



Operation manual

RV 1601 RV 1901



WAD060

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PREFACE

This operation manual contains all data required for a safe and efficient working with your round baler. You will find all data and procedures concerning adjustment, maintenance, lubrication as well as a short view and explication of optionals. Operation and maintenance of twine and net wrapping are included as well. Please keep this manual for reference.

Your dealer will be pleased to help you if problems might occur or if you have questions. He is expertly kept informed by our staff.

Fill in the receipt of delivery, send it to your dealer and keep the copy well.

Enter the machine number (PIN) you find on the type identification plate of the machine in the frame below: it is important in case of any service contact and when ordering parts, etc.

CE CERTIFICATE OF CONFORMITY

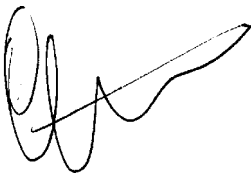
in accordance with the EU-Directive 89/392/EEC

We,
Kverneland Geldrop BV,
Nuenenseweg 165,
NL-5667KP Geldrop

declare under our sole responsibility that the product:
Round balers, types RV1601 and RV1901 to which this declaration relates corresponds to the relevant basic safety and health requirements of the Directives 89/392/EEC (amended with 91/368/EEC, 93/44/EEC and 93/68/EEC) and 98/37/EC.

For the relevant implementation of the safety and health requirements mentioned in the Directives, the following standards have been respected:
EN292-2, EN294, EN704

Geldrop, 01 Febr. 2002



Casper Böhme
General Manager

"KVERNELAND GELDROP BV" manufacturers of farm machinery reserve the right to change design and/or specifications without notice. This does not include an obligation to make changes to machines previously supplied.

Enter here the product identification no. (PIN) of your machine:

WA

WD

WN

1 HOW TO USE THE OPERATION MANUAL

The operation manual is meant for those concerned with the control, use and maintenance of the machine. It contains all data required for a safe handling, use and maintenance of the baler.

Spend sufficient time for reading and understanding this operation manual with its instructions prior to working with the baler. Pay special attention to the safety instructions including the textless safety decals. No following up these instructions/procedures may cause severe accidents. Specifications are subject to change without previous notice.

In this operation manual the following symbols and terms are used:



DANGER:

When you see this safety alert heading and symbol be alert to the danger of injury or death of men and animals!



Attention:

When you see this heading and symbol, be alert to the possibility of damage to equipment, crop, buildings, etc., but to financial and/or juridical problems (warranty, product liability) as well!



A remark, proposal, advise to facilitate a job.

This operation manual has been prepared with the utmost care. Nevertheless errors may occur. If you encounter any, we will be very grateful if you inform us a.s.a.p. We thank you very much in advance for that help, also on behalf of other users!

1.1 Destination and intended use of round balers

This machine is exclusively appropriate designed for collecting of cut non or insignificantly ligneous plants, mainly grasses, from the ground, feeding them through pick-up and cutting unit and consequently forming a round bale inside the baling chamber, taking into account all prescriptions, procedures, etc. as stated herein and/or through decals or other signs on the machine.

This machine shall be exclusively used for the normal agricultural work.



Attention:

Any use beyond the one stipulated above requires written authorization of the manufacturer, this may be required for baling unusual, non-grass plants as well; refer also to the reliability and warranty section 5.2 in this manual! Always ask if in doubt!

1.2 Used terms

Directional indications such as "right", "left", "front" and "rear", etc. are to be interpreted when facing in direction of travel; parts are numbered from left to right. This is also the basic position for defining the direction in connection with which:

- rh (rotation) = clockwise rotation
- lh (rotation) = counter or anti-clockwise rotation
- rotation around a vertical axis is defined when looking from top to bottom;
- rotation around a horizontal axis almost perpendicular to the direction of travel is defined when looking from the left to the right;
- rotation of bolts, nuts, hand cranks, etc. is defined when looking from the position of operation.

Units of measurement are given both in Imperial/US and international metric units; the metric value shall be decisive. Used abbreviations:

lh	=	left hand side;
rh	=	right hand side;
pto	=	power take off (tractor output stub shaft);
cw	=	clockwise;
ccw	=	counter-clockwise, anti clockwise;
' or ft	=	foot / feet
" or in	=	inch(es)
IPL	=	illustrated spare parts lists, parts book;
PIN*	=	Product Identification No. (= machine serial no.);
PSN*	=	Production Series Number.
*	=	you can find this number on the identity plate of the machine



A black vertical line in the margin indicates the position of an important text change/modification (related to the previous issue).

Changed figures are marked through a thick border.

1.3 Safety and liability



Avoid accidents! Don't learn safety the hard way! Stay alert! Think SAFETY! Work SAFELY!
Prior to operating the machine read and observe this operation manual and all safety instructions and decals!



Everyone must be given operating instructions before starting to operate the equipment. Pass on all safety advices also to other users!

Ensure the used tractor complies with all legal and safety requirements for work and traffic use with this machine!

1.3.1 Safety instructions

You are responsible for the SAFE operation and maintenance of your equipment. It is the operator's responsibility to read and understand ALL safety and operating instructions in the manual and to follow these. You must ensure that you and anyone else who is going to operate, maintain or work around the unit be familiar with the operating and maintenance procedures and related safety Information contained in this manual. The manual will take you step-by-step through your working day and alert you to all good safety practices that should be adhered to while operating this equipment! Remember, you are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety programme. Be certain everyone operating this equipment is familiar with the recommended operating and maintenance procedures and follow all safety precautions. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices!

Machine must never be tested on a tractor in an enclosed space because of the danger from exhaust fumes! Always check traffic and operational safety before any putting the machine into operation! Adhere to the general rules of health and safety precautions besides the advice of this manual!

The installed warning and advisory signs give important hints for a safe operation; adhering to serves your own safety! Keep safety decals and signs clean and legible at all times. Replace safety decals and signs that are missing or have become illegible. If original parts on which a safety decal or sign was installed are replaced, be sure that the replacement part also displays the current decal or sign! When making use of public roads adhere to applicable traffic rules! Become acquainted with all installations and control devices as well as with their function before beginning the operation! Doing this during operation would be too late!

The clothing of the operator should be tight. Avoid wearing any loose clothing! Before starting up, maintaining, and moving and/or operating: check surrounding area (bystanders, **especially children!**). Ensure sufficient visibility during all operation and transport!

Nobody shall ride on the machine during transport and/or field operation! Attach accessories in accordance with

mounting instructions and only to the appropriate attaching points! Special care shall be taken when (un)hitching the baler on/off the tractor. Hitch and unhitch the unit from the tractor on a firm, dry and level area. This will lessen the possibility of tipping and/or sinking into soft ground or mud! When (un)hitching the baler from the tractor place the jack stand into the corresponding position! Make certain the tractor is in safe operating condition with adequate braking capabilities for an implement of this weight! Adhere to maximum permissible axle loads, total weights and transport dimensions! Install and check transport equipment, e.g. lighting, warning devices, guards: ensure visibility and proper functioning! Control devices, e.g. ropes, hoses, etc. for remote actuation of devices such as cylinders, shall be guided and positioned in a way they never inadvertently release nor block desired movements/actuators!

For road transport bring baler in a transport position and secure it! Bale chamber shall be empty, tailgate shall be closed and locked! Never leave the operator's seat during operation or transport! Moving behaviour, steerability and braking performance are influenced by trailed equipment! Ensure sufficient braking effect and safe manageability! Always adapt the speed to the local conditions! When making short turns note the larger radius because of increased width and/or length of the combination as well as mass and inertia changes due to the other center of gravity position! Do not operate a machine unless all protection is installed and in functional position! Never stay or allow anyone to stay within the operating area! Never stay or allow anyone to stay within the turning and slewing area! Before leaving the tractor apply the parking brake, shut down the engine and remove the ignition key! Allow nobody to stay between tractor and baler unless the tractor is prevented from inadvertent rolling away by applied parking brake and or placed chocks! Before (un)hitching the baler set the controls in a position that prevents from inadvertent actuation of any function! When making any field adjustments or carrying out maintenance, make sure the tractor and implement are positioned on a firm and level area!

Keep clear of tailgate linkage area: danger of crushing and scissoring! Stay clear of high risk areas like the pick-up tailgate and belts while the machine is in operation. If the intake area should plug, stop the tractor and shut off the engine, then remove the material only after all parts have stopped moving! Do not attempt to push or pull the material into or out of the machine while it is operating! Regularly remove accumulated materials from haytool machinery to reduce fire hazard and interference with the operating parts! Carry a fire extinguisher at all times, especially when operating in dry crop materials. This should be a multi-purpose ABC rated extinguisher with a 5 kg (10 lb) capacity, approved by the appropriate authority! The protection of the baler, e.g. shields and guards, protects from penetrating into danger areas! Therefore all protection must be kept in optimal condition and moved into the protecting position prior to starting to work! Keep side shields closed and locked: for opening a 13-mm-spanner is required! Before performing any work on the baler ensure

the pick-up and the belts have stopped all rotation, shut down the engine and remove the ignition key! Machine continues rotation due to inertia: wait until pick-up and belts really stand still!

Drive very carefully when negotiating hilly or uneven terrain. Special care shall be taken when discharging the bale: ensure it cannot move uncontrollably! Do not allow anyone else in the tractor driver's area unless specific provision is made by the tractor manufacturer to accommodate a passenger. Even if such is the case, travel with extreme caution! Do not modify the equipment in any way. Unauthorised modifications may impair the function and/or safety and could affect the life of the equipment! Repair damages prior to next operation!

Drive through universal joint drive shafts

The rules of this section apply to all universal joint drive shafts whether they are coupled to a tractor pto or other power output shafts! Only use univ. joint drive shafts complying with the manufacturer's specification for that specific use! In order to ensure protection of both man and machine exercise extreme caution when working at a universal joint drive shaft other than described in this manual and/or on the instruction at the univ. joint shaft.

Modification of, and other special jobs on universal joint shafts, require written explicit order and procedure of both machine and univ. joint drive shaft manufacturer is available! Use the correct tools and genuine parts to ensure the right performance and max. safety (also see Reliability and Warranty chapter)! This also in accordance with the EC-safety prescriptions of the Machine Directive 89/392/EEC!

Externally accessible univ. joint drive shafts (e.g. pto drive shafts) as well as tractor pto and machine input shaft must be equipped with appropriate guards and cones! All the parts shall be kept in a proper condition! Lubricate in accordance with the instructions! Univ. joint drive shaft guard tubes shall overlap sufficiently (and as safely advised) in all transport and working positions!

Do not (dis)connect or work on a univ. joint drive shaft unless the engine has been shut down and stopped and the ignition key has been removed! Ensure univ. joint drive shaft is connected correctly and safetied by the lock! Prevent shaft guard from spinning by attaching the safety chain(s) to a static part (e.g. not used top link hole)! Prior to engaging or switching on the pto ensure nobody stays in the danger area of the machine! Do not engage or switch-on the pto while engine is stopped! Prior to engaging or switching on the pto ensure the pto speed cannot exceed 540 rpm! When working with pto drive do not allow anyone to stay near any spinning univ. joint drive shaft! Do not reach across or under a rotating drive shaft to make adjustments or retrieve tools or equipment!

Always stop pto when it is not needed and when the max. universal joint angle might be exceeded. After disengaging or switching off the pto, the pto driven machine will continue running because of inertia! Keep a safe distance to the machine until the pick-up and the belts really stand still! Do not clean and/or (de)grease the pto driven machine and univ. joint drive shafts unless pto and engine have stopped and the ignition key has been removed! Lubricate and

maintain shaft guard tube so it does not bind on the inner rotating shaft! Place the uncoupled pto drive shaft on the retaining device provided! After removal of pto drive shaft place protective cover/cap over pto!

Hydraulics

The hydraulic system is under high pressure! Never attempt to find or even to stop a hydr. leakage with your hands! High pressure fluid easily penetrates skin and clothes, causing severe injuries: see a doctor immediately when injured! When inspecting always use appropriate aid (e.g. a piece of wood or sheet metal) and wear safety goggles and gloves! Regularly inspect hydraulic lines (hoses, tubes, connections) and renew when found defective or aged! Replacement parts shall at least meet the appropriate technical manufacturer's specifications! When plugging-in the hydr. quick-disconnect plug of a hose always ensure the hydr. socket is not pressurised! Ensure sockets are clean! Before starting to perform any work at the hydraulic system, stop the tractor engine (safety the tailgate cylinders as required) and depressurise the system! Safety shut-off valve(s) must be closed in transport! Properly guide hydr. hoses; position an uncoupled hydr. hose to ensure coupling plugs stay clean!

Cutting System

Shut-off selector valve prior to working on the cutting system! Exercise extreme care when carrying out any work on the cutting system! When working in the area of the knives wear protective gloves and keep away from cutting edges! Knife cutting edge is very sharp! Handle knives with extreme care! Keep hands off knives if you need not handle them!

Wheels / Tyres

When working on the wheels make sure that the machine has been placed on the ground safely (jack stand) and that it is secured by chocks against unintentional rolling! Mounting wheels and tyres requires sufficient knowledge and availability of prescribed tools and equipment being in perfect condition; repairs on tyres may only be performed by trained staff with suitable tools! Do not fit other tyre dimensions as prescribed! Severe injury can occur! Trailed machines having 15.3" tyres, do not substitute by 15" tyres when replacing! Check air pressure regularly: ensure prescribed value! Max. speed of travel is 30 km/h (18 mph), this is also valid for transport!

Storage Safety

Store the unit in an area away from human activity! Do not permit children to play on or around the stored unit! Use the provided jack stand supports, store in stable machine mode!

Bale ejection

Never stay behind a baler working on a slope. Keep clear of the bale ejection area. Never attempt to stop a rolling bale: it may weigh over 10 kN (1000 kg; 1 Imp.ton)! Also see decal TR2033!

1.3.2 Safety decals

 Good safety practice requires that you become familiar with the various safety decals, the type of warning and the area, or particular function related to that area, requiring your SAFETY AWARENESS! A safety decal does in no way absolve you from the responsibility to comply with all given safety instructions nor to take all possible and necessary measurements to prevent accidents! This machine has been marked with safety decals in acc. with ISO11684, i.e. decals without text. Please find the decals with an explanation of their meaning below!



TR2001

Stay clear of a raised tailgate unless safety lock is applied!



TR2011

During attachment/detachment of the baler, nobody shall stay between drawbar and tractor!



TR2013

Always place chocks if the baler is parked on a non-horizontal plane!



TR2017

Stay clear of area behind tailgate while tractor engine is running!



TR2029

stay clear of danger area of universal joint drive shafts! Do not work with a pto drive shaft if protection is damaged or not present!



TR2033

Never stay behind a working baler on a slope!

TR2035

The pick-up tines may grasp clothes, etc. if you come close to it and pull you inside the baler: stay at a safe distance of a rotating pick-up!



TR2037

Ensure the scrapers have always the correct setting in accordance with the crop baled, this especially when baling dry crop!



