



METAL-FACH



BELT BALER

Z514

INSTRUCTIONS MANUAL – PART II

TRANSLATION OF THE ORIGINAL INSTRUCTIONS MANUAL

REVISION I

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The symbols used in these Instructions:



DANGER!

Hazard-warning symbol. This indicates the occurrence of a serious hazard condition, which, if not avoided, can result in death or serious injury. This symbol warns against the most dangerous situations.



CAUTION

This symbol highlights very important information and recommendations. Non-compliance with the described recommendations risks serious damage to the machine due to its incorrect operation.



WARNING

This symbol indicates the possibility of the occurrence of a hazard, which, if not avoided, can result in death or serious injury. This symbol indicates a lower level of risk of injury than the symbol including the word "DANGER".



This symbol indicates useful information.



This symbol indicates maintenance activities that should be performed periodically.

4. Operation

After attaching the Baler to a tractor:

- Start the tractor without starting the PTO shaft, and check whether all moving functions of the Baler are working correctly;
- Make sure that the hydraulic system is working; Make sure that the rear flap opens and closes; Lift and lower the pick-up (remember to set the shut-off valve to "OPEN" so that you can lift the pick-up).
- Check if the control unit's electrical connection works correctly.
- Check the electrical system, indicating lamps, and lights.
- Close the rear cover and start the PTO.
- Prior to starting the PTO drive shaft, make sure that there are no people near the machine. Use great care by checking if all mechanical and drive components work correctly.

4.1 Preparing the machine for operation

Before you start work, perform all necessary machine adjustments to prepare it for the requirements of the tasks to be done.

4.1.1 Operating the net wrapping unit



DANGER!

DANGER!

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



WARNING

WARNING!

Secure the knife when carrying out any work near the net cutting knife (see Chapter 5.1.7.2).



WARNING

WARNING!

Particular caution should be exercised during standing on the platform.

It is forbidden to stand on the platform when the machine is in operation.



Use good quality binding material with the characteristics shown in Table 1.

4.1.1.1 Installing a reel of net

The Baler is pre-configured for work with standard net rolls. To obtain a satisfactory result, it is recommended to use the nets with the characteristics shown in Table 1.

To insert a reel of net, do the following:

- Open the left side guard (Chapter 5.1.2) and the top guard;
- Secure the net cutting knife (Chapter 5.1.7.2)
- Turn the crank (1) until the spindle (2) stops (Figure 21);
- Install the reel of net;
- By turning the crank, slide the spindle (2) into the sleeve of the net reel until you feel a slight resistance. This will ensure free rotation of the net reel;
- Make sure that the spindles on both sides are inside the net's sleeve. If not:
 - use the crank (1) to loosen the spindle, correct the position of the net reel, turn the crank again to slide the spindle into the net reel's sleeve until you feel a slight resistance.

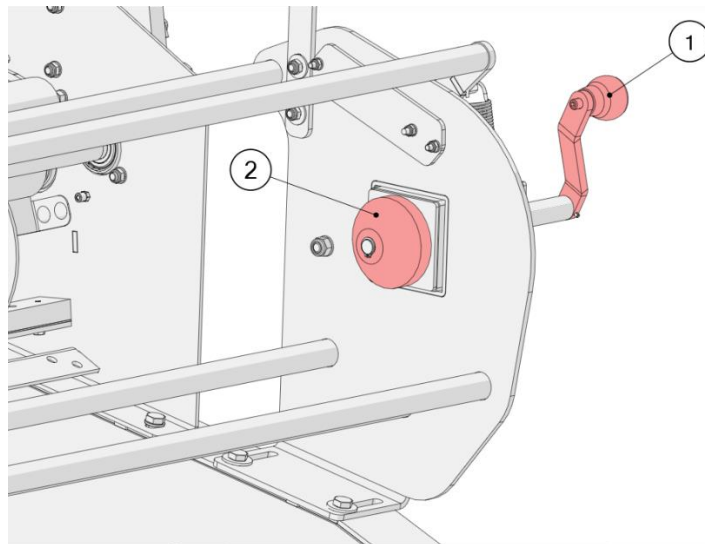


Figure 21. Inserting the net

4.1.1.2 Adjusting the net support

If the net reel is not centred after being installed, adjust the position of the walls of the net feeder. For this purpose, do the following, as shown in Figure 22:

- Open the right-hand side guard (Chapter 5.1.2);
- Loosen the screws (2) on the left and right sides;

- Using the longitudinal holes, move the net feeder's walls (1) until the net reel has reached the correct position;
- Tighten the screws (2) on both sides.

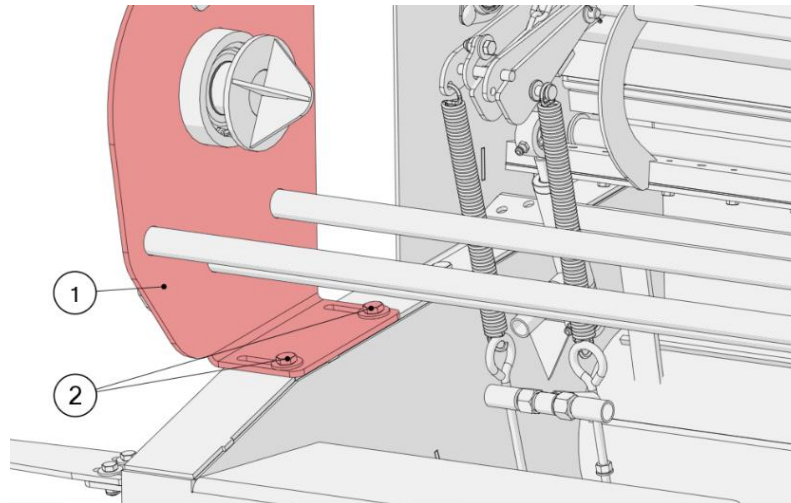


Figure 22. Adjusting the net feeder's walls

4.1.1.3 Distributing the net

The next step is distributing the net:

- Spread the net, as shown in Figure 23, running it through the successive rollers (1, 2, 3, 4, 5);
- Turn the rubber roller (4) so that the end of the net hangs freely behind it, by about 10cm;
- Unlock the net cutting knife;
- Close the guards.

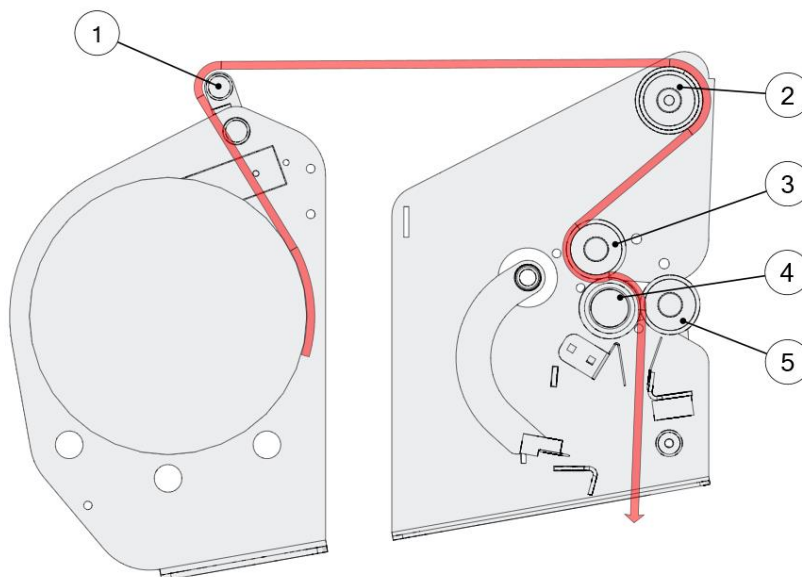


Figure 23. Distributing the net

4.1.2 Preparing the automatic chain lubrication system for operation

Before starting work, fill the oil tank of the automatic chain lubrication system (Chapter 5.10.2). Then, bleed the pump (Chapter 5.10.3).

4.1.3 Adjusting the working height of the pick-up

Before starting work, set the pick-up to the correct height. For this purpose, do the following, as shown in Figure 24:

- Make sure that the PTO is switched off. Switch off the tractor's engine and remove the ignition key;
- Close the hydraulic cut-off valve (Fig. 20);
- Remove the pin (5);
- Adjust the height of the pick-up by changing the position of its support wheel – match the corresponding hole on the plate (3) with the pin (4);
- Use a cotter pin to lock it in position;
- Repeat the steps for the second pick-up wheel by selecting the same hole in the plate (3) on both sides of the machine;
- Remove the safety chain (1) from the hanger (2) on the right and left sides of the Baler;
- Open the hydraulic cut-off valve;
- Using the single-acting valve, lower the pick-up to the required position.

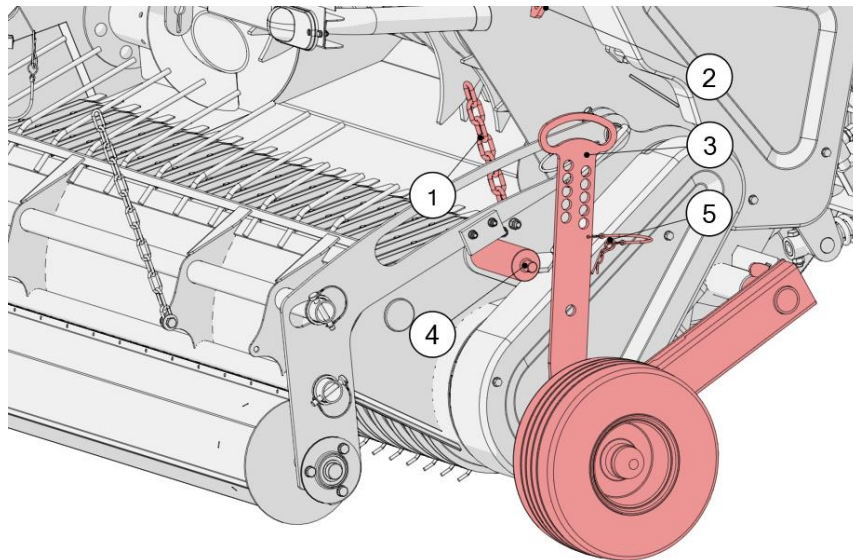


Figure 24. Adjusting the working height of the pick-up



The manufacturer recommends setting the tines of the pick-up at the height of 2cm above the ground.

4.1.4 Windrow clamp adjustment

The height of the roller clamp's position should correspond to the thickness of windrow. When the size of the windrow is large, raise the windrow roller clamp, and lower it for smaller windrow sizes.

