) and levelled by it,
- Drive the tractor up to the wrapper so that its hitch be near the hitch eye of the wrapper,
- Switch off the engine of the tractor, apply the auxiliary brake,
- If the tractor hitch is adjustable, set it opposite the wrapper hitch,
- If it is not possible to customise the tractor hitch more precisely, loosen the two M20 nuts (3) which secure the drawbar eye and set it in the upper (1) or lower (2) position, and then tighten the nuts with the correct tightening torque to secure the connection again,
- Start the tractor and drive up to the wrapper so that the wrapper hitch eye is in the tractor hitch eye,
- Fit the hitch pin and secure the connection against accidental disconnection,
- Fold the support foot of the wrapper to the transport position.

5.2 Adjusting the support foot

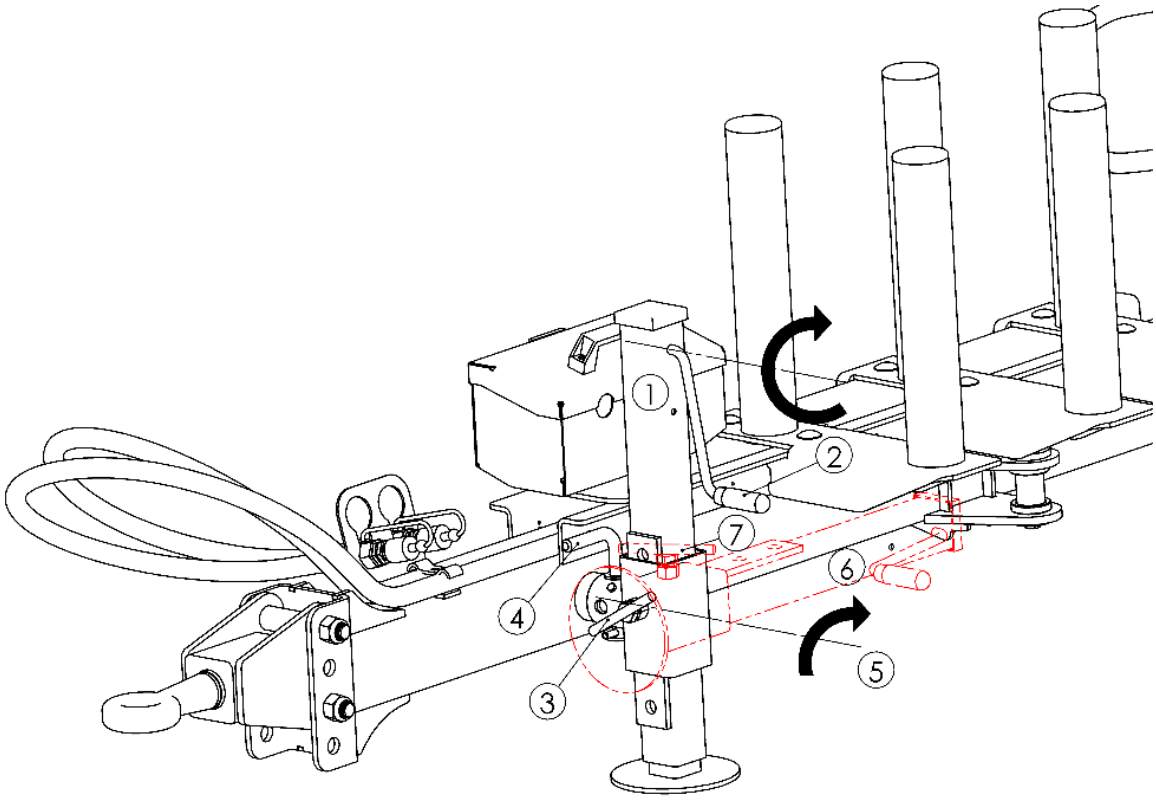


Figure 29. There are two positions of the wrapper support foot

- Transport position – used for driving and operating the wrapper. The foot is then folded and set along the drawbar.

- Working position – used when the wrapper is disconnected from the tractor. It is set perpendicularly to the ground and the degree of its inclination can be adjusted incrementally by means of the locking screw or by stepless turns of the crank.

Setting the foot from the working to transport position (**Fig. 29**):

- During setting the support foot from the working to transport position, the wrapper must be hitched to the tractor.
- Set the support foot (1) to its shortest position using the crank (2).
- Loosen the locking screw (3) and remove the clip pin which secures the locking pin (4).
- Rotate the support foot to the transport position (6) and replace the locking pin with its clip pin.
- Set the position on the incremental adjustment control to the hole which is the nearest to the base of the foot (7) and secure this position tightening the locking screw.

5.3 Wrapper sensors

The proper functioning of the wrapper is primarily ensured by a variety of sensors. They are responsible for communicating current positions of individual working assemblies and rotational speed of rotating components to the control unit, and for switching the machine off physically after the wrapping module limit stops collide (limit switches). The machine features 16 sensors, 13 of which are of the same, inductive sensor type.

All sensors and their working positions are pre-set. Already during the first start-up of the wrapper, make sure that all sensors are installed properly at their respective locations and are at a correct distance to their respective actuators. Shifting their position accidentally may occur during the transport of the machine from the dealer to the buyer, for instance.

Damage of the sensor may occur if they are set improperly against their respective actuators, or if they are fixed incorrectly. It is important to know for the user how to make adjustments of their positions in a quick and safe way. A damaged sensor should be replaced with a new one of the same type so that the wrapper is in a good working order.

5.3.1 Sensor description

Table 6. Sensor description and function

Sensor code	Location	Type	Description
S1	Fig. 30	Angle sensor	Angle position of the service table
S2; S4	Fig. 30	Inductive sensor, proximity switch, PNP	Film cutter open position
S3; S5	Fig. 30	Inductive sensor, proximity switch, PNP	Film cutter closed position
S6	Fig. 30	Inductive sensor, proximity switch, PNP	Drawbar position
S7	Fig. 30	Inductive sensor, proximity switch, PNP	Loading arm open position
S8	Fig. 30	Inductive sensor, proximity switch, PNP	Loading arm closed position
S9	Fig. 30	Inductive sensor, proximity switch, PNP	Counting the number of planet arm revolutions Defining the stopping position of the arms for loading/unloading.
S10	Fig. 30	Inductive sensor, proximity switch, PNP	Defining the transport position for the planet arms
S11; S12	Fig. 30	Inductive sensor, proximity switch, PNP	Film breaks and measuring the length of used film
S13	Fig. 30	Inductive sensor, proximity switch, PNP	Rotational speed and number of revolutions of the service table drum
S14	Fig. 30	Inductive sensor, proximity switch, PNP	Rotational speed and angle of the planet arm rotation
S15; S16	Fig. 30	Limit switch, contactor	Collision with the wrapping module limit stops

5.3.2 Locations of the sensors

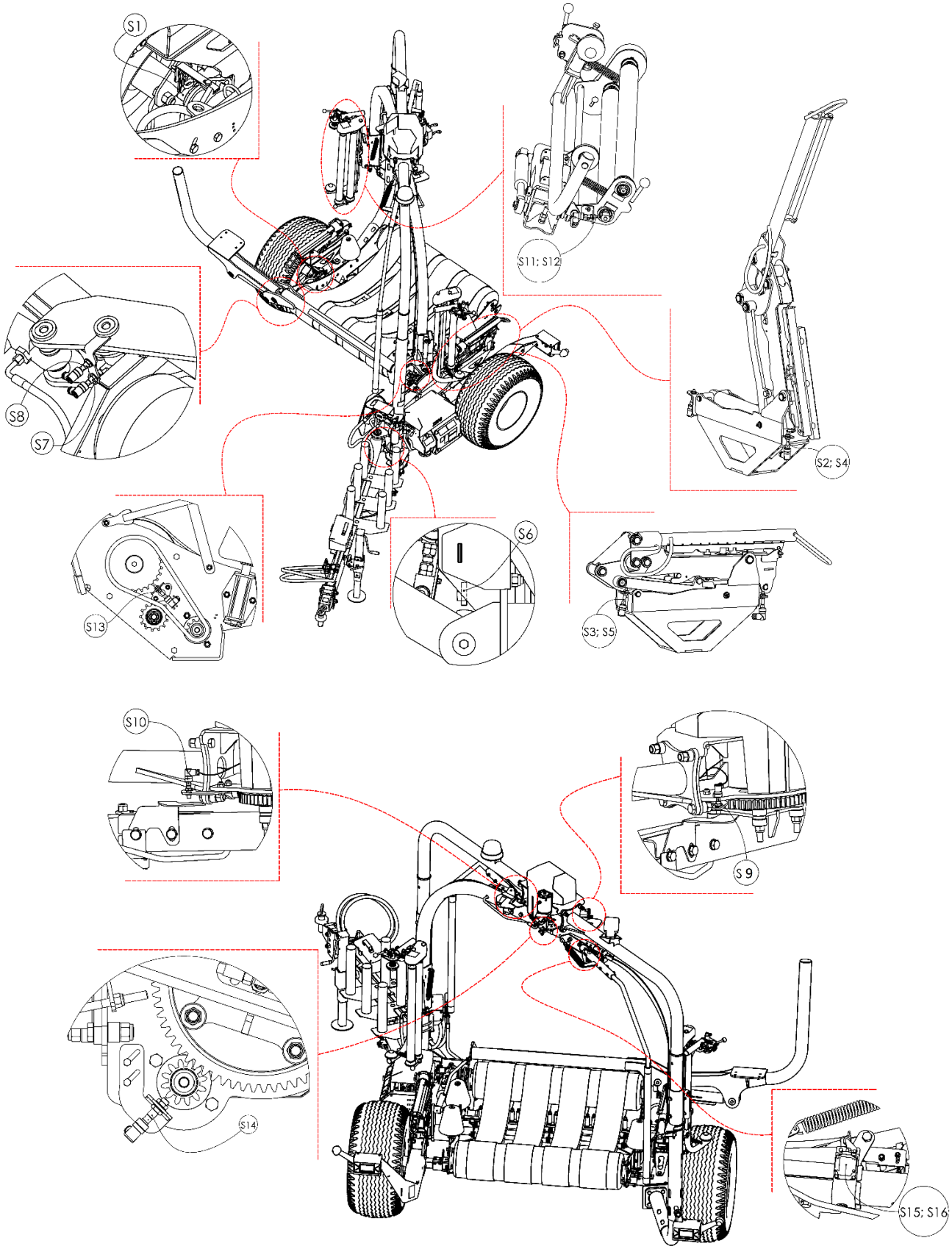


Figure 30. Locations of the sensors on the wrapper

5.3.3 Adjustment of the inductive sensors' settings

WARNING

WARNING!
Never perform any repairs or maintenance work on the wrapper when the tractor is working or not protected against activation.

WARNING

WARNING!
Never perform any repairs or maintenance work on the wrapper when its automatic mode of operation is switched on. Accidental activation of the sensor can cause unintentional movement of the machine.

It may be necessary to adjust the inductive sensor setting if the corresponding working component of the wrapper reaches its limit position without activating a respective sensor. Another case is when the sensor fails to read signals from rotating drive wheels of the rotating components. The inductive sensors are activated by moving the face of the sensor closer to the iron part (it must be attracted by a magnet). Among common activators are bolt heads, steel sheet surface, a chain or gear wheel tooth.