TR2039

Do not hoist the baler other than using the hoisting lugs!



TR2069

Keep clear of movement area of twine tubes: danger of squeezing!



TR2071

Behind lateral doors rotate chains and sprockets. Keep doors closed on a running baler!



TR2075

Danger of cutting by twine cutter. Stay clear of the area of the twine cutting blade if electronic control can be activated!



TR2077

Apply tailgate safety lock prior to going under an opened tailgate:
lever to the right = safe;
lever downward = working position = unsafe!



1.3.3 Liability and warranty

In order to ensure safety, all persons working at and/or with this machine must read and understand this operation manual.

Furthermore this machine shall always be used, handled and stored in accordance with the design and construction destination (intended use) which also means:

Exclusively work in accordance with the instructions given in the appropriate Assembly, Operation and Repair Instructions (manuals) including all valid Errata and Supplements as well as taking into account the relevant Service Bulletins; exclusively use correct tools and equipment being in a perfect condition!

Strictly observe the applicable local regulations concerning safety and accident prevention, generally acknowledged and approved technical, medical and traffic rules as well as the functional limitations and safety instructions stated in above mentioned technical documentation!

Electric/electronic equipment (e.g. control boxes, indicators, etc.) including their accessories (e.g. cables, sensors, etc.) must be handled, treated and stored in accordance with the general accepted standard rules for non-water-proof electric and electronic equipment (e.g. wireless sets), i.e. among others:

- clean and dry storage;
- inaccessibility for rodents, martens, etc.
- prevent exposure to rain and undampened shocks!

Do not use any parts (spares, accessories, lubricants) other than those complying with manufacturer's requirements. A part complies with those requirements when either genuine or approved by the manufacturer or when all its properties can be proven to meet with the appropriate requirements for that very use/ function!

Only well instructed people being familiar with all possible danger shall work with or at the machine!

The machine shall not be used nor transported unless all safety devices (covers, plates, rails, curtains, locks, etc.) are correctly installed and in a perfect condition and set in the appropriate safety position! All safety decals (see 1.3.2) and signs shall be legible and in the correct place!

Unauthorized modification of or arbitrary changes on the machine or parts of it exclude any responsibility and reliability of the manufacturer for the consequences of that operation!



Attention:

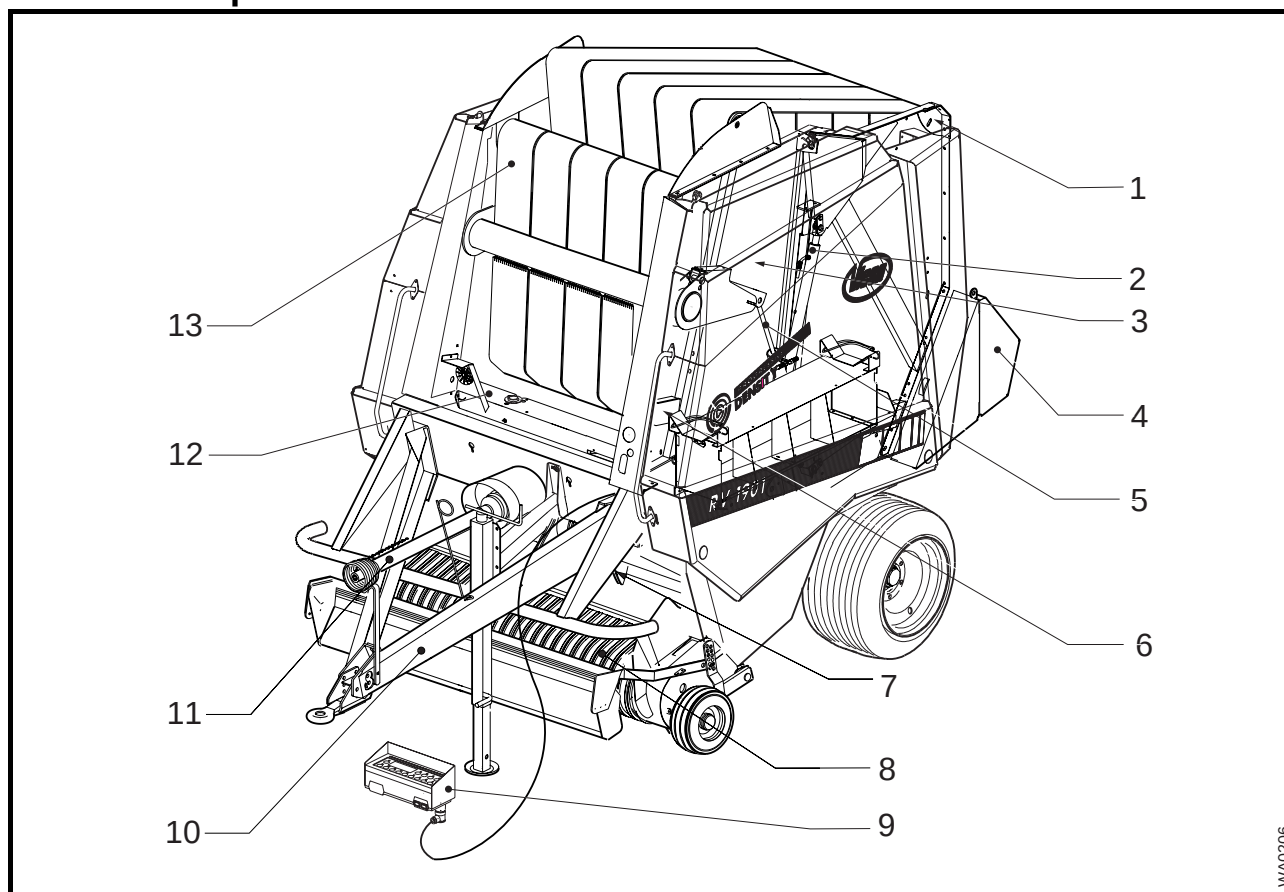
Those disregarding above mentioned rules act grossly negligent (careless) through which all manufacturer warranty and reliability for damages and all other consequences become extinct! The negligent person carries all risks!

2 DESCRIPTION OF THE MACHINE

The round baler will be attached onto a tractor. The baler is powered by the tractor through a pto drive shaft. Furthermore there is a hydraulic and an electric connection to the tractor.

When working the crop on the ground is collected by a pick-up and through a feeder roller transported into the starter chamber. Long crop may, if required, be cut into uniform lengths by a cutting system (OPTICUT-cutting system) prior to transportation into the starter chamber. A belt system provides rotational movement and thus rolls the bale into shape. The build core presses the starter chamber and keeps growing by the constantly fed-in crop. Upon reaching the desired diameter (60 - 160 cm; 2" - 5"3" or 80 - 185 cm; 2"8" - 6" resp.) the bale is wrapped with twine or net. Then the tailgate is opened and the bale is cleared out.

2.1 Main components of the baler



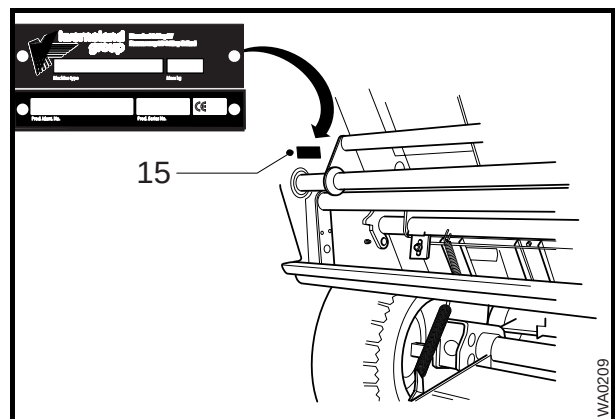
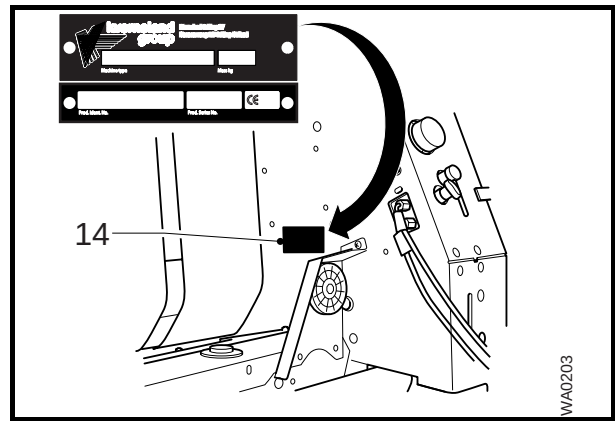
WA0206

- | | | |
|-----------------------|--------------------------|---------------------|
| 1 Tailgate | 6 Hydraulic control bloc | 10 Drawbar |
| 2 Tailgate cylinder | 7 Opticut/rotor | 11 Pto drive shaft |
| 3 Bale chamber | 8 Pick-up | 12 Twine tie system |
| 4 Net wrap system | 9 Electronic control box | 13 Belts |
| 5 Tensioning cylinder | | |

2.2 Product identification

The type identification plates of the baler (14) and of the net wrap (15) contain the following information:

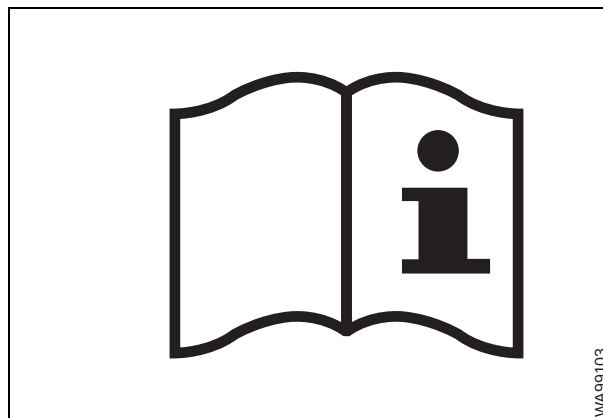
- Name of the manufacturer
- Type of the machine
- Product identification number (PIN) (the serial number)
- Production series number (PSN)
- Weight (mass) in kg



3 PREPARATION FOR USE

Carefully read and understand the operation manual of the baler prior to starting any work with it.

- 1 Ensure both tractor and baler are in perfect condition.
- 2 Check tire pressure and condition.
- 3 Control and handle the bale with care and take into account the correct adjustments and service periods.
- 4 The utmost care is required when working on slopes.



WA99103

3.1 Attachment of the baler

Attach the baler behind a tractor that provides the following specifications:

Drawbar hitch height:

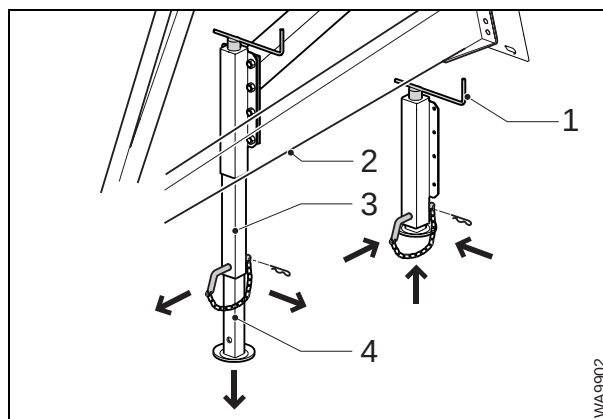
Drawbar hitch height:

low hitch	33-56 cm (12.9" - 22")
high hitch	81-104 cm (31.9" - 40.9")

Hydr. connections: 1 double acting control valve
1 single acting control valve

Pto speed: 540 rpm

- 1 Level the drawbar (2) to the correct height using the crank (1).
- 2 Attach the baler onto the tractor.
- 3 Fully retract the support jack (3).
- 4 Push the support (4) fully up and safety with pin and spring clip.



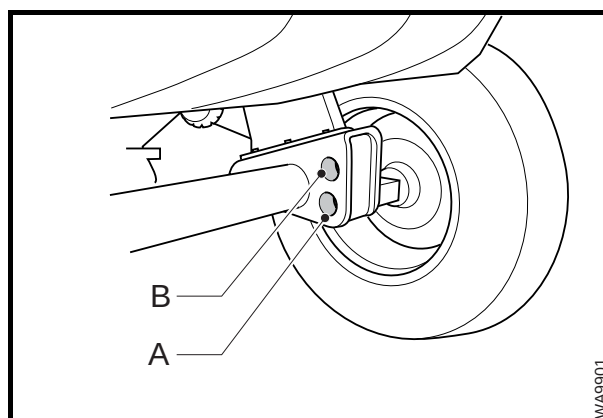
WA9902

3.2 Height adjustment of the baler

Ground distance of the baler can be adjusted. Remove the wheels and choose the required attachment point A or B:

A = Standard attachment of machines.

B = Low setting for machines with wide pick-up, for hilly terrain and for better bale start.



WA9901

3.3 Turning drawbar and hitch eye

Both drawbar and hitch eye can be turned upside down. Doing this the drawbar can be set for high and low attachment.

This figure shows the possibility of fitting the hitch eye into six and the drawbar into two positions: this provides a total of 12 possible settings.

