



METAL-FACH



**REPAIR AND MAINTENANCE BOOK
BALE WRAPPER
Z598
MAY 2020**

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The information included in this Repair and Maintenance Book is valid as of the date of its drawing up. The manufacturer reserves its right to make design changes to machines, and due to this, some values or illustrations might not correspond to the actual state of the machine supplied to the user. The manufacturer reserves its right to make design changes without amending this Repair and Maintenance Book.



CAUTION

CAUTION

When repairing and maintaining the machine, use the Repair and Maintenance Book and the Instruction Manual written for this machine model.

1 Identification, Bale Wrapper

Identify the Bale Wrapper on the basis of the rating plate permanently fixed to the Bale Wrapper's main frame.


<p>A METAL-FACH SP. Z O.O.</p> <p>B S1a</p> <p>C e9*167/2013*11030</p> <p>D SUMZ34000JSSK0001</p> <p>E 1500 kg</p> <p>F A-0: 200 kg</p> <p>G A-1: 1500 kg</p>	 <p>ul. Kresowa 62, 16-100 Sokółka, Poland tel.: +48 (85) 711 98 40-45, fax: +48 (85) 711 90 65</p> <p>Owijarka bel</p> <table border="0"> <tr> <td>Typ handlowy</td> <td>Z598</td> <td>Nacisk na zaczep</td> <td>1,96 kN</td> </tr> <tr> <td>Wariant</td> <td>4D2RNREHB</td> <td>KJ</td> <td><input type="text"/></td> </tr> <tr> <td>Rok produkcji</td> <td>2018</td> <td></td> <td></td> </tr> <tr> <td>VIN</td> <td colspan="3">SUMZ34000JSSK0001</td> </tr> </table> <p>CE</p> <p>www.metalfach.com.pl</p>	Typ handlowy	Z598	Nacisk na zaczep	1,96 kN	Wariant	4D2RNREHB	KJ	<input type="text"/>	Rok produkcji	2018			VIN	SUMZ34000JSSK0001		
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Wariant	4D2RNREHB	KJ	<input type="text"/>														
Rok produkcji	2018																
VIN	SUMZ34000JSSK0001																

Figure 1. Rating plate

Key to the fields on the rating plate:

- A** – Manufacturer's name;
- B** – Category, Subcategory, and Vehicle-Speed Indicator;
- C** – EU-Type Approval Number;
- D** – VIN;
- E** – Permissible total design weight of the vehicle;
- F** – Vertical load at coupling point;
- G** – Permissible design weight per front axle.

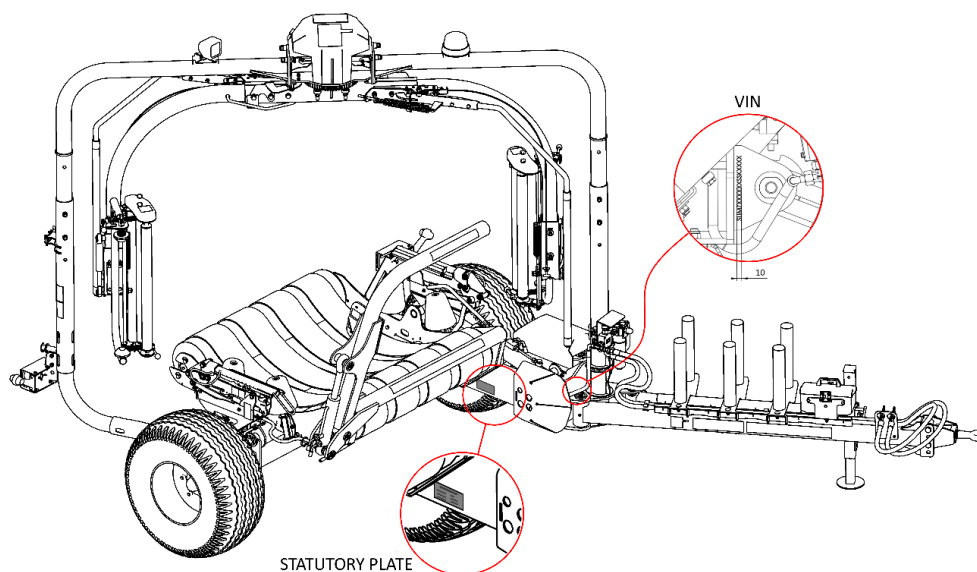


Figure 2. The location of the rating plate and the VIN

2 Bale Wrapper cleaning



Use great care with the use of pressure devices during the cleaning procedure. The bearings and the bolt, hydraulic, and electrical connections are not water-resistant. Do not expose these components to water for a long 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, its residues, and other dirt.
- Clean the lighting components.
- Clean the warning pictograms and the rating plate to keep them legible.
- Wipe the film-tensioner rollers to remove dirt; denatured alcohol can be used for this.
- The service-table rollers 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's 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 soiled L-02 counter casing with a damp piece of cloth with some detergent. Do not use organic solvents for washing (e.g. acetone, benzine, nitro solvent), as it can result in damage to the panel casing.

3 Storage

Post-season or after a long period of the Bale Wrapper's non-use perform the following tasks.

- Remove the film rolls from the feeders,
- Clean the machine (**Section 2**),
- Carry out the recommended maintenance work (**Section 6**),
- 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 that 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.
- Lock out the machine against unauthorised use (use of a padlock chain, a standard component on a bale wrapper drawbar),
- Check the condition and legibility of the pictograms. In the case they are damaged replace them with new ones.



CAUTION

CAUTION!

Store the Bale Wrapper in an atmosphere free from aggressive factors (e.g. ammonia, chemicals).

4 Dismantling and Disposal

Dismantling and disposal should be performed by specialized services familiar with the construction and operation of the Wrapper. Only specialised service centres have the full and up-to-date knowledge on the applied materials and risk associated with the hazards of improper storage and transporting. The authorized services provide both counselling and performance of the complete services concerning the disposal of the machine.

The correct tools and auxiliary equipment (hoist, lifting jack, wheel puller) must be used for dismantling.



CAUTION

CAUTION!

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



CAUTION

CAUTION!

Dismantle the machine. Sort the dismantled parts. Deliver the dismantled parts to the relevant recycling points.



During the dismantling of the Wrapper wear the proper protective clothes and protective boots.

5 Coupling to a tractor

Prior to the commencement of connecting the Bale Wrapper to the tractor make sure that it fulfils all the requirements. Combine the Bale Wrapper Z598 with a farm tractor with power of at least 35 kW and a pull class of at least 0.9.

The tractor must be provided with at least two power-hydraulics quick-release sockets (acc. to ISO 7241-1, type A, size 12.5), affording pressure supply and the free return of oil from the Wrapper's distributor to the tractor's oil tank. The tractor's hydraulic installation must allow the switching off of the hydraulic supply of the working sections from the tractor's operator's seat in the tractor's cockpit.

The Bale Wrapper is designed to work with open centre hydraulic systems. The wrapper manifold supports drive hydraulic systems with a load sensing feature.

The tractor must be provided with a 3 - pin electric socket 12 V (DIN 9680).

Prior to connecting the wrapper with the tractor the operator must make sure that the wrapper is complete and all the bolts are tightened correctly (see **Section 11** for the table of bolt-tightening torques).

Make sure that the points marked for lubrication are actually greased. If it is not the case, have them lubricated. (**Section 10.**)



DANGER

DANGER!

The machine's working area is considered a danger zone. Prior to starting up the machine make sure that there are neither people nor animals in the near proximity of the machine. Stop the Bale Wrapper immediately if any persons come near the machine and require any unauthorised persons to leave this zone. Never stop in the close proximity of or under terraces or balconies, in front of open rooms, or any kinds of platform, where persons or animals can stay. The Bale Wrapper's operator is responsible for all damage inflicted by the machine during operation.



CAUTION

CAUTION!

Make sure that in the area of connecting the wrapper with the tractor and in the near vicinity, there are no third parties present, especially children.



WARNING

WARNING!

Wear well-fitting clothes that cannot be caught by movable elements, and boots with non-slip soles.

In case of the hazard of an item ejection wear a protective helmet with eye protection.



CAUTION

CAUTION!

Make sure the power hydraulic system is tight. In order to check that there are no leaks from the hoses use tissue paper or other paper.



CAUTION

CAUTION!

Standing near the machine while operating the Bale Wrapper poses the threat of impact or crushing. Exercise special caution while coupling and uncoupling the machine's hitch.