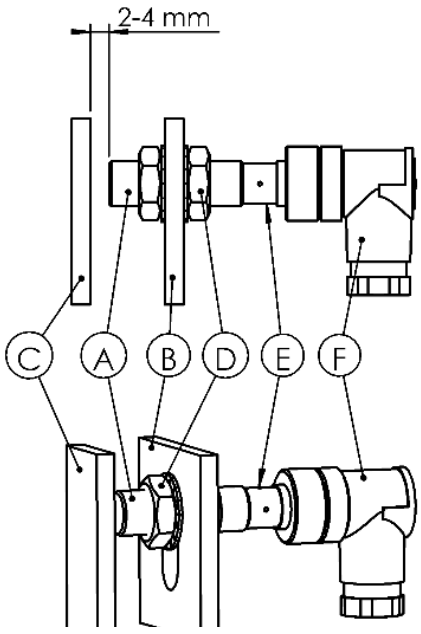


Figure 31. Inductive sensor and its actuator

The procedure of setting the sensor against its activator (**Fig. 31**):

- Set a working component in its final position and turn the tractor hydraulic system off. Switch off the engine of the tractor, apply the parking brake,
- Check, if the plug of the sensor (F) is tightened, as a loosened plug may be a reason for no signal.
- Loosen the nuts (D) which lock the sensor (A) in its holder (B) so that they can be turned manually; depending on the type of the sensor, use a 17 or 13 wrench,
- Move the sensor in its holder so that the distance between its face and the surface of the actuator (C) is 2-4mm,
- Tighten the nuts to lock the position of the sensor in the holder.
- Turn the key of the tractor to enable the wrapper power supply. Switch on the control panel,
- Check if the LED is on in the sensor part (E). If yes, this indicates that the sensor has been activated,
- If the LED is not on, move the sensor towards the activator, or if it is possible, the activator towards the sensor, and repeat the check of the function.

The wrapper inductive sensors are interchangeable. This means that you can diagnose a faulty sensor by installing another wrapper inductive sensor in its place. If the original sensor does not work but the replacement does, it means that the first one is faulty and should be

replaced with a new one of the same type. If the other sensor does not work either, check the connection of the plugs to the control module.

After reinstalling the sensor, make sure that the position of the plug and its cable does not cause collision with the wrapper moving components. Too tightly tensioned or too loose cable may be damaged or worn out more quickly.

5.3.4 Adjusting the angle sensor settings

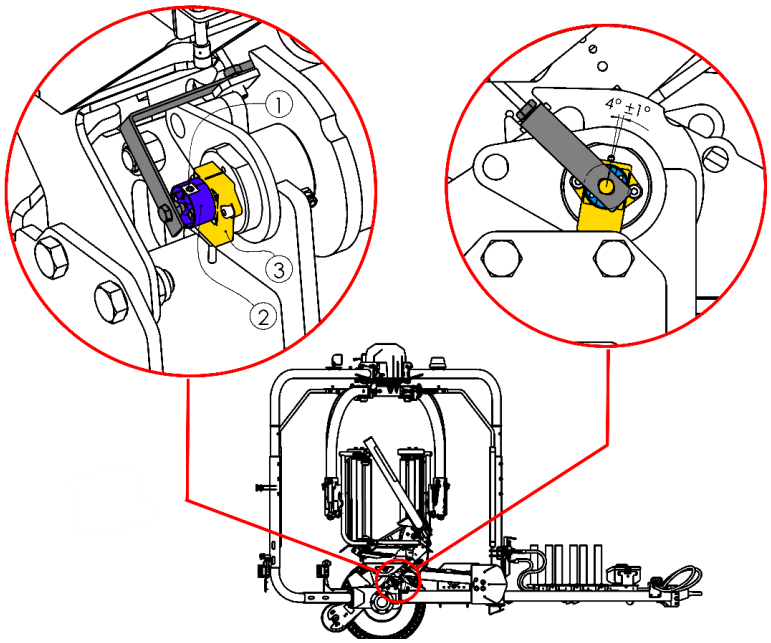


Figure 32. Changing the position of the angle sensor actuator

A non-contact angle sensor with a 180° range of operation communicates the message about a current position of the service table against the wrapper frame to the control module. You can adjust it by means of the control, or mechanically by shifting the fixing angle of its actuator (2) against the sensor (3), fixed to the stable part, specifically, the service table bearing housing. Table inclination values different from the factory ones can be reached in the loading, working and unloading positions. Making the change to the sensor position is recommended only if problems arise with the levelling of the wrapper connected to a tractor.

Adjusting the working settings of the service table from the control panel:

- Set the service table in the horizontal position and use the O/I switch on the side wall of the panel to switch the control panel off.
- Hold MENU to set the switch to I; the adjustment screen for the angle sensor is displayed.
- The loading position is the first to be set: after setting the table in this position, hit OK to confirm.
- Then, set the unloading position, hit OK to confirm.
- Finally, set the working position: set the table in the horizontal position and hit OK to confirm.
- After the final confirmation, the panel goes off. After re-enabling, check whether all the positions set are operational in both the manual and automatic modes.
- If any of the working positions is not operational, it may mean that it is located beyond the sensor readout range and its actuator should be set manually.

The procedure for mechanical setting of the angle sensor (**Fig. 32**):

- Set the service table in a backward-inclined position (for unloading) and switch the tractor hydraulics off. Switch off the engine of the tractor, apply the parking brake,
- Loosen the bolt (1) which locks the actuator (2).
- Turn the actuator body (2) left or right. It swivels around a bolt connected with an arm to the service table.
- The angle between the actuator indicator and the sensor indicator must be ca. 4° (notches on the sensor and actuator), and the distance between the notches should be within the range of 2-3 mm.
- The distance from the actuator to the sensor surface should be 1.5-2mm.
- Secure the position of the actuator by tightening its locking bolt to the axle.
- Start the tractor and switch on the hydraulic system and use the control panel keys to check the range of the service table movements. Make another adjustment from the control panel if required.
- If the adjustment range of sensor fixing is still insufficient, contact the dealer of the machine.

5.3.5 Verifying the function of the wrapping module limit stop sensors

Before you check the function of the sensors detecting collisions of the wrapping module safety stops, stop the tractor engine and apply its parking brake. Turn on the control panel and push the limit stop to the planet arm. The limit stop should return to its original position, and the control panel should show emergency stop. Perform the check for both arms.

WARNING

WARNING!
If either of the safety switches does not work correctly, contact the wrapper dealer's service centre and do not resume work with the wrapper until the fault has been rectified.

5.4 Adjustment of the hydraulic components

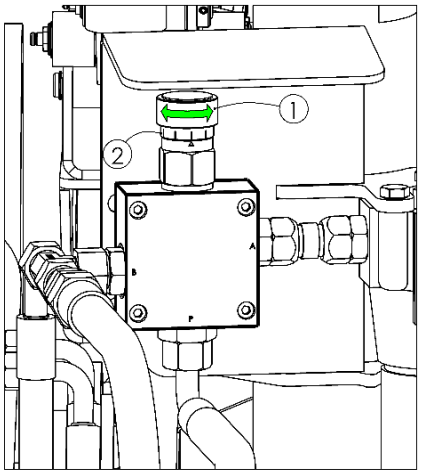


Figure 33. Flow control

The flow control (**Fig. 33**) is located on the front support of the wrapping module (**Fig. 3 –** item 18) and is used for limiting the consumption of oil on the wrapper supply line A and

disposing of the excess oil to the discharge line B. To adjust it, use the hand wheel (1) within the scale (2) range of 0 to 10, where 0 refers to full lock of the flow on the supply line, and 10 refers to the flow at the level of ca. 50 l/min. We recommend to set the range on the scale at 7-10.

If the tractor power hydraulic system is fitted with the flow control, adjust the tractor flow control first.

5.4.1 Adjusting the speed of film feeder lowering

If changing the speed of lowering and lifting the film feeders is necessary, use the throttle/non-return valves located under the upper cover of the hydraulic manifold. Removing the cover (**Fig. 34**):

- Switch off the hydraulic system and the engine of the tractor, apply the parking brake,
- Use the S13 wrench to loosen 4 bolts (2) which lock the upper cover (1) with the frame,
- Remove the cover.

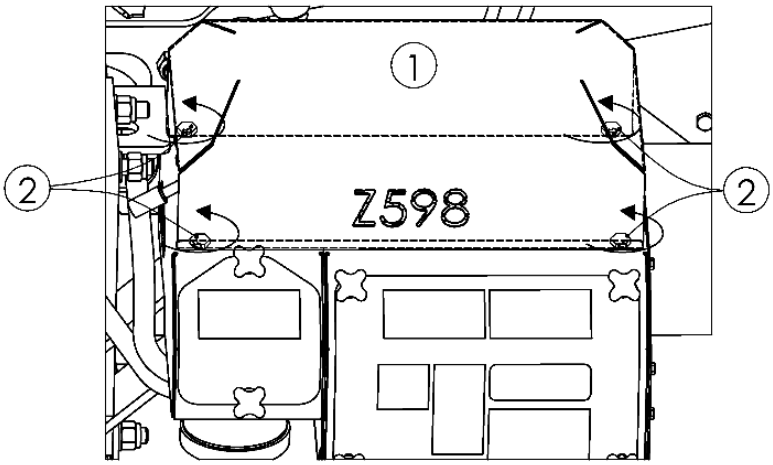


Figure 34. Disassembling the upper cover of the manifold

Adjust the lowering speed of the feeders both under the minimum and full load of the feeders, that is with full film roll and without film. Once you have finished the adjustment, make sure you replace the upper cover of the manifold.

Changing the lowering (**Fig. 35**) and lifting (**Fig. 36**) speed of the feeders:

- Switch off the hydraulic system and the engine of the tractor, apply the parking brake.
- Turn the hand wheel (2) clockwise to close the valve (1).
- To make the adjustment, open the closed valve and count full turns of the hand wheel or use the scale on the valve body.
- Check the lowering and lifting speed of the feeders by firstly aligning the planet arms with the longitudinal axis of the wrapper, and then lowering and lifting the feeders from the control panel.

- The time needed for the lowering either of the feeders cannot exceed 3 seconds from the moment of pressing the key.