WPU / OC 14		OC 23	
33 cm	12.9 in	38 cm	14.9 in
36.5 cm	14.4 in	41.5 cm	16.3 in
40 cm	15.7 in	45 cm	17.7 in
49 cm	19.3 in	54 cm	21.3 in
52.5 cm	20.7 in	57.5 cm	22.6 in
56 cm	22 in	61 cm	24 in
81 cm	31.9 in	86 cm	33.8 in
84.5 cm	33.3 in	89.5 cm	35.2 in
88 cm	34.6 in	93 cm	36.6 in
97 cm	38.2 in	102 cm	40.1 in
100.5 cm	39.6 in	105.5 cm	41.5 in
104 cm	40.9 in	109 cm	42.9 in

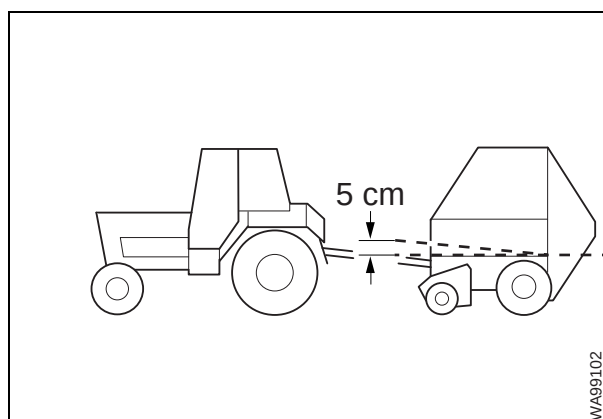
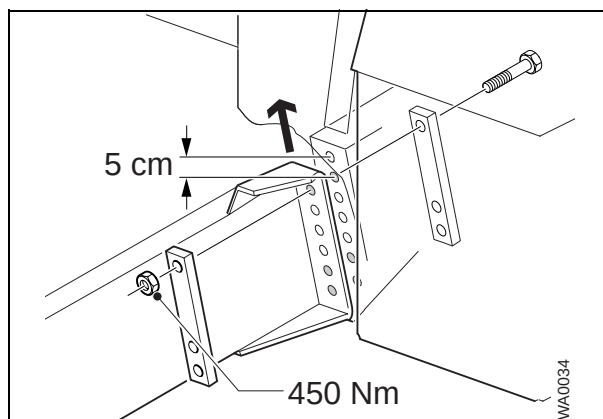
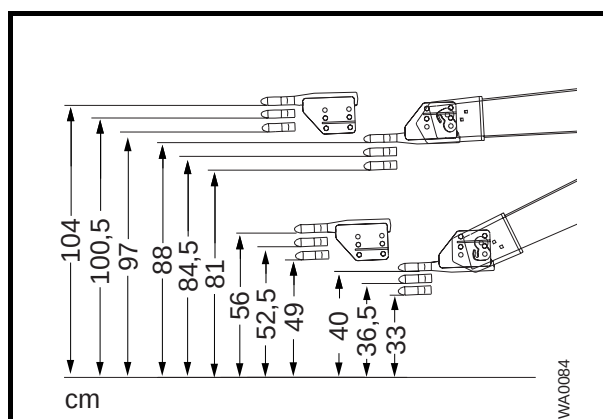
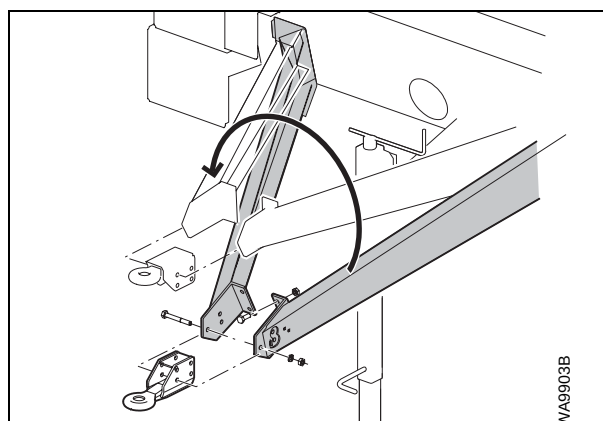
Standard mounting position of the drawbar is low. The hole pattern on the machine allows one extra position 5 cm (2") higher. Torque the drawbar attachment bolts/nuts to 450 Nm (332 ft-lb).


Attention:

Opticut 23 knives: only use the top position of the drawbar!


Attention:

Select the correct position in accordance with your tractor in order to have the train lined up correctly. The baler shall be horizontally or slightly inclined backwards: please use the horizontal striping at either side of the baler for reference!



3.4 Hydraulic connections

Plug in the quick-disconnect plugs of the hydraulic hoses into the hydraulic receptacles of the tractor.

**Attention:**

Ensure quick-disconnect plugs are clean and avoid entering of dirt into the hydraulic system!

3.5 Opening and closing the lateral doors

For filling the twine rolls, for maintenance and adjustments the lateral doors can be opened.

3.5.1 Opening the lateral doors

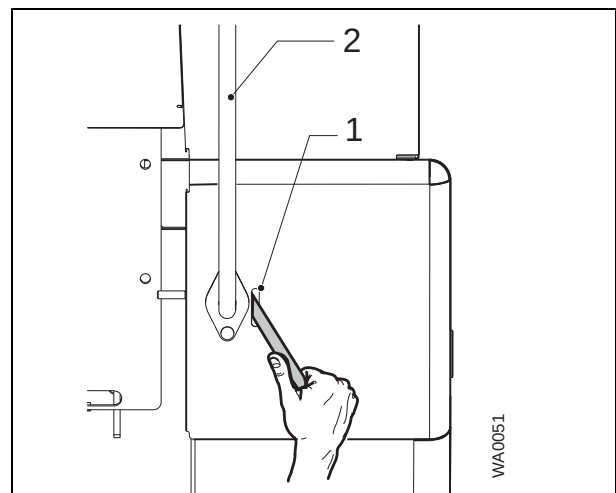
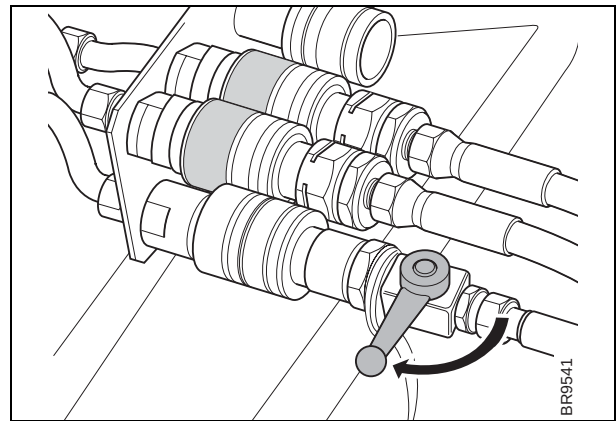
- 1 Slide a fork wrench (13 mm (65/128") jaw size) into the lock slit (1) and unlock.
- 2 Open door by pulling hand-hold (2).

3.5.2 Closing the lateral doors

Close door by pulling hand-hold (2); the doors lock automatically through spring load.

**DANGER:**

Be carefull when pulling doors down to close! The door is spring loaded to close on the last part of the stroke!

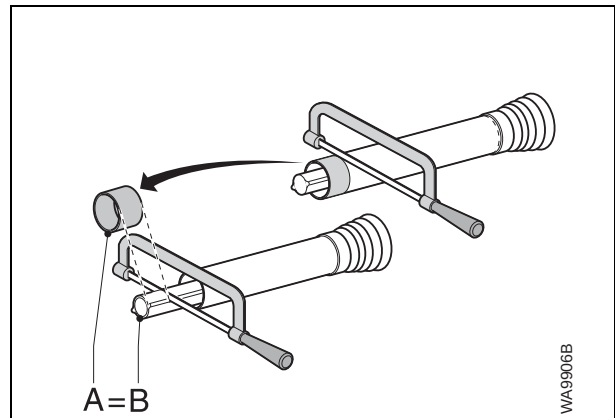
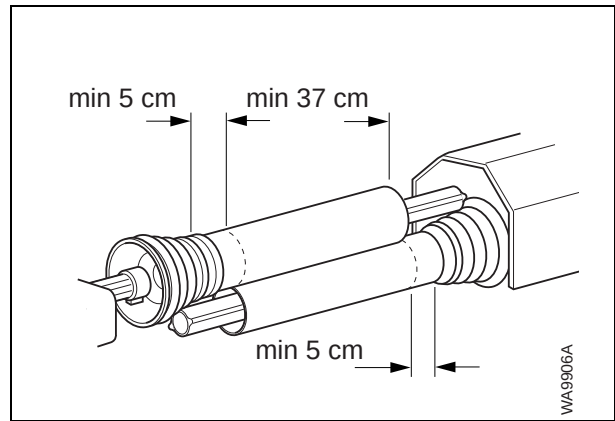


3.6 Pto drive shaft

Length of the pto drive shaft

Prior to coupling the pto drive shaft check the length.

- 1 Correctly line-up tractor and baler.
- 2 Ensure the tractor pto is clean and greased.
- 3 Fit both pto drive shaft halves (not connected!) and hold them together, ensure
 - the protection tube shall be at least **50 mm (1") shorter; the overlap of the profiled drive**
 - tubes shall be at least **370 mm (14-1/2")**.



Attention:

Too long a pto drive shaft may seriously damage drive bearings of both tractor and baler which is beyond any warranty!

Shortening the pto drive shaft

- 1 Exactly determine the correct length of the shaft.
- 2 Shorten the protection tubes.
- 3 Shorten the profiled drive tubes.



The length of both cut-off ends shall be identical!

- 4 Clean cut ends of both protection tubes and profile tubes to ensure they are all smooth and clean.

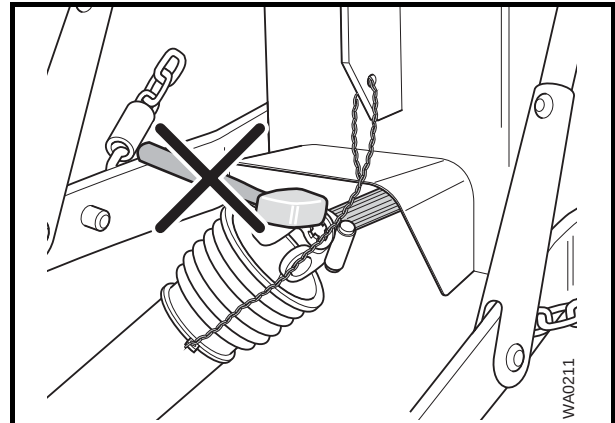


Attention:

At the tractor side the pto drive shaft has a wide angle joint enabling an angle of up to 80°. Ensure the joints are not destroyed due to bottoming of the shaft halves in sharp turns!

Attachment of the pto drive shaft

- 1 Ensure tractor and baler are lined up.
- 2 Ensure the tractor pto is clean and greased.
- 3 Slide the pto drive shaft connecting hub onto the pto holding the shaft push pin pressed.
- 4 Ensure the lock pin will catch with the slot of the pto.



Attention:

Do not fit the pto drive shaft using a hammer. All sliding must work easy (clean as required).

- 5 Attach the safety chains of the pto drive shaft to rigid positions at tractor and baler resp.

3.7 Installation of the INFOBALE control box

Install the control box by using the velcro-type tape in the tractor cab:

Take care of the following:

- Ensure the control box is installed in good manual and visible reach of the driver.
- Do not mount the control box onto a part that is subject to strong vibrations.
- Ensure the control box is not in an area with much dust.
- Do not install a control box where bright sun or rain may reach it.

3.7.1 Electrical connection of the INFOBALE system

- 1 Connect the main power cable of the control unit directly to the 12 V battery of the tractor.

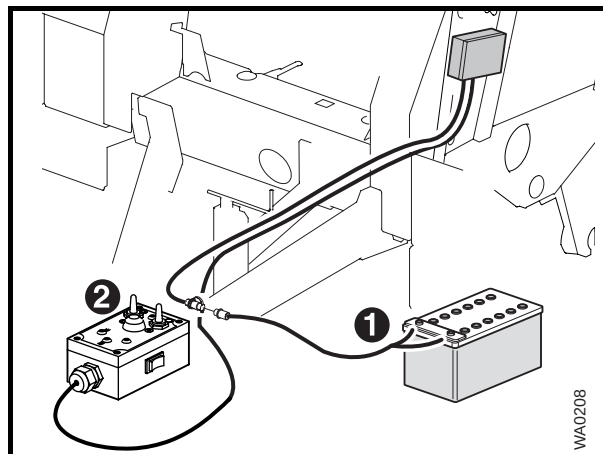
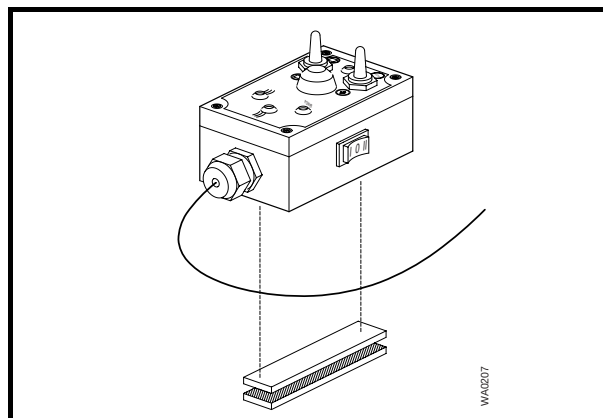
Brown to + pole

Blue to - pole



Some tractors are standardly equipped with a direct power connection from the battery.

- 2 Connect the 7-pin connectors of control box and control unit.



3.8 Installation of the AUTOFORM control box

Install the control box on a support or holder in the tractor cab. :

Take care of the following:

- Ensure the control box is installed in good manual and visible reach of the driver.
- Do not mount the control box onto a part that is subject to strong vibrations.
- Ensure the control box is not in an area with much dust.
- Do not install a control box where bright sun or rain may reach it.

3.8.1 Electrical connection of the AUTOFORM system

- 1 Connect the main power cable of the control unit directly to the 12 V battery of the tractor.

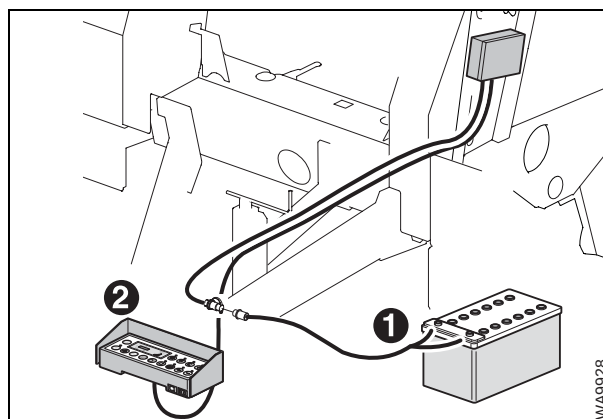
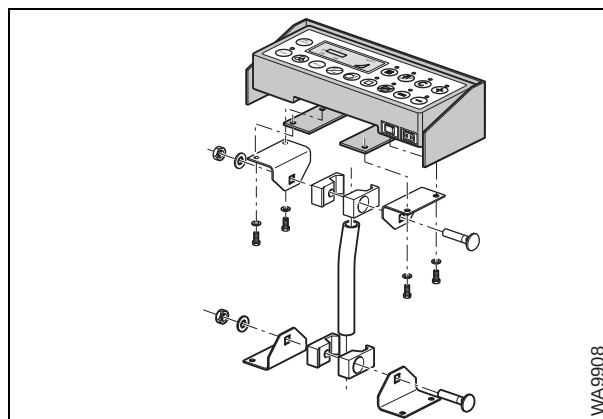
Brown to + pole

Blue to - pole



Some tractors are standardly equipped with a direct power connection from the battery.

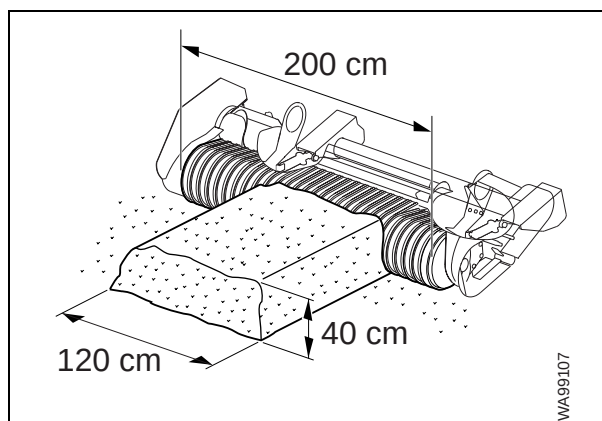
- 2 Connect the 7-pin connectors of control box and control unit.