The procedure of adjusting the roller clamp height is shown in Figure 25:

- Disable the tractor's PTO engine, and remove the ignition key;
- Disconnect the chain (1);
- Using the single-acting valve, lower or raise the pick-up to achieve the correct height of the windrow clamp;
- Attach the appropriate chain link (1) to the hanger (2). Do it on the right and left sides;

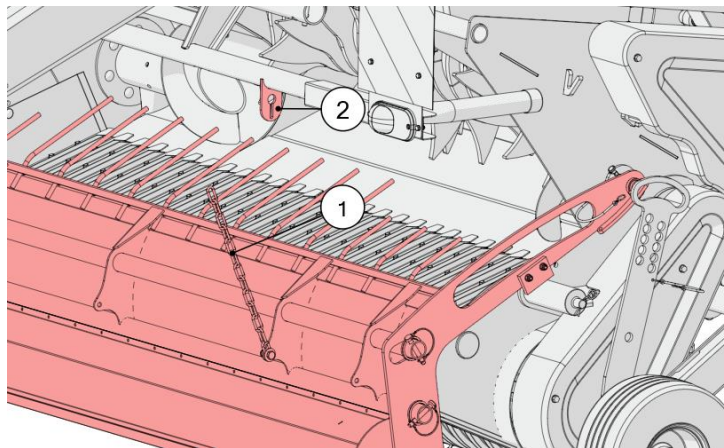


Figure 25. Windrow clamp adjustment

4.1.5 Adjusting the bale ejector

The bale ejector features a stepless adjustment. Do the following to adjust the length of the ejector, as shown in Figure 26:

- Loosen the nuts (2);
- Move the ejector plate (1) to the appropriate length;
- Tighten the nuts.

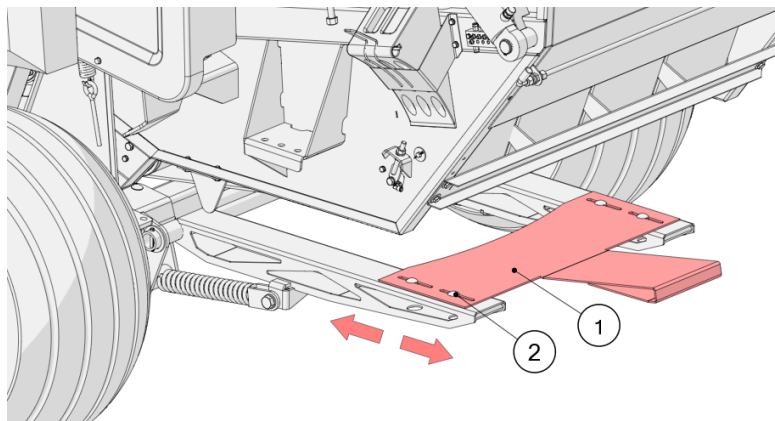


Figure 26. Adjusting the bale ejector

4.2 Control panel operation

The panel is an electronic device designed to control the Baler's operation. It also displays information on the current settings of the machine and the work it is doing.

The control panel is fixed in the tractor's cabin, by means of a holder with a suction cup (Fig. 27). It should be fixed to a clean and smooth surface in order to prevent accidental movement of the panel or unintentional start-up of the Baler's working units. The panel should be located in the tractor so the operator can operate the device with no difficulty or fatigue. The operator can see the messages appearing on his display.



Figure 27. Holder of the control panel

4.2.1 Switching the panel on and off

Procedure:

- Connect the Baler's plug to the tractor's socket 12V;
- Connect the panel to the control module's cable;
- Shift the panel's main switch from the position "0" to "I". The switch is located on the rear side of the panel;

To disable the control panel, change the position of the main switch from "I" to "0".


















4.2.2 Description of the control panel's push buttons

The control panel is shown in Figure 28. The button symbols are shown on the control panel's display.



Figure 28. Control panel

Table 4. Description of the control panel's push buttons


Push button (symbol)	Name	Function
	Operation	The button calls up the operation screen.
	Statistics	The button calls up working statistics.
	Information	The button calls up the information menu.
	Settings	The button calls up the settings menu.
	Field	The button calls up the menu to select the crop field.
	Bale diameter	The button calls up the menu to set the bale diameter.
	START	Commences the feeding of net.
	AUTO / MANUAL	The button to select the mode of net feeding.
	OK	The approval button.
	Return	Returning to a "higher" menu level.
	Delete	Deletes the data saved in the selected working field.
	Up arrow	Text scroll button
	Down arrow	Text scroll button
	Sensor calibration	The button calls up the function of calibrating the bale diameter sensor.
	Sensor control	The button calls up the sensors' control function.
	Screen settings	A menu option, in which the user can change the display settings.
	SET	The button resetting the lower position of the rocker arm.

When the control panel is activated, the screen displays the home screen (Figure 29). The left side of the screen contains the following buttons: operation, bale counter, information, and settings. After pressing the selected key, the screen displays its content.



Figure 29. Control Panel – home screen

4.2.3 Working screens

After pressing this button , the control panel displays the screen shown in Figure 30.

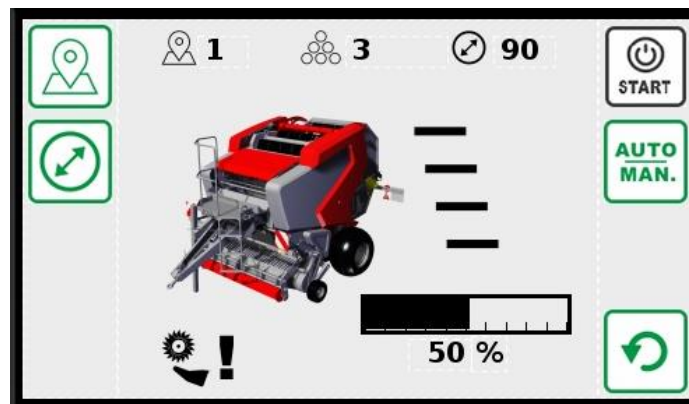




Figure 30. Control Panel – working screen

4.2.3.1 Changing the bale diameter

To change the bale diameter, press this button , and then press  on the left side of the screen. The screen will display the graphics shown in Figure 31. Use the knob to set the desired value, and press the knob to confirm it. The bale diameter's adjustment range is from 90 cm to 160 cm.

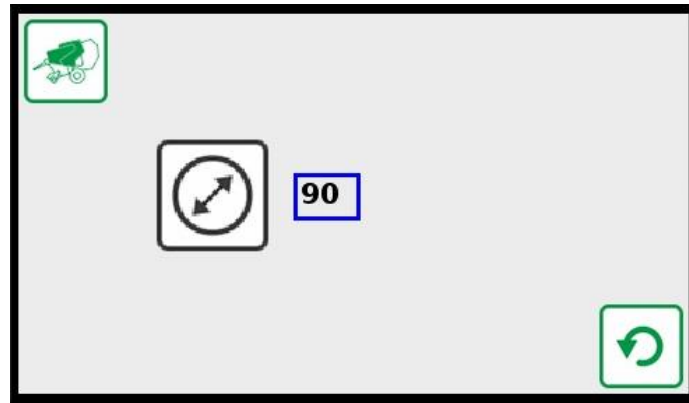


Figure 31. Control panel - adjusting the bale diameter

4.2.3.2 Changing the crop field






To change the crop field, press , and then press . The screen will display the graphics shown in Figure 32. Use the knob to select the field and confirm it by pressing the knob.



Figure 32. Control panel - changing the crop field

4.2.3.3 Working mode

The net can be fed automatically or manually. To select the operating mode, press  and then .

In the automatic mode, the net will be fed automatically. In the manual mode, press , after the “STOP” message is displayed on the screen (Fig. 39) and the machine has stopped operating.

4.2.4 Statistics

After pressing and then , the screen will display a table with information on the quantity of bales, working time, and yield for each individual and the total number of crop fields (Figure 33).

P- 3	11	0 h53 m	12.5	
P- 4	2015	134 h57 m	14.9	
P- 5	457	38 h47 m	11.8	
Σ	48217	4726 h18 m	10.2	
	14 : 27 : 15			
	1 . 12 . 2018			

Figure 33. Control panel – statistics

Use the arrows to scroll up and down the rows in the table. The selected data can be deleted by pressing .

4.2.5 Information

After pressing , the screen will display information about the power supply voltage and software version (Figure 34).

	13.4 V=	
	OPUSA3SN1CANB000	
	S/N 1582695EA	
	4.3" Standard Basic	
	3.0.101-rt130-opusa3-2.2.2-2	
	14 : 27 : 15	1 . 12 . 2018

Figure 34. Control panel – information

After pressing , the screen will display a list of errors related to exceeding the permissible bale diameter (Figure 35).

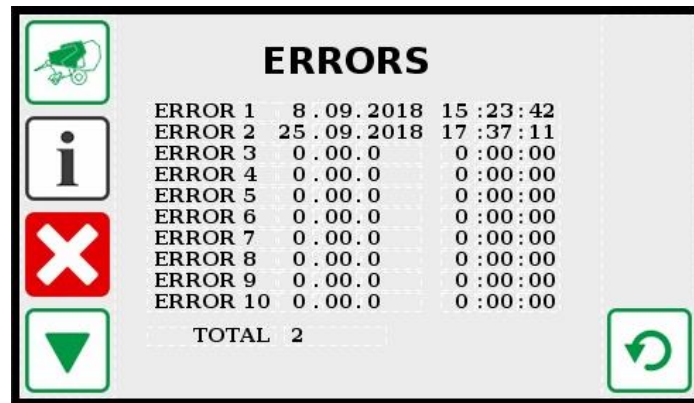


Figure 35. Control panel – errors

4.2.6 Settings

Using the settings menu, you can adjust the display parameters, test the sensors, or calibrate the bale diameter sensor.

4.2.6.1 Changing the display parameters

To change the display settings, press , then select , and change the parameters with the knob.

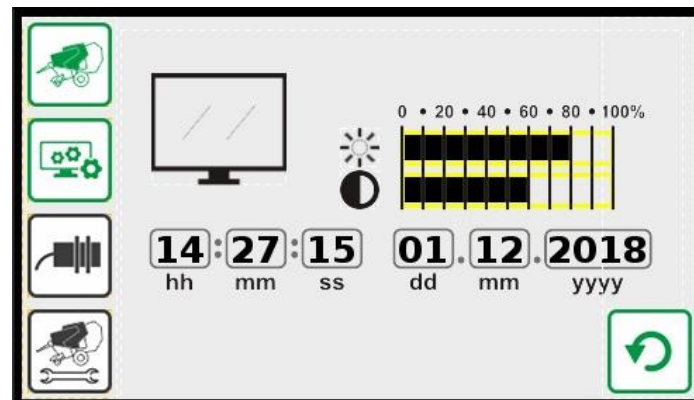




Figure 36. Control panel - display parameters

4.2.6.2 Testing the sensors

Check the operation of the sensors by performing a test. To do this, press  and . The screen will display the graphics shown in Figure 37.

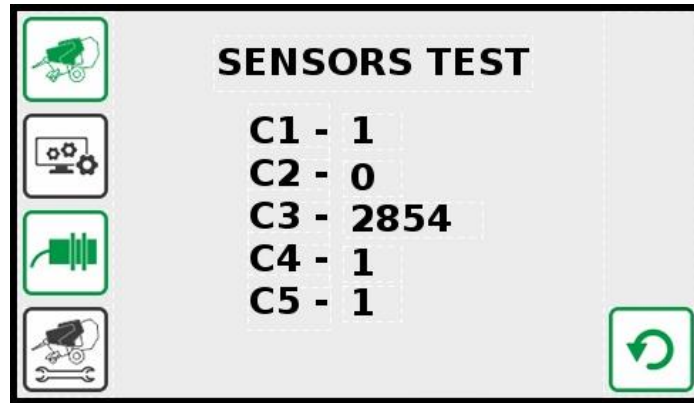




Figure 37. Control panel - testing the sensors

Sensor codes:

- C1 - lock sensor 1;
- C2 - lock sensor 2;
- C3 - bale diameter sensor;
- C4 - rotor floor's sensor;
- C5 - net feeding sensor.