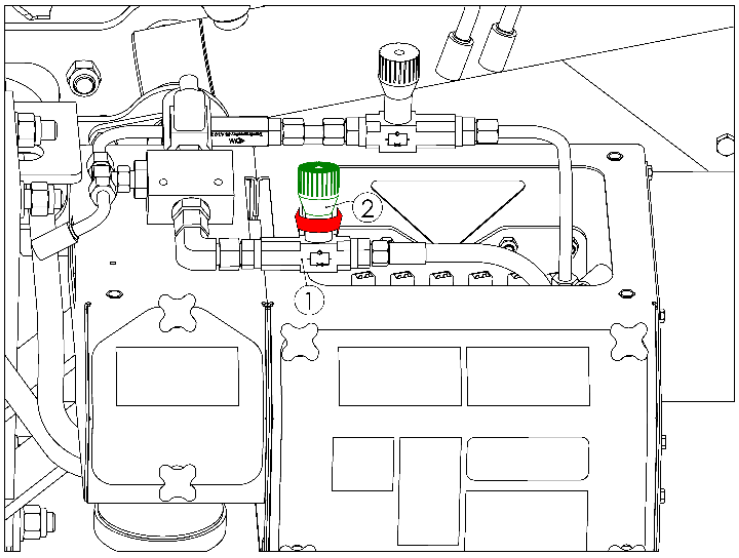


Figure 35. Adjusting the valve of the feeders' lowering speed

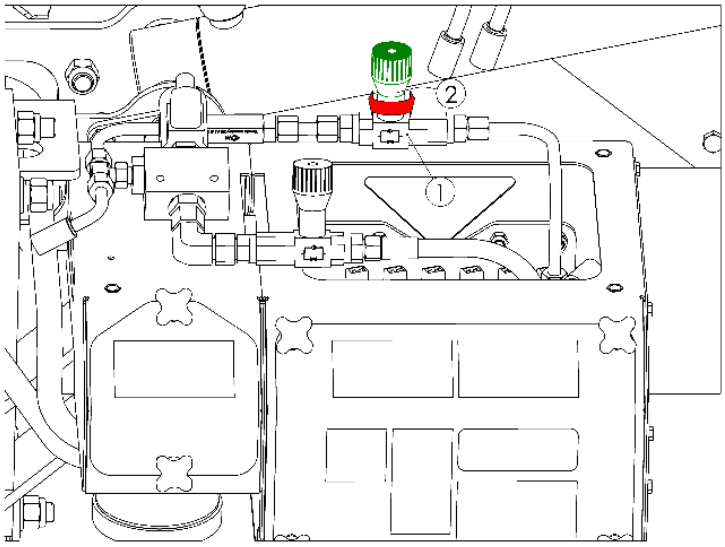


Figure 36. Adjusting the valve of the feeders' lifting speed

5.5 Adjusting the tension of the chains

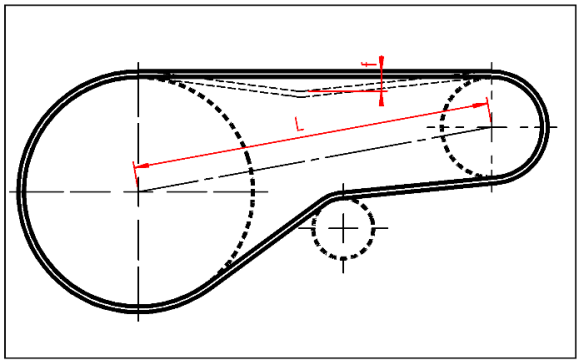


Figure 37. Checking the chain tension, $f = 0{,}1 \times L$

5.5.1 Drive chain of the service table drums

The procedure of drive chain adjustment (**Fig. 38**):

- Tilt the service table to set it in the unloading position,
- Switch off the hydraulic system and the engine of the tractor, apply the parking brake,
- Loosen the 3 M10 bolts (2) which lock the gearbox cover and remove the cover (1),
- Loosen the M16 nut (3) which locks the chain adjuster, and then set the adjuster to the required range (4),
- Tighten the nut which locks the adjuster at the required position,
- Check the tension of the chain at its longest section (5),
- Install the gear unit guard.

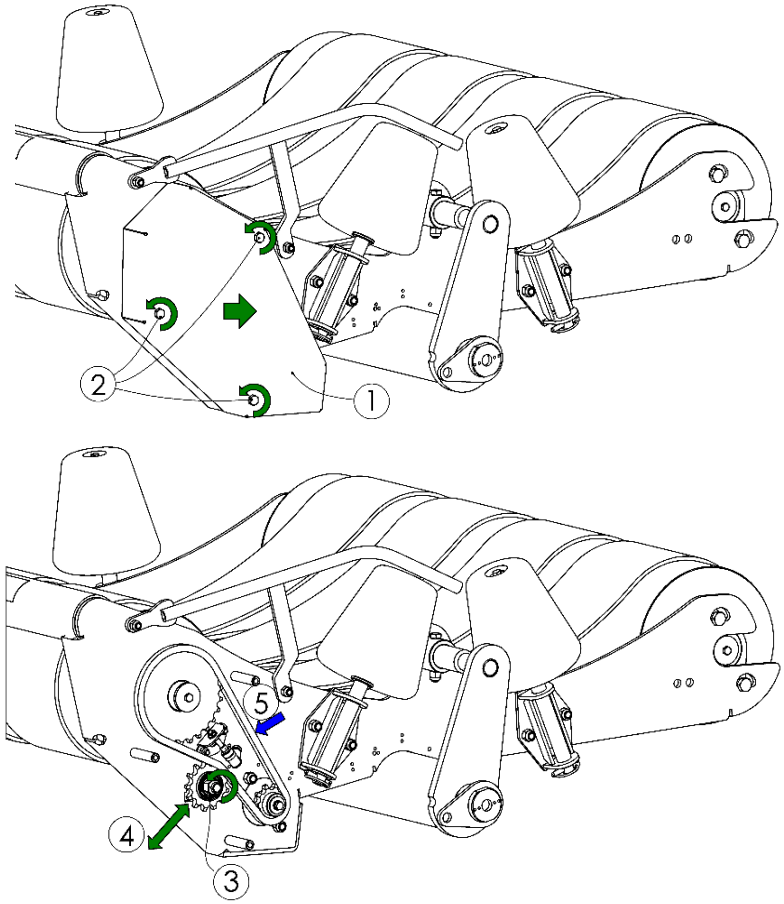


Figure 38. Adjusting the tension of the drum drive chain

5.5.2 Chain of the film adjuster gear unit

You can pre-tension the film in the feeder by changing ratio between two rollers which guide the band. The ratio is 21:12 and enables a pre-tension of the film at the level of 70%. The correct ratio is controlled by the chain gear unit.

The procedure of adjusting the tension of the film adjuster gear unit chain (**Fig. 39**):

- Switch off the hydraulic system and the engine of the tractor, apply the parking brake,
- Loosen two locking knobs (1) to remove the cover of the gear unit.
- Loosen the M8 nut (2) which locks the chain adjuster, and then set the adjuster to the required range (3),

- Tighten the nut which locks the adjuster,
- Check the chain tension (4) and the rollers for free rotating movement,
- Install the adjuster cover.

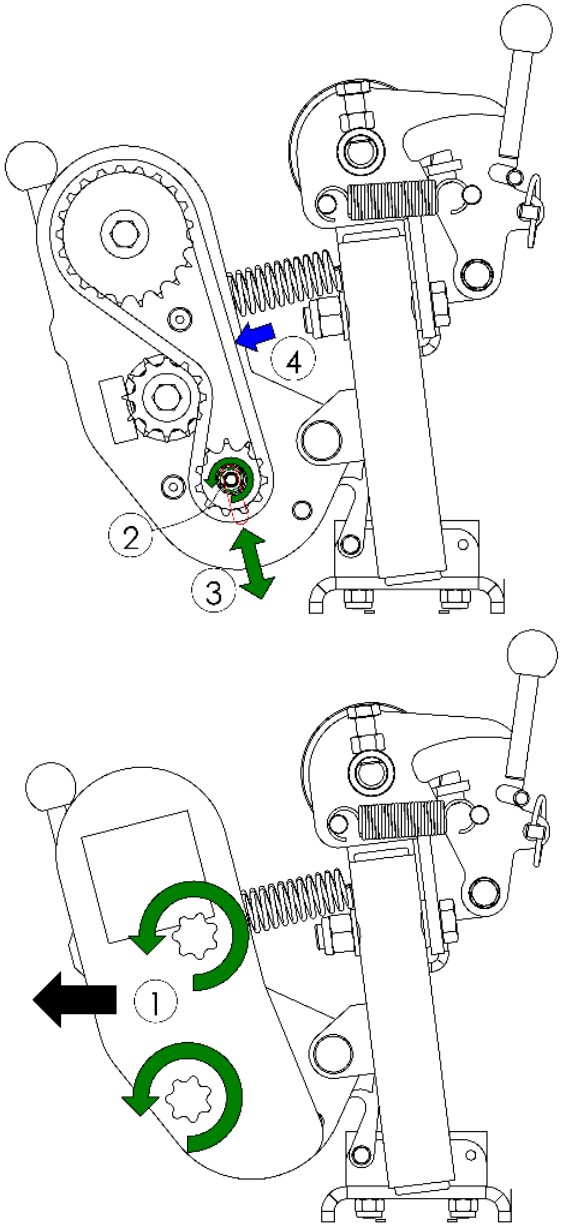


Figure 39. Film adjuster gear unit

6. Preparation for wrapping

6.1 Film installation

The film feeders are designed for the film rolls with a width of 750 mm. The notice sticker shows the correct flow of the film band (**Fig. 40**).

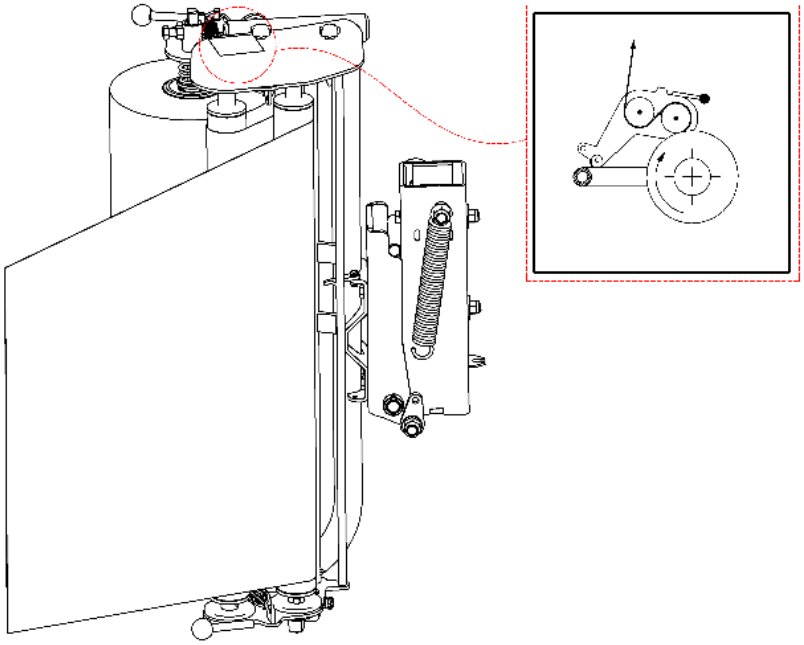


Figure 40. Film band flow

The procedure of installing the film roll in the feeder (**Fig. 41**):

- Set the planet arms with the feeders in the working position.
- Switch off the hydraulic system and the engine of the tractor, apply the parking brake.
- Pull the adjuster (1) and secure its position with the catch (2).
- Remove the clip pin (3) which locks the upper clamp and use the handle (4) to unlock it.
- Lift the upper clamp (5).
- Before you install a new roll, set it so that you obtain the correct band flow.
- Install the roll on the lower cone, lower and lock the upper clamp (6).
- Replace the locking clip pin (7) and release the catch (8).

