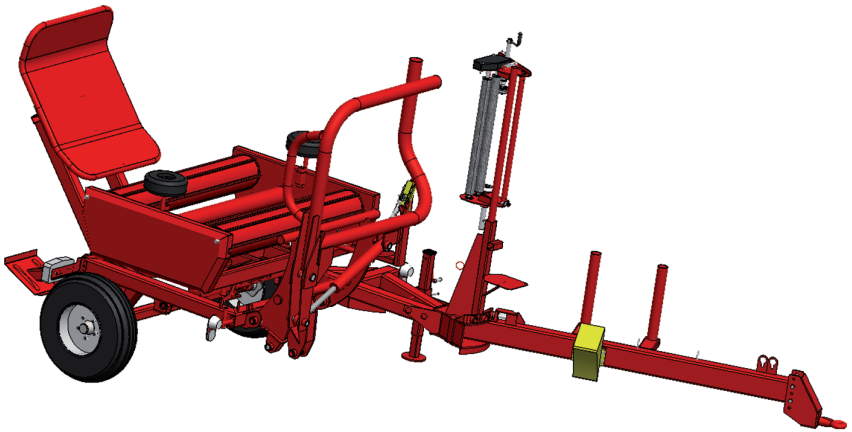


Thank you for choosing our Z593 bale wrapping machine designed for efficient operation.

The following manual will let you fully use the advantages of our wrapping machine and to optimise the bale wrapping process.

The manual contains a detailed table of contents followed by descriptions which will allow to easily identify the device and to make the best use of it.

The information regarding safety and comfort of operation, description of coupling with a tractor, technical service activities and storage conditions are listed on the following pages of the manual.

A spare parts catalogue containing the list of the wrapping machine major components allowing for easy ordering is attached to the manual in a digital form on a CD.

A printed version of the catalogue may be purchased at authorised dealers or directly from the manufacturer.

Both the manual and the spare parts catalogue contain basic information on the product. The elements fitted to the equipment may be slightly different than presented in the manual.

The manufacturer reserves the right to introduce changes without notice.

Warning:

This is a warning symbol and it indicates that it is required to pay special attention to the operator and bystanders' safety requirements or safe operation requirements.

Information:

This symbol indicates additional information which allows to optimise the device operation.

Environmental protection:

This symbol indicates the need to pay special attention to environmental considerations.

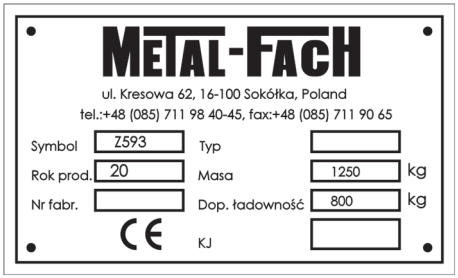
Cross-reference:

this symbol directs you to a page on which detailed information on a given subject is presented.

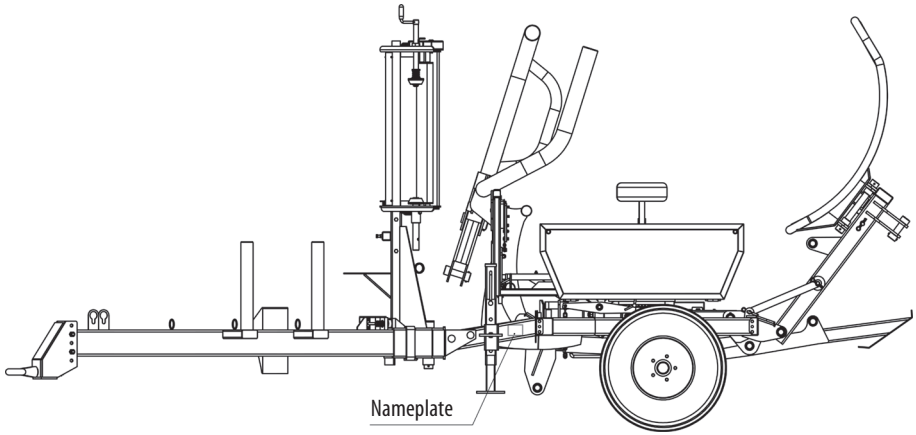
Table of contents

1 Wrapping machine identification, general safety rules
1.1 Wrapping machine identification

The wrapping machine is identified by its nameplate securely fastened to the main frame of the machine. The information presented on the nameplate is shown on the diagram below.



It is forbidden to drive the wrapping machine on public roads without its nameplate or with an illegible nameplate.



When purchasing the machine check the serial number indicated in the Manual and the warranty sheet against the serial number stamped on the nameplate.

The operating manual is a part of the Z593 wrapping machine equipment.

If the machine is sold to another user, it must be supplied with the operating manual. It is advised that the supplier has a confirmation stating that the manual was transferred together with the machine, signed by the buyer and filed.

Carefully read the operating manual.

If the rules stated in this manual are complied with, it will help prevent hazards and operate the machine efficiently; it will also allow to retain the warranty throughout the period granted by the manufacturer.
Detailed information on the structure, operating principles, technology and other details may be obtained from authorised outlets and the wrapping machine manufacturer.

It is forbidden for persons who have not read the manual to operate the machine.

The wrapping machine shall be operated according to its intended use by coupling it with a tractor with nominal power exceeding 30kW and towing power class of at least 0.9. The Z593 bale wrapping machine is designed to pick up bales from the ground, wrap them in film and unload to the ground.

Dry grass and other papilionaceous plants with humidity of approx. 60%[1] shall be rolled into bales using the collecting and wrapping presses. The bale wrapping process should be conducted on the field or in the storage yard practically immediately after they have been rolled (up to 2 hours[2]). The wrapped bales should be stacked in up to two layers on a dry and even surface making sure the wrapping film is not torn.
The fermentation process must continue for 6 to 8 weeks at positive temperatures. Thus provided silage is fit for use as a wholesome feed for animals.
During operation, the operator is not subject to noise which may cause the loss of hearing, as the noise level of the machine does not exceed 70 dB (A) and the operator works inside the tractor cabin.
During the operation, the operator is not subject to harmful vibration as the vibration level transferred to the upper limbs does not exceed 2.5 m/s^2, and the vibration level transferred to the body is lower than 0.5 m/s^2 and the operator is positioned in the tractor cabin.

Any unauthorised changes to the wrapping machine structure absolve the manufacturer from all responsibility for the threats and damage it may cause.

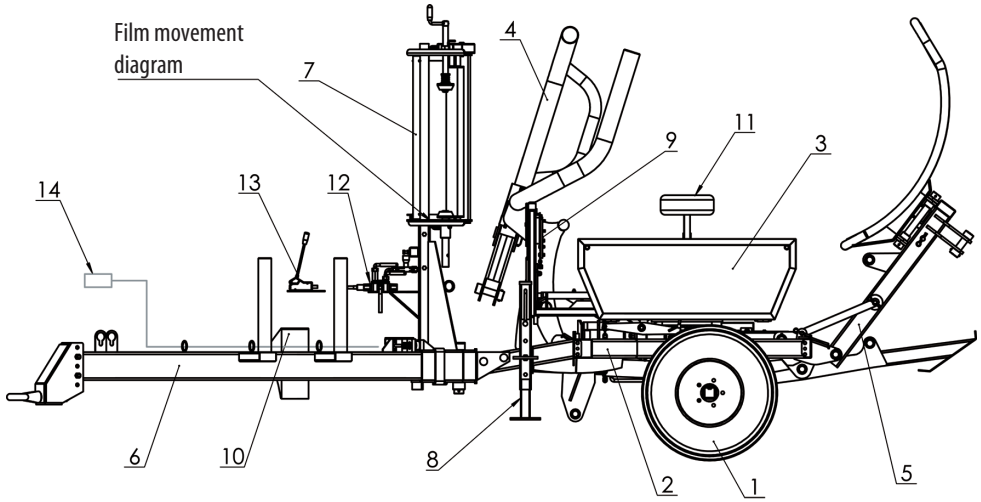
1 Grass and other papilionaceous plants prepared for ensilage and wrapping should be mowed in the early phase of heading (best done in the afternoon). On the next day, after a few hours of drying, the mowed material should be gathered using the wrapping presses. Maximum bale compression must be maintained.

[2] An unwanted decomposition process takes place in bales left unwrapped for a longer time.