The displayed value “0” means that there is no metal element present in the working area of the sensor, while value “1” means that there is a metal element present in the working area of the sensor. If there is a metal element present in the working area of the sensor, but the test gives the “0” value, then the sensor is not working properly.

4.2.6.3 Sensor calibration

To calibrate the bale diameter sensor, press  and . The control panel's screen will display the graphics shown in Figure 38.

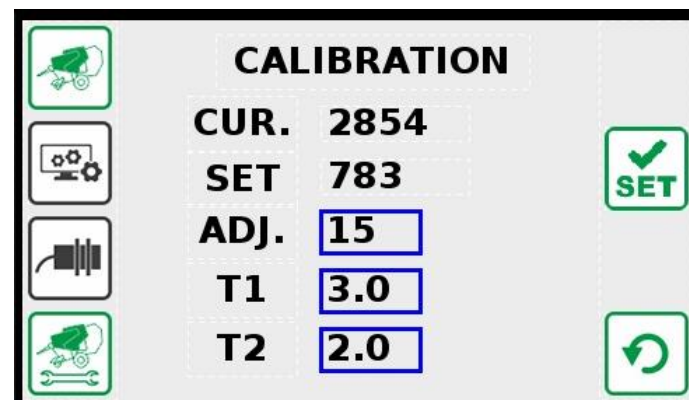



Figure 38. Control panel - calibrating the sensor

Symbols:

- CUR. - value of the angle sensor signal;
- SET - value of the lower position of the rocker arm;
- ADJ. - correcting the bale diameter;
- T1 - operating time of the clutch (range 2-10s; default value: 3s);
- T2 - delay time before activating the clutch (range 1-5s; default value: 2s).

Do the following to reset the value of the lower position of the rocker arm:

- Make sure the chamber is empty and closed;
- Make sure the PTO is activated;
- Press  on the control panel.

4.2.7 Work cycle


To start working, press  on the control panel. Select the bale diameter (Chapter 4.2.3.1), the crop field (Chapter 4.2.3.2), and the operating mode (Chapter 4.2.3.3). After baling has started, the control panel will continue to display information about the completion level of bale formation. It is also communicated by the following acoustic signals: 10 cm before reaching the pre-set bale diameter - a single short beep; 5 cm before finishing the bale - two short beeps. When the set bale diameter has been reached, you will hear intermittent beeps and the control panel will display the “STOP” message (Figure 39). Stop the operation after seeing the message.



Figure 39. Control panel - the “STOP” message

Then, the process of net wrapping commences (Chapter 4.2.3.3).

When the bale wrapping is complete, the control panel will display the message shown in Figure 40, after which the rear chamber must be opened to unload the bale.



Figure 40. Control panel - opening the rear chamber

After the bale has left the chamber, the screen of the cheese panel displays the graphics shown in Figure 41. Then, close the rear chamber and start producing more bales, or stop the operation completely.

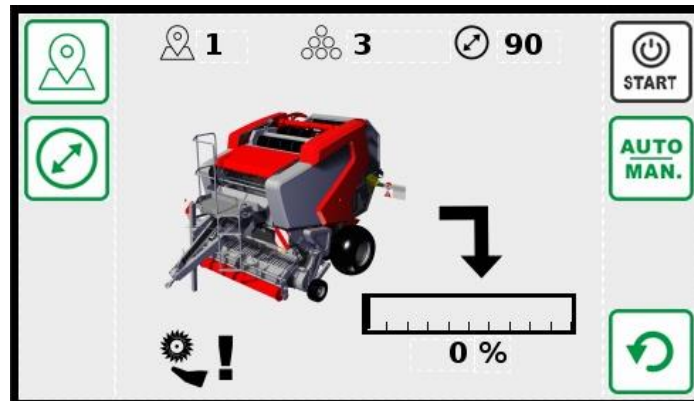


Figure 41. Control panel - closing the rear chamber

4.2.8 Error message

During an operation, the screen of the control panel can display the error message shown in Figure 42. All errors have been discussed in Chapter 6.

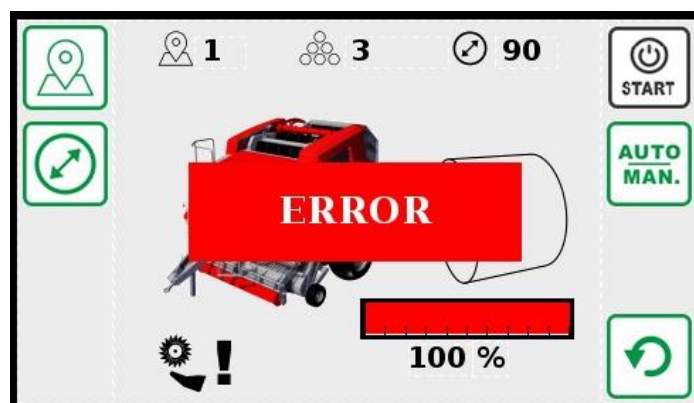



Figure 42. Control panel - an error message

4.3 Windrow collection



CAUTION!
Adjust the tractor driving speed to the windrow's pick-up conditions.
Slow down at wider windrow sections.

CAUTION

Prior to harvesting, the material must be properly prepared by raking. Then, form the windrow into rolls of the maximum width of 1.6 m. The width and height of the windrows should be the same over their entire length to avoid clogging the Baler.

Pick up the formed rolls of windrow, according to the diagram below (Figure 43). When starting to form each individual bale, use the left or right side of the pick-up alternately to collect the material until reaching the desired working pressure on the pressure gauge. Go straight ahead for about 10 m - 20 m, collecting the material from the right side of the pick-up. Then, change the collection side to the left and drive for about 10 m - 20 m. Repeat driving along a straight line and change the side of collecting the material until reaching the desired bale diameter. Adjust the length of the straight sections to the particular conditions.

When harvesting windrow, check the operation of the belts from the tractor. The belts should be in their normal position, while the material must not escape from between them. If the material is escaping on one side - drive the machine in such a way that the material is collected on the other side of the pick-up.

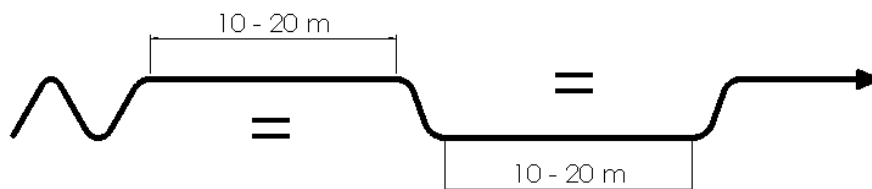


Figure 43. Windrow collection

4.3.1 Collection of silage material


Grass and other papilionaceous plants intended for ensiling and wrapping must be cut in the early phase of earing (preferably, in the afternoon). Next day, after a few hours of drying, gather the mowed material with the use of balers. Keep the highest possible bale compaction degree.


4.3.2 Collecting of dry and brittle material

If the material is not collected, e.g., when travelling between windrows, it is possible that dry and brittle material will fall out. If that is the case, switch off the PTO approximately 10 seconds after finishing the collecting of the material. Turn on the PTO just before you start collecting the material.

4.4 Starting the baling

Before starting the baling, make sure that the shut-off valves of the pick-up and the rear flap are open. Once the machine is properly prepared, you can start baling:

- Switch on the PTO at the nominal speed specified on the gearbox;
- Drive at a speed appropriate to the operating conditions, as recommended in section 4.3;
- Watch the bale diameter indicator. When the desired bale size is reached, stop the tractor;
- Wait, until the bale is wrapped in a net:
 - When the automatic net wrapping mode is activated, the bale will be wrapped automatically,
 - With the manual net wrapping mode activated, press  on the control panel;
- Eject the bale (Chapter 4.5);

After reaching the minimum bale diameter of 90 cm, you can stop the tractor at any time, and start wrapping the bale in a net by pressing  on the control panel. It is a useful feature when the material, left on the field, can be used to produce one bale with a larger diameter than the other bales or two bales with a smaller diameter.

4.4.1 Preventing the forming of abnormal bales

Clean the rollers if the bale is incorrectly shaped, the material is lost during baling, or if the belts are moving vertically. Do the following:

- Make sure that the bale chamber is empty;
- Switch off the PTO;
- Switch off the tractor's engine, and remove the key from the ignition switch;
- Lock the rocker arm by attaching the cord (1) to the hook (2), as shown in Figure 65;
- Switch on the tractor's engine;
- Open the rear chamber;
- Switch off the tractor's engine, and remove the key from the ignition switch;
- Secure the rear chamber in accordance with section 5.1.7.1;
- Disconnect the Baler's electric system from the tractor;
- When all the moving parts have stopped, disconnect the drive shaft;
- Remove the accumulated material, and clean the rollers inside the Baler;
- Activate the drive shaft;
- Connect the electric system;
- Release the rear flap with the shut-off valve;
- Release the rocker arm;
- Switch on the tractor's engine;
- Open the rear flap;
- Close the rear flap.
- Start baling.

4.4.2 Removing the accumulated material

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



DANGER!

DANGER!

Removing the accumulated material during the machine operation is forbidden.



DANGER!

DANGER!

Exercise extra care when removing the accumulated material, for the working area of the rotor is dangerous.

To remove the accumulated material, do the following:

- Stop the tractor, but do not switch off the engine;
- Switch off the PTO;
- Open the double-acting valve to lower the rotor floor;
- Reduce the engine's rotational speed and engage the PTO; The accumulated material should be transferred to the baling chamber. If the blockage is not removed, switch off the PTO, reduce the engine's rotational speed again, and switch on the PTO. Repeat these steps several times to remove the accumulated material;
- Raise the rotor floor;
- Continue working;

4.4.3 Manual removal of the accumulated material

When removal of the accumulated material by lowering the rotor floor does not work, it must be removed manually. To do so, follow the procedure below:

- Switch off the PTO;
- Decompress the hydraulic system (Chapter 4.6.2);
- Switch off the tractor's engine, and remove the key from the ignition switch;
- Disconnect the electric system;
- Wait until all the moving parts of the machine have come to a complete standstill;
- Disconnect the drive shaft;
- Raise the roller clamp, and secure its position with the chain;
- Remove the accumulated material from the pick-up with a de-clogging key;
- Lower the roller clamp to the working position;
- Connect the power supply;
- Connect the drive shaft;

- Switch on the tractor's engine;
- Start the Baler;
- Remove the accumulated material by lowering the rotor floor (Chapter 4.4.2)

4.5 Bale ejection



WARNING

WARNING!

Take special care during operations on inclined area. Pay special attention to the possibility of bale rolling down.



DANGER!

DANGER!

Do not open the rear flap near any high voltage lines. It could cause an electrical shock.

Make sure that no one or no objects are present within the movement range of the rear flap, after wrapping the bale in net. If it is safe, eject the bale out of the chamber:

- Open the rear flap using the single-acting valve; The bale will roll down on the ground, along the ejector. The control panel will display the screen shown in Figure 41;
- Set the single-acting valve to the float position in order to close the rear flap. This will ensure minimum wearing of the pump, provide sufficient time to use the locking device, and retract the net cutting knife's cylinder;
 - During baling, the single-acting valve should be in the floating position;
- The closing of the rear flap will be communicated on the control panel;
- Start driving and collecting material or finish working.