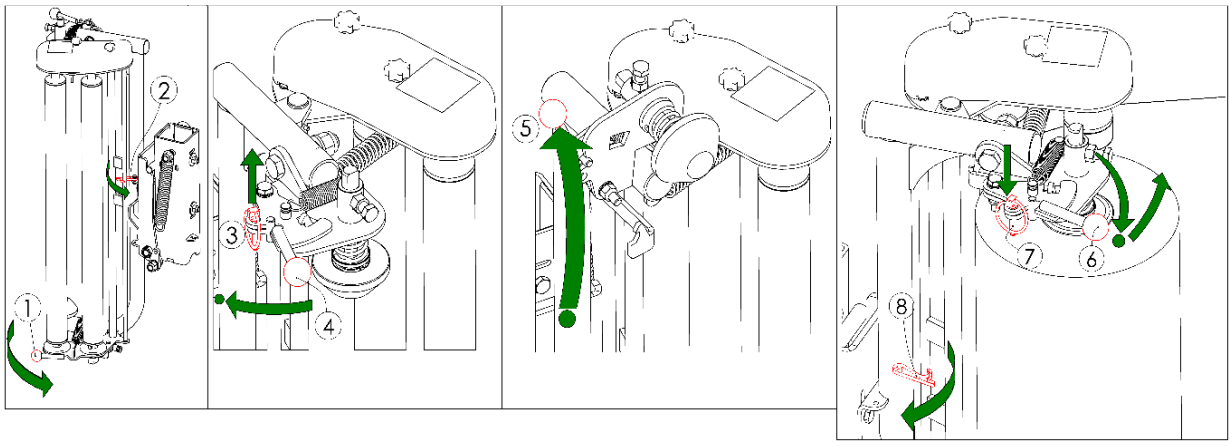


Figure 41. Installing a new film roll

6.2 Customising the service table to the bale size

Before you start wrapping, customise the service table to the size of bales to be wrapped. The components to be set are the passive drum and the side rolls.

The passive drum which tensions the working belts and side rolls, which support the side surface of a bale, can be set in two positions (**Fig. 42**):

Position A – wrapping bales with a diameter of up to 1.3 m

Position B – wrapping bales with a diameter above 1.3 m

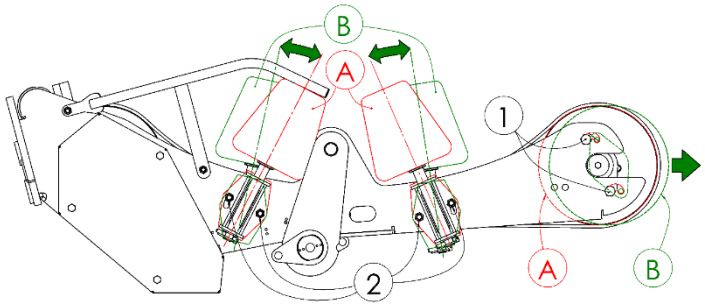


Figure 42. Working table adjustment components

The procedure of adjusting the service table settings (**Fig. 42**):

- Set the service table in the horizontal position.
- Switch off the hydraulic system and the engine of the tractor, apply the parking brake.
- Loosen the bolt nuts (1) which lock the bearings on both sides of the passive drum.
- Shift it to position A or B.
- Tighten the nuts (1) to lock the drum in a position.
- Loosen the nuts which lock the side supports (2).
- Shift the side supports to position A or B.
- Tighten the nuts (2) to lock the supports in a position.

6.3 Storage bins for sparefilm rolls

Six storage bins for spare film rolls are located on the wrapper drawbar. The tubes after used film rolls can be put into empty bins.

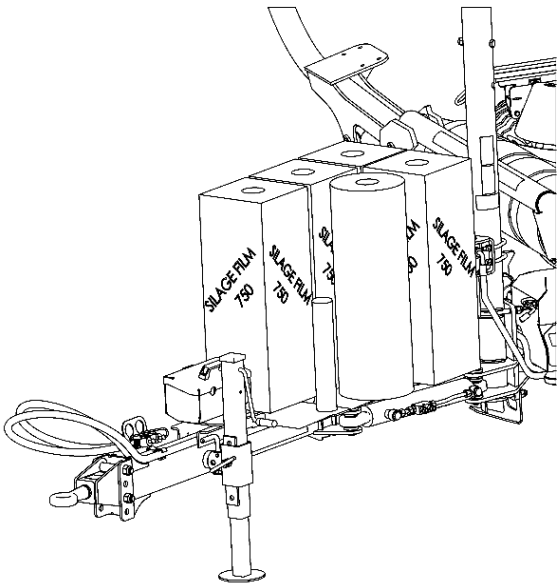


Figure 43. Storage bins with spare film rolls

6.4 Attaching film

After you load the first bale on the service table, you can attach the film directly to the bale or the film cutters. To attach the film to the cutters:

- Use the control panel key to open the film cutters,
- Switch off the hydraulic system and the engine of the tractor, apply the parking brake,
- Wrap the film band around the seizing arm (**Fig. 44**),
- Start the tractor and close the film cutters.

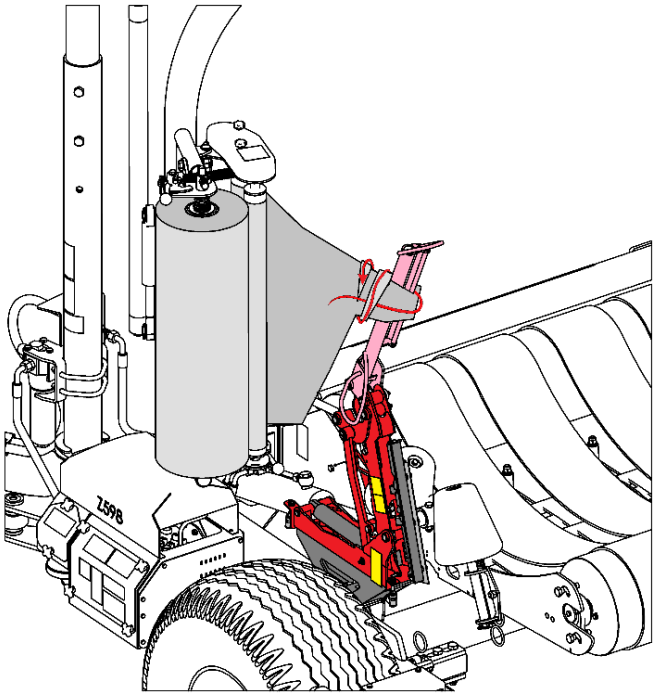


Figure 44. Attaching the film on the cutter arm

6.5 Basic rules of wrapping

6.5.1 Preparing bales

The bales used for wrapping should be of a regular and repeatable, cylindrical shape. A degree of bale compaction must be suitably customised to the type of vegetative material, its humidity and planned time of storage. Irregular-shaped bales or those with a too low degree of compaction can cause difficulty in proper wrapping. Bales must not be contaminated with soil.

Wrap bales in temperatures above zero. Preferably, wrap bales within 2 hours from their formation. Inside the unwrapped bales, adverse decomposition processes take place, mould growth prevents their use as feed, and in extreme circumstances it may lead to bale spontaneous combustion. Never wrap bales during rain. Run the wrapping on a field or at the bale storage area. Avoid unnecessary transport to reduce the risk of damaging the film covering bales. Make use of the bales within 12 months from the date of their wrapping.

6.5.2 Preparing film

For wrapping, use silage film with a width of 750mm wound on tubes with a height of 770mm. Using new film rolls is recommended. Following the end of work, remove the film rolls from the feeders, wrap tightly with a stretch film and store in a dry place without UV exposure or without any contact with chemical agents or sharp objects.

Take particular care when operating the film pre-tensioning (65-85%)[1]. A tensioning device which is worn out or not lubricated may cause excessive or insufficient film tensioning. The film tension may not be higher than 70%. Maintaining the proper condition of the rollers, particularly their edges, reduces the risk of film break during wrapping.

ATTENTION

ATTENTION!

Particular caution should be exercised during film installation. The blade of the cutter is very sharp. Risk of sustaining hand injury. Before you install the film in the cutter, turn off the tractor engine, remove the ignition key and apply the auxiliary brake of the tractor.

6.5.3 Number of planet arm revolutions

Calculating the number of planet arm revolutions:

- Determine the bale circumference (cm),
- Divide this value by 65 and round the result up to the nearest whole number,
- Add 2 to the obtained figure.

In this way, you will obtain the number of revolutions needed to cover a bale with two film layers.

To obtain the number of revolutions for four layers, multiply the result by 2, for six ones, by 3, etc.

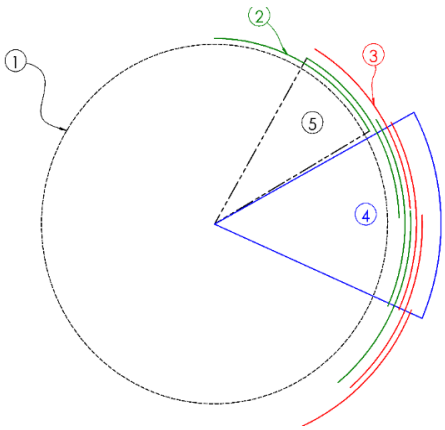


Figure 45. – film layers on a bale: 1 – cylindrical surface of a bale; 2 – two film layers applied to a bale at first revolution of the bale; 3 – two film layers applied at the second

[1] Mark two vertical lines with the distance of 10 cm apart. The line length of 17 cm corresponds to 70% of the film pre-tensioning. The film width at the end of the bale should not be lower than 600 mm for the 750-mm film.

revolution of the bale; 4 – a section of a bale covered with four film layers; 5 – an overlap of two bands of film

6.5.4 Film layer number

Individual film layers should overlap by ca. 50%. The minimum number of film layers should not be lower than 4 layers. At choosing a number of layers, consider the time for a bale to be stored, dry matter content and amount of stems.

Table 7. Number of film layers in relation to the storage time and bale type

STORAGE TIME (months)	DRY MATTER CONTENT		
	LOW 20-35%	MEDIUM 40-60%	HIGH more than 60%
2	4	6	6
4	4	6	8
6	6	6-8	8
8	6	8	8-10
10	6	8	10
12	6	8-10	10
	FILM LAYER NUMBER		

7. Operation and maintenance activities

WARNING

WARNING!
The operation-maintenance activities can be performed exclusively by persons familiar with this instruction manual, having relevant qualifications and tools for performing such activities. Lack of knowledge concerning the principles of safe operation and maintenance works at the wrapper and use of improper tools may result in hazard for human life or machine damage.

During performing of the operation-maintenance works you should wear relevant protective clothes and boots, adequate for the activities to be performed and substances with which you will be in contact.

Do not repair leakages from the pressurised devices and hydraulic elements.

In the case of damaging of machine parts they should be replaced with new, original parts. Application of not original or incorrect parts results in loss of the machine guarantee.

Unintended operation of the wrapper or operation by unauthorised persons who do not have right qualifications must be strictly avoided.

Accidental starting up of the machine must be prevented.

In the case it is necessary to carry on works at the wrapper elements that cannot be reached standing on the ground, only equipment intended for ascending (safe ladders) can be used. Do not use the wrapper elements for climbing the machine.

Tighten the bolts on fixed connection according to the values of tightening torques shown in Table 9 (**Chapter 7.5**). Tighten the bolts on moving connections so that the lowest possible play is achieved and their mobility is preserved.

Follow the check lists during connecting the machine with the tractor, starting it up and disconnecting the wrapper with the tractor.

It is recommended to run an operation and maintenance activities log book. It will allow for the continuous insight at the machine technical condition and to avoid repair activities in the field.

Hydraulic oil leakages to the environment must be prevented. Carry on repairs of the hydraulic installation on the place where there is no danger of oil penetration into the soil, ground water, food and animal fodder. Use tight and safe containers to store worn oil.