1.2 Wrapping machine construction

The Z593 wrapping machine consists of the following assemblies:

- Complete axle with ground wheels item 1
- Lower frame item 2
- Rotary frame item 3
- Loading arm item 4
- Unloading unit item 5
- Drawbar item 6
- Wrapping film feeder item 7
- Support foot item 8
- Cutting unit item 9
- Wheel lock wedge item 10
- Side wheel item 11
- Hydraulic control unit item 12
- Control levers item 13
- L-02 counter item 14



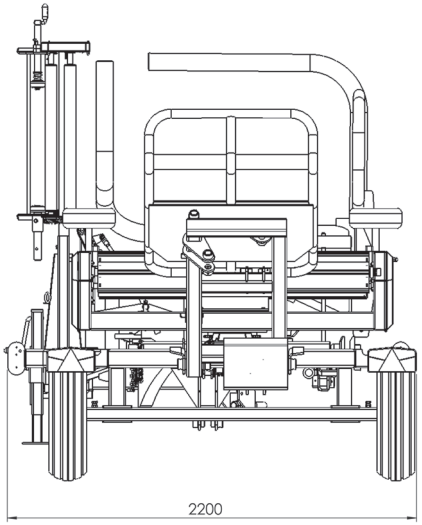
The drawbar (6) is attached to the bottom frame (2) and equipped with an adjustable hitch ring for the connection of the wrapping machine to the tractor and its levelling for a working or transport position.
A rotary frame (3) is attached to the bottom frame (2). The loading arm (5) and the bale unloading unit (5) are mounted to the bottom frame (2) in a movable way. The film feeder (7) is attached to the bottom frame (2). A pictogram presenting the film movement during the wrapping macine operation is placed on the film feeder.

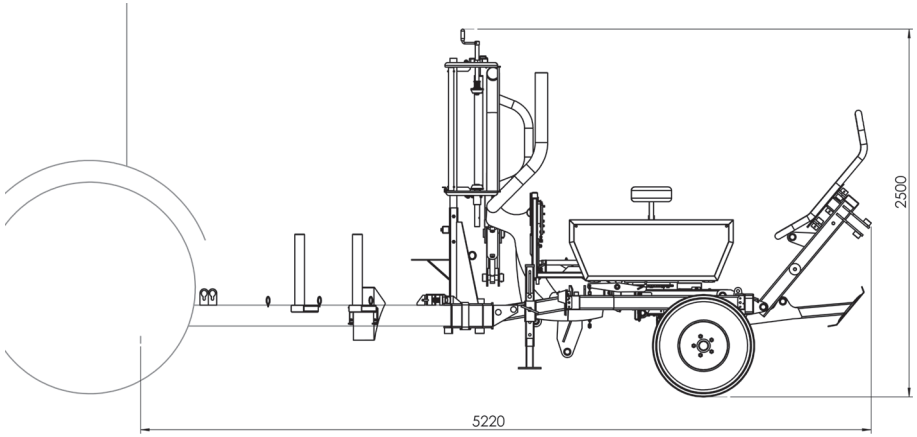
1.3 Wrapping machine characteristics

No.	Designation	Unit	
1	Type		Z593
2	Coupling with the tractor	-	Hitched
3	Undercarriage type	-	Mono-axial
4	Overall dimensions in the working position Length/width/height	mm	6050/3000/2500
5	Overall dimensions in the transport position Length/width/height	mm	5220/2200/2500
6	Machine weight	kg	1250
7	Maximum bale weight	kg	800
8	Wrapped bale dimensions Length Diameter	mm	 1200 1000-1200
9	Maximum operating speed	kph	10
10	Maximum transport speed	kph	15
11	Coupling with a tractor through	-	Agricultural hitch
12	Tractor class	-	0.9
13	Minimum tractor power output	kW	30
14	Required pressure in the tractor power hydraulic system:	MPa	14
15	Recommended tractor pump output	l/min	22
16	Tractor hitch load	kN	1.2
17	Wheel spacing	mm	2000
18	Tyres	-	10.0/80- 12 10PR

19	Tyre pressure	bar	3.5
20	Drawbar hitch-ring diameter	mm	40
21	Wrapping machine drive	-	Hydraulic and the tractor power hydraulic system
22	Rotary frame drive	-	Hydraulic motor
23	Maximum rotational speed of the rotary frame	RPM	35
24	Bale loading method	-	Automatic, using a loading arm
25	Bale unloading method	-	Automatic with the unloading unit
26	Film cutting	-	Automatic, after bale wrapping is finished
27	Film width	mm	500; 750
28	Number of the rotary frame (table) revolutions using film: 500 mm 750 mm	revs.	 24 16
29	Bale wrapping time	min	~2
30	Number of operators	-	1 (tractor driver)
31	Wrap counter	-	Electronic, type L-02
32	Electrical system voltage	V	12
33	Machine lighting	-	Following the requirements of the traffic code

1.4 Wrapping machine dimensions

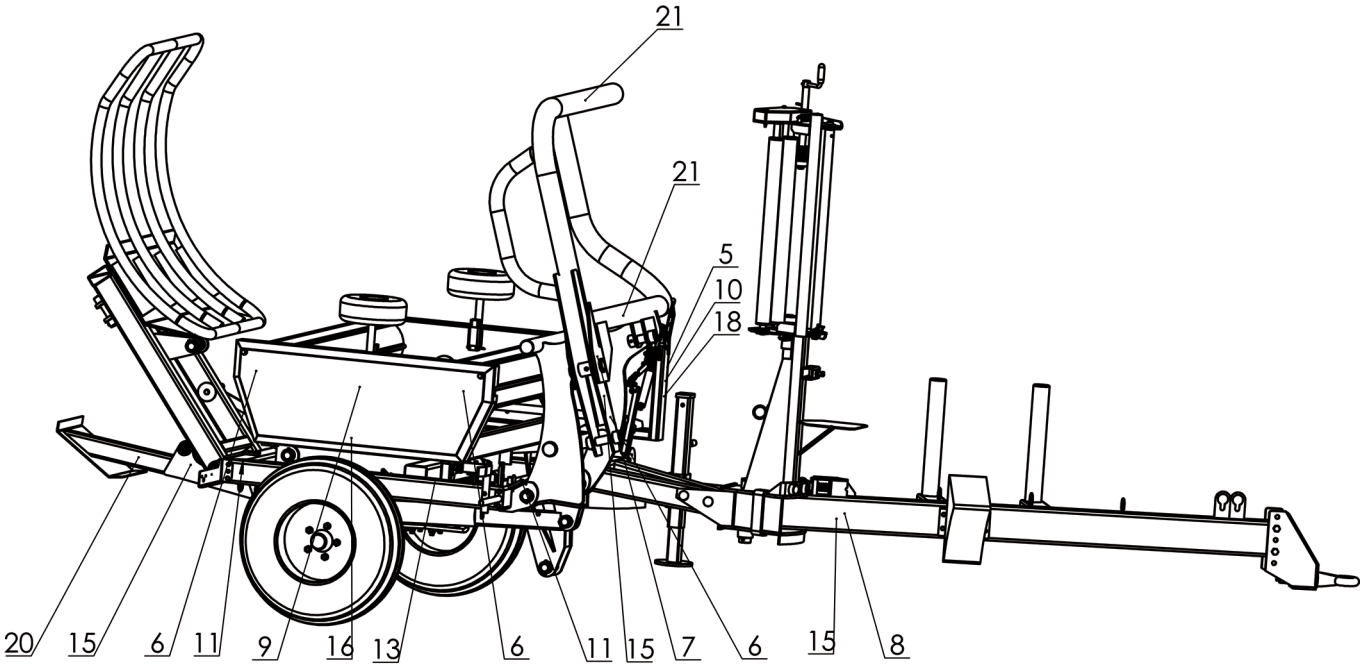




The drawings show the dimensions of the machine in a transport position.

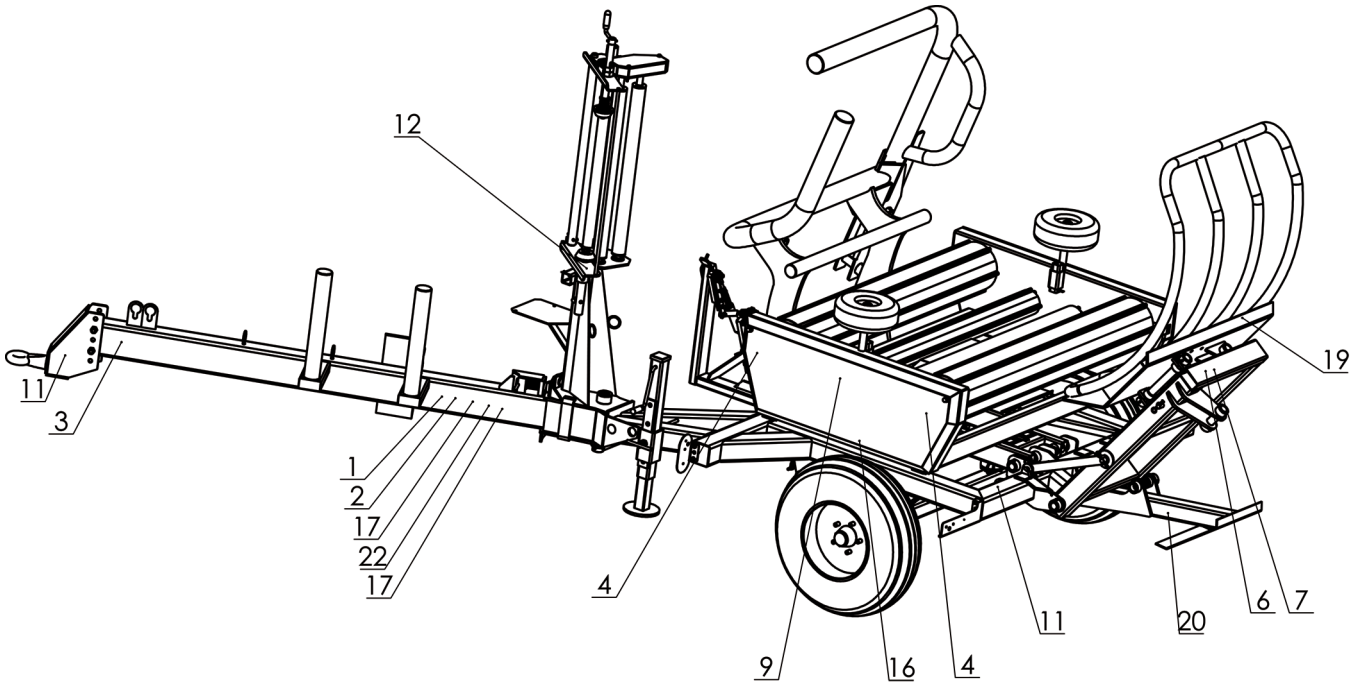
The dimensions of the wrapping machine in the working position are presented in the table.
Wrapping machine characteristics ⏭ Section 1.3. of the Manual.