5.1 Connecting with the drive

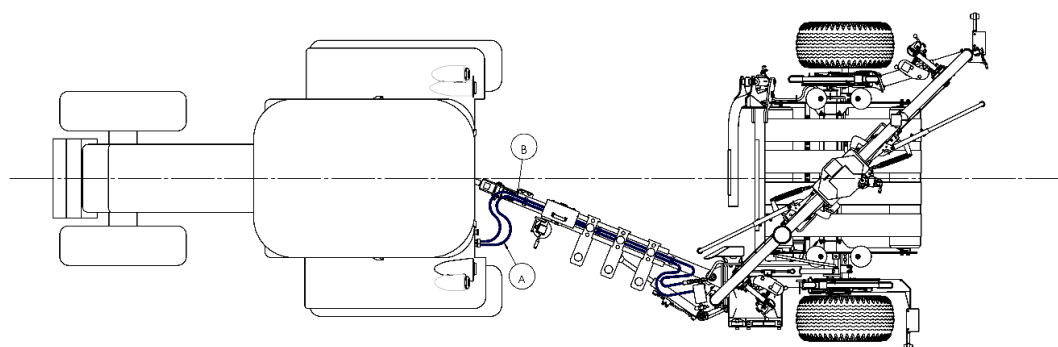
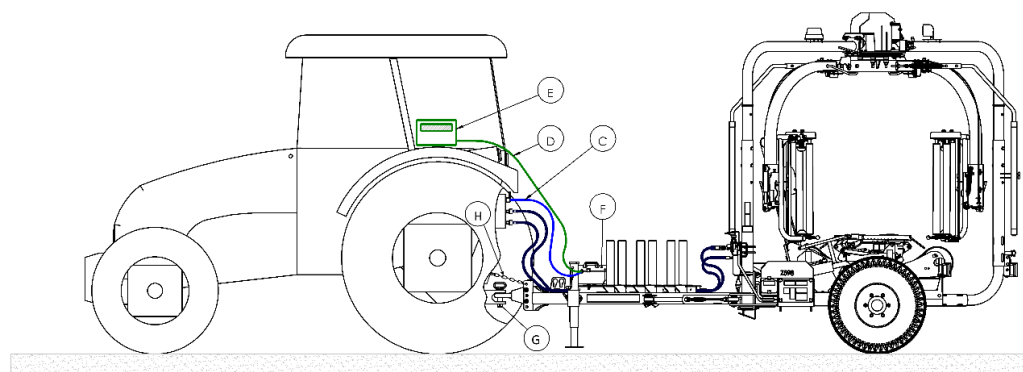


Figure 3. Connecting the hitch and drive of the Bale Wrapper

- Connect the Bale Wrapper to the lower tractor's hitch, which allows the transmission of a vertical load of 2 kN. Check stability and manoeuvrability with the tractor.
- Make sure that in the area of the Bale Wrapper coupling with the tractor and in the near vicinity there are no bystanders present, especially children.
- While connecting with the tractor, position the machine along the tractor's axis on paved, even and level ground. Stop the tractor's engine, take the key from the ignition, and engage the tractor's parking brake.
- Level the Bale Wrapper by means of the adjustable support foot, and by setting a suitable hitch height at an appropriate adjustment eye.
- Remove the padlocked chain, which protects the machine against unauthorised use, from the hitch eye.



CAUTION

CAUTION!

Couple the drawbar eye with the tractor's agricultural hitch only, and check the connection for correctness, and the protections against accidental disconnection.

- Remove the padlocked chain, which protects the machine against unauthorised use, from the hitch eye.
- Start the tractor and drive it towards the Bale Wrapper so that the opening in the hitch eye of the tractor aligns with the opening in the hitch eye of the Bale Wrapper. The opening diameter in the hitch eye is 44 mm.

- Stop the tractor's engine, take the key from the ignition, and engage the parking brake.
- Attach the Bale Wrapper hitch eye using a suitable hitch pin (G), and secure the pin with a locking pin against spontaneous detachment.
- Use a chain (H) to provide additional security against detachment of the combination by fastening it between the Bale Wrapper hitch and the tractor. It will ensure residual controllability of the Bale Wrapper if the machines are suddenly uncoupled.
- Connect the electric power supply plug to the wrapper (**Section 8**) Protect against accidental disconnection. Put excess supply conductor (C) in the operator cab or in the box for electric bundle (F).
- Place the control panel (E) in the tractor cockpit and then connect to it the communication cable (D). Put excess communication cable in the operator cab or in the box for electric bundle.
- Connect the hydraulic supply system by plugging the supply hose plug (A) and the return hose (B) in the supply sockets of the tractor.
- Adjust the support foot and set it to the transporting position.
- Before you start working or enter public roads, ensure the ground-wheel bolts are tightened correctly.
- Before you enter public roads, connect the wrapper lighting system (**Section 9**) to the socket in the tractor. Check the lighting for correctness.
- Start the tractor, switch on the control panel and check correct operation of the power hydraulic systems in the manual mode, without the bale and without film on the feeders.

5.1.1 Checking of operation of wrapper hydraulic system control

- In the manual mode, move the drawbar to set it in both the working and transport positions.
- If the planet arms are not in the collision position with the loading arm, extend and fold the arm manually to check its functionality. Leave the arm in the extended position.
- Tilt the service table for loading and unloading (with the loading arm extended). Leave the service table in the horizontal position.
- Open and close the film cutters. Leave the cutters in the closed position.
- If the planet arms are not in the collision position with other wrapper components and the film feeders are in the vertical position, perform several clockwise (looking at the wrapper from above) rotations of the wrapping module. Stop the planet arms aligned with the wrapper longitudinal axis.
- Use the push button on the control panel to turn the film feeder by 90° to the horizontal position.
- Then, use the film cutter closing button to lift the film feeders to the vertical position.
- Turn the planet arms of the wrapping module to the standby or transport position, and leave them as such.
- Optionally, check the power hydraulics without bales and without film for functionality in the automatic mode (**Section 5.1.2**).

5.1.2 Checking power hydraulics control for correctness in the automatic mode

- Set the moving wrapper components in the working position. Set the minimum number of rotations of the wrapping module.
- Select the 2D wrapping operation mode and confirm starting the automatic operation – the auto./man button.
- Execute automatic loading.
- Execute automatic wrapping. The planet arms should turn clockwise looking from the top, start and slow down smoothly. After the preconfigured number of rotations, the planet arms should stop in the position that prevents unloading or reloading.
- If the planet arms have stopped correctly, you can confirm the automatic unloading.
- After unloading, the wrapper should go into the standby position.

If the hydraulic and control systems work correctly, load first bale and ensure that the value of the tractor front axle load does not exceed 20% of the tractor weight. It is proved by maintaining the complete controllability of the tractor.

5.2 Drive disconnection

The procedure for uncoupling the Bale Wrapper from the tractor

- Make sure that in the area of the Bale Wrapper coupling with the tractor and in the near vicinity there are no bystanders present, especially children.
- If it is possible, set the Bale Wrapper's components in the transporting position.
- If the wrapper is to be idle for a long time, lower the service table.
- Position the Bale Wrapper in its storage place on even and level ground. Stop the tractor's engine, take the key from the ignition, and engage the tractor's parking brake.
- Disconnect the electrical supply, wrapper control and lighting systems. Wind the cables and place them in the box on the wrapper drawbar.
- Disconnect the power hydraulics system and protect the hydraulic hoses in their clamps on the wrapper drawbar (**Fig. 4 – B**).
- Lower the support foot from its transporting position to the working position.
- Make sure that there is no hazard of accidental machine displacement and place a wheel chock if necessary.
- Disconnect the drawbar eye from the farm hitch of the tractor. Detach the additional chain that links the hitch to the tractor.

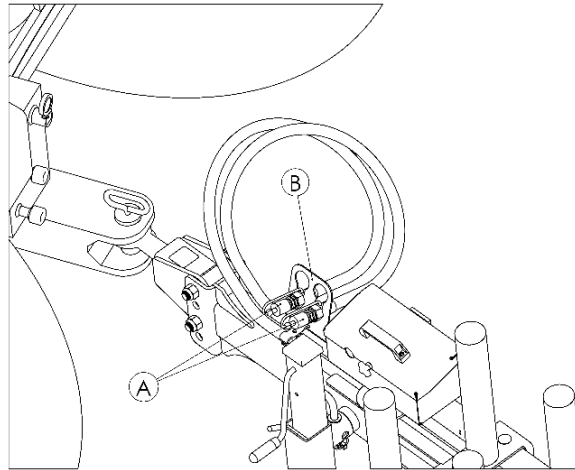


Figure 4. Hydraulic conductor clamp



CAUTION

CAUTION!

Hydraulic connections must always be kept clean. After use reinstall plastic cover supplied at purchasing the machine (**Fig. 4- A**).



CAUTION

CAUTION!

After disconnecting the Wrapper from the tractor, its control panel should be stored in a dry, safe, place, away from the reach of unauthorised persons, especially children.



CAUTION

CAUTION!

After disconnecting the wrapper from the tractor, its power- supply wires and the communication cable of the control panel should be stored in the box for the electric bundle mounted on the wrapper drawbar.

6 Maintenance and adjusting

While performing the operation-maintenance works you should wear the appropriate 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 damage to machine parts they should be replaced with new, original parts. The application of non-original or incorrect parts results in the loss of the machine guarantee.

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

The accidental starting up of the machine must be prevented.

If it is necessary to carry out works on Bale-Wrapper elements that cannot be reached standing on the ground, only equipment intended for ascending (safe ladders) can be used. Do not use the Bale Wrapper's components for climbing the machine.



Tighten the bolts on fixed connection according to the values of tightening torques shown in **Section 11**.

Tighten the bolts on moving connections so that the lowest-possible play is achieved and their mobility is preserved.

Follow the check lists while connecting the machine with the tractor, starting it, and disconnecting the Bale Wrapper from the tractor.



It is recommended to run an operation and maintenance activities log book. It will facilitate continuous insight into the machine's technical condition and to avoid the need for repair activities in the field.

Hydraulic-oil leakages to the environment must be prevented.

Carry out repairs to the hydraulic installation in a place where there is no danger of oil penetration into the soil, ground water, food, or animal fodder. Use tight and safe containers to store used oil.