4 BALING

4.1 Windrowing

Do not make the windrow higher than 40 cm (16") in order to prevent the hitch and the jack stand from pulling through the windrow. Maximum windrow width is the pick-up width. The best result provides a 120 cm (4 ft) wide windrow.



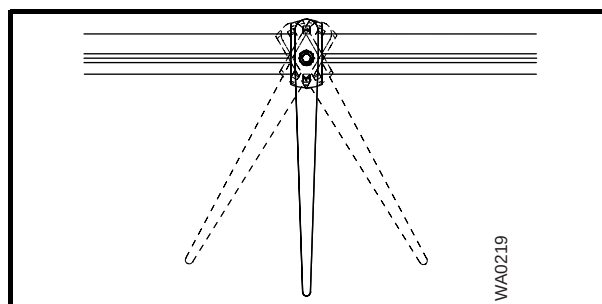
4.2 Forward speed

Use an adequate forward speed to ensure the crop is fed uniformly and constantly into the machine.

4.3 Driving pattern and bale shape

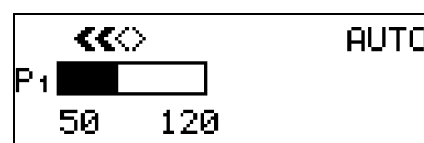
4.3.1 INFOBALE

The left-right indicator on the front side of the baler indicates at what side the bale has to be formed. Steer the machine in such a way that the windrow is fed alternately at the right and at the left side into the pick-up this in order to fill the bale chamber to the optimum. Continue checking this at the left-right indicator. The driving is especially critical when working in a narrow windrow.



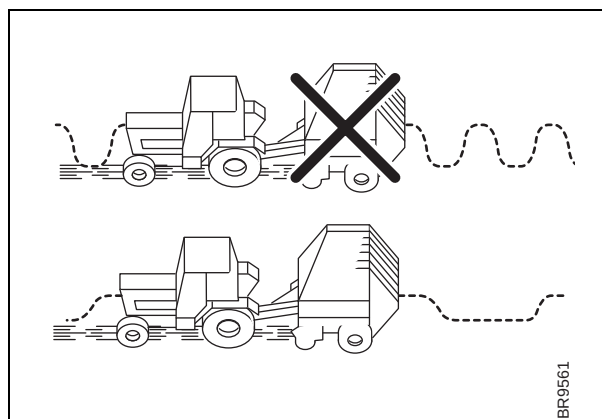
4.3.2 AUTOFORM

The bale shape indication arrow points on the control box display indicate how the bale is formed inside the bale chamber. Steer the machine in such a way that the windrow is fed alternately at the right and at the left side into the pick-up this in order to fill the bale chamber to the optimum. Continue checking this on the display. The driving is especially critical when working in a narrow windrow.



Attention:

Do not weave over a narrow windrow but always stay driving for a while at the sides as the figure shows. This since zig-zagging causes bad lateral feed and thus badly formed bales!



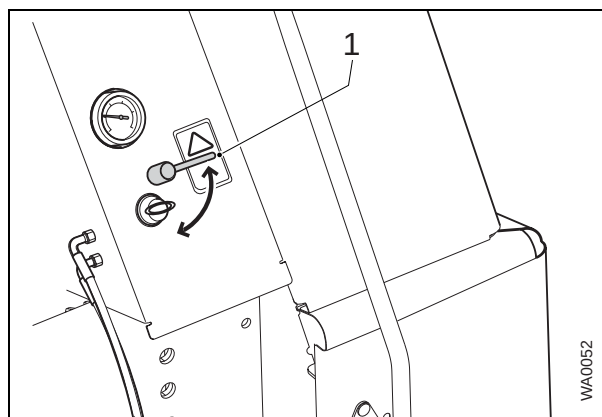
4.4 Tailgate



DANGER:

Prior to going under an open tailgate always lock the tailgate safety valve with handle (1):

- handle to the right: Valve closed (= safe under the tailgate)
- handle downward: Valve open (baling position = not safe under tailgate)



4.5 After the first bale

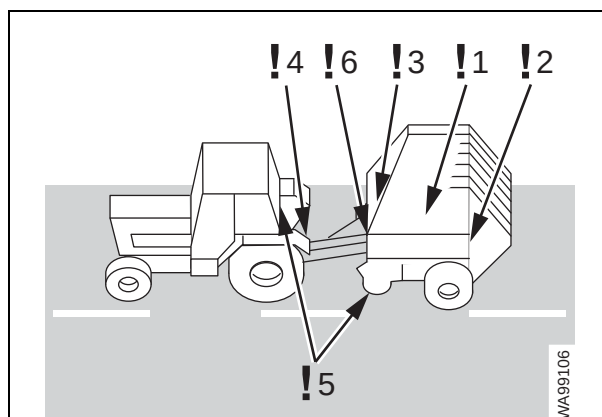
After the first bale check the following and readjust as required:

- Bale dimension (refer 6.4.1 bale diameter)
- Density of the bale (refer chap. 11 hydraulic system)
- Wrapping of the bale (refer chap. 9 twine tie or chap. 10 net wrap).

4.6 Before you leave the field

In order to prevent accidents ensure the following:

- 1 Ensure the last bale has been cleared out.
- 2 Ensure the tailgate has been closed and locked.
- 3 Clean away all accumulated crop.
- 4 Ensure the baler has been hitched correctly onto the tractor with all safety pins in place.
- 5 Move the pick-up into full up position and lock the cock in the hydraulic line.
- 6 Check all doors and accesses are closed and locked.



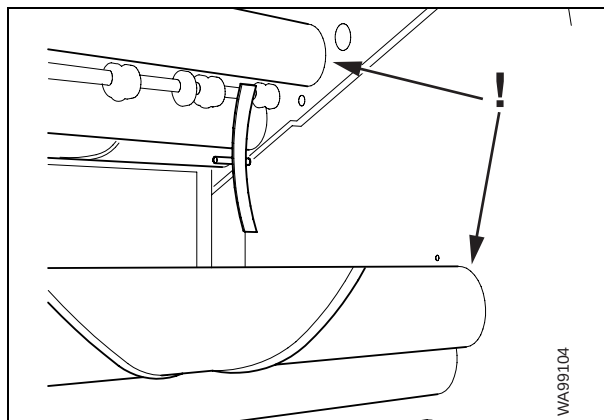
Attention:

- Observe local traffic regulations.
- Check lighting of the train.
- Do **never** transport a bale inside the baler!

4.7 Daily checks

4.7.1 Rollers

Daily check the (tension) roller bearing sealings for crop accumulation. Clean the bearing area as required. Check the rollers for easy and smooth (no sounds) rotation. Find the cause of a trouble, replace roller or bearing as required.



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4.7.2 Tyre pressure

Tyre size	Pressure
15.0/55-17	2 bar (29 psi)



Attention:

Torque value of wheel nuts shall be 270 Nm (200 ft-lb)!

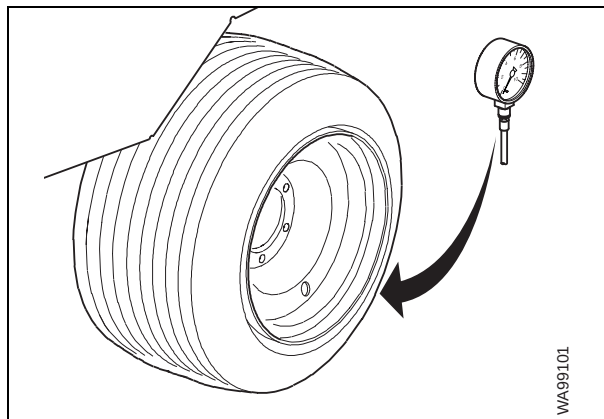
4.7.3 Pick-up

Tines of the pick-up are subject to wear. Check the condition and completeness of the pick-up tines every day after the days work.



Attention:

We recommend thoroughly inspecting these parts at the beginning of the season and to replace parts as necessary!



WA99101

5 ELECTRONIC CONTROL SYSTEM INFOBALE

The baler can be equipped with an INFOBALE electronic control system. This control system controls the growing bale, the wrapping and clearing out of the bale.

Furthermore the system also provides error indicating functions.

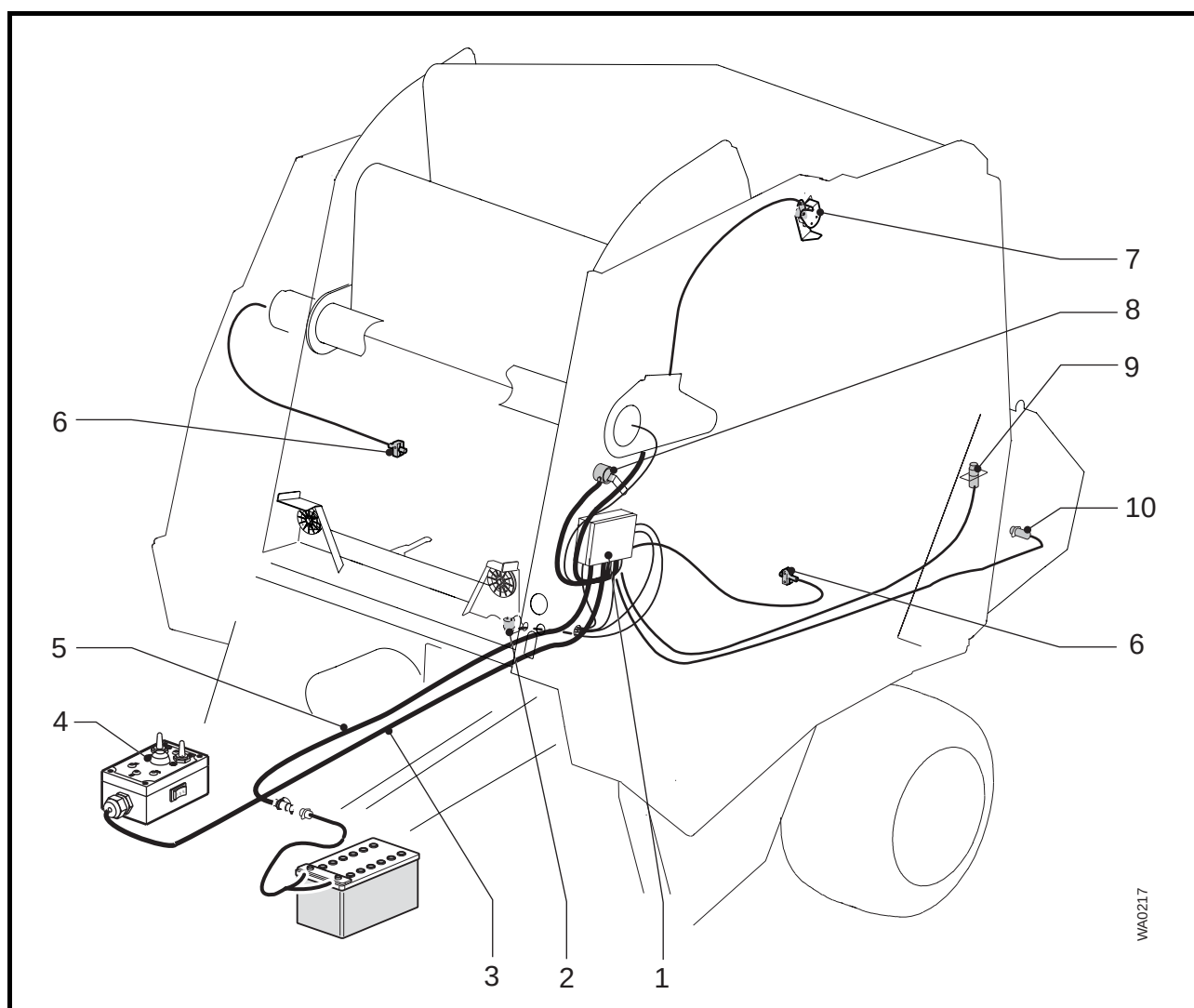
The control box enables supervision of the total baling procedure from the tractor cab.



All dimensions are given in metric values: see conversion table in section 14.3.

Sensors

The baler is equipped with a lot of sensors (proximity switches and rotational sensors). The proximity switches "feel" metal and function best within a range of 3 - 5 mm (1/8" - 3/16"). When a proximity switch makes contact this is indicated by a red light on top of the switch.



- 1 Control unit
- 2 Twine tube position sensor
- 3 Control cable
- 4 Electronic control box
- 5 Power cable

- 6 Tailgate lock sensor
- 7 Max. diameter sensor
- 8 Bale growth sensor
- 9 Net measuring roller of net wrap
- 10 Brake position of net wrap spindle

5.1 Electronic control box



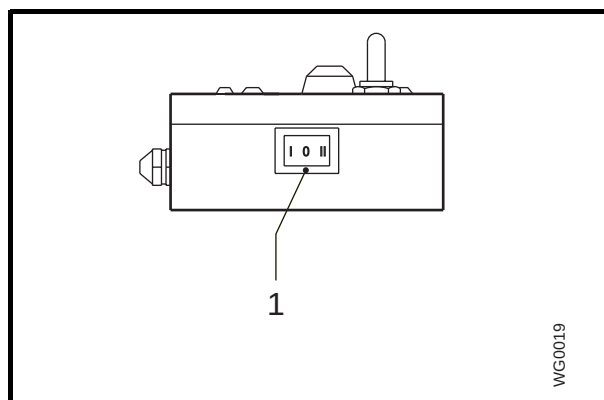
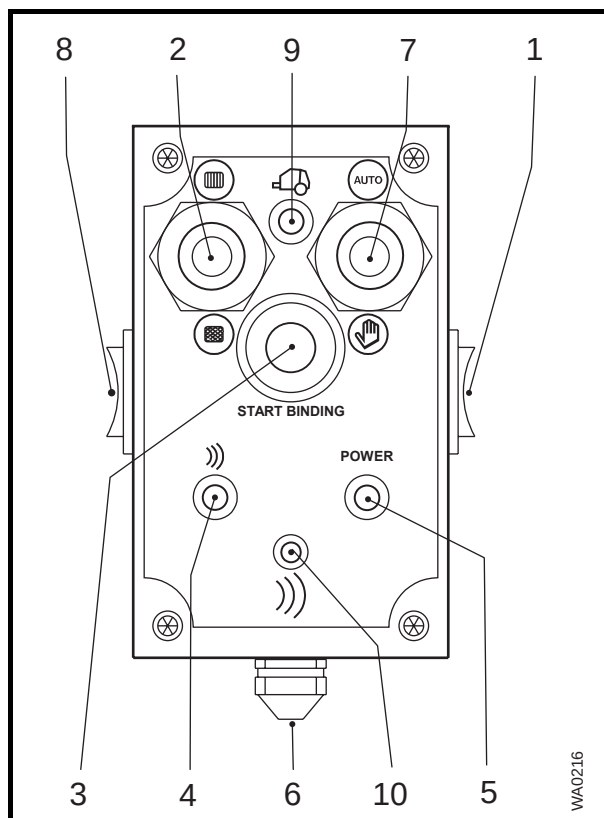
Attention:

Always protect the control box against humidity and mechanical damages!