4.6 End of operation

4.6.1 Shutting down on the field

After finishing work, do the following:

- Make sure that the bale chamber is empty;
- Engage the tractor's idle gear;
- Switch off the PTO;
- Use the single-acting valve to lift the pick-up;
- Switch off the tractor's engine, and remove the key from the ignition switch;
- Close the cut-off valve (Figure 20);
- Secure the pick-up in its position (Chapter 5.1.7.3.)
- Place the pick-up wheels in the transportation position (Chapter 1.7.3);
- Clean the Baler off by removing the material which could fall out in transportation;

- Drive to the next field or the parking place.


4.6.2 Uncoupling the Baler from the tractor


Make sure that no bystanders, especially children, are present in the Baler storage area and immediate vicinity. Procedure:

- Position the Baler in its place of storage, on an even and level ground.
- Make sure that the bale chamber is empty and the rear flap closed.
- Then, decompress the hydraulic system:
 - Switch on the tractor's engine;
 - Set the double-acting valve to the float position;
 - Wait for the hydraulic system to decompress;
 - Switch off the tractor's engine, and remove the key from the ignition switch.
- Engage the parking brake (Chapter 5.1.3);
- Place chocks under the wheels (Chapter 5.1.4);
- Lower the support foot (Chapter 5.1.5);
- Disconnect the braking system:
 - Uncouple the connectors marked in red and yellow;
 - Couple the connectors to the secondary connections;
- Disconnect the electrical supply system;
- Disengage the power hydraulics;
- Install the covers for the hydraulic and electric connections.
- Disable and disassemble the PTO drive shaft. Put the disassembled shaft on the support designed to store it. Protect the terminals of the power input connection and PTO with guards;
- Disconnect the drawbar eye from the tractor's hitch.
- Draw the protecting chain through the hitch eye and lock it.

5. Maintenance and adjusting

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

 <p>DANGER!</p>	<p>DANGER!</p> <p>All activities related to maintenance and adjusting must be executed during machine stoppage and when all the moving parts of the machine have stopped.</p>
---	--

 <p>CAUTION</p>	<p>CAUTION!</p> <p>Use original spare parts only.</p>
---	--

The original spare parts manufactured by Metal Fach are designed to match the specific needs of our equipment.

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

Table 5. Tightening torque values for 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	

5.1 General procedures

5.1.1 Switching off the Baler

If the Baler is connected to the tractor, apply the manual brake, disable the engine, and remove the ignition key. Remember to switch off the control panel as well.

The procedure for shutting down the Baler includes the following:

- Placing the tractor and the machine in a safe place, on level ground;
- Engage the hand-brake in the tractor;
- Make sure that the PTO is switched off;
- Switching off the tractor's engine and removing the key from the ignition switch;
- Decompressing the hydraulic system (Chapter 4.6.2);
- Engage the parking brake in the Baler (Chapter 5.1.3);
- Place chocks under the wheels (Chapter 5.1.4).

5.1.2 Opening or closing the side guards

It will be necessary to open the side guards to access some parts of the machine. For this purpose, do the following, as shown in Figure 44:

- Open the interlock (1) with the key;
- Lift the guard using the handle (2).

You can close the guard by pushing it down, until it locks in place.

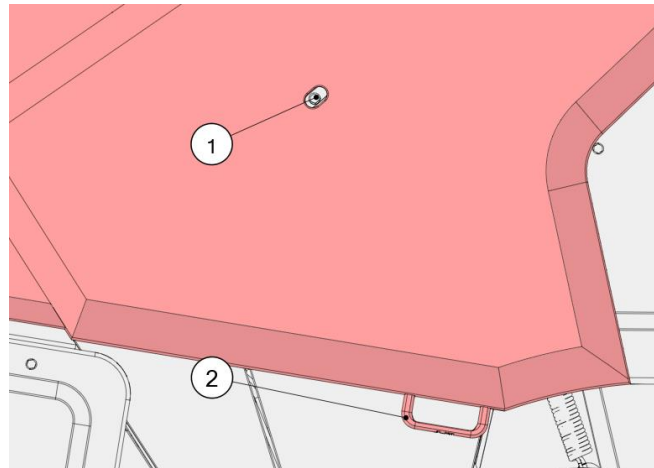


Figure 44. Opening the left-side guard

5.1.3 Using the parking brake

Always engage the parking brake when the machine has been parked to uncouple it from the tractor. Release the brake before driving.

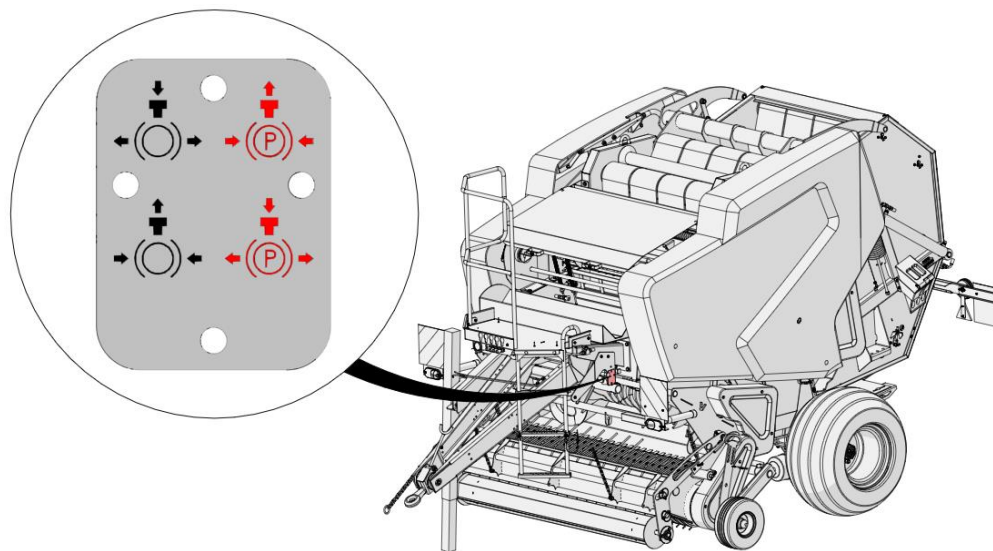


Figure 45. Parking brake

Use the parking brake as indicated on the plate shown in Figure 45.

The red symbols on the plate refer to the engaging and releasing of the spring-loaded parking brake. It can be engaged manually by pulling the red button. The parking brake is also engaged when there is a pressure drop, resulting from a leak in the braking system. The spring-loaded parking brake is released by pressing the red button.

The black symbols shown on the plate refer to the engaging and releasing of the emergency brake. The emergency brake is engaged automatically, after breaking away of the brake lines.

5.1.4 Placing chokes

Before uncoupling the machine from the tractor, secure the ground wheels with the chocks (2) located in the holders (1) on the left- and right-hand side of the machine (Figure 46).

Remove the chocks before coupling the Baler to the tractor.

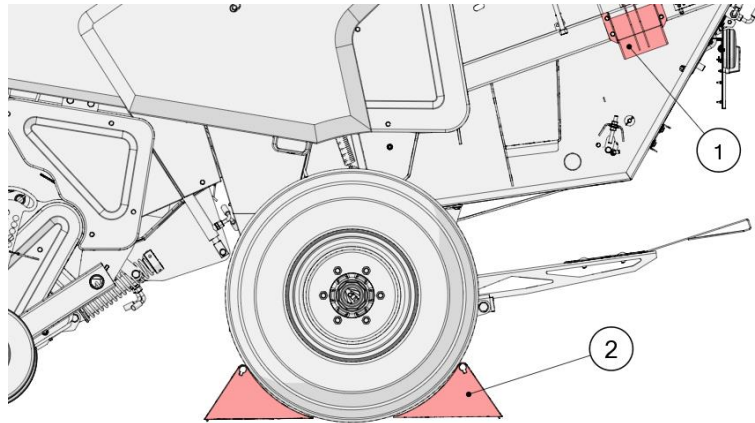


Figure 46. A ground wheel protected with a chock

5.1.5 Using the support foot

The support foot can be lowered / lifted quickly or slowly.

To move the support foot quickly, rotate the crank out as much as possible:

- Lifting – rotate clockwise;
- Lowering – rotate anti-clockwise.

To move the support foot slowly, push the crank in as far as possible:

- Lifting – rotate anti-clockwise;
- Lowering – rotate clockwise.

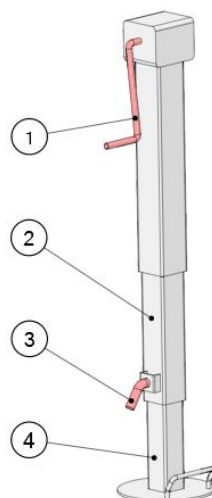


Figure 47. The support foot

Installing the support foot (Figure 47):

- Make sure that the machine is positioned on a level ground, the parking brake is on, and the wheels secured with the chocks;
- Remove the pin (3);
- Pull the support foot (4) out of the holder (2) to the desired height;
- Lock its position with the pin (3);
- Turn the crank (1) until the support foot (4) rests against the ground.

Removing the support foot (Figure 47):

- Turn the crank (1) to push the holder in as much as possible (2);
- Remove the pin (3);
- Move the foot (4) inside the holder (2);
- Lock its position with the pin (3);

5.1.6 Draining the braking system's air tank



CAUTION

CAUTION!

The braking system's air tank must be drained daily.

To empty the air tank of the braking system, do the following:

- Open the right-hand guard (Chapter 5.1.2)
- Pull the pin of the tank's drain valve (Figure 48);
- Hold the pin until all water has been removed;
- Use the tractor's pneumatic system to supply air to the tank (at least 5 bar).