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

When changing a wheel, lift the Bale Wrapper using the points marked with the jack

pictogram .



CAUTION

CAUTION!

Do not inflate the tyres over the recommended pressure. For unladen machine this is 3.5 bar.



CAUTION

CAUTION!

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.

Parts from other manufacturers are not inspected or approved by Metal Fach. To avoid risk, use the original spare parts by Metal Fach only.

6.1 Machine maintenance



To maintain the proper working order and service life of the moving components of the machine, follow the guidelines laid down in the maintenance table (**Table 2**) 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.

It is recommended to remove as much of the previous residual grease as possible from the sliding surfaces before carrying out the lubrication, as it can contain contaminations (sand, organic impurities) that can cause quicker part degradation or loss of grease properties. After carrying out the lubrication, remove the excess grease spilt from the lubrication points so that you prevent them from attracting dirt and hampering the machine's operation.

6.2 Regular replacement components

Table 1. Intervals of component replacement

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

6.3 Adjusting the height of the wrapper hitch eye

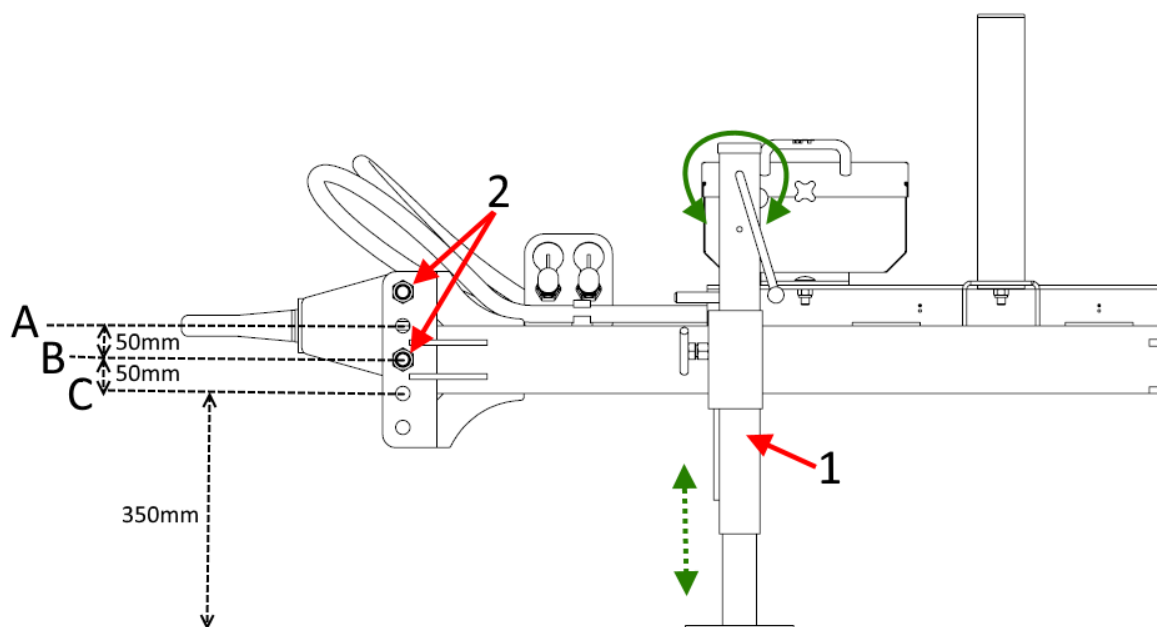


Figure 5. Adjusting the height of the hitching eye

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. 5**):

- The wrapper must be set on level ground, propped by a support foot (1) and levelled by it,
- Drive the tractor up to the wrapper so that its hitch is near the hitch eye of the wrapper,
- Switch off the engine of the tractor, apply the parking 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 (2) that secure the drawbar eye and set it in the upper (A), middle (B) or lower (C) position.
- Relock the connection with nuts by tightening it with a torque of 400 Nm,
- 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.

6.4 Adjusting the support foot

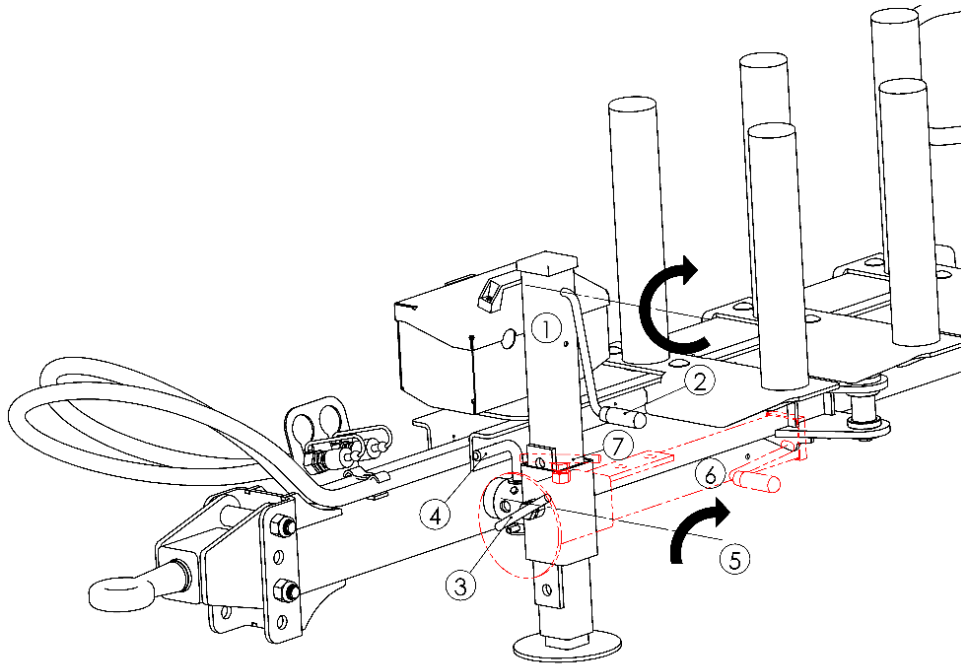


Figure 6. There are two positions of the wrapper support foot

- 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. 6**):

- While 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 that 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 that is the nearest to the base of the foot (7) and secure this position tightening the locking screw.

6.5 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. 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 from their respective actuators. Shifting their position accidentally may occur during the transport of the machine from the dealer to the buyer, for instance.

Damage to the sensor may occur if they are set improperly against their respective actuators, or if they are fixed incorrectly. It is important for the user to know 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.

6.5.1 Sensor description

Table 2. Sensor description and function

Sensor code	Location	Type	Description
S1	Fig. 7	Angle sensor	Angle position of the service table
S2; S4	Fig. 7	Inductive sensor, proximity switch, PNP	Film cutter open position
S3; S5	Fig. 7	Inductive sensor, proximity switch, PNP	Film cutter closed position
S6	Fig. 7	Inductive sensor, proximity switch, PNP	Drawbar position
S7	Fig. 7	Inductive sensor, proximity switch, PNP	Loading arm open position
S8	Fig. 7	Inductive sensor, proximity switch, PNP	Loading arm closed position
S9	Fig. 7	Inductive sensor, proximity switch, PNP	Counting the number of planet arm revolutions Defining the stopping position of the arms for loading/unloading.
S10	Fig. 7	Inductive sensor, proximity switch, PNP	Defining the transport position for the planet arms
S11; S12	Fig. 7	Inductive sensor, proximity switch, PNP	Film breaks and measuring the length of used film
S13	Fig. 7	Inductive sensor, proximity switch, PNP	Rotational speed and number of revolutions of the service table drum
S14	Fig. 7	Inductive sensor, proximity switch, PNP	Rotational speed and angle of the planet arm rotation
S15; S16	Fig. 7	Limit switch, contact	Collision with the wrapping module limit stops