If it is necessary to conduct the operation-maintenance activities under the elevated machine parts (e.g. wheel replacement), they must be protected against lowering by installing stable supports under.

7.1 Cleaning

Use great care during the cleaning procedure with the use of pressure devices. The bearings and the bolt, hydraulic and electrical connections are not water-resistant. Do not expose these components to water for a longer time. Each time after you clean the machine with water, these components must be lubricated again. Dry the places where the electrical bundle sheath is damaged and protect them with water-resistant repair tape for electrical bundles.

Cleaning the machine after use:

- Clean the machine of all vegetation, their residues and other dirt.
- Clean the lighting components.
- Clean the warning pictograms and the rating plate to keep them legible.
- Wipe the film adjuster rollers to remove dirt; denatured alcohol can be used for this.
- The service table belts can be washed with water with detergent and a pressure device.

Protecting the machine after cleaning:

- After you have cleaned the machine with water, lubricate bearings, gaskets and articulated connections again.
- Apply a layer of a plant-origin oil on the film cutter blades.
- Protect any coating defects and protective layer scratches with anti-corrosion agents and paint.
- Damaged safety stickers must be renovated or added as required.

Clean the dirtied control panel casing with a dump piece of cloth with some detergent. Do not use organic solvents for washing (e.g.acetone, benzine, nitro solvent), as it may result in damage of the panel casing.

7.2 Machine maintenance

To maintain a proper working order and service life of the moving components of the machine, follow the guidelines laid down in the maintenance table (**Tab. 8**) and carry out regular inspections of the machine. The maintenance work is to be carried out on the wrapper set in the working position.
If any other position needs to be used, it will be noted accordingly.

Use the greases class EP 2 or EP 3 (e.g. ŁT-43 EP-3) as plastic grease. Use a grease gun to apply lubrication via the grease nipples. Use a brush covered with grease to lubricate sliding surfaces. As for the roller chains, it is recommended to use greases and oils dedicated for roller chains.

Removing from the sliding surfaces as much of the residue of the previous grease as possible before carrying out the lubrication is recommended, as it can contain contaminations

(sand, organic impurities) which may cause quicker part degradation or loss of grease properties. After carrying out the lubrication, remove the excess of grease spilt from the lubrication points so that you prevent them from attracting dirt and hampering the machine operation.

7.3 Lubrication interval

Table 8. Lubrication Table

COMPONENT NAME	LUBRICATION POINT	DRAWING NO./ PAGE NO.	LUBRICATION INTERVAL			
			After first 10 hrs	Every 50 working hours	Pre-seasonally	Post-seasonally
Cutter slide bearings	1	Fig. 46 / p. 31	•		•	
Cutting blade	2	Fig. 46 / p. 31		•	•	•
Feeder bearings	3	Fig. 46 / p. 31	•	•	•	•
Feeder gear unit drive chain	4	Fig. 46 / p. 31	•	•	•	•
Upper clamp of film roll	5	Fig. 46 / p. 31	•		•	•
Feeder cylinder bearings	6	Fig. 46 / p. 31	•		•	
Drawbar swivel joint	7	Fig. 47/ p.32	•		•	
Support foot gear unit	8	Fig. 47 / p. 32			•	
Support foot swivel joint	9	Fig. 47 / p. 32	•		•	•
Drawbar cylinder bearings	10	Fig. 47 / p. 32	•		•	
Service table cylinder bearings	11	Fig. 48/ p.32	•	•	•	
Loading arm cylinder bearings	12	Fig. 48 / p. 33	•	•	•	
Loading arm swivel joint	13	Fig. 48 / p. 33	•	•	•	
Adjuster unit of the drum drive chain	14	Fig. 48 / p. 33	•		•	
Drum drive chain	15	Fig. 48 / p. 33	•	•	•	•
Drum bearing units	16	Fig. 48 / p. 33	•		•	
Drive module bearing unit	17	Fig. 49/ p.32			•	
Toothed wheels of drive module gear unit	18	Fig. 49 / p. 34	•	•	•	
Moving components of safety stop latch	19	Fig. 49 / p. 34	•		•	•

7.4 Lubrication points

The lubrication points were marked numerically in this manual, where each number has one of the three linings, which means the kind of the lubricant and tools used for its application.

Marking of the lubrication points:

1 – plastic grease applied with a grease gun

1 – grease applied on sliding surfaces with a brush,

1 – plant oil (e.g. rape) applied with a brush.

The lubrication points on the machine fitted with grease nipple are marked on the machine  with notice stickers:

7.4.1 Film cutter and film feeder

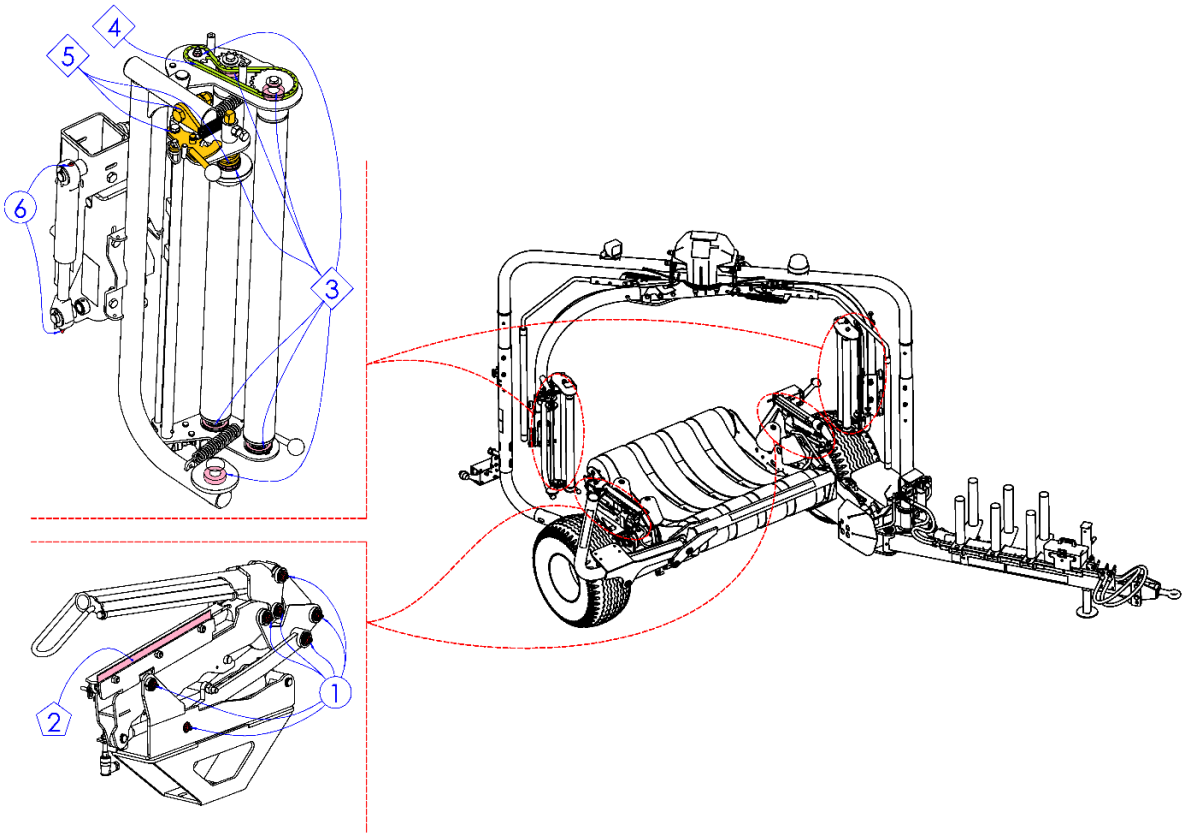


Figure 46. Lubricating points of film cutter and film feeder: 1 – nipples of cutter slide bearings; 2 – cutting blade; 3 – feeder bearings; 4 – feeder transmission drive chain; 5 – film roll upper clamp; 6 – nipples of feeder cylinder bearings

7.4.2 Drawbar components

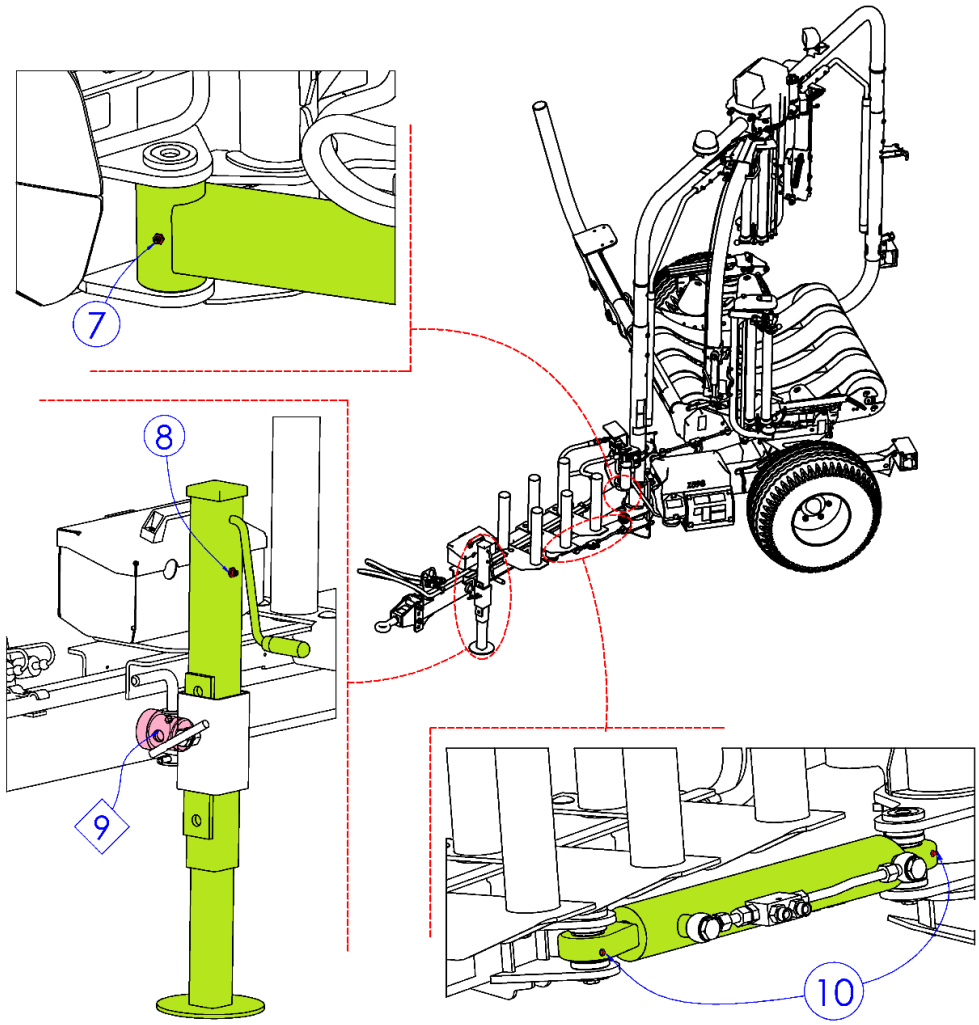


Figure 47. Lubrication points of the drawbar components: 7 – nipple of drawbar swivel joint;
8 – nipple of support foot gear unit; 9 – support foot swivel joint;
10 – nipples of drawbar cylinder

7.4.3 Service table with the loading arm

Carrying out the lubrication of the service table components require the service table to be tilted to the unloading position and the drum drive cover to be removed.