1.5 Location of pictograms
Location of pictograms - right



The meaning of pictograms is explained in Section 1.6 of the Manual.

Location of pictograms - left



The meaning of pictograms is explained in Section 1.6 of the Manual.

1.6 Warning Symbols

Warning pictograms on the machine (⏭ Section 1.5) inform the operator about the hazards and dangers which may occur during the machine operation. Keep the symbols clean and legible.

Replace illegible symbols with new ones. New pictograms can be purchased from the manufacturer.

Pictogram 1

Refer to the operating manual before performing this action.

Pictogram 2

Turn off the engine and remove the ignition key before servicing or repairs.

Pictogram 3

Do not stand near the pull rods of the operating wrapping machine.

Pictogram 4

Do not open or remove the safety guards during machine operation.

Pictogram 5

Do not touch rotating elements during the machine operation.

Pictogram 6

Do not approach the working machine. Danger of being crushed by a bale.

Pictogram 7

Keep a safe distance from the raised arm. Danger of being crushed.

Pictogram 8

Danger zone. Before operating install a support.

Pictogram 9

CAUTION! IT IS FORBIDDEN FOR BYSTANDERS TO STAY NEAR THE OPERATING MACHINE.

Warning pictogram.

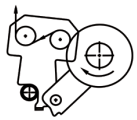
WARNING!
SHARP KNIFE

Pictogram 10

Warning pictogram.

Pictogram 11

Attachment points for loading on a means of transport.



Pictogram 12

Film wrapping diagram.

Pictogram 13

Proper location of the bale counter sensor below the magnet.

Pictogram 14

Lubrication point.

Pictogram 15
Danger of crushing.

Pictogram 16
Recommended wrapping machine tire pressure.

Pictogram 17
Avoid contact with liquids under pressure.

Pictogram 18
Use protective gloves during maintenance operations.

Pictogram 19

40 x 950 warning sign.

Pictogram 20

50 x 300 warning sign.

Pictogram 21

40 x 800 warning sign.

Pictogram 22

CE requirements conformity symbol.

1.7 General safety rules

1.7.1 During operation and repair of the wrapping machine the agricultural health and safety regulations contained in the Regulation of the Minister of Agriculture and Food Economy of 12 January 1998 must be complied with.

1.7.2 Only an adult with a valid agricultural tractor driver's licence and familiarised with the occupational health and safety regulations regarding agricultural equipment and this Manual may operate this machine.

1.7.3 The following manual must be read and adhered to, paying special attention to directions regarding the safe operation of the wrapping machine.

1.7.4 The manual indicates the machine parts which pose a potential threat. Hazardous areas are marked with yellow stickers with warning pictograms. Pay special attention to the hazardous areas and strictly adhere to the rules.

1.7.5 The operator must familiarise themselves with the meaning of the pictograms.

1.7.6 It is forbidden to operate the wrapping machine without the safety guards installed on moving components.

1.7.7 Always check the condition and completeness of the machine and positioning of its safety guards before starting the machine.

1.7.8 Before starting the wrapping machine and entering public roads, inspect the attachment of the machine to the tractor, attachment of the wheels and proper connection of the drawbar to the tractor.

1.7.9 All adjustment, repair and maintenance works shall be conducted with the tractor engine turned off and making sure that the machine is secured against accidental activation.

1.7.10 Before commencing loading and during this process, make sure that there are no bystanders, especially children, nearby.

1.7.11 During the operation of the wrapping machine, allow for free space near the rotating elements. During bale wrapping, no people or animals are allowed near the rotating elements.

1.7.12 Exercise extreme caution when working on an inclined land. Note that the bales may roll down slopes.

1.7.13 It is forbidden to operate the wrapping machine with any of the assemblies lifted.

1.7.14 Do not stand between the wrapping machine and the tractor when the tractor engine is running.

1.7.15 Exercise special caution at coupling and disconnecting the wrapping machine from the tractor. The machine should be coupled with the tractor equipped with a coupling device able to withstand the vertical load larger than the vertical load exerted on the wrapping machine drawbar⏭Section 1.3.

1.7.16 During operation, use appropriate protective clothing and shoes with anti-slip soles.

1.7.17 While loading the wrapping film, the tractor engine must be turned off and protected against accidental activation (ignition key removed, parking brake on).

1.7.18 It is forbidden to operate damaged hydraulic lines. The damaged lines must be immediately replaced with new ones. During the replacement of hydraulic lines, use impermeable protective clothing.

1.7.19 The machine hydraulic system shall only be operated from the tractor cabin.

1.7.20 The hydraulic control unit should be installed in the tractor cabin within the operator's reach in a way which will not pose a threat to the operator in case a hydraulic line breaks.

1.7.21 Follow the traffic code regulations and the manufacturer's recommendations when travelling on public roads.⏭Section 8.2.

1.7.22 Before entering public roads, perform a visual inspection of the transported machine.

1.7.23 It is forbidden to stay on the wrapping machine during transport.

1.7.24 While travelling on public roads, it is forbidden to transport wrapped swath or silage on the wrapping machine.

1.7.25 It is forbidden to operate the wrapping machine while under influence of alcohol.

1.7.26 It is forbidden to operate the wrapping machine while under influence of drugs or medicines with similar effects.

1.7.27 It is forbidden to operate the wrapping machine while under influence of medicines which affect the ability to drive vehicles or reduce psychophysical fitness or cause concentration disorders and increase reaction time.

1.7.28 It is forbidden to drive the wrapping machine near sources of open flame.

1.7.29 It is required to strictly adhere to the fire protection regulations and immediately extinguish any fire which may occur during the wrapping machine use or at its standstill.

1.7.30 Do not approach the working wrapping machine with open flame and do not smoke near the machine.

1.7.31 Every time before commencing work, check if the tractor is equipped with a dry powder extinguisher. If not, place a dry powder fire extinguisher on the tractor.

2. Coupling with the drive

2.1 Drive coupling

The Z 593 bale wrapping machine should be coupled with agricultural tractors of rated power not lower than 30kW and towing power class 0.9, equipped with two hydraulic system connections.
The wrapping machine shall be coupled to the lower hitch or to the upper hitch allowing for the maximum vertical load of 1.2 kN.

Make sure that there are no bystanders, especially children, in the coupling area.

During coupling the equipment to the tractor, place the machine in the tractor axis on flat, level ground. Turn off the tractor engine, remove the ignition key and engage the tractor parking brake. Level the wrapping machine by selecting the appropriate adjustment opening in the hitch.

Couple the hitch-ring only with the lower hitch and check whether the machine is properly connected and secured against accidental disconnection.

Make sure that the tractor hydraulic system is tight.

Connect the electric power source. Check if the electric and signalling systems work properly.

Connect the hydraulic power source. Check if the hydraulic systems work properly, especially the lifting and blocking mechanisms responsible for controlling the working and transport positions.

Load the first bale ⏭ 5.4 and make sure that the vertical load on the tractor front axle is larger than 20% of the tractor weight. The tractor should remain fully steerable.

2.2 Disconnecting from the drive

Make sure that there are no bystanders, especially children, in the wrapping machine storage area and its vicinity.

Place the wrapping machine for storage on a hard, flat and level ground. Turn off the tractor engine, remove the ignition key and engage the tractor parking brake.

Disconnect the electric power supply.

Disconnect the hydraulic system.

Lower the main frame support. Disconnect the hitch-ring from the transport hitch. Make sure that the machine will not move accidentally.

3 Commissioning

The commissioning of a newly purchased bale wrapping machine is performed by the dealer's service.

Before commissioning, familiarise yourself with the following manual, paying special attention to the fragments regarding the safety of the operator and bystanders.

If there are any doubts regarding safety issues, please contact your sales representative or the manufacturer.

Before each start up of the wrapping machine, the control levers shall be installed in the tractor operator's cabin.

Commissioning of the counter

Install the wrap counter in the tractor cabin. Connect it to the revolution counter and with to supply using a feeder cable.

The proper connection is signalled by a blinking red light on the counter display. Press and hold the button (activation symbol C).

Each activation of the counter is accompanied by the display test and power supply voltage test. The display will show the indication 8888 and all decimal points and LEDs will light up, additionally a sound signal will be activated.