6.5.2 Locations of the sensors

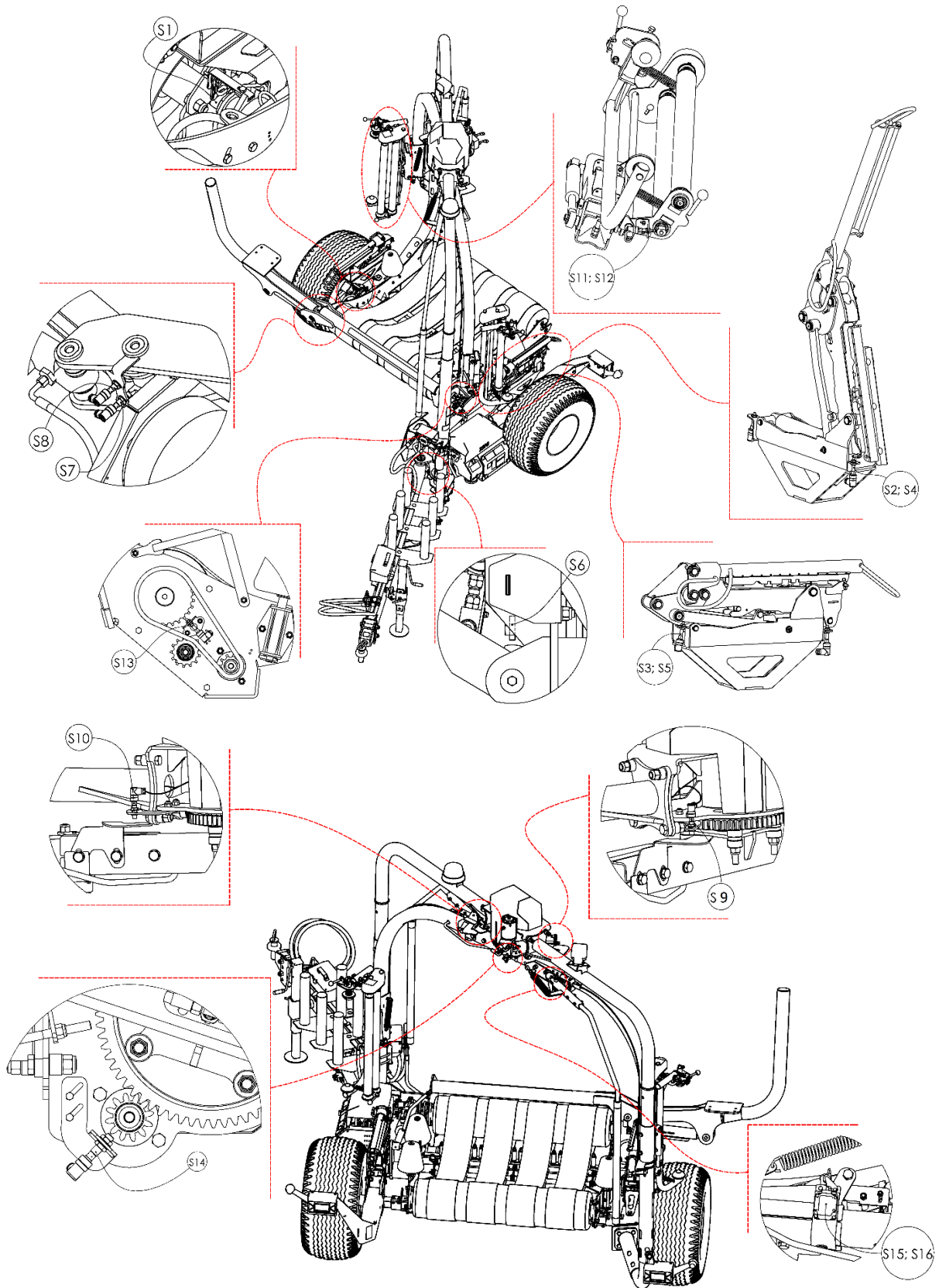


Figure 7. Locations of the sensors on the wrapper

6.5.3 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.

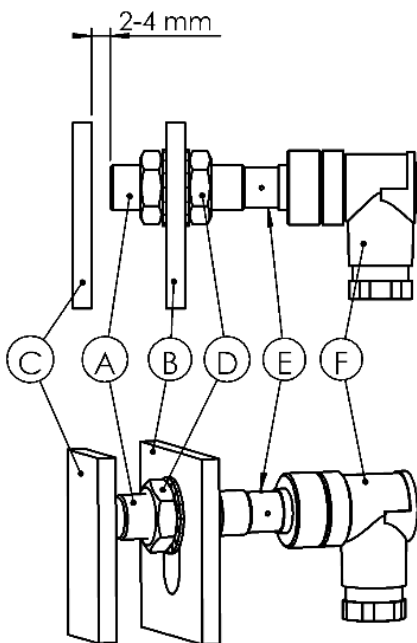


Figure 8. Inductive sensor and its actuator

The procedure of setting the sensor against its activator (**Fig. 8**):

- 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) that 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 activator (C) is 2-4 mm,
- 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. A too tightly tensioned or too loose cable may be damaged or worn out more quickly.

6.5.4 Adjusting the angle sensor settings

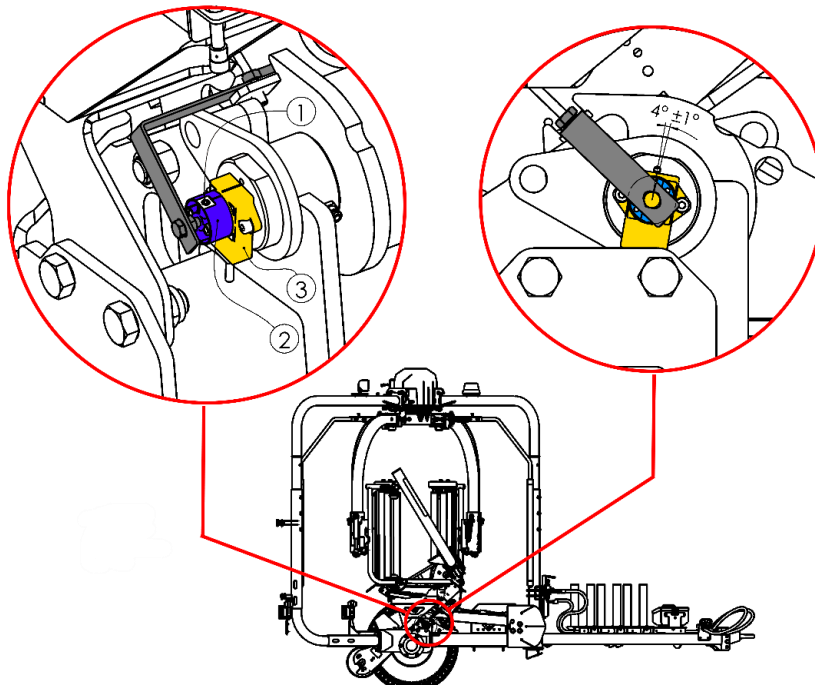


Figure 9. Changing the position of the angle sensor actuator

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. 9**):

- 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) that 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 1.5-2 mm.
- 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.

6.5.5 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 turn off. Perform the check for both arms.



WARNING

WARNING!

If either of the safety 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.

6.6 Adjustment of the hydraulic components

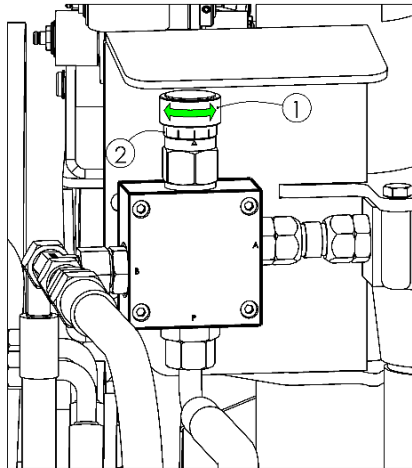


Figure 10. Flow control

The flow control (**Fig. 10**) is located on the front support of the wrapping module 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.

6.6.1 Adjusting the speed of film feeder lowering

If changing the speed of lowering and lifting the film feeders is necessary, use the choke/non-return valves located under the upper cover of the hydraulic manifold. Removing the cover (**Fig. 11**):

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

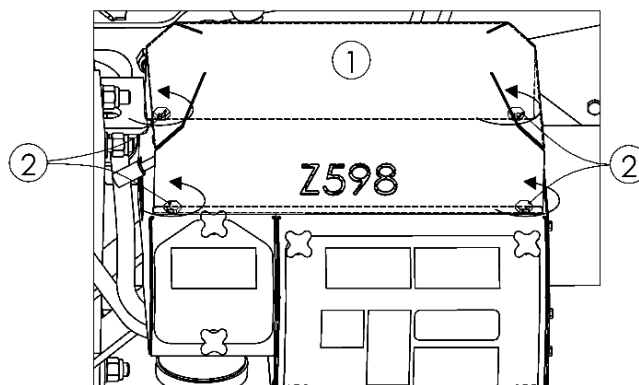


Figure 11. Dismantling the upper cover of the manifold

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. 12**) and lifting (**Fig. 13**) 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.