When the control box is switched on a beep sounds and the control LED (5) illuminates!

5.1.1 Control elements and their function

- 1 Main switch with the positions:
0 = OFF
I = ON
II = emergency switch control
- 2 Toggle switch:
top setting = twine tie
lower setting = net wrap
- 3 Switch for manual wrapping initiation or to restart a wrapping cycle
- 4 Light signal
- 5 LED: control box ready for use
- 6 Control cable
- 7 Toggle switch:
lower setting = manual wrapping
top setting = automatic wrapping
- 8 Three-position toggle button for emergency wrap control (twine or net)
- 9 LED: tailgate monitoring
- 10 Sound signal



5.1.2 Control elements and their function

With toggle switch (7) of the control box the manual or automatic wrapping mode is selected.

As soon as the filling of the bale reaches 90% two short beeps are emitted. In automatic mode wrapping starts when the pre-set diameter has been reached. Three short beeps are emitted six times and flashing on of the LED (5) indicate the wrapping has started. In manual mode the wrapping is started upon pressing button (3).

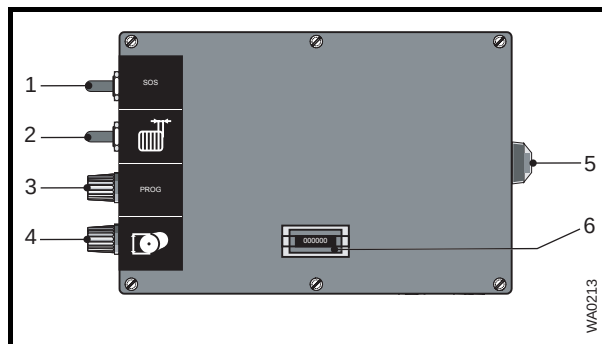
When the wrapping is ready the buzzer sounds for three seconds.

5.2 Machine control unit

The machine control unit is positioned behind the front lh side panel. The machine control unit contains the electronic control elements for both twine tie and net wrap.

5.2.1 Control elements and their function

- 1 Toggle switch SOS (1):
activation of twine tie emergency control
activation of net wrap emergency control
- 2 Toggle switch (2) twine end distance / calibration:
Position 1: twine end distance = 10.5 cm resp.
Position 2: twine end distance = 13.5 cm resp.
Position 3: twine end distance = 15.5 cm resp.
Position 1: setting calibration to RV 1601 (WD) resp.
Position 3: setting calibration to RV 1901 (WA).
- 3 Rotatable knob (3) to set the amount of twine or the amount of net.
- 4 Rotatable knob (4) to set the bale diameter.
- 5 Push button (5) Reset
- 6 Bale counter (6) (total number of bales, not resetable)



5.2.2 Twine wrap settings

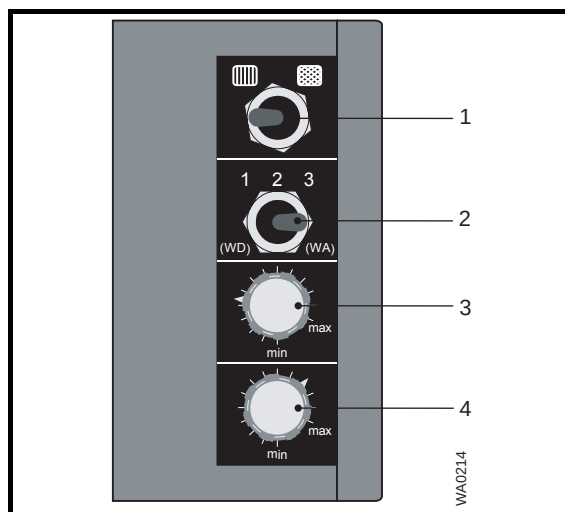
The distance of twine end wraps is pre-set with the toggle switch (2) on the machine control box (positions 1, 2 and 3).

Rotatable knob (3):

- 1 Position minimum: 3 lateral wraps, 4 central wraps and 3 end wraps in between at either side
- 2 Middle position: 3 lateral wraps, 6 central wraps and 3 end wraps in between at either side
- 3 Position maximum: 3.5 lateral wraps, 8 central wraps and 3.5 end wraps in between at either side.



The above-mentioned number of wraps are nominal values only since the effective number depends upon the pto speed.



5.2.3 Net wrap settings

The number of net wraps is pre-set with rotatable knob (3) on the machine control box.

Position:

- 1 minimum: 2 wraps
- 2 maximum: 5 wraps



The number of net wraps does not depend upon the bale diameter. At the start of wrapping the control system automatically calculates the quantity taking into account the actual bale diameter. Only the pto speed influences the real number of wraps.

5.2.4 Reset

It is possible to retract the actuators (recalibrate) to their idle position through pushing the reset button (5) on the machine control unit.



DANGER:

Upon activating the reset function both net and twine knives are activated! Stay clear of the respective areas! The baler shall not run since this will cause the net to be pulled into the machine!

5.3 Working with the baler using INFOBALE electronic control in emergency mode

In case of wrapping trouble the wrapping can also be controlled manually by-passing the electronic system.



DANGER:

Also during emergency control it is important to close all protection and keep it closed!



Attention:

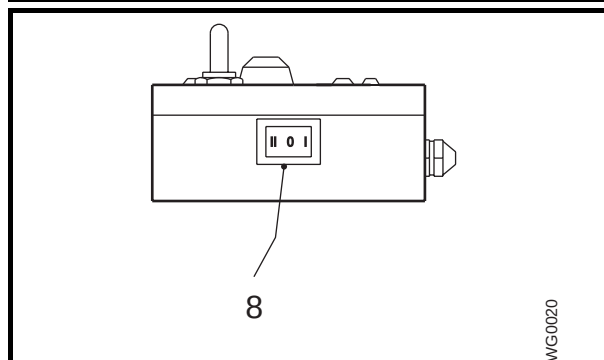
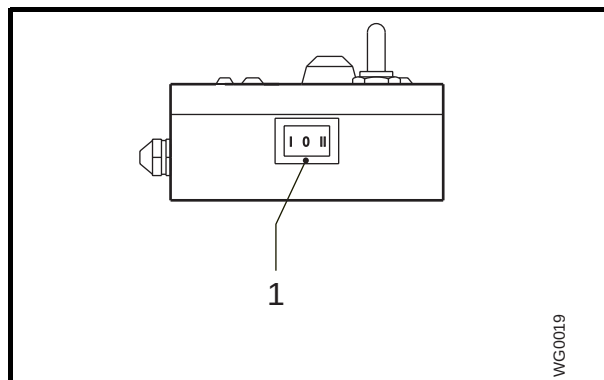
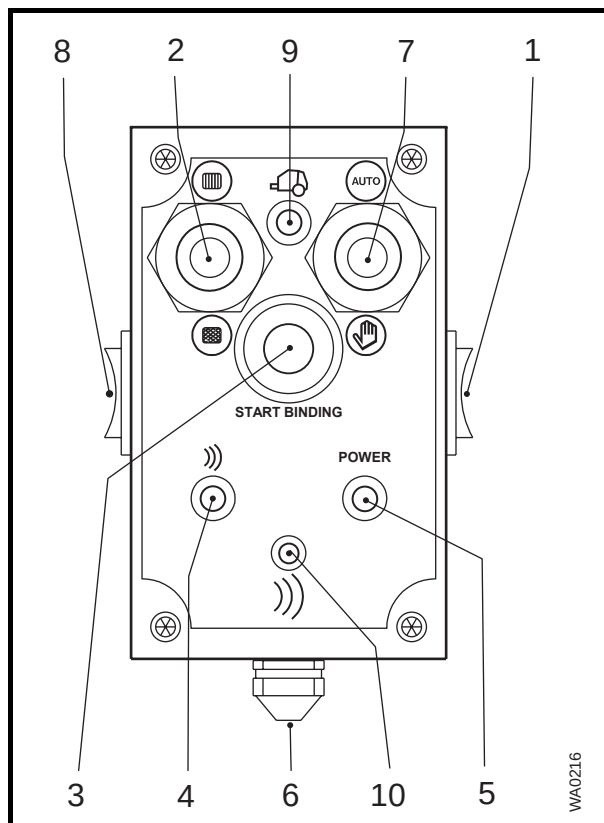
In emergency mode (II) the wrapping continues running as long as the button (8) on the control box is held pushed! This function is not meant nor designed for long-term use, but only meant to enable finishing a bale already in the baler! After ejection of that bale immediately find and repair the trouble!

5.3.1 Twine tie

- 1 Flip switch (1) on the machine box to the position twine tie.
- 2 Set main switch (1) on the control box to II (emergency control).
- 3 Activate toggle button (8) on the control box.
- 4 After the twine tie is running about 2 seconds, release button (8).
- 5 Pulse toggle button (8) to the opposite side till the twine has been cut.

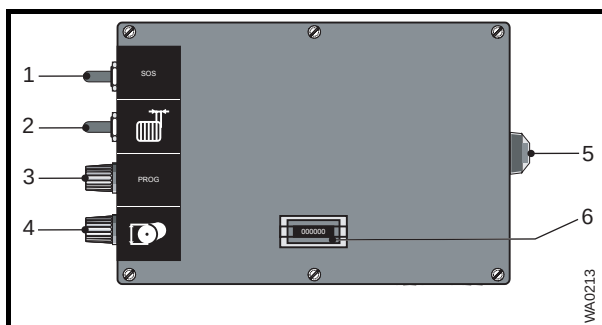
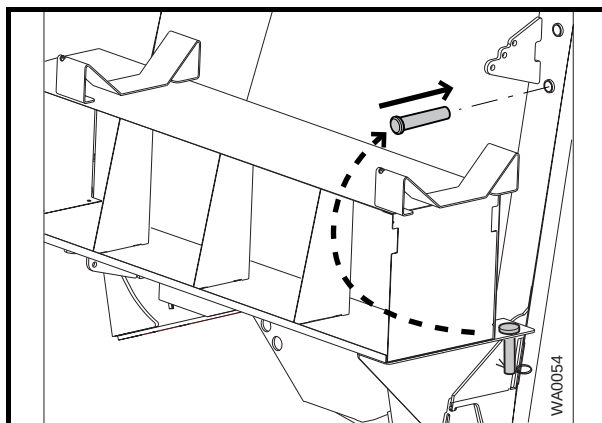
5.3.2 Net wrap

- 1 Flip switch (1) on the machine box to the position net wrap.
- 2 Set main switch (1) on the control box to II (emergency control).
- 3 Activate toggle button (8) on the control box.
- 4 After net wrap has started, release button (8).
- 5 After a couple of seconds running, push button (8) to the opposite side till the net is cut. The net roll brake is applied.



5.4 Calibration of the bale diameter sensor

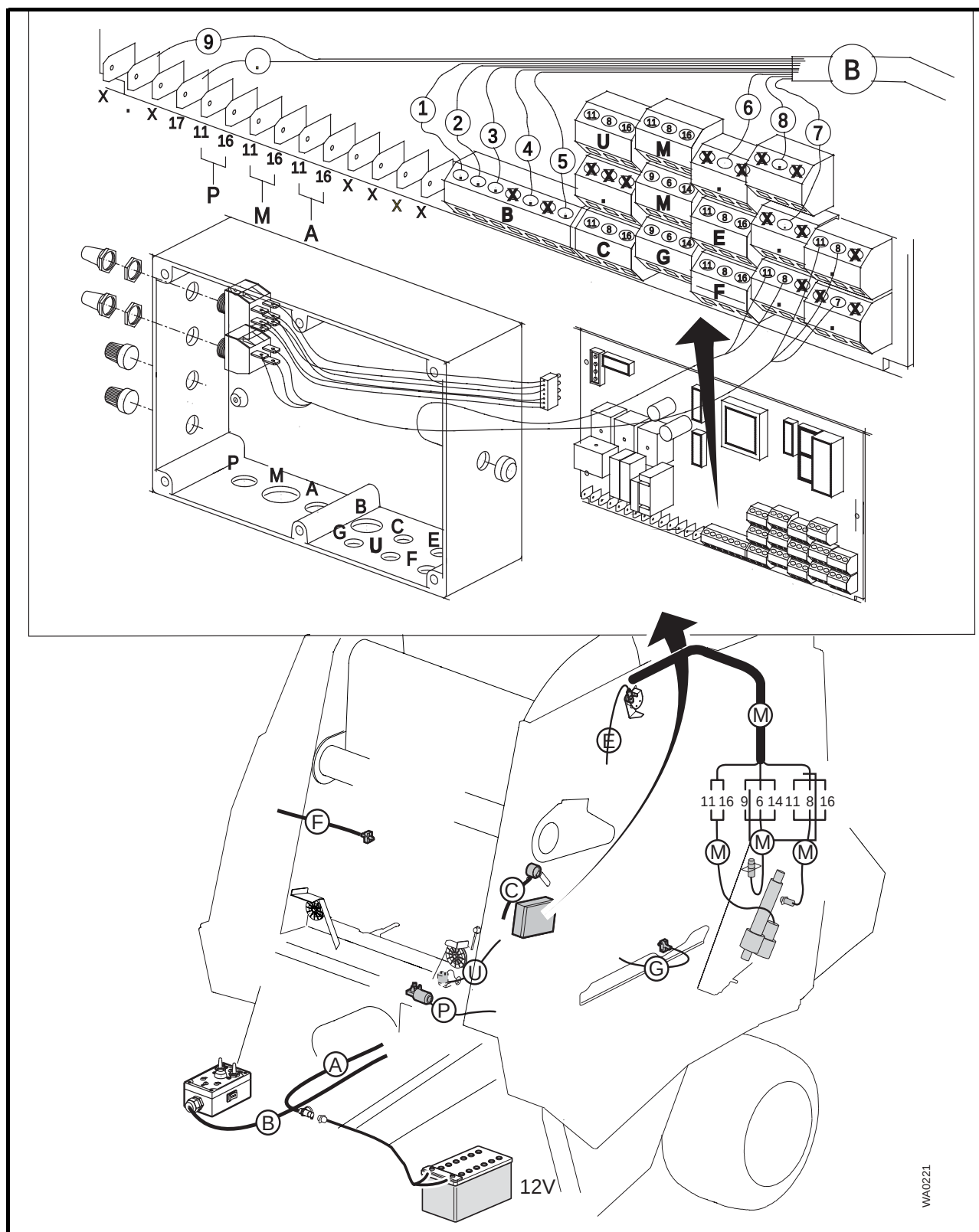
- 1 Open the tailgate and position the stop pin in the lower hole in the sidewall
- 2 Then lower the tailgate pressureless (floating position) till the tensioner arm rests on the stop pin. This is the basic position for calibration.
- 3 Set toggle switch (2) to WD (= RV 1601) or WA (= RV 1901)
- 4 Push reset button (5) on the machine control box while starting the system. Keep the reset button pushed in till a beep signal sounds. This may long about 15 seconds! If the calibration has failed a beep signal sounds for 10 seconds!
- 5 Then release the reset button: calibration is ready now!
- 6 When the calibration is finished, remove the stop pin and reposition it into its retaining hole.