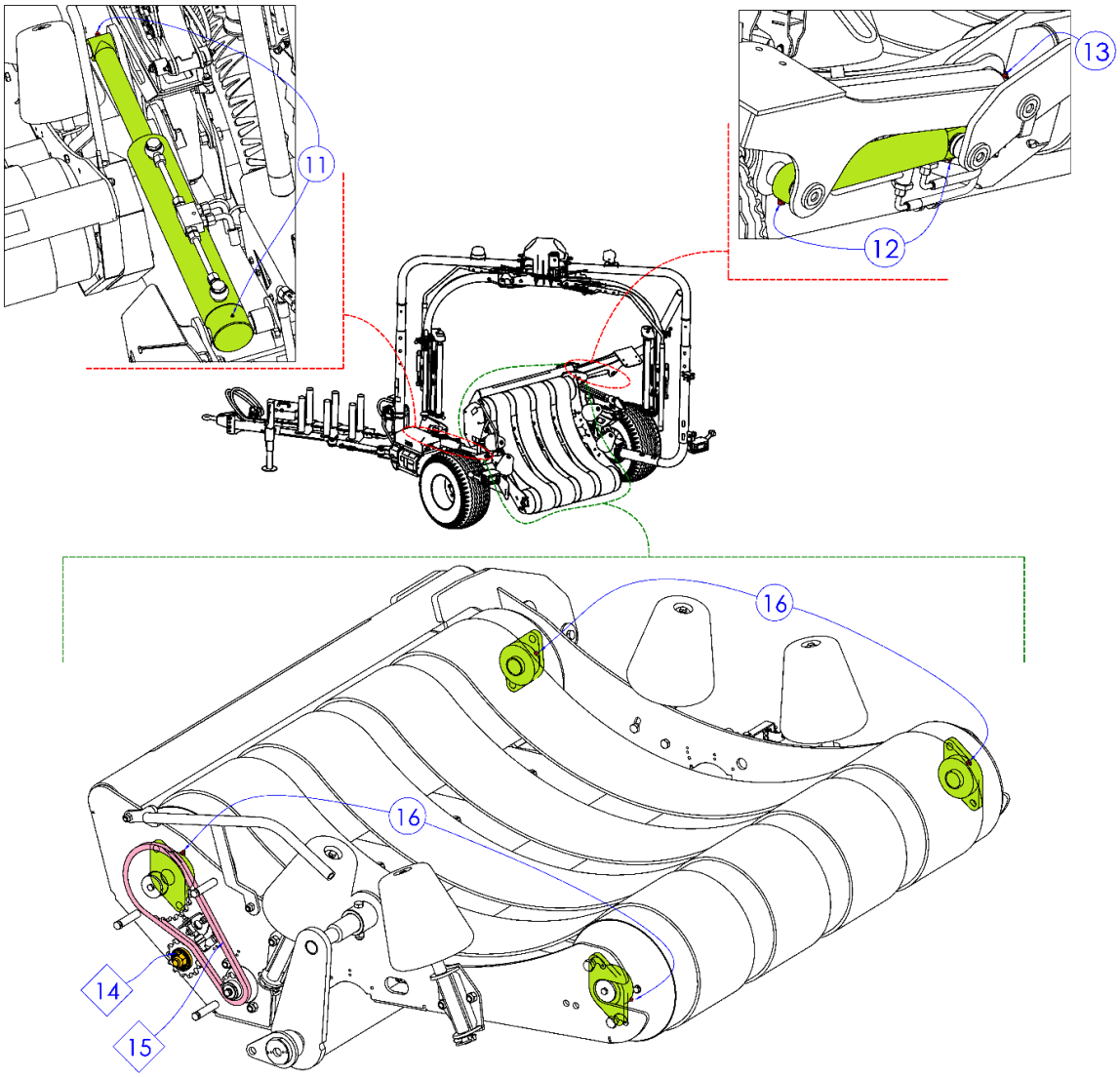
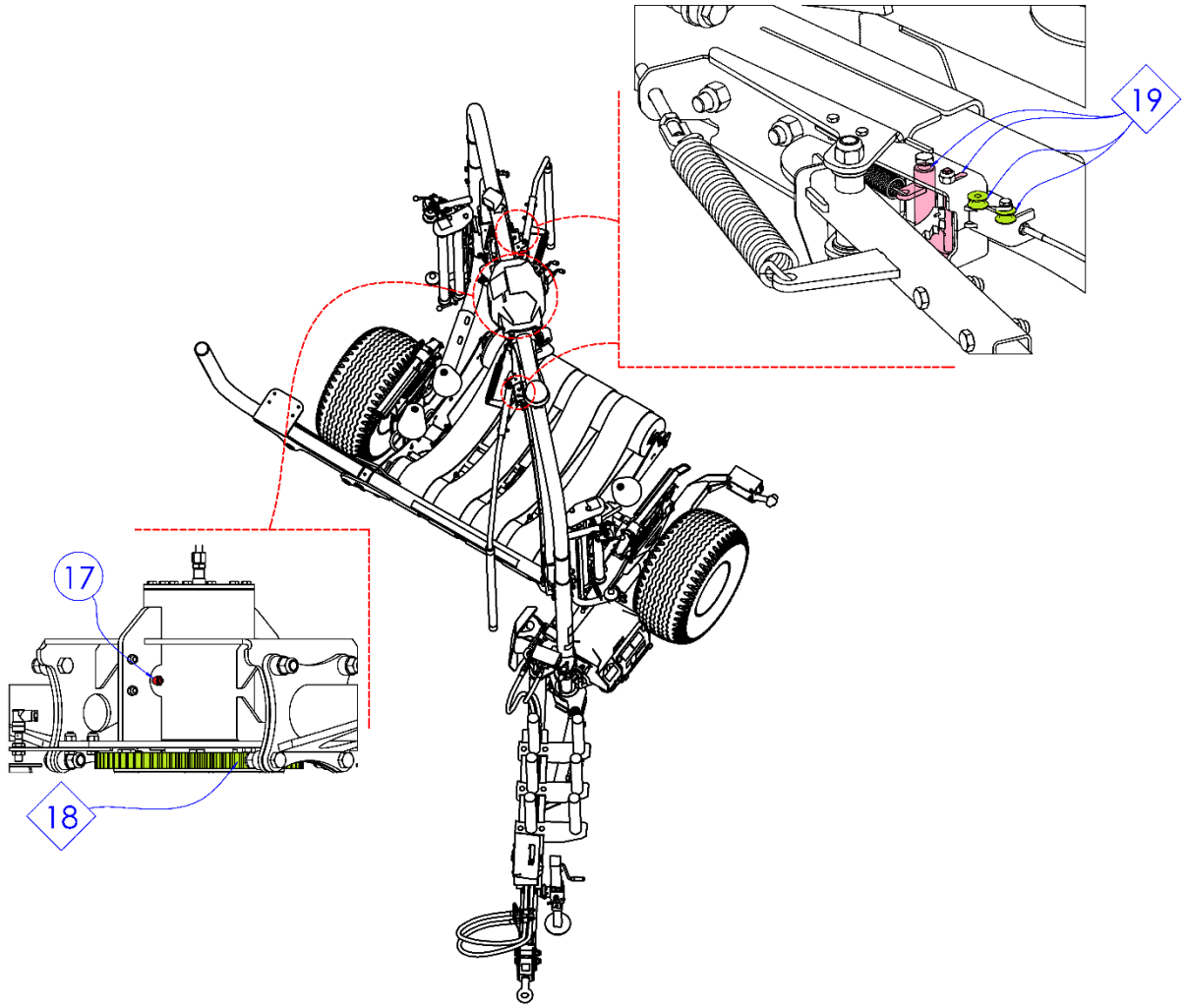


Figure 48. Lubrication points of the service table with the loading arm:
11 – nipples of table tilt cylinder; 12 – nipples of loading arm cylinder; 13 – nipple of loading arm swivel joint; 14 – adjuster unit of drum drive chain; 15 – drum drive chain; 16 – nipples of drum bearing units

7.4.4 Drive module of the planet arms and limit stop latches

Disassemble the module cover before you carry out the lubrication of the planet arm drive module bearings (**Fig. 49**). Use special, safe ladders or platforms to reach elevated wrapper components. Never climb the machine itself.

Figure 49. Lubrication points of the drive module and limit stop latches: 17 – nipple of drive module bearings; 18 – toothed wheels of drive module gear unit; 19 – moving components of safety stop latch



7.5 Bolt tightening specifications

Table 9. Tightening torque values for bolts

BOLT SIZE	STRENGTH CLASS			WRENCH SIZE [mm]
	R=8.8	R=10.9	R=12.9	
	TIGHTENING TORQUE [Nm]			
M3	1.3	1.8	2.1	6
M4	2.9	4.1	4.9	8
M5	5.7	8.1	9.7	9
M6	9,9	14	17	10
M8	24	34	41	13
M10	48	68	81	17
M12	85	120	145	19
M14	135	190	225	22
M16	210	290	350	24
M18	290	400	480	27
M20	400	570	680	30
M22	550	770	920	32

7.6 Regular replacement components

Table 10. Intervals of component replacement

COMPONENT NAME	REPLACEMENT INTERVAL	
	Every 2 years	Every 6 years
Hydraulic filter insert	•	
Hydraulic hoses		•

7.7 Storage

After the season operation of the machine has finished or after a longer period of the wrapper non-use perform the following:

- Remove the film rolls from the feeders,
- Clean the machine (Chapter 7.1),
- Carry out the recommended maintenance work (Chapter 7.2),
- Repair or replace any damaged components,
- Repair any defects of the paint coating and other protective layers,
- Set the machine on a level, compacted surface and place chocks under the wrapper wheels to protect the wrapper from rolling away,
- It is recommended to store the wrapper under roofing or protective waterproof tarpaulin,
- It is recommended to store the wrapper with a lowered service table and closed loading arm,
- Store the wrapper in a manner which does not compromise the safety of persons or animals. The film cutters fitted with sharp blades must remain in the closed position.
- Check the condition and legibility of the rating plate. If it is damaged, contact the service centre.
- Store the control panel in a dry room protecting the terminals against dirt and humidity.
- Wind the control panel cable and store in a dry room protecting the terminals against dirt and humidity.

8. Authorised service

8.1 Guarantee service

The manufacturer provider a guarantee for the machine on the terms and conditions as stipulated in the guarantee card.

In the period covered with the guarantee the repairs are performed by the authorised services of the dealers or the manufacturer services.

8.2 Routine service

After the period of the guarantee coverage it is recommended to carry on the periodical inspections at the authorised services of the dealers.

8.3 Ordering spare parts

Purchase the spare parts at the dealer's, or order them at the manufacturer directly providing: last and firs name or the company name and the address of the buyer, name, symbol, factory number and year of manufacture, catalogue part name, catalogue drawing or standard number, number of ordered parts, agreed terms of payment.

9. Wrapper transport

ATTENTION

ATTENTION!
Before you drive the wrapper on public roads, remove the film rolls from the feeders and put them inside the storage bin on the machine drawbar.