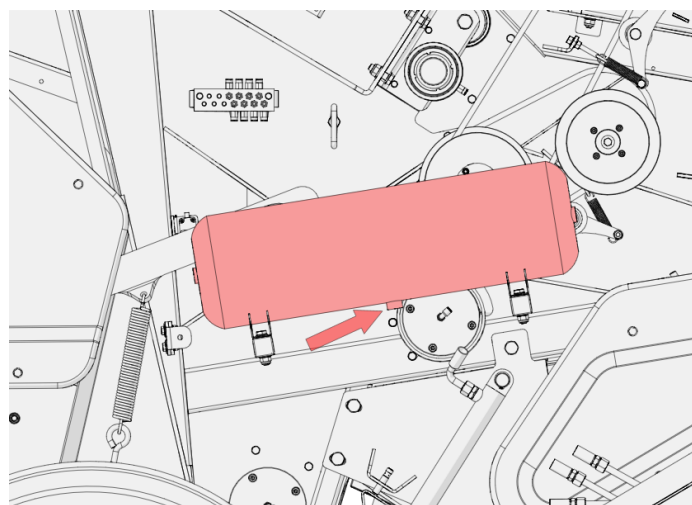


Figure 48. Draining the braking system's air tank

5.1.7 Safety systems

5.1.7.1 Securing the rear flap

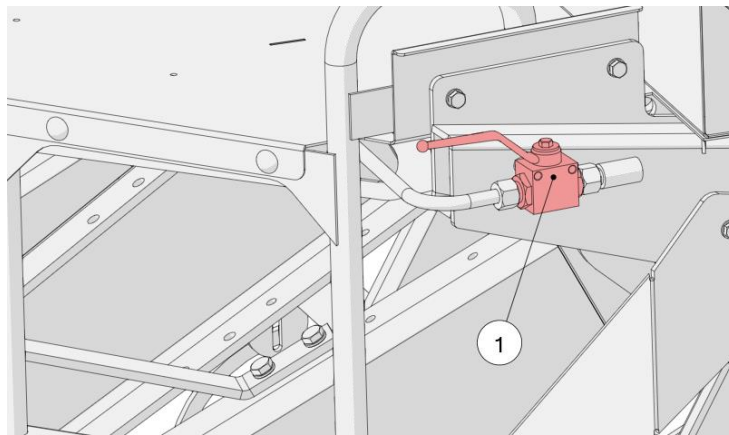


Figure 49. The shut-off valve of the rear flap

A hydraulic shut-off valve (1) is used to protect the rear flap against unintentional lowering (Figure 49). To do this, open the rear flap, and then turn the shut-off valve (1) to the closed position. To unlock the rear chamber, turn the valve to the working position and close the chamber.

5.1.7.2 Securing the net cutting knife



WARNING

WARNING!

Secure the knife when carrying out any work near the net cutting knife.

To secure the net cutting knife, open the top cover, then install the hook with chain (2) on the pin (1), as shown in Figure 50.

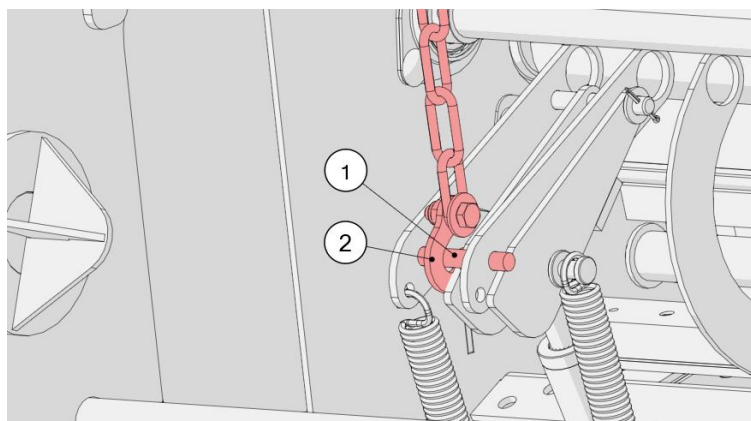


Figure 50. Securing the net cutting knife

5.1.7.3 Securing the pick-up

Install the chain (1) on the hanger (2) to prevent the pick-up from falling down, as a result of a pressure drop in the hydraulic system while driving. The pick-up should always be secured when transporting the machine.

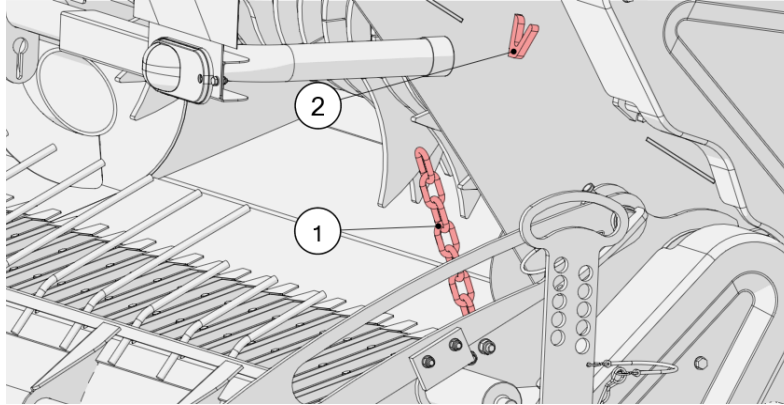


Figure 51. Securing the pick-up

5.2 The Baler's maintenance schedule

Table 6. The Baler's maintenance schedule

Time	Activity
After the first hour of operation	<ul style="list-style-type: none"> • Tighten the bolts on the ground wheels (Chapter 5.13) • Tighten the chains (Chapter 5.3)
Every 10 working hours	<ul style="list-style-type: none"> • Check the oil level in the tank of the automatic chain lubrication system (Chapter 5.10.1) • Check the condition of the hydraulic hoses for damage and leakage (Chapter 5.14) • Check tyre pressure
Every 500 bales (when working on sandy terrain - 2 times a day)	<ul style="list-style-type: none"> • Grease the components of the Baler, according to section 5.8 • Check the tightening of the drawbar's bolts, according to Table 5
After 3000 bales	<ul style="list-style-type: none"> • Grease the components of the Baler, according to section 5.8
After 6 weeks of not using the Baler	<ul style="list-style-type: none"> • Grease the components of the Baler, according to section 5.8
At the end of the season	<ul style="list-style-type: none"> • Tighten the chains (Chapter 5.3) • Grease the components of the Baler, according to section 5.8
At the beginning of the season	<ul style="list-style-type: none"> • Adjust the net wrapper's brake (Chapter 5.5) • Check the tightening of the bolts on the wheels (Chapter 5.13)
After 6 years of operation	<ul style="list-style-type: none"> • Change the hydraulic lines

5.3 Adjusting the tensioning of the chains

Check the chain's tension at regular intervals. Adjust the chains, according to the schedule (Chapter 5.2).

To adjust the tension of the Baler's chains, do the following:

- Switch off the machine, according to section 5.1.1;
- Position the pick-up wheels in the transportation position (Fig. 15);
- Open the left-hand guard of the Baler (Chapter 5.1.2)
- Remove the left guard of the pick-up (1) by undoing the bolts (2), as shown in Figure 52;
- Remove the left guard of the rotor (1) by undoing the bolts (2), according to Figure 53;

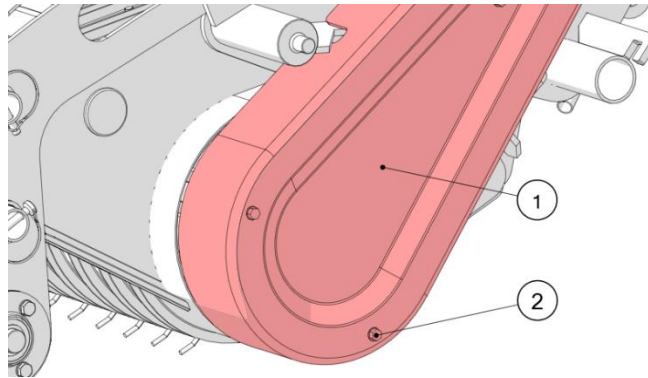


Figure 52. The left guard of the pick-up

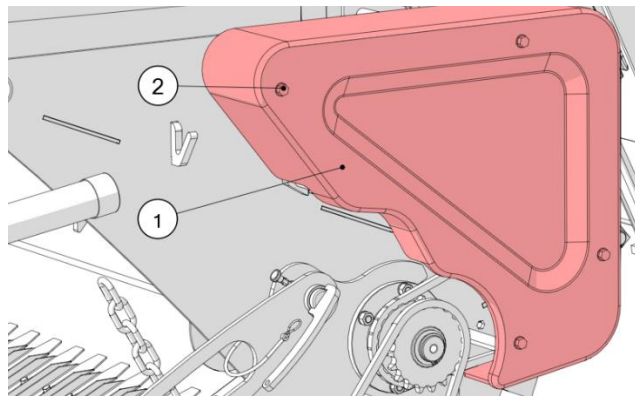


Figure 53. The left guard of the rotor

- To tension the chain of the pick-up (3), loosen the bolts in the tensioner (2) and slide it upwards so that the chain is tightened (Fig. 54);
- Lock the position of the tensioner by tightening the bolts;
- The driving chain (1) is tensioned via an automatic tensioner (4). Read the value on the indicator (7), as shown in Figure 54. The indicator should show a value between the bars marked as 5 and 6. If the indicator is outside this range, do the following:
 - Loosen the bolt in the tensioner;
 - Turn the automatic tensioner until the indicator is between the bars marked as 5 and 6;
 - Tighten the bolt in the automatic tensioner;

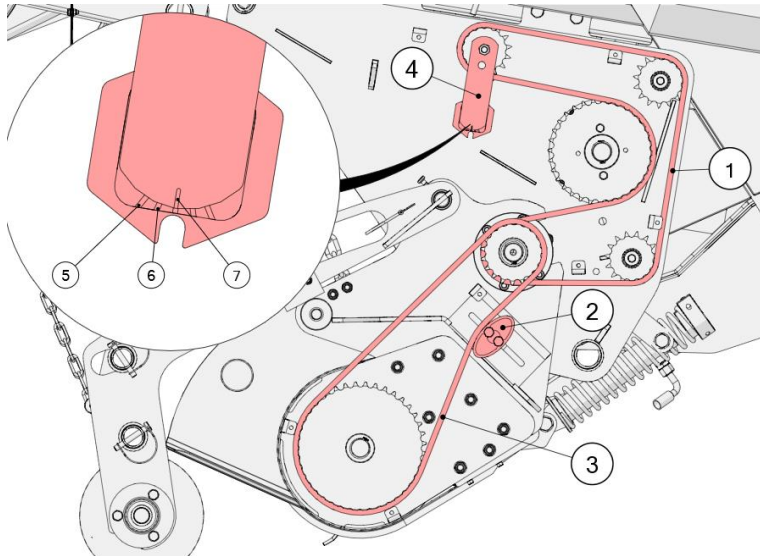


Figure 54. Tightening the chain of the pick-up

- Install the guards of the pick-up and the rotor by tightening the bolts;
- Remove the guards (1) and (2) by undoing the bolts (3) (Figure 55);



Figure 55. The left-side guards

- To adjust the chains in the baling chamber (1) and (2), turn the tensioner's nuts (3) and (4), as shown in Figure 56, and adjust their distances according to the following values:
 - A = 175mm;
 - B = 175mm;

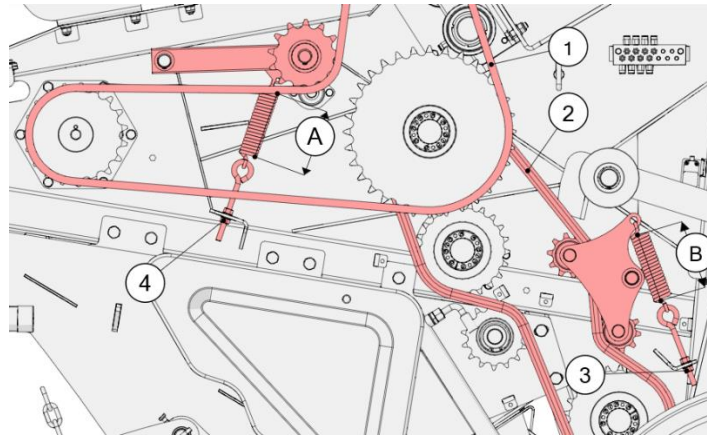


Figure 56. chain-tensioning

- Install the guards;
- Close the left-side guard;
- Adjust the chain of the pick-up on the right side of the machine in the same way as on the left side;
- Open the right-hand side of the Baler (Chapter 5.1.2);
- Remove the right-hand guard of the rotor (1) by undoing the bolts (2), as shown in Figure 57;
- To tension the rotor's chain (1), turn the nuts of the tensioner (2) so that the distance is $C = 95$ mm, as shown in Figure 58;