Then the power source voltage will be displayed e.g. U12.7, which denotes the voltage of 12.7 V.

Every other condition indicates that the counter is damaged.

Then the year of manufacture of the counter will be displayed e.g. 2011 and a yellow LED will light up (1). . Using the F2 button enter the year of manufacture of the wrapping machine (between 2000 and 2099).

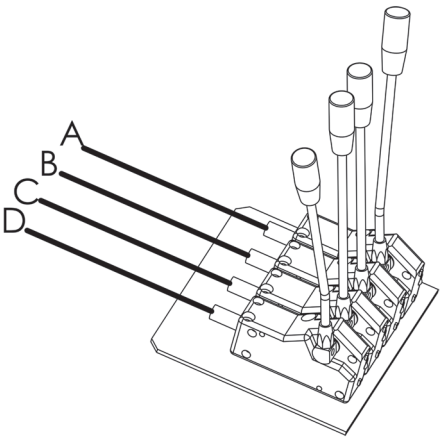
Pass to setting the wrapping machine serial number with F1. A flashing LED (2) signals the option of setting the wrapping machine option. Enter the serial number

pressing and holding F2 button (range from 0000 to 9999).
Check if the entered data is correct by pressing the F1 button. It should display the year of manufacture and the wrapping machine serial number in an alternate way.
If the entered data is correct, confirm using the on/C button by pressing and holding it for about 10 seconds. The confirmation of the entered data will be signalled by a blinking red LED and intermittent sound signal.
It is only possible to enter the year of manufacture and serial number once. After the information is confirmed, it cannot be corrected. To stop the data entering procedure, disconnect the counter from its power source. The wrap counter data cannot be erased and no changes can be made.

4. Control and current adjustment elements

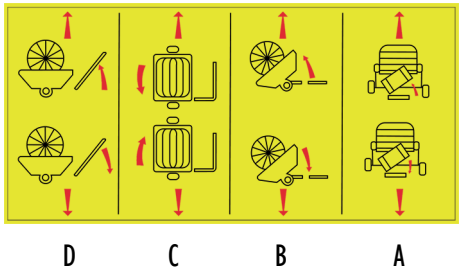
4.1 Location of the controls

Before each start up of the wrapping machine, the control levers shall be installed in the tractor operator's cabin.



Information pictograms are attached to the controls.

Control lever pictograms



Pictograms listed from left to right:

D - Raising and lowering of the loading arm,

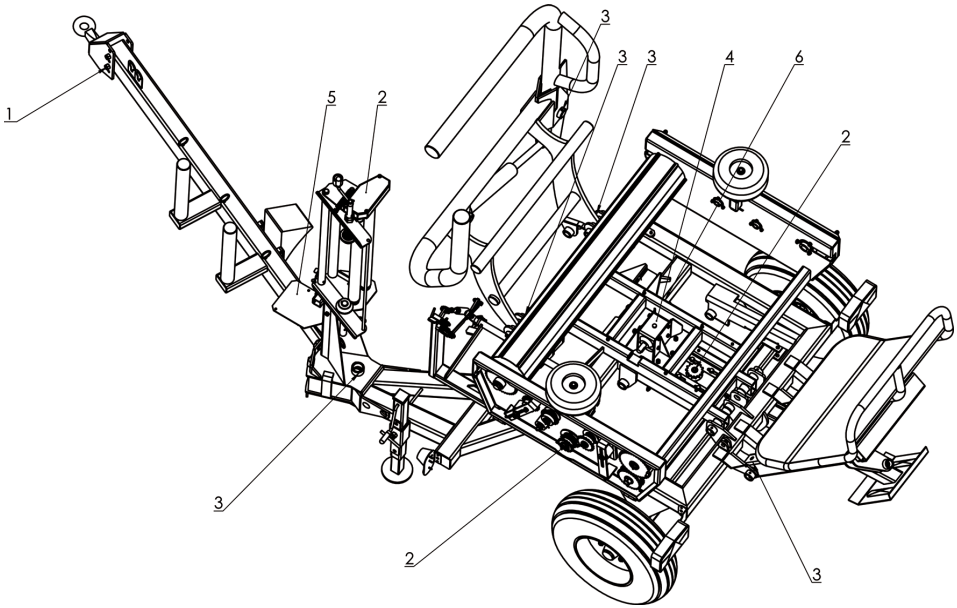
C. Rotary table movement,

B - Raising and lowering of the rotary table;

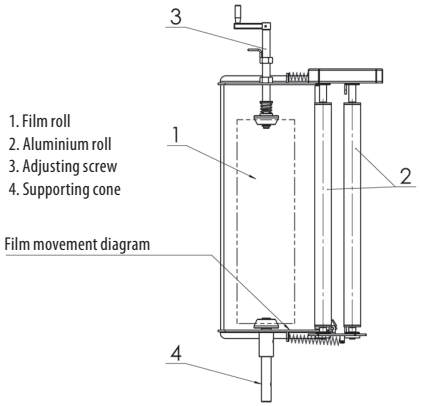
A - -Unloading unit lifting/lowering.

4.2 Location of ongoing adjustment points

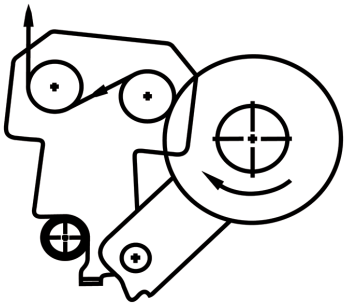
Levelling of the wrapping machine during coupling with the tractor	Item 1
Chain tension	item 2
Pictograms of the lubricating points are located on the machine. ⏭ Section 1.5	Item 3
Intersecting axis gear	item 4
Hydraulic control unit	item 5
The revolution sensor is marked with a pictogram on the machine ⏭ Section 1.5	Item 6



Wrapping film feeder



Film movement diagram



With each revolution of the rotary frame, the bale and film rotate by a certain angle around the horizontal axis, which causes consecutive layers of film to be wrapped tightly around the bale.

5. Wrapping machine operation

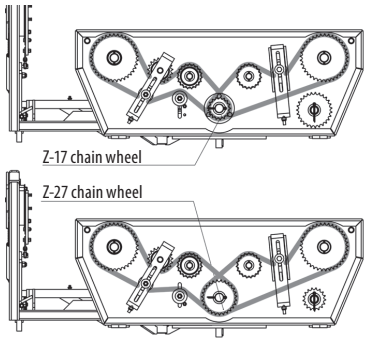
5.1 Installing the film

Place the film roll on the feeder pin in the following order:

- Tilt the support with the metal rollers and secure it using the hook attached to the wrapping unit.
- Using a lever (crank) undo the upper pin pressing the film upwards.
- Set the height of the lower pin in a position relevant for the film roll width (500 mm or 750 mm).
- Place the film roll on the lower conical pin.
- Clamp the roll by turning the lever (crank) on the upper pin so that the roll is securely held in the vertical position.
- Protect the roll from unscrewing using the nut on the crank screw.
- When installing the roll of film, place its internal, sticky side towards the bale axis.
- Properly set the initial tension of the film ⏭ Section 5.4.
- Pull the film through the rollers as indicated in the diagram located on the gear cover.
- Pull the end of the film so that it may be easily handled in the machine.

The wrapping machine is originally intended to wrap with 500 mm wide film. To use a 750 mm film, the chain wheel must be replaced (see the diagram below). To do so, it is required to:

- Unscrew the 4 M12 hub nuts, remove the side guard of the rotary frame (from the chain transmission side).
- Loosen the M12 screw on the chain tightening mechanism.
- Remove the chain from the Z17 chain wheel installed on the main shaft and remove the split pin securing the wheel.
- Remove the Z17 chain wheel form the shaft (using an appropriate tool).
- Secure the removed Z 17 chain wheel.
- Replace it with a Z27 chain wheel.
- Secure the Z27 repeating the abovementioned procedure in a reverse order.

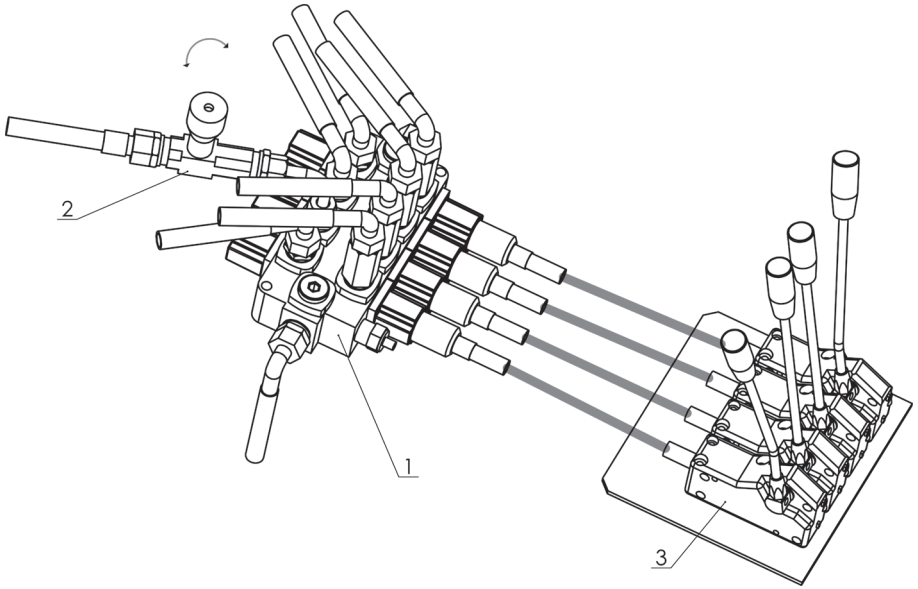


5.2 Hydraulic system

The wrapping machine hydraulic system is powered from the tractor hydraulic system. To attach the machine to the tractor hydraulic system, the attachment cables are connected to the hydraulic controls and further to the wrapping machine hydraulic motor.
Through the chain transmission, the hydraulic motor rotates the drums with the loaded hay silage bales. By means of a 4-section hydraulic control unit (1), the hydraulic engine powers 5 double-acting cylinders responsible for:

- Tilting the rotary table and the unloading unit to the vertical and horizontal position,
- Raising and lowering of the loading arm,
- Rotation of the working table.