9.1 Stability of the tractor and wrapper unit during bale unloading

Before you hitch the machine to the tractor to work with, determine the stability of the tractor and wrapper unit during unloading (**Fig. 50**). To determine the stability, assume the criterion of the least advantageous circumstances when, during unloading a bale, the hitch is subjected to an upward vertical force F1.

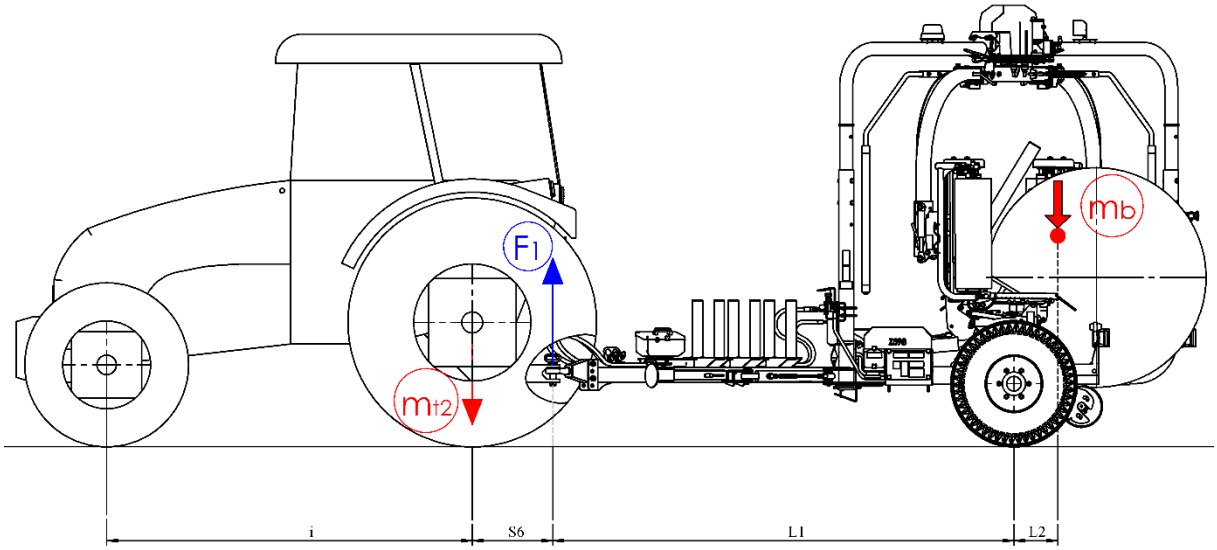


Figure 50. Stability of the tractor and wrapper unit during unloading

$$0{,}5 \times m_{t2} \times g \times i \geq F_1 \times (i + s_6),$$

$$m_{t2} \geq \frac{2 \times F_1 \times (i + s_6)}{g \times i}$$

where:

m_{t2} – tractor rear axle load [kg]

g – acceleration due to gravity [$g = 9{,}8\ m/s^2$]

i – the distance between the tractor axles [m]

s_6 – the distance between the middle of the rear axle to the hitch point [m]

F_1 – upward vertical force acting on the hitch point during unloading, F_1=2.4 [kN]

If the tractor does not comply with the stability criterion, load its rear axle additionally with such weight, so that its value ensures stability during the unloading. Otherwise, the wrapper may not be used with the tractor which fails to comply with the stability criteria.

9.2 Manoeuvrability of the tractor and wrapper unit with a loaded bale

Before coupling the tractor with the wrapper, make sure that the traffic is fully manoeuvrable. The front axle load of the tractor must be at least 20% of the tractor weight (**Fig. 51**). If this condition is not fulfilled the front axle of the tractor must be loaded.

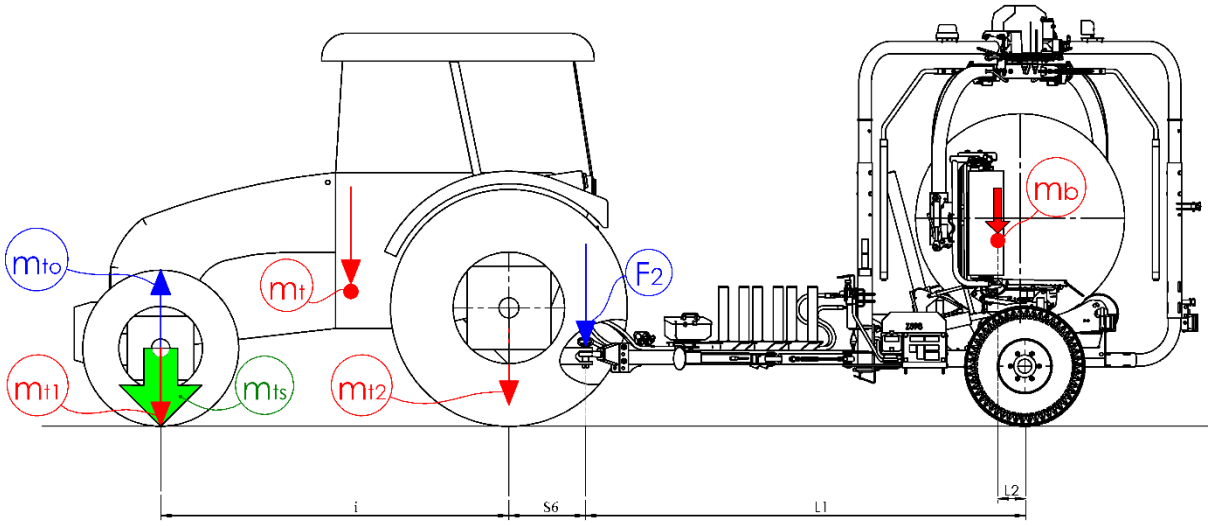


Figure 51. Manoeuvrability of the tractor and wrapper during a ride with a bale

$$F_2 = \frac{m_b \times g \times L_2}{L_1} \Rightarrow |F_2| \approx 2000N$$

$$m_{to} = \frac{F_2 \times (i + s_6)}{i \times g}$$

$$m_{ts} = m_{t1} - m_{to}$$

$$m_{ts} \geq 0{,}2 \times m_t$$

where:

F_2 – downward vertical force acting on the hitch [N],

m_b – wrapper weight, with a loaded bale [kg],

m_t - tractor weight [kg];

m_{t1} – tractor axle load, without hitching the wrapper,

m_{to} – additional unloading of the tractor front axle [kg],

m_{t1} – tractor axle load, with the loaded wrapper,

L_1 – distance from the hitch point to the wrapper wheel centre line, L_1=3.15[m],

L_2 – distance from the middle of the wrapper weight to the wrapper wheel centre line, L_2=0.2[m],

9.3 Load transport

The wrapper is designed to be carried by railroad and road transport of a relevant payload capacity.

ATTENTION

ATTENTION!
For the road or rail transport loading by means of lifting gear, use the fixing points of frame components marked with a pictogram on the machine:

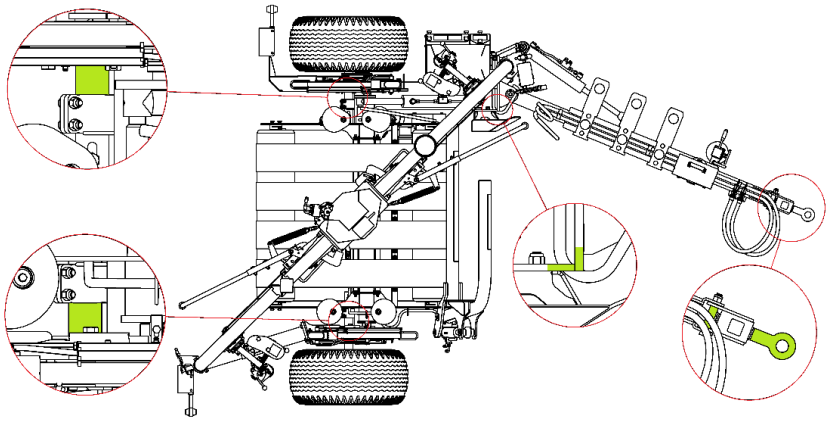


Figure 52. Locations of the fixing points on the wrapper

Lifting equipment can be operated by trained operators holding relevant qualifications. It is forbidden to transport the wrapper with a silage bale located on it. For the time of transport the transported wrapper should be permanently and reliably attached to the floor.

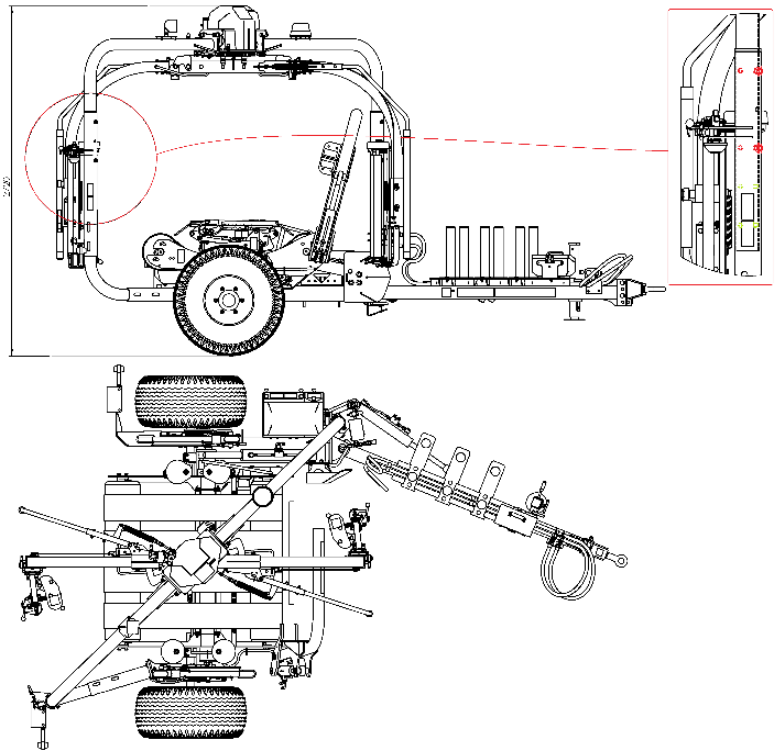


Figure 53. Lowering the transport height of the wrapper by slipping off the wrapping module supports

10. Wrapper disposal

Disassembly and disposal should be performed by specialized services familiar with construction and operation of the wrapper. Only the specialized services possess the full and updated knowledge in the respect of the materials used and the risk related to the hazards in the case of their incorrect storage and transport. The authorized services offer both counselling as well as performance of the complete services concerning disposal of the machine.

Proper tools and auxiliary equipment (hoist, lifting jack, wheel puller) must be used for disassembly.

Store the worn oil in tight containers. Without any delay supply it to a petrol station that runs purchase of the worn oil.

Disassemble the machine. Segregate the disassembled parts. Supply the dismantled parts to the relevant recycling points.

During disassembly of the wrapper use proper protective clothes and protective boots.

11. Accessories

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

- Bale tipper (tips bales vertically),
- Working lighting, a set,
- Spare parts catalogue hard copy,
- Warning and notice pictograms, a set
- A triangular plate indicating slowly moving vehicles,
- Varnish coating repair set.