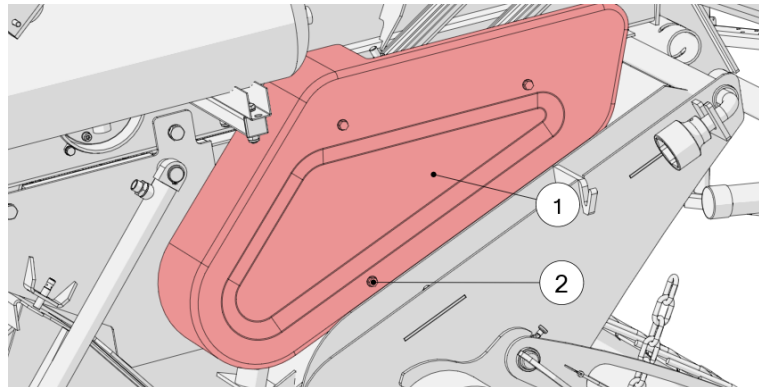


Figure 57. The right guard of the rotor

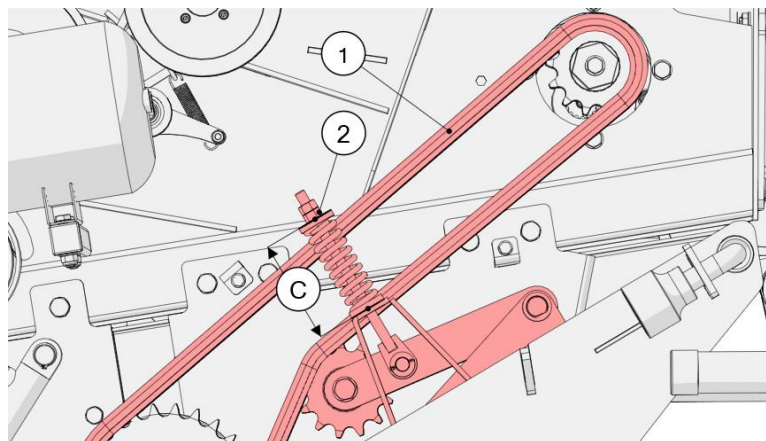


Figure 58. Tensioning the chain of the rotor

5.4 Lock adjustment

To adjust the lock, do the following:

- Open the side guard (Chapter 5.1.2);
- Remove the lock's guard (1) by undoing the bolts (2), as shown in Figure 59;
- Adjust the lock (1) by turning the nut (2) so that the distance is $D = 300$ mm, as shown in Figure 60;
- Repeat these steps on the other side of the machine.

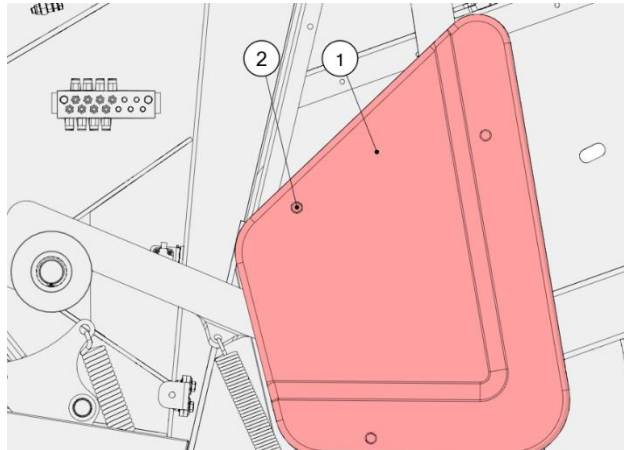


Figure 59. The lock's guard

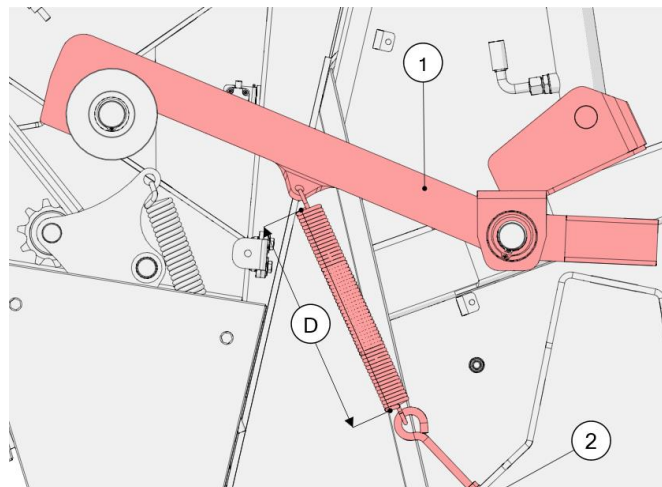


Figure 60. Adjusting the lock

5.5 Adjusting the disk brake of the net wrapper

The net wrapper's brake should be adjusted in such a way that it is not possible to rotate the brake disk manually, after the lever (1) (Figure 61) has been shifted. To adjust the brake, do the following:

- Make sure that the Baler is switched off, according to the procedure discussed in Chapter 5.1.1;
- Open the right-hand side of the Baler (Chapter 5.1.2);
- Loosen the bolt (3), as shown in Figure 61;

- Tighten the threaded bushing (2) so that the brake linings (4) are fully seated on the brake disks;

If the brake linings (4) are worn on one side (see Figure 61):

- Loosen the nut (5);
- Tighten the bolt a little (6) so that the linings are parallel to one another;
- Tighten the nut (5).

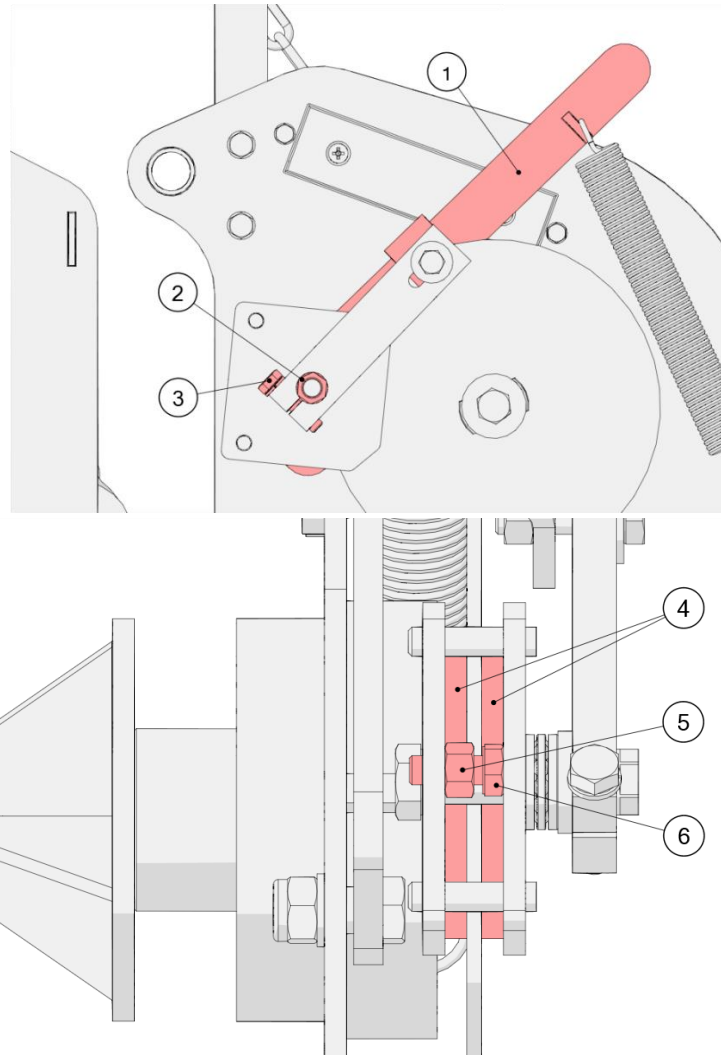


Figure 61. Adjusting the brake of the net wrapper

5.6 Changing the net cutting knife

To change the net cutting knife, do the following:

- Make sure that the Baler is switched off, according to the procedure discussed in Chapter 5.1.1;
- Secure the net cutting knife, according to section 5.1.7.2;
- Loosen the bolts on the strip holding the knife;
- Change the net cutting knife;
- Tighten the bolts.

5.7 Replacing the lock bolts in the pick-up

If the lock bolts securing the pick-up are sheared, replace them with bolts of the same parameters, i.e. M8x35 8.8 hex bolts, acc. to PN-EN ISO 4017 (galvanised, with full thread). To do so, follow the procedure below:

- Remove the guard (1) by undoing the bolts (2), as shown in Figure 53;
- Remove the sheared lock bolts (1) and make sure no parts of the damaged bolts still remain between the driving components (Figure 62);
- Use a wrench to turn the rotor and set the holes of the safety element in such a position, which enables installing new lock bolts (1), and tighten them;
- Install the protective guard.

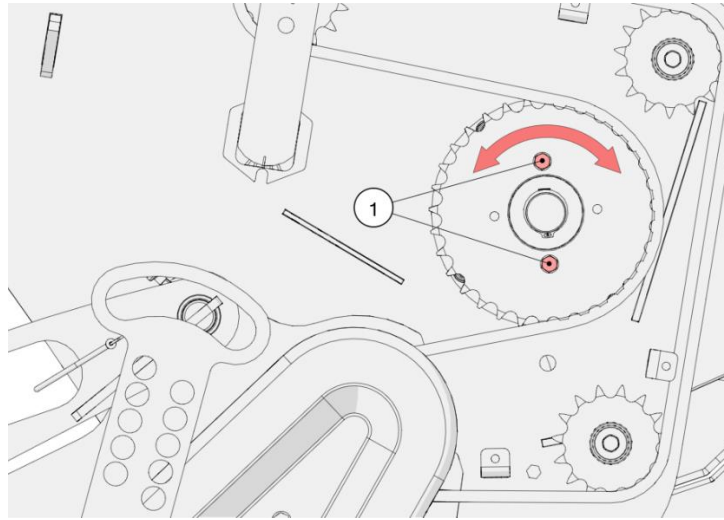


Figure 62. Replacing the lock bolts

5.8 Lubrication plan



CAUTION

CAUTION!

All lubrication points should be greased, according to Table 7 and Figure 64.

The lubrication points are marked on the machine with the pictogram shown in the figure below.