5.5 Alarm warnings

Alarm	Cause	Times	Lasts (sec)	Repeats
Quick beep	- Failure (e.g. tailgate lock open, net not fed in).		- Till failure has been removed.	
Quick beep.	- Max. bale diameter has been reached.	- 6	- 5 sec.	
Long beep.	- Bale growth sensor broken.		- 10 sec + LED does not burn.	- every baling cycle after closing tailgate.
Quick interrupted beeps	- No twine tie available (just net wrap); although twine tie has been selected. - Twine tie sensor gives fault value.		- 10 sec.	- every baling cycle after closing tailgate.

5.6 Electrical connections



- 6. orange
- 7. red
- 8. black
- 9. white
- 10. yellow
- 11. brown
- 12. grey

- 13. lila
- 14. green
- 16. blue
- 17. yellow+green

WA0221

6 ELECTRONIC CONTROL SYSTEM AUTOFORM

The baler can be equipped with an AUTOFORM electronic control system. This control system controls and monitors the growing bale, the wrapping and clearing out of the bale. Furthermore the system also provides error indicating functions.

The control box enables supervision of the total baling procedure from the tractor cab. Especially the following functions can be monitored:

- Bale diameter indication
- Drive indications to fill the bale chamber uniformly
- Bale shape indications
- Bale wrapping process (twine tie/net wrap)
- Tailgate open/closed indication

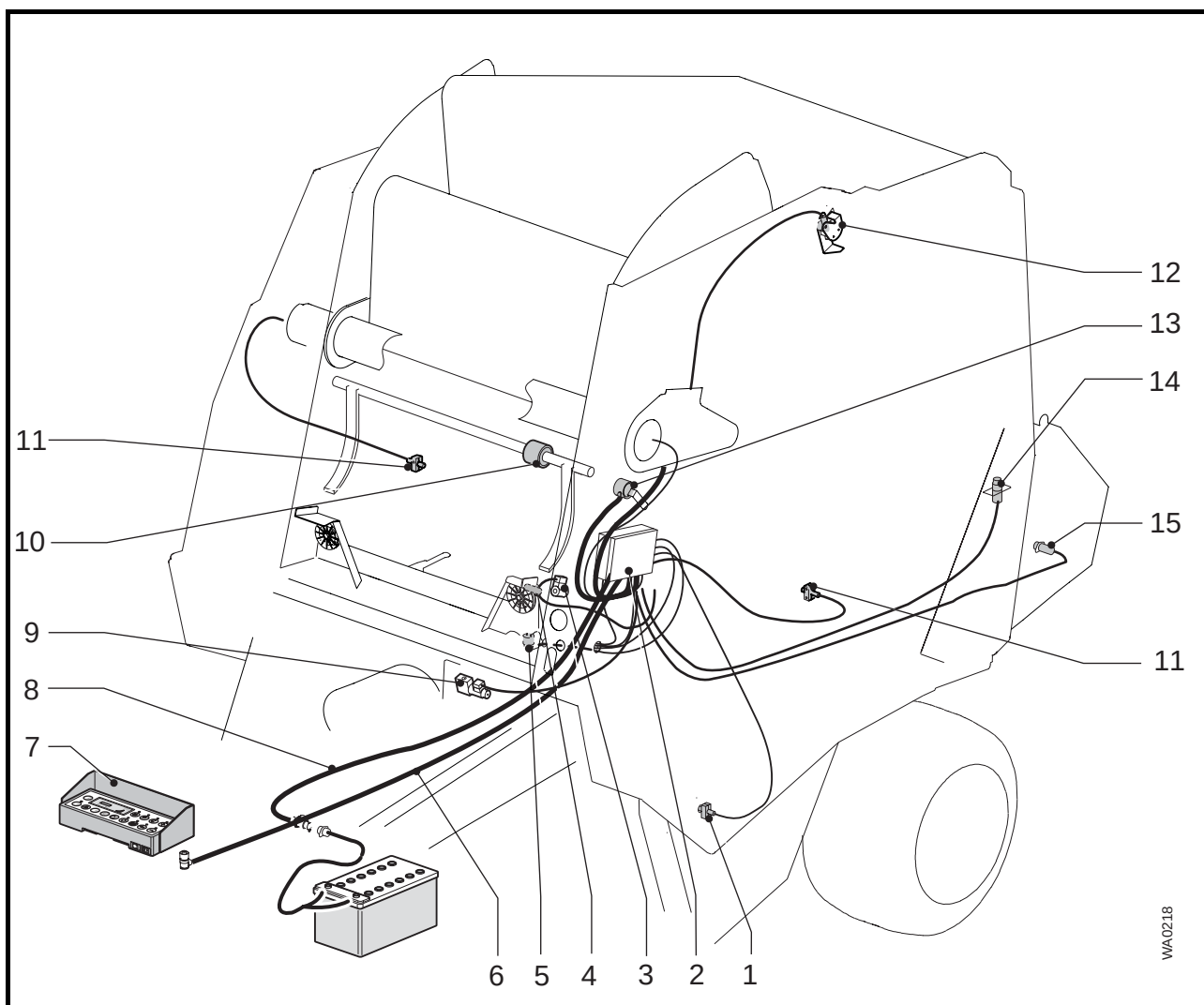
- Bale counters (4 day counters, 1 total counter)
- Knife position indication of the OPTICUT system
- Soft core control



All dimensions are given in metric values: see conversion table in section 13.3.

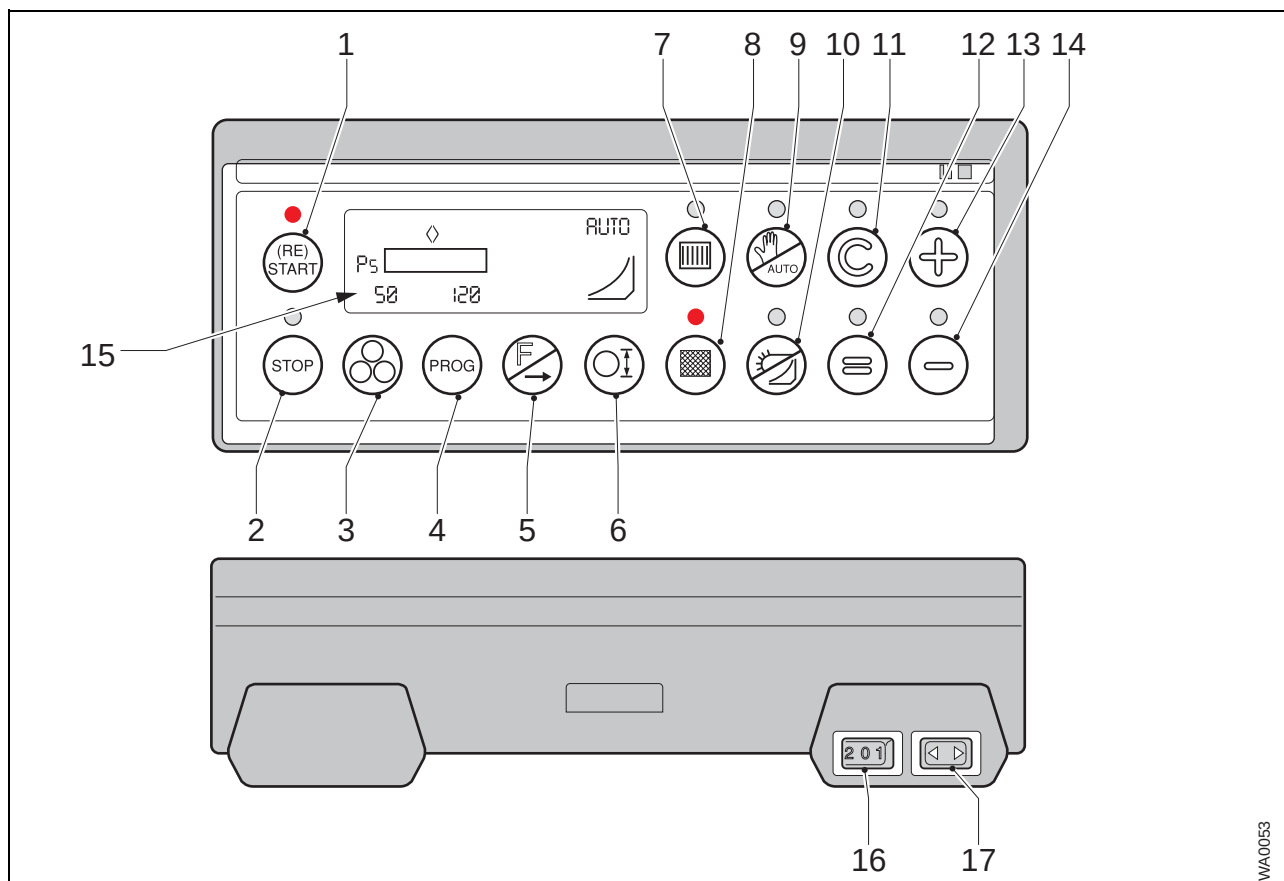
Sensors

The baler is equipped with a lot of sensors (proximity switches and rotational sensors). The proximity switches "feel" metal and function best within a range of 3 - 5 mm (1/8" - 3/16"). When a proximity switch makes contact this is indicated by a red light on top of the switch.



- | | | |
|-------------------------------------|---------------------------------------|---------------------------------------|
| 1 Knife position (OPTICUT only) | 6 Control cable | 11 Tailgate lock sensor |
| 2 Control unit | 7 Electronic control box | 12 Max. diameter sensor |
| 3 Electr. controlled pressure valve | 8 Power cable | 13 Bale growth sensor |
| 4 Twine running (option) | 9 Pick-up / knives change-over valve | 14 Net measuring roller of net wrap |
| 5 Twine tube position | 10 Left/right (bale shape indication) | 15 Brake position of net wrap spindle |

6.1 Electronic control box



WA0053

6.2 Controls

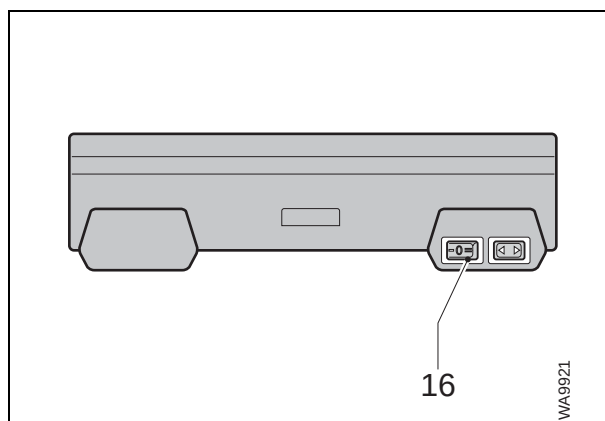
- 1 (RE)START button
 - A. To (re)start the control system
 - B. To restart the wrapping
- 2 STOP button

To stop, interrupt a procedure, return to the starting position. Activity is interrupted.
- 3 Bale counters
- 4 Selection of wrapping programme
- 5 Function button: to move to the next function or adjustment position
- 6 Setting of bale diameter
Setting of optional soft core
- 7 Twine tie
- 8 Net wrap (option)
- 9 Selection of automatic or manual control
- 10 Selection pick-up or knives
- 11 Clear button
- 12 Confirm / save button
In some functions used to move to next function in series
- 13 Increase value button: new value blinks till confirmation with - button
- 14 Decrease value button: new value blinks till confirmation with - button
- 15 Display
- 16 Main switch, providing positions:
 - 1 ON
 - 0 OFF
 - 2 Override control ON
- 17 Override control switch (use see 5.6)

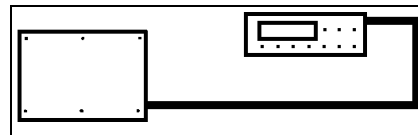
6.3 Working with the baler using AUTOFORM electronic control

6.3.1 Starting

- 1 Set the main switch (16) to 1. The screen displays the load display d1 and then automatically switches to the basic display (d2). The basic display is the starting display which also shows when a function is interrupted by means of the -button. When this display shows, no active controls are possible (safety position).



d1



d2

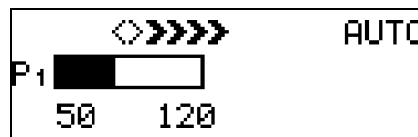


- 2 Push button  or  in order to select twine tie or net wrap (option) resp.
- 3 Push -button if required to select manual or automatic control. Automatic is standard setting.

- 4 Push button .

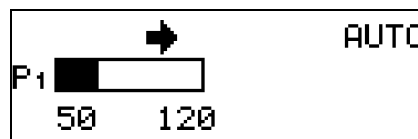
- Now the **working display** shows (d4). Through this display the working is monitored.
- The horizontal bar displays the growing of the bale. The arrow tips on top of the bar show the difference between left and right side diameters. Four arrow tips indicate the max. difference has been reached. Normally you adapt your driving direction when the third arrow tip shows. As soon as **the fourth** arrow tip appears **the buzzer sounds: immediately change** your driving direction.

d4



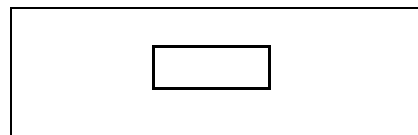
- If the bale shape indication does not function correctly (at rh and lh side in the bale chamber) or has not been installed, the arrow tips are replaced by single complete arrows (e.g. display d3), also see 5.4.9.

d3

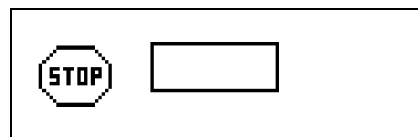


- 5 Now drive with an adequate forward speed (4 - 15 km/h; 2.5 - 9 mph) over the windrow, steering left and right in accordance with the indication of the bale shape indication system.
 - A **buzzer sound** alerts the driver when **90%** of the desired bale size has been reached.
 - Upon reaching the desired diameter (**100%**) **the buzzer sounds again, with different sound** and display d5 shows: twine tying commences.
- 6 **Stop immediately** upon appearance of display d5a!

d5

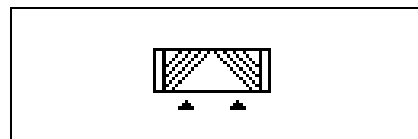


d5a

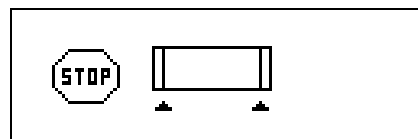


- As soon as the twine tie tubes have reached the beginning position display d5b shows.
- The twine tie procedure is shown through displays d5b, d6 and d7.
- When twine tie has been finished display d8 shows, now the tailgate can be opened.