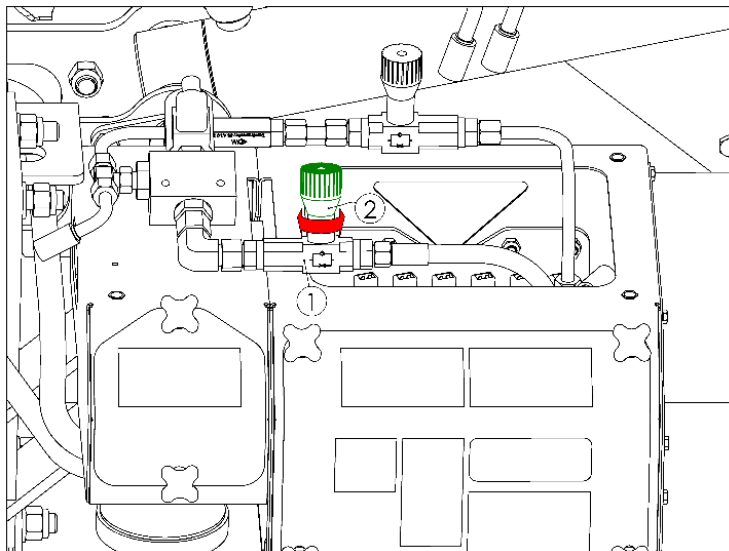


Figure 12. Adjusting the valve of the feeders' lowering speed

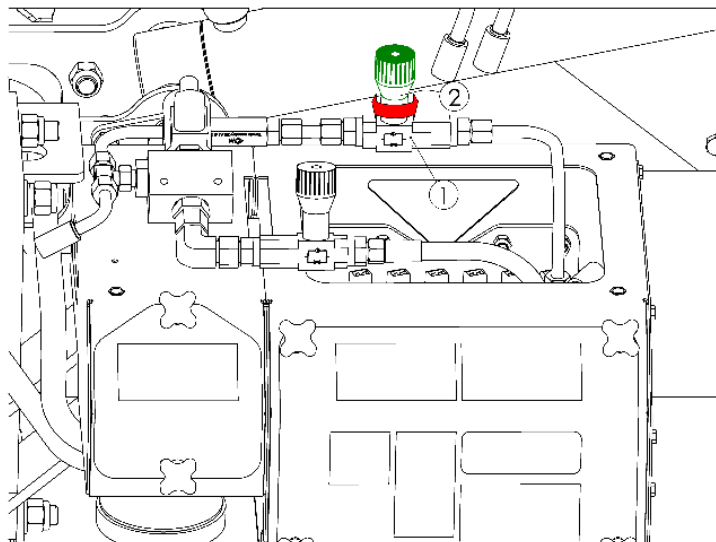


Figure 13. Adjusting the valve of the feeders' lifting speed

6.7 Adjusting the tension of the chains

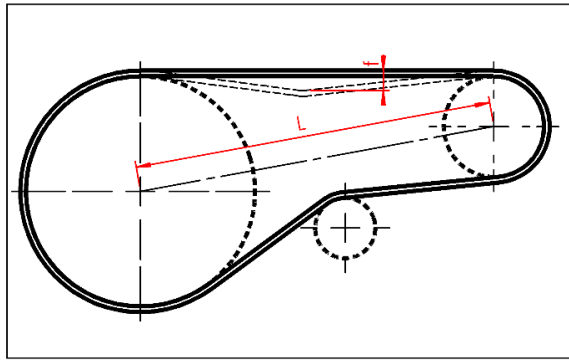


Figure 14. Checking chain tension, $f = 0.01 \times L$

6.7.1 Drive chain of the service table drums

The procedure of drive chain adjustment (**Fig. 15**):

- 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) that lock the gearbox cover and remove the cover (1),
- Loosen the M16 nut (3) that locks the chain adjuster, and then set the adjuster to the required range (4),
- Tighten the nut that locks the adjuster at the required position,
- Check the tension of the chain at its longest section (5),
- Install the gear unit guard.

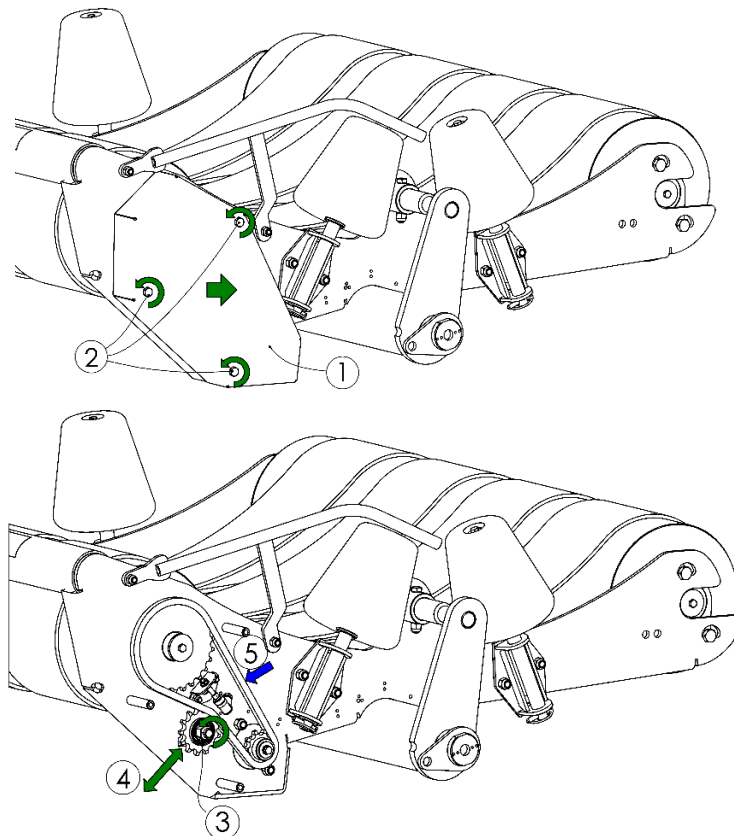


Figure 15. Adjusting the tension of the drum drive chain

6.7.2 Chain of the film adjuster gear unit

You can pre-tension the film in the feeder by changing ratio between two rollers that guide the band. The ratio is 21:12 and enables a pre-tension of the film at the level of 70-80%. The correct ratio is controlled by the chain gear unit.

The procedure of adjusting the tension of the film adjuster gear unit chain (**Fig. 16**):

- 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) that locks the chain adjuster, and then set the adjuster to the required range (3),
- Tighten the nut that locks the adjuster,
- Check the chain tension (4) and the rollers for free rotating movement,
- Install the adjuster cover.

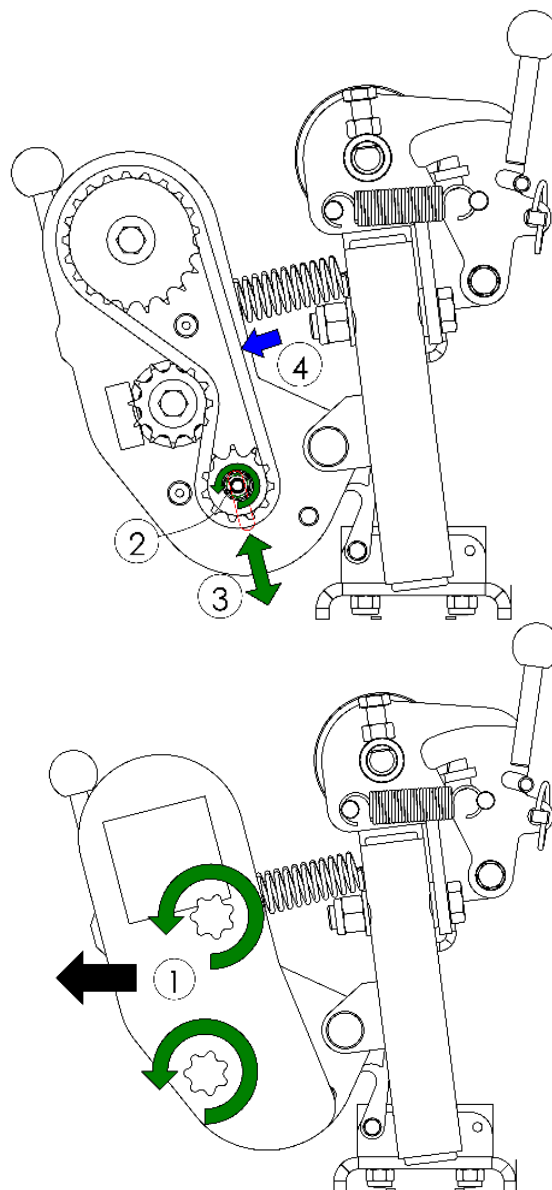


Figure 16. Film adjuster gear unit

7 Wrapper hydraulic installation

The Bale Wrapper's hydraulic installation is supplied from the tractor's power hydraulics system. Connecting to the power hydraulic system is realized with connecting hoses supplying the hydraulic distributor and further on the hydraulic motors and hydraulic servos (cylinders). The individual hydraulic components are connected to one another with flexible and metal hydraulic hoses.

The Z598 wrapper features the power hydraulic system (**Fig. 17**), in which the following element can be distinguished:

- | | |
|-------------------------------|------------------------------|
| 1 – hydraulic supply plugs, | 6 – hydraulic motor valve, |
| 2 – oil flow control, | 7 – check valve, |
| 3 – oil pressure filter, | 8 – shut-off solenoid valve, |
| 4 – hydraulic manifold, | 9 – choke/ non-return valve, |
| 5 – cylinder hydraulic valve, | 10 – hydraulic swivel hitch. |