The control over the engine and hydraulic cylinders is done with control levers located in the tractor cabin during operation. The levers are connected to the 4-sectional control unit using Bowden cables.



The pictograms on the support inform about the functions fulfilled by each control lever (3) on the 4-sectional control unit (1).
The 4-sectional control unit (1) is protected against high pressure from the hydraulic system by means of a safety valve. Additionally four throttle valves are embedded in the hydraulic system.

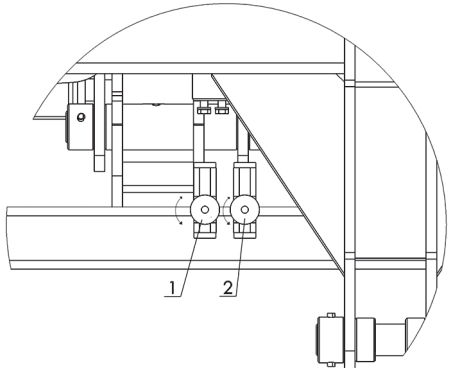
The valve indicated on the illustration as item 2 is located in the rotary frame section and operates only in the table rotation system rotating clockwise, which is opposite to the wrapping direction. It is responsible for a smooth stop of the rotary frame.

Delayed blocking of the rotary table indicates that the valve must be adjusted properly.

Do not adjust the valve behind the control unit.
It is pre-adjusted by the manufacturer.

The other two throttle-check valves (Item 1 and 2) of the table unloading control are located at the actuator lifting and lowering the wrapping machine table at bale unlodading (see the drawing). They allow for a setting ensuring smooth movements of the rotary frame and bale unloading unit. The bale unloading order is described in Section⏭ 5.5. Turn the loaded unloading unit at lowering, after the lowest point has been reached. After turning, set the unloading table to the initial position, simultaneously lowering the rotary frame to the lowest position.

The fourth non-return valve is embedded at the back of the main frame on the bale unloading unit actuator return. The valve shall be positioned so that the unloading assembly is slowly lowered to the ground.



Before operating the wrapping machine, check the operation of the hydraulic system by testing the following elements without a bale loaded:

- Table rotation;
- Lifting and lowering of the rotary table,
- Lifting and lowering of loading arm,
- Lifting and lowering of the bale unloading unit,
- Tilting of the bale unloading unit.

5.3 Wrap counter
5.3.1 Wrap counter system
L-02 wrap counter

The wrap counter is an electronic device used for counting the wraps on a bale and may be used on all types of wrapping machines.

The wrap counter should be installed in the tractor cabin in a place where it is visible and accessible to the operator.

Protect the counter against humidity, excessive vibration and hitting the cabin elements, and especially

against falling on a hard surface. The counter can be fixed using its back surface catch.

Protect the counter from water, chemical agents, direct atmospheric precipitation, frost, high temperature exceeding 50°C and direct exposure to sunlight.

The counter kit comprises of:

- Pre-programmed counter in a plastic casing,
- Revolution sensor;
- Bundle of wires;
- Multi-contact connection.

The revolution sensor attached to an unmoving part of the wrapping machine operates in conjunction with a magnet attached to the rotary frame which passes impulses to the revolution counter. Each rotation of the bale is counted and displayed on the revolution counter display.

When the programmed number of revolutions is performed, the counter signals completion of wrapping with a blinking light and a sound signal.

The counter may be programmed to a required number of revolutions between 10 and 49.

Revolution sensor

Connect the revolution sensor installed in the cabin to the power source (12V) and revolution sensor using the specially prepared bundle of wires.

Protect the wires connecting the sensor with the revolution counter against accidental mechanical damage.

Protect the connections of the wires with the revolution counter against accidental uncoupling.

5.3.2 Switching the system on and off

The blinking red signalling light indicates that the revolution counter system has been configured properly.

Press and hold the ON button marked with the letter C.

Each activation of the counter is accompanied by the display test and the power supply voltage test ⏭ See Section 3.

A positive test result indicates the unit is ready to work with the settings entered during the previous use.

Press and hold the C button until a red blinking light appears on the display (for about 3 seconds). After this signal, the counter unit may be disconnected.

5.3.3 Working with the counter in the counting mode

Setting the wrap number

Press the F1 and F2 buttons at the same time. The last settings shall be displayed. The setting mode is signalled by the activation of two LEDs, red - warning and green - wrapping. Change the number of wraps using the F2 button (within the scope of 10 to 49 wraps). Confirm using the C button. The counter is ready to work with its new settings.

changes, the red LED will light up and a sound signal will be emitted. Hold both buttons pressed until the sound signal is heard. The indications for the given field have been erased.

Field selection

Change the field number using the F1 button (1, 2, 3). Change the stored bale indication for a given field using the F2 - set the number of wraps and the number of bales. Additionally, the F2 button can display the average efficiency of the wrapping machine during a working hour and the number of wrapped bales.

After the field number is selected, erase the counter indication by simultaneously pressing the F2 and C buttons. When the device is ready to enter the changes, the red LED will light up and a sound signal will be emitted. Hold both buttons pressed until the sound signal is heard. The indications for the given field have been erased.

Operation of the counter in the counting mode

Start work after selecting the field and setting the number of wraps. The counter indicates wrapping as soon as it receives impulses from the wrapping machine sensor. After a set number of wraps is reached, the red LED and the counter display begin to blink. A complete wrap is also signalled by an intermittent sound signal.
Erase the wrapping end signal by pressing and holding the C button. Hold the button until the display indicates the number of wrapped bales and the red LED turns off. The counter is ready for counting wraps on another bale.

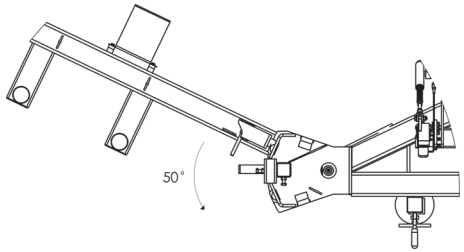
Erase the wrapping end signal by pressing and holding the C button. Hold the button until the display indicates the number of wrapped bales and the red LED turns off. The counter is ready for counting wraps on another bale.

Example of the L02 wrap counter indications:

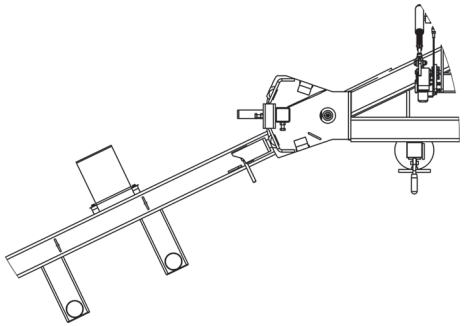
Graphic symbol	Indication	Sample indication	Meaning
	Number of bales	16	12 bales were wrapped in the reference field.
	Time	3.25	Working time It was 3 hours and 25 minutes in the reference field.
	Production efficiency	3.5	On average 3.5 bales are wrapped per 1 hour in the reference field.
	Wrapping	24.15	The wrap counter is set to 24 wraps. In the reference moment the number of wraps is 15.
	Warnings Alarms	Blinking and Err 1 signal displayed	Error no. 1

5.4 Wrapping

To prepare the machine for work the wrapping machine drawbar needs to be placed in its working position following the diagram below:



Transport position



Working position

Set to the working position with a drawbar coupled with the tractor transport hitch.

Proceed as follows at changing the drawbar position:

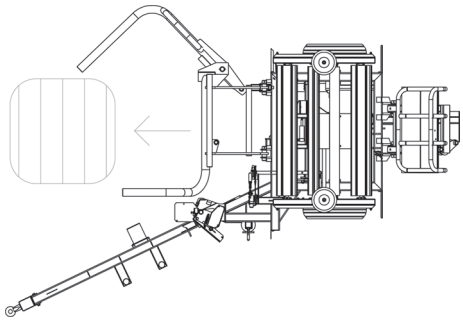
- Align the coupled wrapping machine with the tractor axis,
- Remove the drawbar security pin (back part of the drawbar),
- Lock the right road wheel of the machine,
- Slowly move the tractor with the machine forward until the security pin is in the working position sleeve axis,
- Lock the drawbar in the working position with a pin,
- Unlock the loading arm,
- Unlock the unloading unit,
- Place the loading arm and unloading arm locks in the specified places.