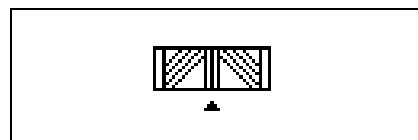
d6



d5b

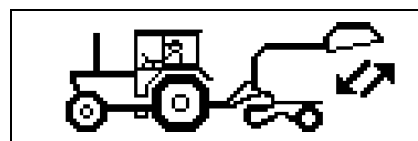


d7



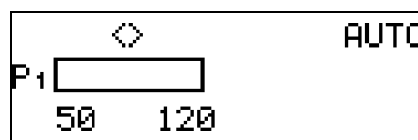
- Open tailgate (using hydr. valve control lever in tractor cab), the bale is cleared out of the bale chamber

d8



- After closing and locking of the tailgate the **working display** d4 re-appears.

d4



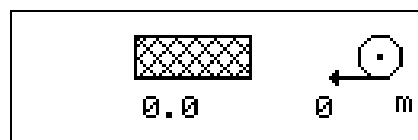
Net wrap

Upon reaching the desired diameter (100%) the buzzer sounds again, with different sound and display d9 shows. Soon d9 will be replaced by d9a which means **stop immediately**, the buzzer sounds to remark this. After completion of the net wrap display d8 re-appears, now the tailgate can be opened.

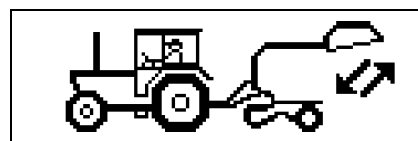
During net wrap cycle the actual number of wraps is indicated in the center of the display. The total used net quantity since clearing the counter is shown at the rh side of the display.

Open tailgate, the bale is cleared out of the bale chamber. After closing and locking of the tailgate the working display d4 re-appears.

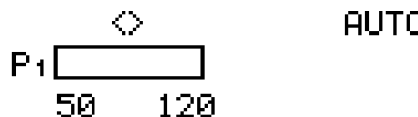
d9



d8



d4



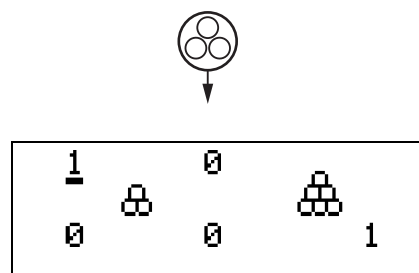
During net wrapping the number of metres net used is shown in the display d9. The total used net quantity since clearing the counter is shown at the rh side of the display.

6.3.2 Bale counters

The number of produced bales can be shown on the display as follows:

- 1 When in working display d4 or in the basic display d2 push button .
 - **At the left** four **day counters** show (can be cleared to zero).
 - **At the right** shows the **total counter** that cannot be cleared.
- 2 By pushing button  you go to the chosen day counter (the value of the active counter is underlined)
- 3 By pushing button  the selected counter is cleared to zero, or
- 4 as required the shown quantity can be corrected by means of the  and  button.
- 5 Confirm the new value with button 
- 6 Leave this function by pushing button 

d10

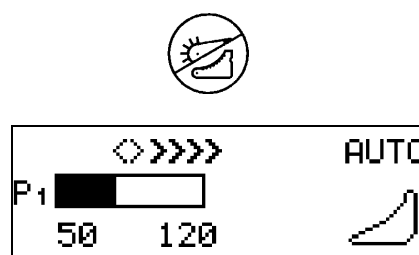


6.3.3 Control of pick-up / cutting mechanism

Using the button  pick-up or cutting mechanism is selected.

- Standard setting is pickup, the LED above the button is on.
- When the cutting mechanism is selected the knives can be controlled hydraulically in and out (using hydr. control lever in tractor cab).
- As soon as the knives are in cutting position a knife symbol appears in the rh lower corner of the display.

d12

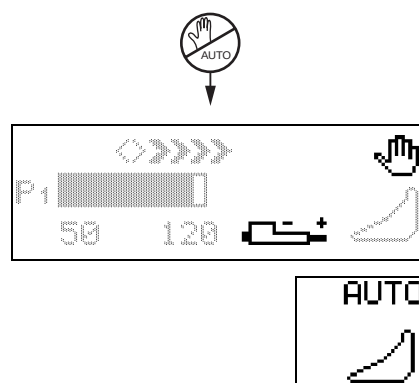


6.3.4 Manual and automatic mode

When the working display d4 shows you can select this mode through pushing button .

- In manual mode the complete baling cycle is automatic except the wrapping. The latter must be started by pushing the button . The drive of the selected wrapping (twine or net) can be controlled manually by means of the buttons  and .
- In the manual mode the display shows at the rh upper corner a hand instead of the word AUTO; the LED over the button is on.

d16



6.4 User functions

6.4.1 Bale diameter, standard

Push button , the display bale diameter shows:

6.4.2 Bale diameter + mixed chamber option

Push button , the display bale diameter shows:

- lh dimension: outer diameter of the bale
 2nd lh dimension: diameter soft core (option)
 values at the rh: bale and soft core pressure.

This option works with a proportional pressure setting enabling adjustment of both outside and core pressure.

6.4.3 Adjustment of outer diameter

- 1 Push button  once
- 2 Adjust desired value using buttons  and 
- 3 Confirm set value with button 

6.4.4 Adjustment soft core diameter (option)

- 1 Push button  twice
- 2 Adjust desired value using buttons  and .
 minimum value is 60 cm (23-5/8") (0 is no soft core)
 the max value equals the total bale diameter (complete soft bale).
- 3 Confirm set value with button 
- 4 Pressure setting see 5.7.7.

6.4.5 Outer layer pressure

6.4.6 Core pressure



Attention:

In case of mixed chamber always switch off the electronic system in order to prevent an empty battery!

6.4.7 Changing the wrapping programmes

The standard twine tie programmes P1/P2/P3 can be changed upon desire.

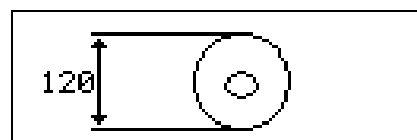
Adjustable is:

- Number of wraps near the bale sides (starting wraps);
- Number of intermediate wraps;
- Number of final wraps;
- Distance from lateral wraps to the side of the bale in cm.

Procedure for twine tie:

- 1 Push button  to reach twine tie programme P1.
- 2 If you want to go to the programmes P2 or P3 push the button  once or twice more resp.
- 3 Push button  to select the value that has to be changed (that value starts blinking).
- 4 Adjust the desired value with the buttons  and .

d15c



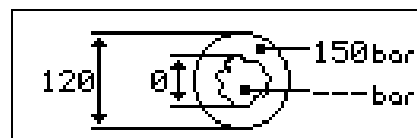
d15a



d15b



d15a



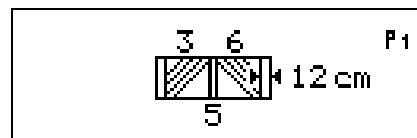
d15d



d15e



d16



- 5 Confirm pushing button  (the value stops blinking).
- 6 Pushing button  you leave this function.

**Attention:**

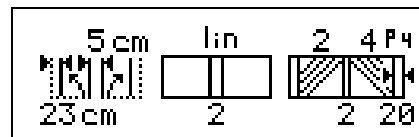
The number of wraps does not depend upon the bale diameter. At the start of wrapping the control system automatically calculates the quantity taking into account the actual bale diameter. Only the pto speed influences the real number of wraps: it is based upon a pto speed of 540 rpm.

The twine tie programme P4 (flax programme) can be set as desired as well.

Adjustable is:

- Distance of the side wraps to the side of the bale in cm (1 cm = 25/64"), shown at the rh in the display;
- Distance between the wraps when baling;
- Number of final wraps when bale has reached its final diameter (center of the display);
- Wrapping pattern (left side of display).

d17

**Attention:**

Flax twine tie programme only can work when electronic twine running sensors are installed and connected!

Procedure:

- 1 Push .
- 2 Four times push button  to move to twine tie programme P4.
- 3 Select value to change by pushing -button, value will blink.
- 4 Change value by pushing buttons  and .
- 5 Confirm new value by pushing button .

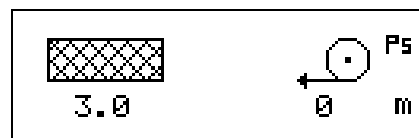
6.4.8 Changing number of net wraps around the bale

- 1 Push button .
- 2 Select net wrap by button  if still required.
- 3 Push button  to go to wrapping programme P5.

The value below the left picture (fig d18) indicates the number of wraps.

- 4 Push button  till that figure starts blinking.
- 5 Change value by pushing buttons  or  to desired extend.
- 6 Confirm by pushing .

d18





6.4.9 Clearing total net quantity

During net wrapping the number of metres net used is shown in the display.

- 1 Select net wrap by button if still required.
- 2 Push button to go to wrapping programme P5.
The value below the right picture indicates the total number metres (1 m = 3'3") of net used since the last clearance.
- 3 Push button until that figure starts blinking.
- 4 Push button to reset value to zero.
- 5 Confirm value zero by pushing button .

6.4.10 Display contrast

- 1 Push button to get the basic display d2.
- 2 Once push button
- 3 Adjust contrast by pushing buttons or to desired extend.
- 4 Push button to get back to the basic display d2.
- 5 Push button to get back to the working display.

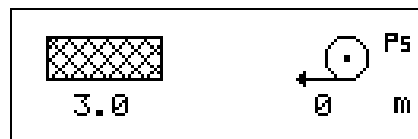
6.4.11 Volume level of the buzzer

1. Push button to get the basic display d2.
2. Twice push button .
3. Adjust volume by pushing buttons or to desired extend.
4. Confirm by pushing button .
5. Push button to get back to the basic display d2.
6. Push button to get back to the working display.

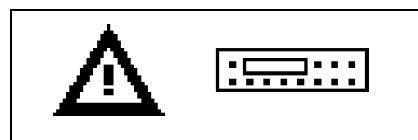
6.4.12 Bale shape indication

- 1 Push button to get the basic display d2.
- 2 Three times push button .
- 3 Adjust by pushing buttons or to desired extend.
- 4 Confirm by pushing button .
- 5 Push button to get back to the basic display d2.
- 6 Push button to get back to the working display.
 - The rh value in the display indicates the difference between left and right side of the bale. This value is represented by four arrow tips. One arrow tip is the fourth part of that value.
 - If no bale shape indicator is connected or if this indicator malfunctions display d20 shows
 - Adjustment: as soon as the adjusted value of difference is reached, e.g. 10 cm (4"), the arrow changes direction.

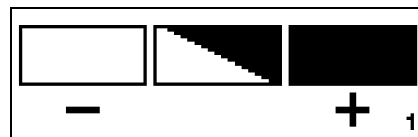
d18



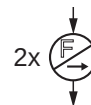
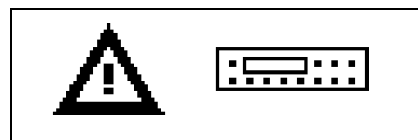
d2



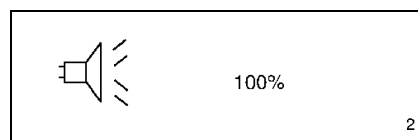
d19



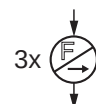
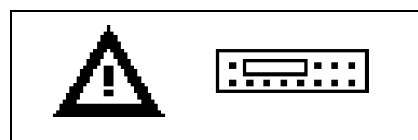
d2



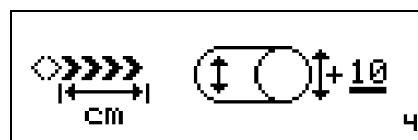
d11



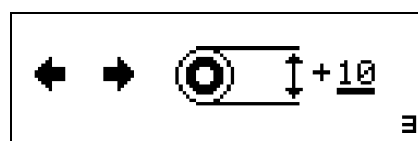
d2



d21



d20



6.4.13 Battery voltage check

- 1 Push button  to get the basic display d2.
- 2 Four times push button .
- 3 Push button  to get back to the basic display d2.
- 4 Push button  to get back to the working display.



Battery tension (voltage) shall not be less than 11.5 V

6.5 Error indications

Errors always show in the same position on the display.

6.5.1 Tailgate open or not locked

When during baling the tailgate is not correctly shut this is indicated in the display and additionally the buzzer sounds. How to proceed:

- 1 Repeat closing the tailgate.
- 2 If the error indication persists, check locks, sensors and cable connections.
 - Renew a faulty sensor as soon as possible.
 - The buzzer can be silenced by pushing button , although this is only possible if but **one** sensor is faulty.

6.5.2 Oversize warning

Upon exceeding the max. bale diameter the oversize sensor initiates both this warning and the immediate wrapping.

How to proceed:

- 1 **Stop immediately.**
- 2 Eject the completely wrapped bale.
 - After ejection of the bale the warning disappears.
- 3 If this warning appears, readjust the bale diameter correction (see 6.7.4).

6.5.3 Twine run

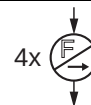
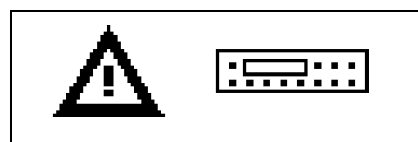
The twine is running although it should not (e6):

The twine is not running although it should do so (except when the pto is not rotating) (e7).

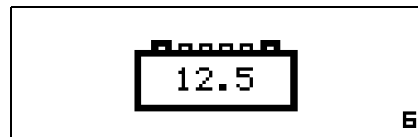
How to proceed:

- 1 Check twine routing and correct fault.
- 2 Proceed with job.

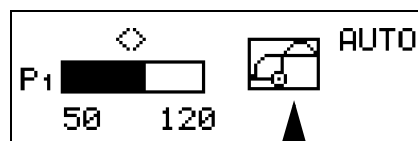
d2



d22



d23



e1



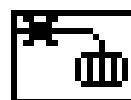
e2



e6



e7



6.5.4 Net run

The net is running although it should not (e3):

How to proceed:

- 1 Check if net has been cut.
- 2 Check whether net is pulled by belt(s) and/or bale.

The net is not running although it should do so (this is indicated some seconds after initiation of the wrapping procedure) (e4).

How to proceed:

- 1 Check net routing and correct fault.
- 2 Proceed with job.

e3



e4

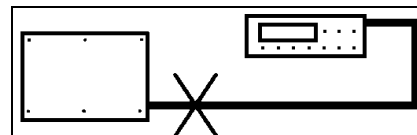


6.5.5 Bad electrical supply or connection(s)

How to proceed:

- 1 Check all electrical connections.
- 2 Check battery tension (voltage) (see 4.10)
- 3 Check function of rotational sensors, check cables for broken leads and bad electrical connection(s).

e5



6.5.6 Drive indication instead of bale shape indication

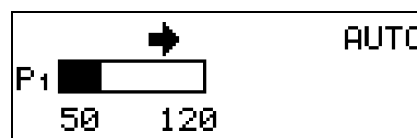
There are two possible causes for malfunction of the bale shape indication:

- 1 Bad electrical connection(s).
 - 2 Calibration beyond reach of the rotational sensors.
- In both cases the four arrow tips in the working display are replaced by **one full arrow**. The arrow indicates the direction in which the driver must steer to fill the bale chamber uniformly.