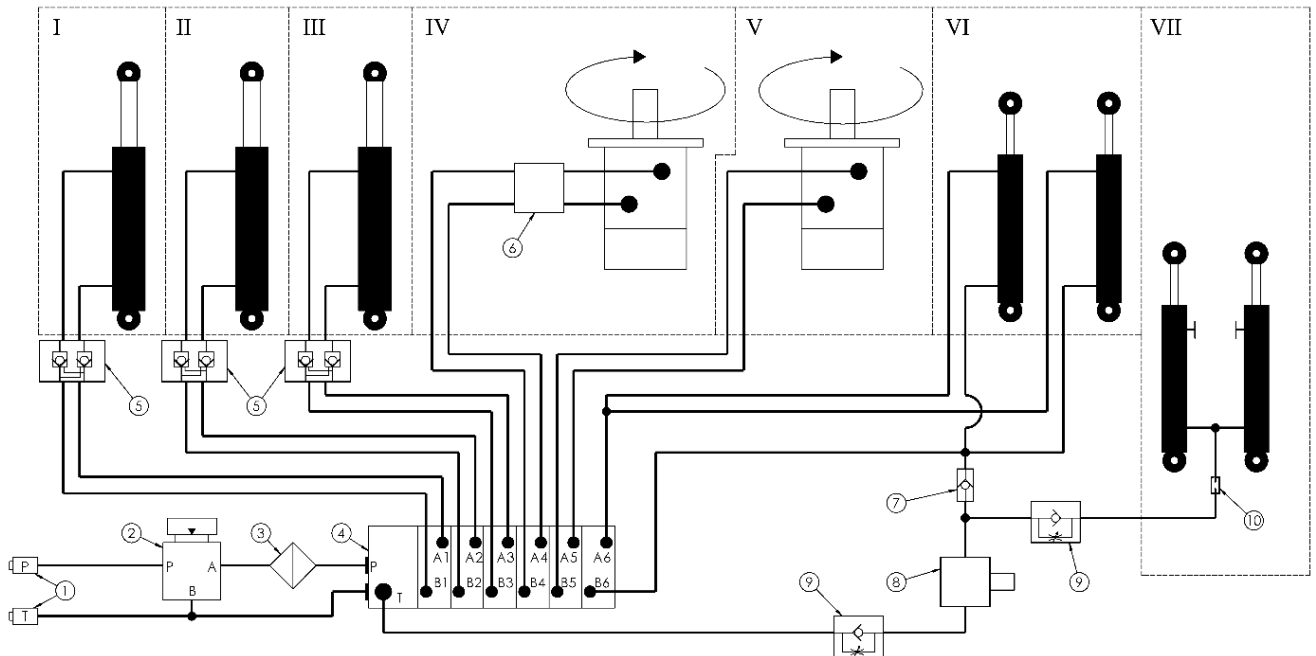


Figure 17. Central unit hydraulic system

- Section I – drawbar hydraulic cylinder,
- Section II – loading arm hydraulic cylinder,
- Section III – service table frame hydraulic cylinder,
- Section IV – wrapping module hydraulic motor,
- Section V – service table roller hydraulic motor,
- Section VI – film cutter hydraulic cylinders,
- Section VII – film feeder tilt hydraulic cylinders.

The control of the hydraulic receivers is executed via the electronic control panel located for the time of operation in the tractor operator's cab. The panel is communicated via the **communication cable with the control module, which directly controls solenoid valves in the hydraulic distributor and receives the signals from the sensors.**

The hydraulic block is protected against too-high pressure in the tractor power hydraulic system with a pressure valve set by default at 180 bar. A maximum hydraulic oil pressure at which the wrapper can work is 160 bar.

A flow controller with the range of 0 – 50 l/min prevents the wrapper hydraulic system from excessive oil volume coming from the tractor power hydraulic system.



The hydraulic system of the wrapper was factory filled up with L-HL 46 oil type. The tractor's hydraulic system working with the Bale Wrapper must be filled with the same type of oil. Filling up the hydraulic system with oil of another type should be consulted on with the manufacturer of the machine.



CAUTION

CAUTION!

Hydraulic oils of different types should not be mixed together. It may result in damaging the of the tractor and the wrapper itself.



CAUTION

CAUTION!

Supplying the wrapper with pressure higher than the one recommended in the manual may lead to damaging the wrapper hydraulic system.



The wrapper hydraulic system has been protected from dirt by installing a high pressure filter on the line. Replace the filter element every 2 years of wrapper operation or whenever the contamination indicator installed on the filter shows the red field.



WARNING

WARNING!

The manual control lever located on the hydraulic block are used only for manual machine setting in the transport position in the event of failure of the electronic control. Do not use it for regular machine operation under any circumstances.



CAUTION

CAUTION!

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



CAUTION

CAUTION!

Work on pressurised hoses is prohibited, may cause pollution or serious injuries.

Before starting any maintenance works, reduce the pressure in the hydraulic lines.

8 Power supply system

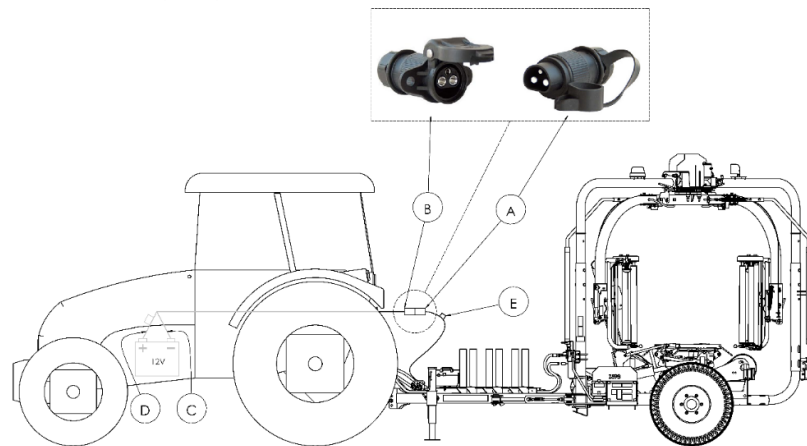


Figure 18. The connection diagram of 12 V electric power supply of the tractor to the wrapper

Electric power supply 12 V of the wrapper is taken from the electric system of the tractor after connecting the 3-pin power supply plug A (**Fig. 18 - A**) to the tractor electric socket B (**Fig. 18 - B**). The tractor must be provided with a 3 - pin electric socket 12 V (DIN 9680) connected to the tractor battery.

The power supply wiring harness has an overload protection in the form of fuses, which are placed in their bases E (**Fig. 18-E**) immediately after the plug A.

In the case of burning of any of the fuses of the power supply wiring harness disconnect the power supply plug and replace the damaged fuse with a new one of the same load value. Before reconnecting find and eliminate the source of installation overload.



CAUTION

CAUTION!

Do not connect the power supply of the wrapper to the lighter plug if the tractor is not provided with the 3-pin 12 V DIN 9680 socket. Submit a request to the distributor of the tractor to provide it with this socket fitted with a suitable wire connection to the battery.

Table 3. Connection of the socket wires to the battery (Fig. 18 – B, C and D):

Lead (battery pole)	Pin marking on socket
C (-)	31
D (+)	15/30



CAUTION

CAUTION!

Provide relevant space for electric wires of power supply and control. Too much tensioned or loosely hanging wires may be damaged and result in uncontrolled movements of the machine, consequently, in damaging it or the tractor.

9 Lighting system

The wrapper is equipped with the 12 V road lighting system connected to the tractor system by means of the 7-pin plug, ISO 1724 Type N (**Fig. 19 – A**). The tractor must be fitted with a socket that is suitable for the plug (**Fig. 19 – B**).

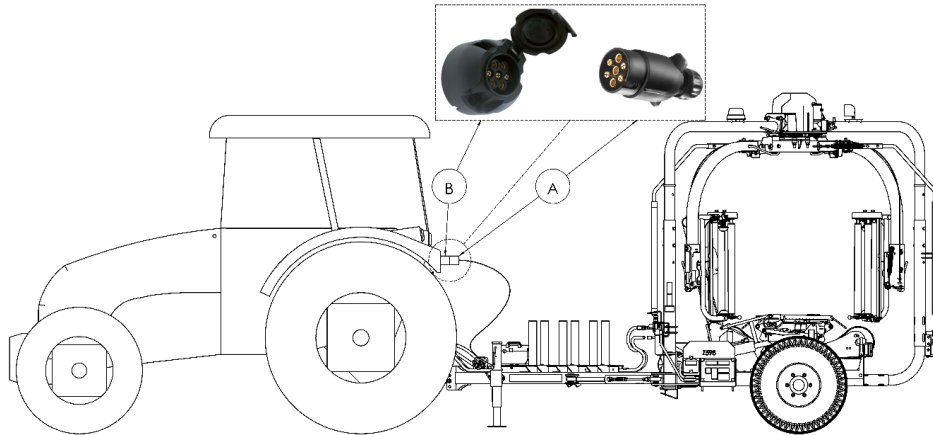


Figure 19. Connection of the lighting system

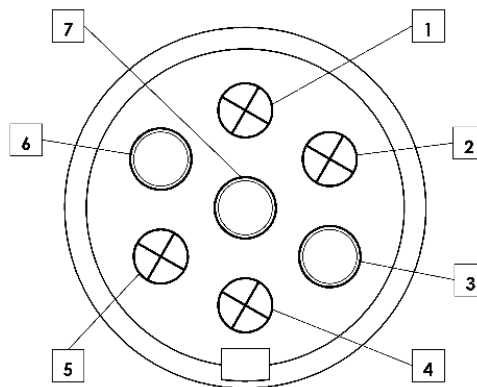


Figure 20. Wrapper-lighting plug (socket side view)




Table 4. Description of the plug lighting wires (**Fig. 20**)


No. of pin	Designation	Circuit description
1	L	Left indicator
2	54G	Fog lights
3	31	Earth
4	R	Right indicator
5	58R	Right-position lamps
6	54	STOP
7	58L	Left-position lamps

10 Lubrication

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:

-  – plastic grease applied with a grease gun
-  – grease applied on sliding surfaces with a brush,
-  – plant oil (e.g. rape) applied with a brush.