Note

Be careful while changing the position of the side wheel. There is a risk of the operator's hand being crushed.

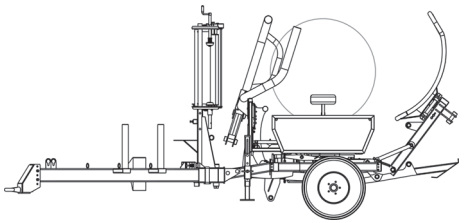
Bale loading

Lower the loading arm to its maximum lower position i.e. horizontal position when it is approx. 10 cm above ground in its maximum deflection. Place the rotary frame perpendicular to the driving direction so that the film cutting cutter is in front of the machine. Stop the rotary table about 25° beyond the axis parallel to the wrapping machine axis and move the table back using the control switch lever to a position parallel to the machine axis until the rotary table is locked. Move towards the bale as shown in the drawing below.



The axis of the wrapping machine moving forward should be perpendicular to the loaded bale axis and the lowered arm should hold the bale.

Stop the tractor when the bale rests against the stop plate of the lateral loading arm. Lift the grab arm until the bale rolls freely onto the wrapping machine rotary table, as shown in the drawing below.



Consecutive bales are loaded from the ground to the wrapping machine rotary table in the same way.

Lower the grabbing arm to the bottom when the bale rests on the roatry table.

Note:
Before operation check:

- Whether the wrapping machine drawbar is properly connected to the tractor transport hitch,
- Whether the power hydraulic lines are properly connected,
- Whether the revolutions counter system is properly connected,
- Raising and lowering of the loading arm,
- Whether the rotary table is placed in its vertical and horizontal position correctly,

- Smoothness and direction of the rotary frame and drums movement - the rotary frame should rotate counterclockwise,
- Tightening of the wrapping machine side wheel pins.

The bales should be wrapped only at positive temperatures. The bales should be wrapped in a field or in their storage area.

By avoiding unnecessary transport of bales, the risk of the wrapping film being damaged is minimised.

Pay particular attention to the initial film tension (65-80%)[1]. A worn or unlubricated tension mechanism may cause the film to be wrapped too tightly. The film tension must not exceed 70%.

Pull the film at the first bale as far as possible from the feeder and attach it using the string binding the bale. Using the control lever, turn on the hydraulic motor of the wrapping machine. While placed on the rotary table, the bale is rotated by a certain angle around its horizontal axis with every revolution around its vertical axis, which causes overlapping of consecutive layers of film resulting in a tight wrap around the bale. Maintain the tractor engine revolutions at 1500 rpm while wrapping.

Wrap at least 4 layers of film so that each of them overlaps in 50%.

We advise to finish the wrapping after about 24 revolutions of the frame while using 500 mm film or 16 revolutions while using 750 mm film. Secure the end of the film. A properly wrapped bale has four layers of the wrapping film around it.

[1] Mark two vertical lines on the film roll in a distance of about 10 cm from each other. The distance between the lines of 17 cm after tensioning represents 70% initial film tension. The width of the film measured at the end of the bale should not be less than 400 mm when using 500 mm film and not less than 600 mm when using 750 mm film.

Note:
Before turning on the rotary frame drive, make sure that there are no bystanders in the working area.

Note:

Maintaining the rolls in good condition, especially their edges, minimises the risk of the film breaking while wrapping.

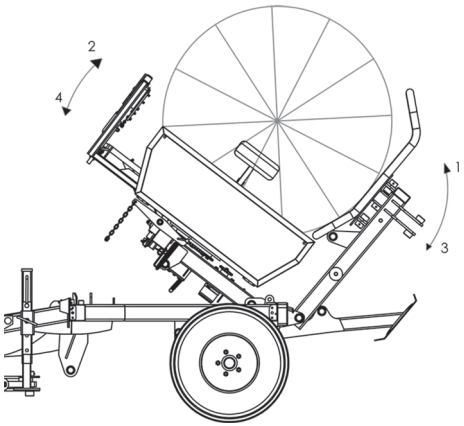
Do not wrap bales during precipitation.

If the bale is wrapped too tightly, halt the wrapping process. Establish the cause of excess film tension. Set the proper film tension. Resume the wrapping process.

Use the bales within 12 months from their wrapping date.

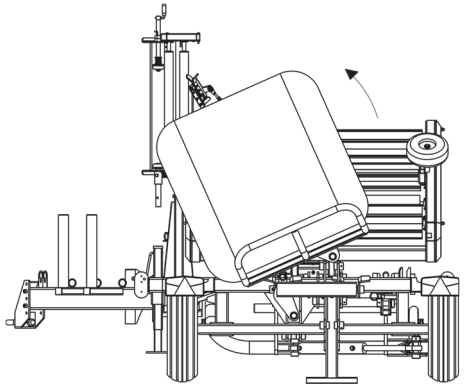
5.5 Unloading the wrapped bale

To unload the bale, stop the rotary table about 25° beyond the axis perpendicular to the wrapping machine axis and move the table back using the control switch lever to a position perpendicular to the machine axis until the rotary table is locked.
The film cutting system should be located in front of the wrapping machine. Bales are unloaded by lifting the rotary table with the bale as shown in the drawing below.



During the unloading process, the cutter cuts away the film.

The bale on the unloading unit shall be turned with the unloading unit rotation control level as shown in the drawing below.



After unloading the bale, all working components should return to their initial position. Another bale may now be loaded.

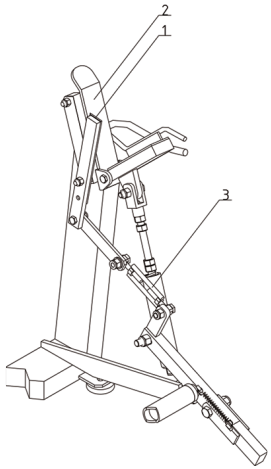
Note

Bales are unloaded correctly as follows (see the drawing): lifting of the unloading unit (1), tilting of the rotary table (2), lowering of the unloading unit (3) and lowering of the rotary table (4).

Correct tilting of the unloading arm and rotary table is set with two throttle valves - see ⏭ Section 5.2.

Film cutting

If the film cutter fails to operate correctly, stop the wrapping machine, turn off the tractor engine, remove the ignition key and engage the tractor parking brake. Adjust the cutter cutting angle (1) in relation to the film in the clamp (item 2). The adjustment is made using the tightening screw (item 3). When the screw (3) is turned clockwise, the cutter angle in relation to the film is decreased and the other way round.



A properly set cutter cuts the film when the unloaded bale touches the ground.

When the angle is too steep, the film is not cut even though the bale is unloaded to the ground.

Lower the control lever on the hydraulic control unit when there is danger caused by the wrapping machine. Turn off the tractor engine, remove the ignition key and engage the tractor parking brake. Locate the hazard and remove it.

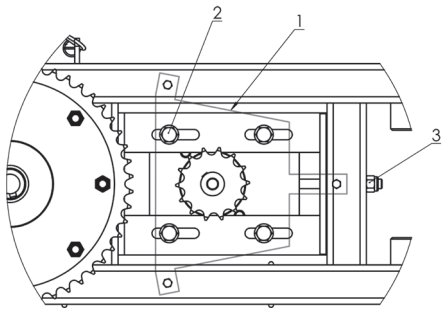
Lock the rotary table during loading and unloading of the bale.

Take extra caution when adjusting the cutter. The cutter is extremely sharp. Danger of hand injury.

Side wheels located on the sides of the rotary frame prevent the bale from falling off the drums while wrapping.

5.6 Drive chain adjustment

Two chain transmissions are used in this bale wrapping machine. After wrapping the first 10 bales, the tensioning of the drive chains needs to be adjusted.



Remove the chain cover (item 1). Loosen the 4 M12 nuts (item 2). Turn the M12 screw in the chain tightening mechanism (item 3) so that the chain has a 20 mm slack after tightening. Tighten the 4 M12 screws (item 2). Install the chain guard.

Check the tightening and the chain condition periodically after wrapping every 120 bales.

5.7 Finishing work

After the work is complete, disconnect the revolution counter and secure the revolution sensor against humidity.

Before a longer downtime of the wrapping machine, disassemble and place the impulse sensor in a dry storage room.

Place the machine on a hard, flat, level ground. Disconnect the hydraulic power source and the electric power supply.
Support the drawbar using a support stand. Disconnect the machine drawbar from the tractor transport hitch.

It is forbidden to disconnect the wrapping machine from the tractor when there is a bale on the rotary table.

Clean the machine and control its condition, paying special attention to the quality of the paint coat. If it is required to make some touch-ups, it is advised to use the paint repair kit supplied by the manufacturer.

Protect the rubber elements, i.e. hydraulic lines,side wheels and the tape feeder rubber rollers against direct sunlight.