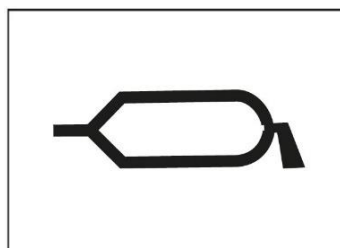


Figure 63. Marking of the lubrication points on the Baler

Table 7. Lubrication plan

Marking in the figure	Machine element	Lubricant	Notes
Every 500 bales (or every day)			
1	PTO shaft	All-purpose lubricant	
2	Collective bar	All-purpose lubricant	Lubricate on both sides of the machine.
3	Collective bar	All-purpose lubricant	
4	The tank of the automatic chain lubrication system	Lubricant, according to ISO VG 68 - ISO VG 220 (not thickening)	Check the oil level every day.
5	Rocker arm's shaft	All-purpose lubricant	Lubricate on both sides of the machine, according to section 5.8. Use a ladder to access the lubrication points.
6	Rocker arm's shaft	All-purpose lubricant	Lubricate on both sides of the machine, according to section 5.8.
7	Rocker arm's shaft	All-purpose lubricant	
At the end of the season (when working in special conditions - once a week)			
8	The support foot	All-purpose lubricant	
9	Gear	80W90 gear oil	Change the oil after the first 50 hours of operation. The oil changing procedure has been described in section 5.12.
10	The moving elements of the net wrapper	Machine oil	
11	Membrane	All-purpose lubricant	Lubricate on both sides of the machine.

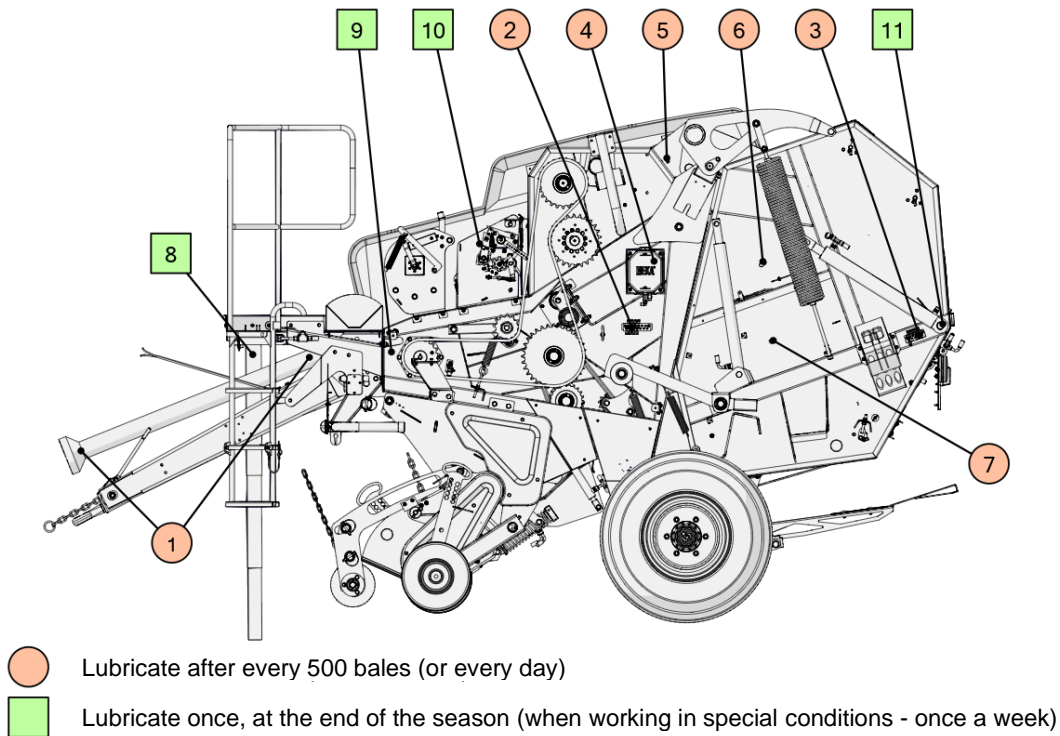


Figure 64. Lubrication points

5.9 Lubrication of the rear flap and the rollers of the tensioning arm

To lubricate the rear flap and the rollers of the tensioning arm, do the following:

- Make sure that the bale chamber is empty;
- Switch off the tractor's engine, and remove the key from the ignition switch.
- Lock the rocker arm by attaching the cord (1) to the hook (2), as shown in Figure 65;
- Open the rear chamber;
- Switch off the tractor's engine, and remove the key from the ignition switch.
- Lower the rear flap to open it to $\frac{1}{4}$ of the total range;
- Secure the rear chamber, according to section 5.1.7.1;
- Lubricate the rollers, according to the lubrication plan (Chapter 5.8);
- Release the rear flap with the hydraulic shut-off valve;
- Release the rocker arm;
- Switch on the tractor's engine;
- Open the rear flap;
- Close the rear flap.

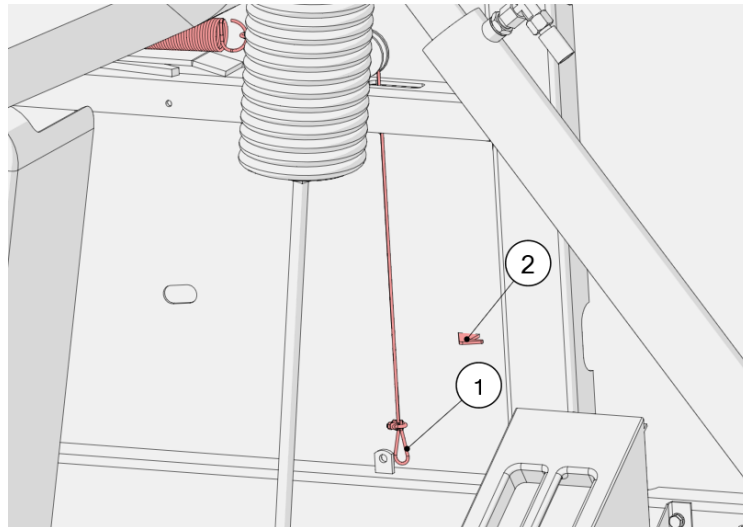


Figure 65. Locking the rocker arm

5.10 The automatic lubrication system for chains

5.10.1 Checking the oil level in the tank

The automatic chain lubrication system feeds oil from the tank to the machine's chains. Before checking the oil level in the tank, make sure that the PTO is disengaged, the tractor's engine is switched off, and the key removed from the ignition switch.

The oil level should be above the minimum mark, as indicated on the tank.

Check the oil level each time before starting work. If necessary, top it up.



CAUTION

CAUTION!

Using the mechanical pump without oil is prohibited. Operating the mechanical pump "dry", risks getting it damaged.



CAUTION

CAUTION!

The oil flow velocities are set during the initial start-up by the technical service. Do not change them. If adjustment is necessary, it will be done by the technical service.



Always use clean oils. Use a lubricant compliant with ISO VG 68 - ISO VG 220 (not thickening).

5.10.2 Filling the oil tank

If the oil in the tank has to be refilled, do the following:

- Make sure that the PTO is disengaged, the tractor's engine is switched off, and the key removed from the ignition switch;
- Open the left-hand guard (Chapter 5.1.2);
- Clean the machine around the tank (2) to prevent dirt from penetrating inside the tank (Figure 66);
- Unscrew the plug (1);
- Check the cleanliness of the filter; If the filter is dirty, remove it, clean it with petroleum benzine or petroleum, and re-install it in the tank;
- Pour clean oil through the filter until reaching the maximum level indicated on the tank;
- Screw in the plug (1).

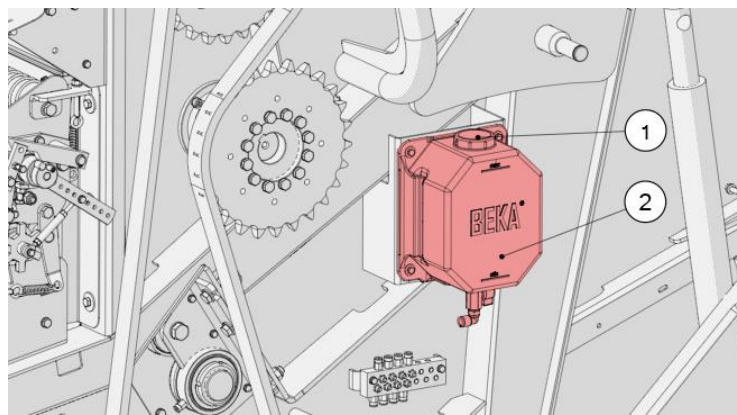


Figure 66. The tank of the automatic chain lubrication system

5.10.3 Bleeding the pump of the lubrication system

The automatic chain lubrication system's pump must be vented before the machine is started for the first time and each time the tank is drained and filled with oil.

To bleed the pump, do the following:

- Make sure that the PTO is disengaged, the tractor's engine is switched off, the ignition key is removed, and the tractor's hand-brake is engaged;
- Open the left-hand guard (Chapter 5.1.2);
- Disconnect all lines from the pump (1) (Figure 67);
- Place an oil container under the pump (1);
- Start the tractor's engine and engage the PTO
- Wait 20 seconds until air bubbles are removed from the pump;
- Engage the PTO, switch on the tractor's engine, and remove the key from the ignition switch;
- Connect the lines to the pump; Check the tightness of the connections.
- Check the oil level in the tank – top it up, if necessary.

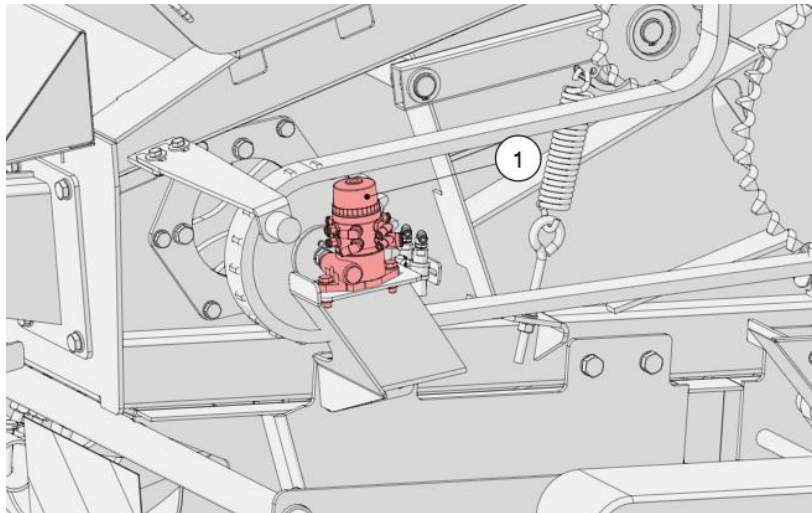


Figure 67. The pump of the automatic chain lubrication system

5.11 Lubrication of bearings

The Z514 Baler is fitted with the integrated lubrication system of bearings. The collective bars (1) with grease nipples (2) enable the lubrication of the machine bearings (Figure 68). The collective bars are located on the left- and right-hand side of the Baler. They must be lubricated, according to the lubrication plan (Chapter 5.8).