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

10.1.1 Lubricating points for the film cutter and film feeder

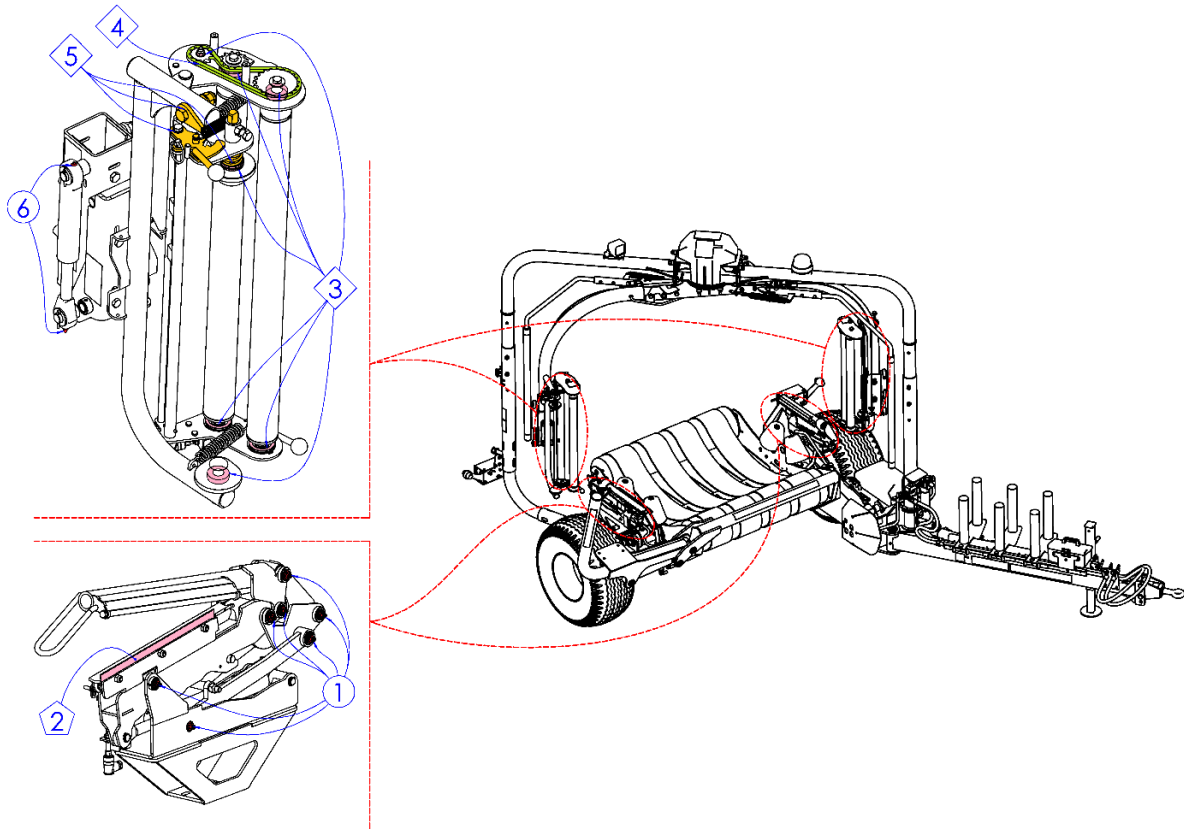


Figure 21. Lubricating points for the film cutter and film feeder:
 1 – grease nipples for the cutter's slide bearings; 2 – cutting blade; 3 – feeder bearings;
 4 – feeder gear unit drive chain; 5 – upper roll holder;
 6 – grease nipples for feeder cylinder;

10.1.2 Lubrication points for drawbar components

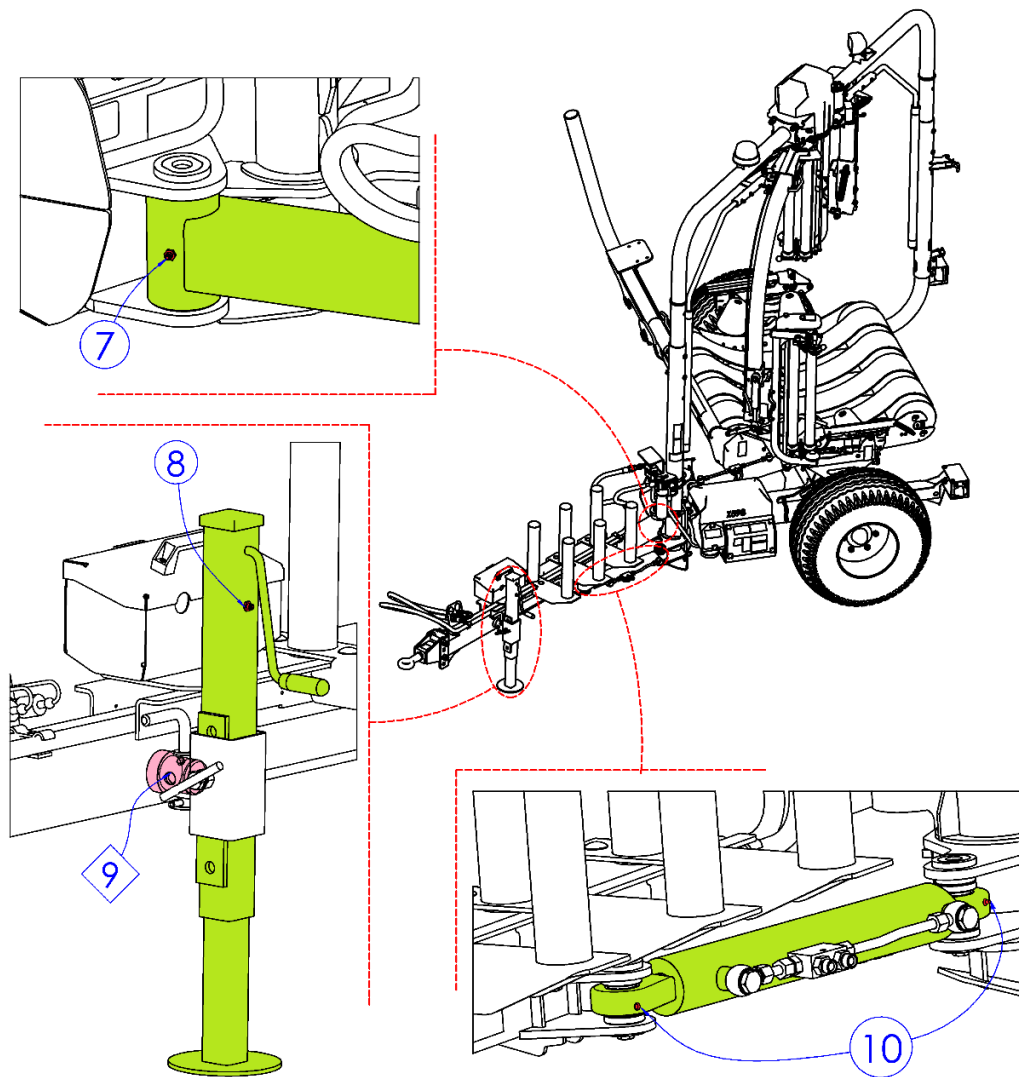


Figure 22. Lubrication points for drawbar components:
 7 – drawbar joint grease nipple; 8 – support foot gear grease nipple;
 9 – support foot swivel joint; 10 – drawbar cylinder grease nipples;

10.1.3 Lubrication points for the 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.

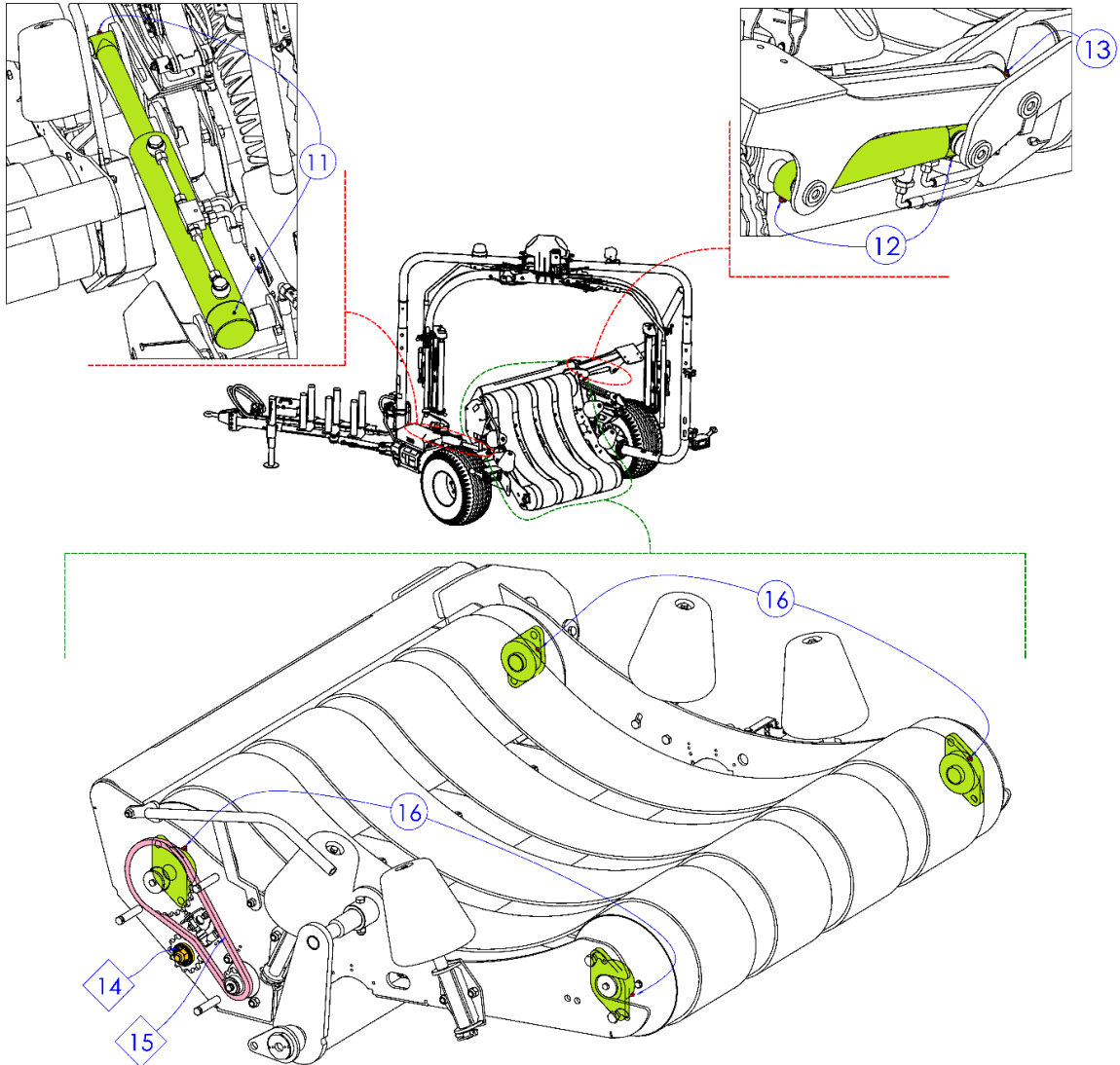


Figure 23. Lubrication points of the service table with the loading arm:

- 11 – grease nipples for the table tilt cylinder; 12 – loading arm cylinder grease nipples;
- 13 – loading arm swivel joint grease nipple;
- 14 – tensioner unit of the table roller drive chain; 15 – table roller drive chain;
- 16 – grease nipples for table roller bearing units;

10.1.4 Drive module of the planet arms and limit stop latches

Dismantle the module cover before you carry out the lubrication of the planet arm drive module bearings (**Fig. 24**). Use special, safe ladders or platforms to reach elevated wrapper components. Never climb the machine itself.

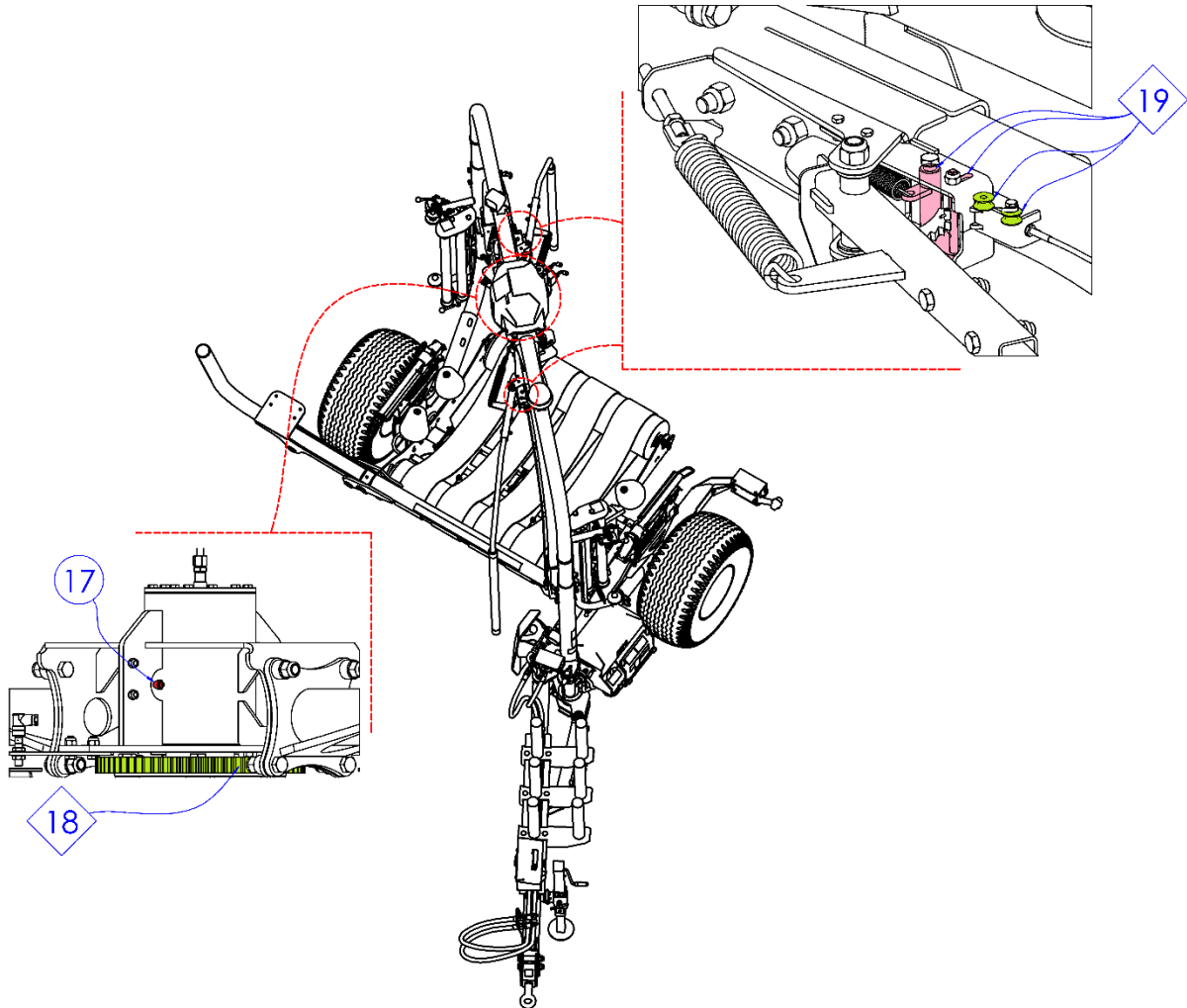


Figure 24. Lubrication points of the drive module and limit stop latches:
 17 – drive module bearing grease nipple; 18 – toothed wheels of drive module gear unit;
 19 – moving components of safety stop latch.

10.2 Lubrication interval

Table 5. Lubrication-interval 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. 21	•		•	
Cutting blade	2	Fig. 21		•	•	•
Feeder bearings	3	Fig. 21	•	•	•	•
Feeder gear unit drive chain	4	Fig. 221	•	•	•	•
Upper roll holder	5	Fig. 21	•		•	•
Feeder cylinder bearings	6	Fig. 21	•		•	
Drawbar swivel joint	7	Fig. 22	•		•	
Support foot gear unit	8	Fig. 22			•	
Support foot swivel joint	9	Fig. 22	•		•	•
Drawbar cylinder bearings	10	Fig. 22	•		•	
Service table cylinder bearings	11	Fig. 23	•	•	•	
Loading arm cylinder bearings	12	Fig. 23	•	•	•	
Loading arm swivel joint	13	Fig. 23	•	•	•	
Tensioner unit of the drum drive chain	14	Fig. 23	•		•	
Drum drive chain	15	Fig. 23	•	•	•	•
Drum bearing units	16	Fig. 23	•		•	
Drive module bearing unit	17	Fig. 24			•	
Toothed wheels of drive module gear unit	18	Fig. 24	•	•	•	
Moving components of safety stop latch	19	Fig. 24	•		•	•

11 Metric-bolt-tightening torques

Optimised tightening-torque values for bolts or screws and nuts [Nm] are shown in Table 6.

Table 6. Tightening-torque values for metric bolts

Bolt-tightening torques – metric bolts in Nm							
Size Ø mm	Pitch mm	Bolt version – strength classes					Wheel nuts, wheel screws
		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	

12 Possible faults

Table 7. Possible faults

No.	Fault description	Cause	Method of rectification
1.	Rapid hydraulic oil overheating	Insufficient amount of oil in the tractor's system	Check the oil level in the tractor. Replenish the oil
		Incorrect setting of the Bale Wrapper flow control	Verify the setting on the Bale Wrapper flow control
		Hydraulic system contamination	Check the hydraulic filter
			Contact the dealer
Too high a 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's 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 Bale Wrapper flow control
		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 (Section 6.5)
		Oil leakage	Check if there is a leak from the hydraulic hoses or cylinder
		Plug connection at the control module	Check the plugs for tightness
		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	Method of rectification
4.	Planet arms move too slowly	Insufficient amount of oil in the tractor's 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 (Section 6.4.1)
		Inductive sensor of the planet arm rotational speed	Check the S14 sensor position and function (Section 6.3)
		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 (Section 6.3)
		Inductive sensor of the stopping position of the arms in transport position	Check the S10 sensor position and function (Section 6.3)
		Inductive sensor of the planet arm rotational speed	Check the S14 sensor position and function (Section 6.3)
		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 (Section 6.3)
		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 (Section 6.3)
			Contact the dealer
8.	Film not cut by the film cutter.	Blunt blade	Replace the blade
		Incorrect blade setting	Adjust the blade setting
		The roll holder not lowered to its final position	Check the S3 and S5 sensor position and function (Chapter 6.3)
9.	Film not gripped by the film cutter	The roll holder not lowered to its final position	Check the S3 and S5 sensor position and function (Chapter 6.3)
		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	Method of rectification
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 160 bar (16 MPa)
12.	The film on a wrapped bale is damaged during unloading	Incorrect place of unloading	Unload the wrapped bales only at a place that 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 tensioner roller	Wipe the adjuster roller with sandpaper Replace heavily damaged adjuster rollers with new ones
		Contaminated surface of the tensioner 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 (Section 8)
		Low quality film	Use better quality film

NOTES

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