6 Regular inspection

6.1 User inspection

After every use of the wrapping machine, check:

- The condition and legibility of the nameplate and pictograms;
- Condition of the machine drawbar elements;
- Tightness of the hydraulic system;
- Drive chain of the rotary frame;
- Drive chains of the rotary drums.

The nameplate must only be replaced at an authorised service point.

Replace the illegible pictograms with new ones.

After the working season is over, grease the drive chain of the rotary frame and the drive chains of the rotary drums using the LT-43 bearing lubricant.

Send the counter to an authorised service if the casing is damaged. Any attempt to repair the damaged counter will result in the warranty becoming null and void.

Replace the oil of the intersecting axis gear every 2 years as follows:

- Place the machine on a level surface.
- Place a leakproof tank below the drain plug.
- Remove the drain plug, the filler plug and the overflow plug,
- After the oil is drained, close the drain plug,
- Pour fresh 80W90 hydraulic gear oil to the filler plug level,
- Close the filler plug and overflow plug.

The used oil should be sent to a petrol station which collects such products.

During oil replacement, it is required to wear impermeable protective clothing suitable for contact with oil-based products.

Replace the hydraulic lines every 5 years. Before every working season, check (without a silage bale loaded) the operation of the transmission system by turning on the rotary table, raising and lowering the rotary table and raising and lowering the loading arm.

If the counter is soiled, clean it using a damp cloth with a mild detergent. Do not use organic solvents for cleaning (acetone, petrol, "nitro" solvent etc.) as the counter casing may be damaged.

6.2 Service checks

Periodical service checks shall be performed after every two working seasons of machine use.

It is advised to use original spare parts which will help maintain the wrapping machine in a good technical order for a long time.

7 Authorised service

7.1 Warranty service

The manufacturer issues a warranty on conditions described in the warranty card. During the period covered by the warranty, repairs shall be made at authorised service stations or at the manufacturer's service point.

7.2 Ongoing maintenance

After the period covered by the warranty it is advised to perform periodical inspections, adjustments and repairs at authorised outlets service stations.

7.3 Ordering of spare parts

Spare parts should be ordered from resellers or directly form the manufacturer stating the name and surname of the user or company name and address, name, symbol, serial number and year of the machine manufacture, catalogue name of the part, catalogue number, number of drawing or standard, number of ordered items and agreed terms of payment.

8 Transporting the wrapping machine

8.1 Transporting a load

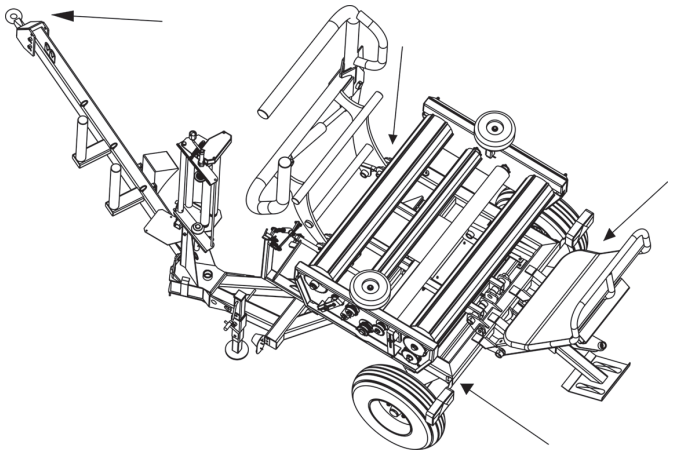
The wrapping machine is suitable for road and rail transport using carriers with appropriate load bearing capacity.

For loading on a means of road transport, use lifting devices with a lifting capacity appropriate for the machine weight including a loaded roll of film. Use the frame elements marked on the machine as attachment points (see the pictogram).

The lifting device should be operated by experienced operators with appropriate qualifications.

It is forbidden to transport the wrapping machine with a bale of silage or swath loaded on it. The transported wrapping machine must be securely fastened to the carrier vehicle.

Correct way of attaching the lifting slings is presented on the diagram below.



8.2 Driving on public roads

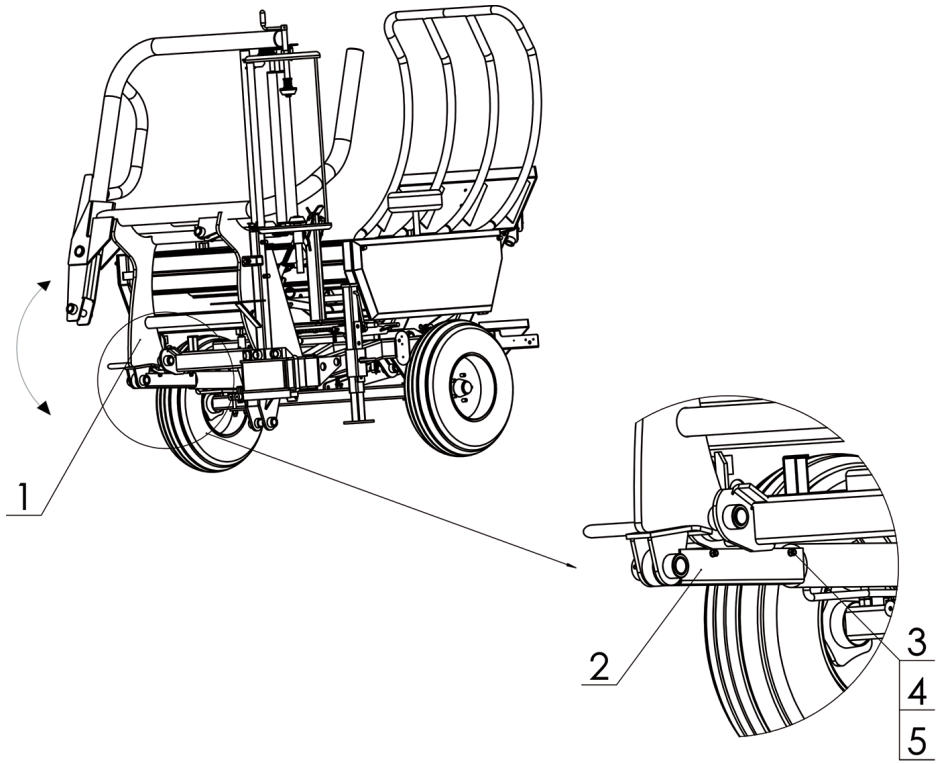
The wrapping machine may be used on public roads as a machine attached to a tractor transport hitch.

The dimensions of the machine prepared for transport ⏭ Section 1.4.

For transporting the machine on public roads, tractors with a rated power not lower than 30kW and towing power class not lower than 0.9 equipped with a transport hitch may be used.

Before entering a public road:

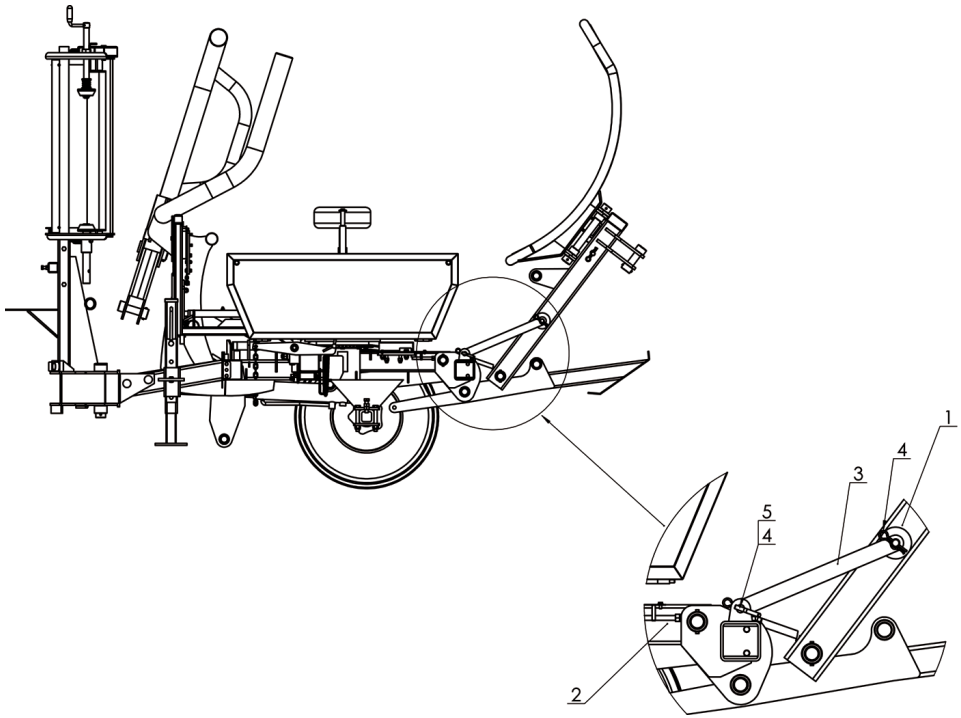
- Place the hitch in its transport position ⏭ Section 5.4.
- Place the rotary frame in its transport position so that the drums are locked perpendicular to the wrapping machine axle.
- Lift the loading arm (1) to its maximum position and lock it to prevent unauthorised lowering using a locking device (2) as shown in the drawing.
- Lock the bale lowering arm in the top position with the lock as shown in the drawing.
- Disconnect and properly secure the hydraulic lines.
- The levers of the control unit should remain in the tractor cabin.
- Place the triangle denoting slow-running vehicles in the stand in the rear grip.