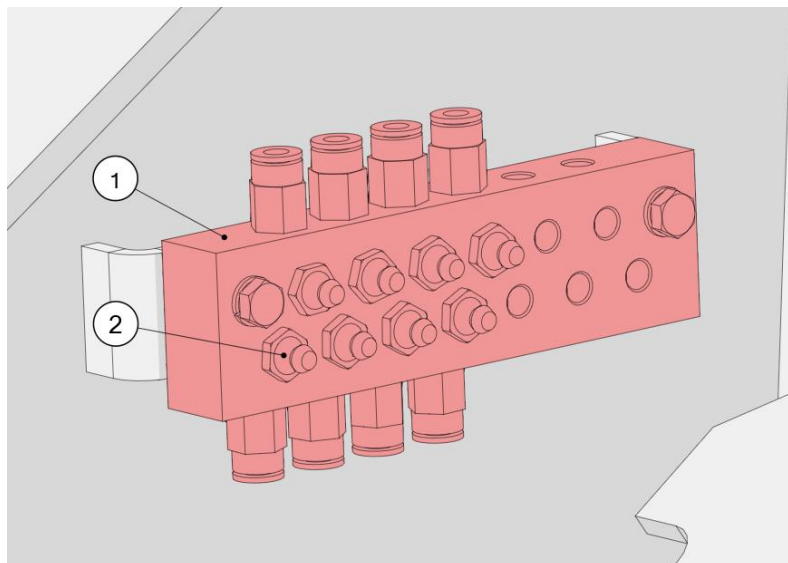


Figure 68. The central lubrication of the bearings

5.12 Changing oil in the gearbox



The oil in the gearbox must be changed after the first 50 hours of operation.



CAUTION

CAUTION!

Do not overfill the gearbox with oil. It may result in overheating or oil leakage.

The oil should be exchanged while it is still warm (e.g. immediately after using the machine).

5.12.1 Oil draining

To drain the oil from the gearbox, do the following:

- Prepare a container for used oil;
- Unscrew and remove the plug located on the bottom of the gearbox (Figure 69). It is accessible through the hole in the bottom part of the front bar, above the pick-up;
- Drain oil to the previously prepared container;
- After emptying the box, replace the cap.

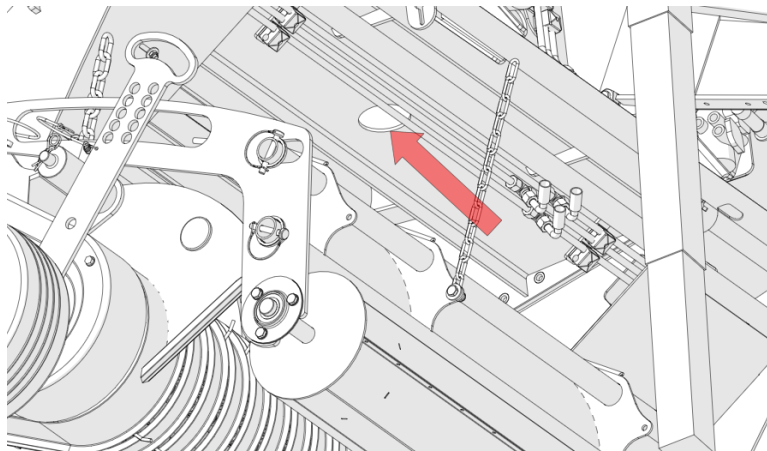


Figure 69. Drain cap

5.12.2 Oil topping-up



Important: Use the transmission oil type 80W90.

To refill oil in the gearbox, do the following:

- Unscrew and remove the cap in the top section of the transmission box;
- Top up the oil;
- Clean and replace the plug.

5.13 Ground wheels

5.13.1 Inspecting the condition of tyres



CAUTION

CAUTION!

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



CAUTION

CAUTION!

Check the tightness of the bolts on the wheels, according to the maintenance schedule (Chapter 5.2). The tightening torque should be in accordance with Table 5.

Schedule regular checks of the tyre pressure and ensure it is suitable for a respective tyre.



CAUTION

CAUTION!

Check the tightness of the bolts on the wheels, according to the maintenance schedule (Chapter 5.2). The tightening torque should be in accordance with Table 5.

5.13.2 Changing the ground wheel



DANGER!

DANGER!

Carry out all activities related to changing the ground wheels, when the machine is stopped and all moving parts of the machine are in standstill.



WARNING

WARNING!

Observe road traffic regulations and the manufacturer's recommendations, when carrying out maintenance on public roads (Chapter 1.7.3).



CAUTION

CAUTION!

The jack should only be applied on the Baler's axis. The jacking points are shown in Fig. 70. Do not attach the jack to any other point, as it could damage the machine.



CAUTION

CAUTION!

Tighten the nuts again, after one hour of driving. The tightening torque should be in accordance with Table 5.



CAUTION

CAUTION!

Use the tyres as specified in Table 1.

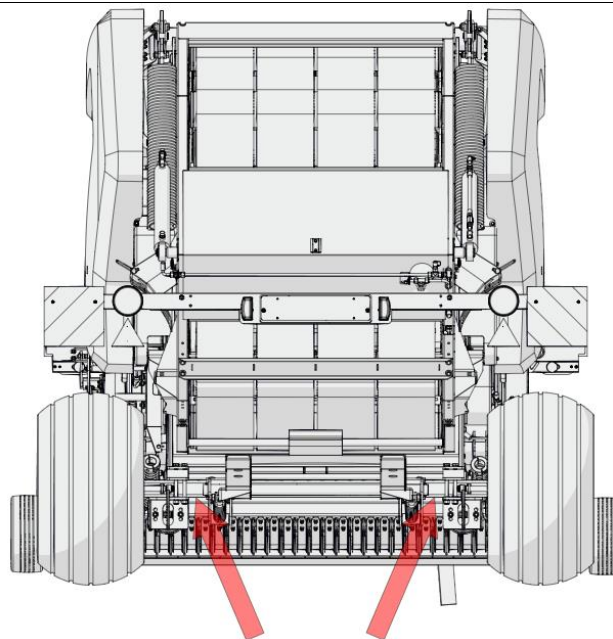


Figure 70. The jacking points

If the ground wheel must be changed, do the following:

- Make sure that the machine is properly coupled to the tractor;
- Make sure that it is standing on level ground;
- Make sure that the PTO is disengaged, the tractor's engine is switched off, and the key removed from the ignition switch;
- Engage the parking brake (Chapter 5.1.3);
- Place the chocks under the wheels (Chapter 5.1.4);
- Place the jack in the position shown in Figure 70. The load carrying capacity of the jack must be adapted to the machine;
- Loosen the nuts on the wheel;
- Using the jack, lift the machine so that the wheel to be replaced is above the ground;
- Remove the nuts;
- Take off the wheel;
- Install a new wheel;
- Fix the wheel by tightening the nuts manually;
- Lower the jack;
- Use a calibrated torque wrench to tighten the nuts alternately (the torque must correspond to the values defined in Table 5);
- Check the tyre pressure in accordance with Table 1 (it should be 250kPa);
- Re-tighten the wheel nuts after one hour of driving. The tightening torque should be as shown in Table 5.

5.14 Inspecting the hydraulic lines



WARNING

WARNING!

It is prohibited to check the hydraulic hose lines for leaks by hand or with any other parts of the body. If hydraulic fluid comes into contact with the skin, clean it and see a doctor, if necessary.

Check the condition of the hydraulic lines according to the maintenance schedule (Chapter 5.2). To do so, follow the procedure below:

- Switch off the Baler, according to section 5.1.1;
- Perform a visual inspection from a safe distance: check the lines for any damage;
- If you suspect a line to be leaking, use filter paper or a piece of paper to find the leaking spot;
- Replace the hydraulic lines immediately, if they are damaged or leaking. The hydraulic lines must be changed by certified technicians.

5.15 Maintenance of the battery

All work on the battery should only be carried out by a qualified service technician.

It is prohibited to modify the battery by machining, welding, or any other means.

6. Possible faults

The most frequent faults and problems which may occur during the machine's operation are presented in the table below. If the suggested solutions fail to bring the required result, contact the distributor or service centre of Metal Fach.

Table 8. Possible faults

Pick-up

Problem	Possible cause	Solution
Clogging the inlet of the chamber.	Too large and/or irregular windrows or too high working speed.	Form the windrows of the right size and/or work with lower pick-up speed.
	Excessive picking up the windrow on one of the sides of the pick-up.	Drive the Baler equally from one side to the other.
	Too low rotational speed (RPM).	Work with a rotational speed of 540 RPM.
No lifting or lowering action of the pick-up unit.	Ball valve closed.	Follow item 3.4 to check the setting of the valve.
Pick-up tines tear the material.	Too high rotational speed of the pick-up compared to the working speed.	Increase the working speed.
		Decrease the PTO's rotational speed (RPM).
The pick-up tines leave out parts of the windrow.	Too low rotational speed of the pick-up compared to the working speed.	Decrease the working speed.
		Increase the PTO's rotational speed (RPM).
The pick-up does not collect all the windrow.	Too large windrow width.	Form a new, narrower windrow.
The pick-up does not collect windrow from a level ground.	The pick-up set too high.	Lower the pick-up position.
		Set the pick-up wheels correctly.
The pick-up lets the material pass and stops.	The protection component is defective.	Halve the volume of the windrow.
		Adjust the wheel position to lift the pick-up.
		Remove the accumulated plant material, and replace the protective component.
Insufficient windrow pick-up.	The pick-up tines were lost or damaged.	Replace the pick-up tines.

Forming bales

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

Net wrapping

Problem	Possible cause	Solution
Net is not distributed well on a bale.	Too large mesh of the net.	Use standard net.
	Incorrect path of net flow.	Check if the net is installed correctly.
	Incorrectly adjusted net brake.	Adjust the net brake.

PTO shaft

Problem	Possible cause	Solution
The clutch of the PTO is creaky.	Too big bale diameter or weight.	Decrease the bale diameter or weight.
	A blockage in the feeding unit.	Remove any accumulated material.

Hydraulic system

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

Control panel

Problem	Possible cause	Solution
The "ERROR" message (Fig. 42) and an acoustic signal.	The maximum bale diameter has been exceeded.	Stop the operation and wrap the bale in net. Do not exceed the maximum bale diameter.
	No wrapping material (net) present.	Fill the containers with net.
	The sensor distance to the bolt adjusted incorrectly.	Set the sensor within the distance of 2-3mm from the bolt.
The message displayed on the panel instructs to close the chamber, even though it is open (Fig. 41).	The sensor distance to the lever adjusted incorrectly.	The sensor should be located within with the distance of 2-3mm from the lever.

INDEX OF NAMES AND ABBREVIATIONS

dB (A) - decibel A, sound pressure unit;

Hitch, the lower transportation hitch – hitching components of an agricultural tractor (see the tractor's Instructions Manual)

kg – kilogram, weight unit

km/h – kilometre per hour, linear speed unit

kPa – kilopascal, pressure unit

kW – kilowatt, power unit

m – metre, length unit

min – minute, an auxiliary time unit equal to 60 seconds;

mm – millimetre - auxiliary length unit equal to 0.001 m

OHS - occupational safety and health;

Pictogram – an information plate

Power input connection- the shaft receiving the transferred torque - a part of the Baler;

PTO - rear Power-Take-Off shaft, a part of the agricultural tractor;

PTO drive shaft - the articulated telescopic shaft transmitting the torque;

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

rev - revolution, determining the kind of movement;

rpm - revolution per minute, a rotation speed unit;

UV - ultraviolet radiation; It is an invisible electromagnetic radiation with a negative impact on human health; UV radiation has a negative effect on rubber parts;

V – Volt, a voltage unit

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NOTES

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A series of 25 horizontal dotted lines spanning the width of the page, providing a template for handwritten notes or a checklist.



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