12. Residual risk

12.1 Residual risk description

The residual risk results from an erroneous behaviour of the wrapper operator. The largest hazard occurs during execution of the following activities:

- Assembly of the wrappers on tractors that do not fulfil the requirements described in the instruction,
- Staying under raised machine units,
- Staying of persons in the area of wrapper operation,
- Servicing or repairing the wrapper when the tractor engine is still on,
- Control of the wrapper by an operator who is outside the tractor cockpit,
- Control of the wrapper by an operator under the influence of alcohol,
- Operating of a damaged wrapper or operation with the guards removed.
- Operation of the wrapper on slopes exceeding 8°,
- Transport of the wrapper of silage bales on the public roads,
- Staying of people on the machine during its operation or transport,
- Using the wrapper not for its intended purpose,
- Leaving the unsecured wrapper on slopes,
- Staying in the area between the tractor and the machine during the tractor engine operation.

When presenting the residual risk the bale wrapper is treated as a machine that till the moment of starting its manufacturing was designed according to the current state of the art.

12.2 Residual risk assessment

Observing the recommendations such as:

- Read carefully the guidelines of the instruction manual and adhere to them,
- Standing under raised machine units is forbidden,
- No persons allowed in the area of wrapper operation,
- Maintenance and repair of the wrapper at authorised services,
- Operation of the machine by trained and authorised operators,
- Protection of the wrapper against the access of children and the third persons,

The residual hazard can be minimized during the use of the wrapper and consequently operation of the machine with no hazard for people and the environment.

ATTENTION

ATTENTION!
There exists the residual risk in the case of disobeying the particular recommendations and indications of the manufacturer.

13. Typical faults and their removing

Majority of errors and faults can be rectified by the users on their own. Before contacting the service centre or manufacturer, the users should verify if it is possible to identify and solve the problem by themselves, using the information provided in this chapter.

After an error or fault occurs, switch the wrapper and tractor off and protect it from accidental rolling away. It is prohibited to operate a damaged machine, as it may lead to the damage in the machine and serious injuries.

Table 11. Malfunction description, ways of identification and rectification

	Fault description	Cause	Way of rectification
1.	Rapid hydraulic oil overheating	Insufficient amount of oil in the tractor system	Check the oil level in the tractor. Replenish the oil
		Incorrect setting of the wrapper flow control	Verify the setting on the wrapper flow control (Chapter 5.4.1)
		Hydraulic system contamination	Check the hydraulic filter
			Contact the dealer
		Too high volume of oil consumption from the tractor	Reduce the volume of consumption in the tractor
2.	Hydraulic cylinders move too slowly	Insufficient amount of oil in the tractor system	Check the oil level in the tractor. Replenish the oil.
		Too low oil pressure in the hydraulic system	Set a higher supply pressure
		Incorrect setting of the wrapper flow control	Verify the setting on the wrapper flow control (Chapter 5.4.1)
		Too low volume of oil consumption from the tractor	Raise the volume of consumption in the tractor
			Check the function under a different tractor
		Hydraulic system contamination	Check the hydraulic filter
			Contact the dealer
3.	One of the cylinders does not move	The inductive sensor of cylinder position	Check the sensor position and function for the respective cylinders (Chapter 5.3)
		Oil leakage	Check if there is a leak from the hydraulic hoses or cylinder
		Plug connection at the control module	Check the plugs for tightening
		Plug connection of the solenoid valve in the hydraulic block	Check the plug connection of the solenoid valve at the hydraulic block
			Contact the dealer

No.	Fault description	Cause	Way of removing
4.	Planet arms move too slowly	Insufficient amount of oil in the tractor system	Check the oil level in the tractor. Replenish the oil
		Incorrect setting of the wrapper flow control	Verify the setting on the wrapper flow control (Chapter 5.4.1)
		Inductive sensor of the planet arm rotational speed	Check the S14 sensor position and function (Chapter 5.3)
		Too low volume of oil consumption from the tractor	Raise the volume of consumption in the tractor
			Check the function under a different tractor
		Hydraulic motor valve	Contact the dealer
5.	The planet arms do not stop in correct positions	Inductive sensor of the stopping position of the arms in standby position	Check the S9 sensor position and function (Chapter 5.3)
		Inductive sensor of the stopping position of the arms in transport position	Check the S10 sensor position and function (Chapter 5.3)
		Inductive sensor of the planet arm rotational speed	Check the S14 sensor position and function (Chapter 5.3)
		Too low volume of oil consumption from the tractor	Raise the volume of consumption in the tractor
6.	Working drums do not move	Inductive sensor of the drum rotational speed	Check the S13 sensor position and function (Chapter 5.3)
		Too low volume of oil consumption from the tractor	Raise the volume of consumption in the tractor
7.	The service table does not stop in correct positions	Angle sensor of the service table position	Check the S1 sensor position and function (Chapter 5.3)
			Contact the dealer
8.	Film not cut by the film cutter.	Blunt blade	Replace the blade
		Incorrect blade setting	Adjust the blade setting
		The film clamp not lowered to its final position	Check the S3 and S5 sensor position and function (Chapter 5.3)
9.	Film not gripped by the film cutter	The film clamp not lowered to its final position	Check the S3 and S5 sensor position and function (Chapter 5.3)
		Incorrect setting of the cutter cylinder eye	Contact the dealer
10	Problems with bale loading, wrapping and unloading	Unsuitable shape or/and dimensions of the bale	Wrap bales with a correct shape and dimensions given in the wrapper characteristics.

No.	Fault description	Cause	Way of removing
11.	The hydraulic system does not answer to the controlling signals from the control panel	Incorrect direction of oil flow	Put the distributor lever on a right position or switch the hydraulic plugs.
		Oil pressure too large	Diminish the setting of the oil pressure in the tractor to the max. value of 160bar (16MPa)
12.	The film on a wrapped bale is damaged during unloading	Incorrect place of unloading	Unload the wrapped bales only at a place which does not pose a risk of damaging the bale.
		Too few film layers	Raise the number of film layers.
13.	Damage and breakage of the film band during wrapping	Damaged surface of the adjuster roller	Wipe the adjuster roller with sandpaper
			Replace heavily damaged adjuster rollers with new ones
		Contaminated surface of the adjuster roller	Clean the roller surface
		Damaged film roll	Replace the damaged film roll with a new one
		Film is too tensioned	Lubricate the components of the film feeder (Chapter 7)
		Low quality film	Use better quality film

GUARANTEE TERMS

1. The manufacturer hands over the bale wrapper designed and made according to the standards currently in force. The manufacturer guarantees that the supplied wrapper is free from any manufacturing faults.
2. Metal-Fach Sp. z o.o. provides for the wrapper the guarantee period service during 24 months counted from the date of the first sale, at its use as intended, complying at the same time with the recommendations included in this instruction.
3. The prove of providing the guarantee by the manufacturer is the guarantee card correctly filled up by the dealer with the customer signature, confirming acceptance of the guarantee terms.
4. The quality guarantee covers the faults of the machine caused by its faulty manufacturing, material faults and concealed defects.
5. The guarantee does not cover the units and parts subject to normal operation tear and wear.
6. The guarantee does not cover mechanical damages and damages resulting from incorrect operation, incorrect maintenance and incorrect setting of the wrapper.
7. The guarantee does not cover damages resulting from incorrect storage of the machine.
8. Loss of the guarantee results automatically due to self made changes performed by the user.
9. The manufacturer is not liable for loss, damage or destruction of the product resulting from the causes other than the inherent faults of the supplied machine.
10. During the guarantee period the manufacturer shall perform all guarantee repairs of the faults caused by the manufacturing plant, except for the faults mentioned in points 5 to 8.
11. The guarantee repair shall be executed within 14 work days from the date of reporting/supplying the wrapper to the indicated service points or any other time agreed upon by the parties.
12. The guarantee shall be extended for the duration of the repair period.
13. The repairs performed by the service points in the guarantee period that are not covered by the guarantee shall be fully paid for. Prior to execution of such a repair the service point shall agree its performance with the user, proposing the scope of the repair, its planned costs and time of execution.
14. The decision of paid repair execution by the authorized service point of the wrapper that at the moment of reporting the repair is in the guarantee period is taken by the customer.

The current information concerning the products is available on the web site **www.metalfach.com.pl**

GUARANTEE CARD

Metal-Fach sp. z o.o.
ul. Kresowa 62
16-100 Sokółka

SELF-LOADING WRAPPER
Z598

Guarantee services on behalf
of the manufacturer are rendered by _____

Filled up by the Seller

Product manufacturing date _____

Serial number of the machine _____

Date of sale _____

Seller signature _____

Buyer's first and last name _____

Address _____

_____

_____

Seller signature _____

GUARANTEE REPAIRS

No.	Date of breakdown removal	Description of performed actions and replaced parts	Guarantee period of the indicated part extended till	Seal and legible signature

NAME AND ABBREVIATION INDEXES

Bar – bar, pressure unit (1 bar = 0.1 MPa)

OHS – occupational health and safety

dB (A) - decibel A, sound pressure unit

Drawbar pull class – a value characteristic for drawbar pull of a tractor, class 0.9 corresponds to the drawbar pull of 9 Kn.

km/h - kilometre per hour, linear speed unit

kW - kilowatt, power unit

l/min – litre per minute, volume flow rate unit

m - meter, a length unit

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

mm – millimetre, an additional length unit

rev. - revolution, determining the kind of movement

rpm - revolution per minute, a rotation speed unit

pictogram - an information plate

pos. X – a position, marking a position in a figure or diagram

Fig. X – a figure numbered X

Fig. X – Y – a figure numbered X, item in the figure marked Y

tab. X – a table numbered X

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

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

V - Volt, a voltage unit

Hitch, upper transport hitch – hitch components of a farming tractor (see a tractor instruction manual)

ALPHABETIC INDEX

PART I

H

Hydraulic system 29

O

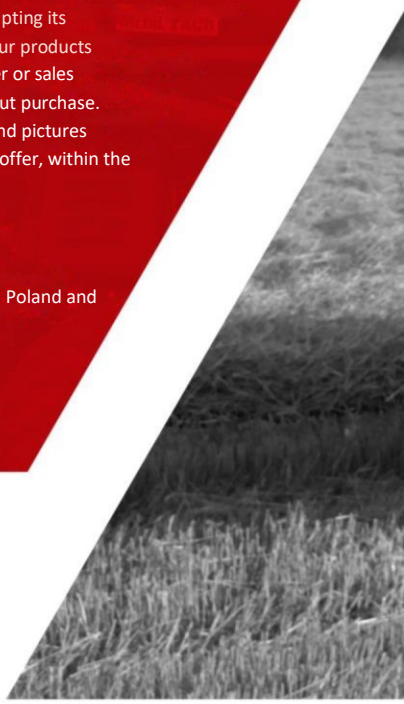
PART II

NOTES

Since Metal-Fach Sp. z o.o. is continuously perfecting its products and adapting its commercial offer to the needs of clients, we reserve the right to modify our products without prior notice. Therefore, we advise contacting an authorised dealer or sales representative of Metal-Fach Sp. z o.o., prior to making your decision about purchase. Metal-Fach Sp. z o.o. will not accept any complaints, regarding the data and pictures contained in the catalogue, as the presented offer shall not constitute an offer, within the meaning of the provisions of the Civil Code.

The pictures do not necessarily show standard accessories.

Original spare parts are available from authorised dealers, located both in Poland and abroad, and also at the Metal-Fach retail outlet.



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