Every time before entering public roads, check if the wrapping machine is correctly connected to the tractor.

It is forbidden to carry persons or bales of silage on the rotary table.

Before entering public roads, check if the tractor is fully steerable. The load on the front axle must be at least 20% of the tractor own weight. If this condition is not met, additional weight is required on the front axle.



While driving on public roads, the speed should be adjusted to the existing conditions and not exceeding 15 kph.

Follow the traffic code regulations when transporting the wrapping machine on public roads. If an emergency requires the driver to stop the tractor with a coupled wrapping machine on a public road, the tractor driver should:

- stop the vehicle without causing any danger to the road users;
- stop the vehicle as close to the road edge as possible and parallel to the road axis;
- turn off the engine, remove the ignition key, engage the parking brake and place wedges under the wrapping machine wheels;
- outside a built-up area, the warning triangle should be placed 30 - 50 meters behind the vehicle and the emergency lights must be activated;
- while driving in a built-up area, turn on the emergency lights and place the warning triangle in the stand on the rear of the machine. Make sure that the triangle is visible to other road users;
- in case of failure, take the required precautions to ensure safety in the area.

9 Wrapping machine storage

The wrap counter should be stored in a dry place with the electrical connections protected against soiling and humidity.

The sensor cable should be folded and stored in a dry place with the electrical connections protected against soiling and humidity.

Store the wrapping machine on a hard, flat, level surface.

It is advised to store the wrapping machine in a dry location, protecting it against UV rays and other harmful agents.

If the wrapping machine is stored without any canopy roof, protect it with a water-resistant tarpaulin or film.

Store the wrapping machine in an atmosphere free of aggressive agents (e.g. ammonia, chemicals).

After the working season is over, clean the wrapping machine and check the condition of the protective paint coating. Touch up the damage to the paint coating at a service workshop.

Check the condition and legibility of the nameplate. If the plate is damaged, notify the service station.

Check the condition and legibility of the pictograms. If they are damaged, replace them with new ones.

10 Hazards

10.1 Description of residual risks

Residual risk results from incorrect actions of the wrapping machine operator. The greatest hazards occur during the following forbidden actions:

- Installation of the wrapping machine on tractors which do not meet the required minimum criteria stated in this manual;
- Standing below raised components of the machine;
- Standing in the machine working area;
- Maintenance or repairs conducted with the tractor engine on;
- Use of damaged hydraulic lines;
- Machine operation by an operator standing outside the tractor cabin;
- Machine operation by an operator under influence of alcohol;
- Operating a wrapping machine which is damaged or without protective guards in place;
- Operating the wrapping machine on slopes with an inclination exceeding 8°;
- Transporting bales of silage on the wrapping machine;
- Remaining on (aboard) the machine when it is working or during transport;
- Using the wrapping machine against its intended use;
- Leaving the wrapping machine unsecured on an inclined land;
- Standing between the tractor and the machine while the engine is running.

With the aforementioned residual risks, the bale wrapping machine is regarded as a machine which has been designed and built according to the current state of technology.

10.2 Assessment of residual risks

Follow these guidelines:

- Read and fully understand the Operating Manual.
- Do not stand below the raised lifting components of the machine.
- Do not stand in the machine working area.
- The maintenance and repairs of the wrapping machine should performed at authorised service workshops.
- The machine should be used by trained and authorised operators.
- Protect the wrapping machine from access by children and bystanders.

– Only then can you eliminate the residual risks related to using this wrapping machine and keep it safe to people and the environment.

Note:

The residual risks occur present when the aforementioned manufacturer's rules and indications are not followed.

11 Wrapping machine disposal

Disassembly and disposal of the wrapping machine should be performed by specialised service stations familiarised with the construction and functioning of the machine. Only specialised service stations have a complete and up-to-date knowledge of the applied materials and hazards related to their improper transport and storage. Authorised service stations offer both advice and complete machine disposal services.
Use proper tools and auxiliary equipment for the disassembly (jack, lift, wheel extractor).

Dismantle the machine. Segregate the dismantled components. Pass the dismantled components to relevant collection points.

Dismantle the machine. Segregate the dismantled components. Pass the dismantled components to relevant collection points.

During disassembly of the wrapping machine use proper protective clothing and shoes.

12 Typical problems and troubleshooting

Item	Problem	Possible cause	Remedy
1	2	3	4
1.	Wrapping machine hydraulic actuators work slowly or do not work at all.	Not enough oil in the tractor hydraulic system	Check the oil level in the tractor. Top up oil.
		Pressure in the tractor hydraulic system is too low.	Check the tractor hydraulic system pressure.
		Wrong setting of the external circumference lever	Turn on the pump drive.
		Damaged actuator.	Replace the actuator.
2.	The wrapping machine works too slowly.	Not enough oil in the tractor hydraulic system	Check the oil level in the tractor. Top up oil.
3.	Oil leaks from the control unit	Worn seal rings	Replace the seal rings on the hydraulic control unit.
4.	Too wide or too narrow overlapping of the film edges during wrapping	Incorrectly installed chain wheel.	Replace with a proper chain wheel. ⏭ Section 5.1
5.	The cut film is not held in the cutter unit.	The rubber clamp holding the cut film is not adjusted properly.	Adjust the film pressure element. ⏭ Section 5.5
6.	Problems with bale unloading	Rotary table lock does not operate.	Lock the table. ⏭ Section 5.2

13 Accessories

The user may purchase the following optional and additional equipment at an authorised reseller or directly from the manufacturer:

- Spare parts catalogue - printed version.
- Warning triangles for slow-running vehicles ⏭ Section 8.2.
- Chain wheel extractor ⏭ Section 5.1.
- Paint touch-up kit ⏭ Section 5.7.

14 Names and abbreviations

Nameplate - plate with information which unequivocally identifies the machine

Pictogram - information plate

OHS - Occupational Health and Safety

Hitch, upper transport hitch - coupling elements of the tractor ⏭ See the tractor operation manual.

UV - ultraviolet radiation; invisible electromagnetic radiation which may have a negative influence on human health; UV radiation also has a negative effect on rubber elements.

Towing power class - value which characterises the towing power of a given tractor, class 0.9 refers to the towing power of 9kN. Ursus C 355 and 4011 have such a towing power class.

kW - kilowatt, unit of power

V - volt, unit of voltage

bar - unit of pressure

kg - kilogram, unit of mass

m - meter, unit of distance

mm - millimetre, auxiliary unit of distance equal to 0.001 m

min - minute, auxiliary unit of time equal to 60 seconds

rev - revolution, type of movement

rpm - revolutions per minute, unit of rotational speed

kph - kilometres per hour, unit of speed

db(A) - A-scale decibel, unit of acoustic pressure

Bale wrapping machine warranty card

Warranty card
Z593 Bale wrapping machine

Metal-Fach
ul. Kresowa 62
16-100 Sokółka

Bale wrapping machine Z593 **Serial number: .....Year/ date of production .....**

TO BE FILLED IN BY THE SELLER

Date of sale .....

The warranty service is provided on behalf of the manufacturer by: .....

Seller's stamp, legible signature of the outlet representative

Name and surname of the Customer.....Signature .....

City, post code.....

Street, number.....Tel. .....

Warranty conditions

1. The manufacturer provides a bale wrapping machine designed and built in compliance with the current standards. The manufacturer guarantees that the supplied bale wrapping machine is free of manufacturing defects.

2. Metal-Fach Sp. z o.o. provides warranty service for 12 months starting from the date of first sale, provided the wrapping machine is used for its intended purpose and the recommendations contained in the manual are followed.

3. The warranty card properly filled in at the Outlet is the confirmation of the manufacturer's warranty; the acceptance of the warranty conditions must be confirmed with the customer's signature.

Warranty conditions

4. The quality warranty covers the machine defects caused by defective manufacturing, material defects and latent defects.

5. The warranty does not cover the assemblies and parts which are subject to normal wear and tear.

6. The warranty does not cover any mechanical damage or other damage resulting from improper use, improper maintenance or improper adjustment of the wrapping machine.

7. The warranty does not cover any damage resulting from improper storage of the machine.

8. Any unauthorised modifications in the construction of the machine introduced by the user will result in automatic termination of the warranty.

9. The manufacturer shall not be held responsible for loss, damage or destruction of the product resulting from causes other than defects of the supplied machine.

10. During the warranty period the manufacturer will repair any defects which occurred as a result of the manufacturer's negligence with the exception of defects listed in Sections 5 - 8.

11. The warranty repair shall be made within 14 working days of the notification/ supply of the wrapping machine to the designated service station or at another time agreed upon by the parties.

12. The warranty is extended by the time required to complete the repair.

13. During the warranty period all repairs which are not covered by the warranty are performed by authorised service stations at a full cost chargeable to the user. Before such repairs, the service station will inform the user of the suggested cost, time and scope of the repair.

14. The decision whether to commence a chargeable repair of the wrapping machine with a warranty valid at the time of repair is made by the customer.