How to proceed:

- 1 Check all electrical connections.
- 2 Re-calibrate the rotational sensors with an empty bale chamber (see 5.7.3).

d3



6.5.7 Non-confirmable error displays

Strong electromagnetic radiation / fields may generate electronic errors. Non-approved transmitters may be the cause. The system may show not identifiable errors: if the error cannot be confirmed/identified at the machine, ignore it and proceed your work.

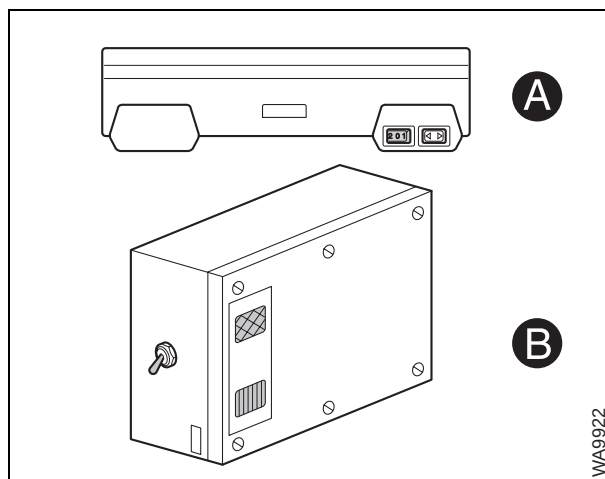
6.6 Manual override of wrapping

In the odd case of electronic failure (AUTOFORM malfunction) the manual override offers the possibility to control the twine tie actuator (M1) and/or net wrap actuator (M2) manually, this in order to enable the operator to finish the field. You find the control unit at the lh side in the baler. The toggle switch on the control unit has three positions:

center:	OFF
up:	Net wrap manual control ON
down:	Twine tie manual control ON

Procedure:

- 1 Switch main switch on control box to **position 2 (override ON)**.
- 2 Set the toggle switch on the control unit as required:
 - **up**, for manual control of **the net wrap** actuator.
 - **down**, for manual control of **the twine tie** actuator.
- 3 Use toggle switch (17) on control box to control the actuator chosen.



6.7 AUTOFORM control box dealer functions

Dealer functions are functions meant for use (reading and adjustment) by a dealer.

How to proceed:

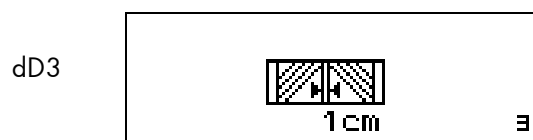
- 1 Switch main switch on control box to 1 (ON) or when in a working display push button .
- 2 Push buttons  and  at once.
 - Pushing the button  you go through the displays without changing anything.

6.7.1 Machine type

- 1 Once push button .
- 2 Push button  or  to set type WD160 or WA185.
- 3 Confirm new setting by pushing button .
 - WA and WD indicate the type, 160 and 185 the max. bale diameter.

6.7.2 Stop position of final twine wrap

- 1 Twice push button .
- 2 Change the value by pushing buttons  or .
- 3 Confirm new setting by pushing button .
 - Standard setting is 1. A higher value means a larger distance between the final wraps.



6.7.3 Baler shape sensor calibration

Ensure the chamber is empty.

- 1 Three times push button .
- 2 Twice push button , the shown actual value (e.g. 128) is then entered and confirmed.

The rotational sensors are positioned at the lh and rh side inside the baler. This calibration compensates the lh and rh sensors with respect to each other.

6.7.4 Correction of bale diameter

- 1 Four times push button .
- 2 Change the value by pushing buttons  or  this may be adjusted from +10 to -10 cm (+4" to -4").
- 3 Confirm new setting by pushing button .

6.7.5 Bale growth sensor calibration



Attention:

Open tailgate, then place stop pin in the lower hole in the lateral wall. Then lower the tailgate pressureless (floating position) till the tensioner arm rests on the stop pin. This is the basic position for calibration.

- 1 Five times push button .
- 2 Twice push button  the actual value is then entered and confirmed.

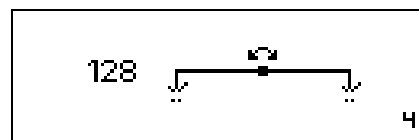
6.7.6 Twine run control (option)

- 1 Six times push button .
- 2 Set the value to 0 or 1 pushing the buttons  or .
- 3 Confirm new setting by pushing button .

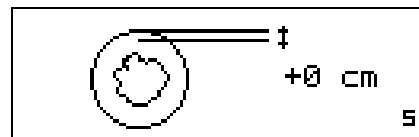
0 = sensor **disengaged**

1 = sensor **engaged**

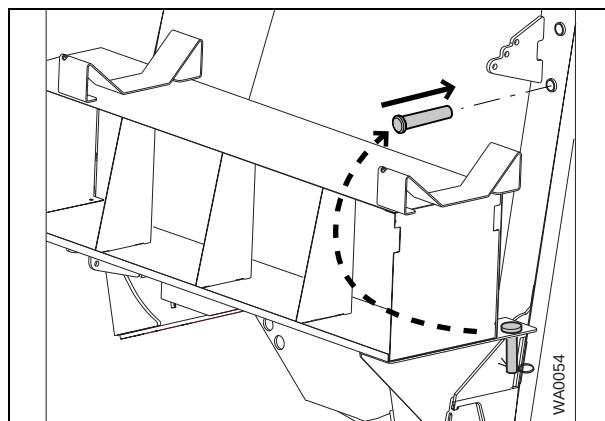
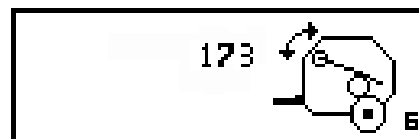
dD4



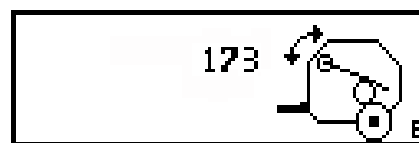
dD5



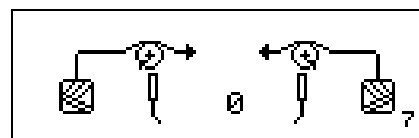
dD6



dD6



dD7



6.7.7 Mixed chamber option (proportional pressure control)

- 1 Seven times push button . .
- 2 Set the value to 0 or 1 pushing the buttons  or .
- 3 Confirm new setting by pushing .

0 = function **not activated**

1 = function **activated**

6.7.8 Battery check

The battery tension (voltage) shall be not less than 11.5 V when not under load.

Battery check under load:

- 1 Eight times push button .
- 2 Push button  or , the shown value shall not be less than 8 V.

6.7.9 Time setting

- 1 Nine times push button .
- 2 Change the value by pushing buttons  or .
- 3 Confirm new setting by pushing button .

6.7.10 Default re-initiation

- 1 Ten times push button .
- 2 When the button  is pushed the system is reset to the default setting (factory setting).

6.7.11 Software version

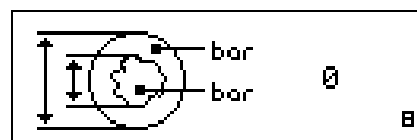
In case of communication with the service you will need these data.

- 1 Eleven times push button .
- 2 Make a note of the shown values.

6.8 Factory-set read-only displays

When pushing the buttons  and  at once you reach the factory-set displays. You can look through them by means of the button  but changing is not possible. Pushing the  button you return to the initial display.

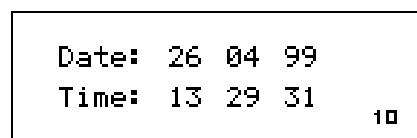
dD8



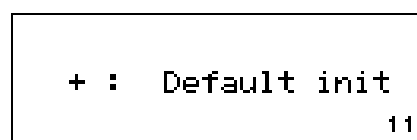
dD9



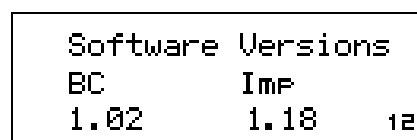
dD10



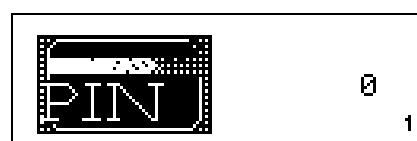
dD11

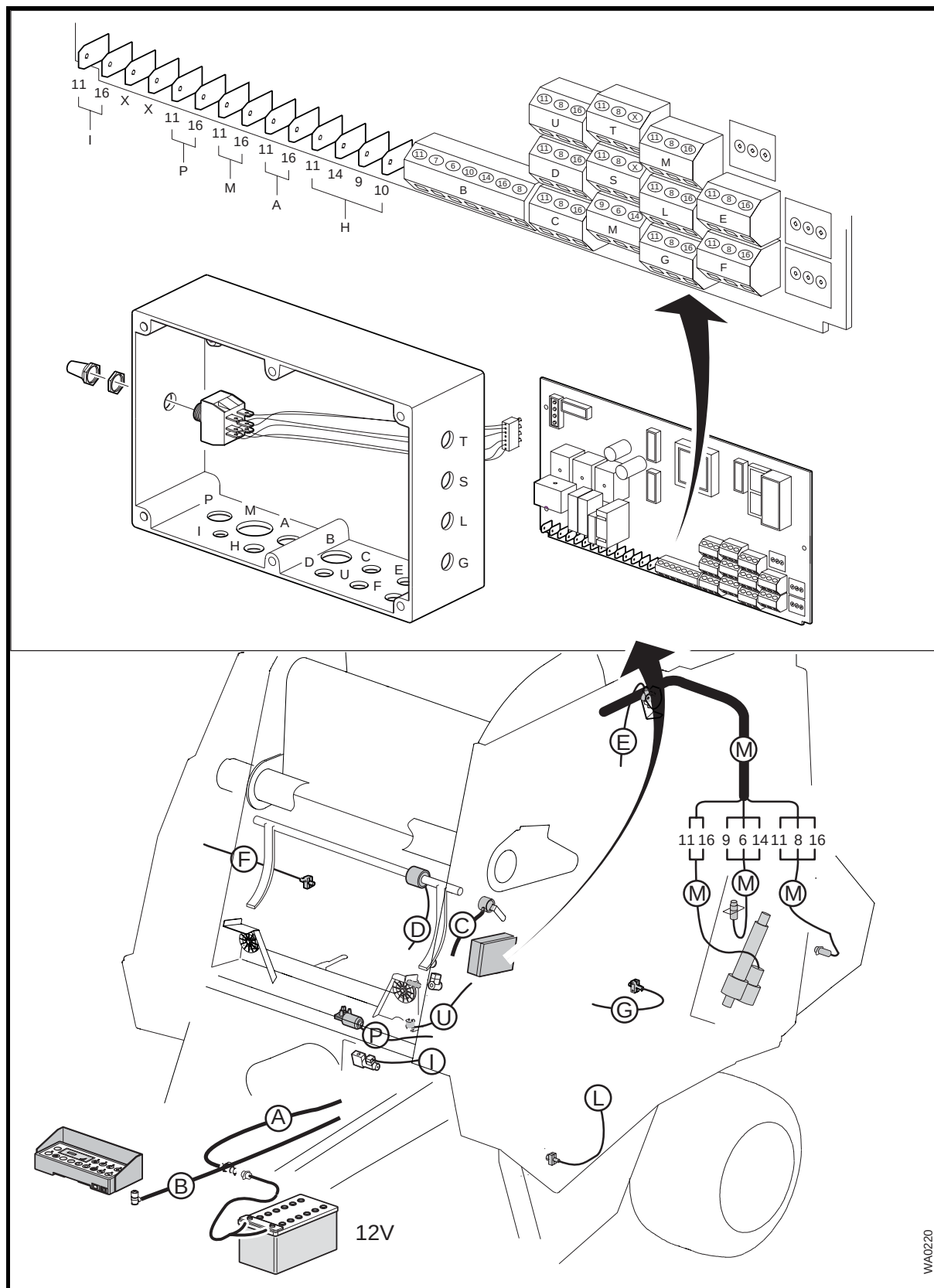


dD12



dF1





- 11. brown
- 12. grey
- 13. lila
- 14. green
- 16. blue
- 17. yellow+green

7 PICK-UP (OPEN THROAT AND OPTICUT/ROTOR SYSTEM)

The crop is picked up from the ground by means of the pick-up tines and then fed into the starting chamber via an intake roller or an intake rotor.

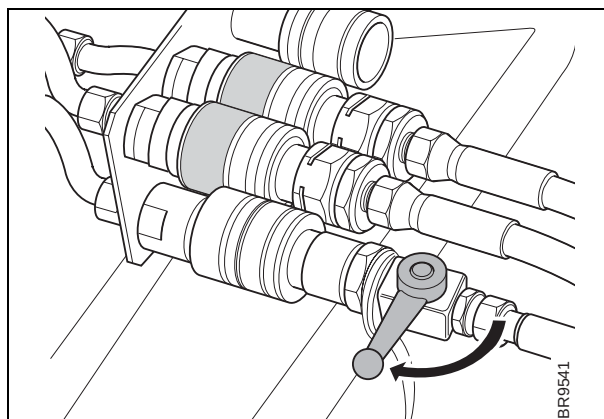


DANGER:

- Stay clear of a rotating pick-up!
- When the pick-up is blocked, then stop the tractor engine, remove the ignition key and wait until all parts of the baler have come to a real stand still.
- Never try to pull crop out of or push crop into a rotating pick-up! **Danger of life!**

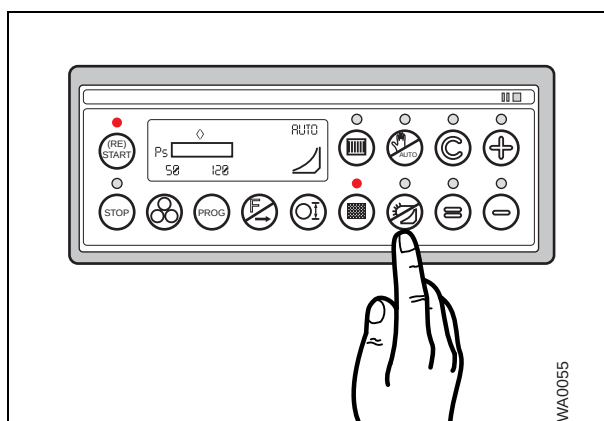
7.1 Lifting the pick-up

The pick-up is controlled through a single acting control valve on the tractor. In order to ensure the pick-up does not lower in transport, because of a leaking valve, always close the cock in the hydraulic hose (quarter of a turn). Put tractor valve in floating position during baling.



Conditions to control the pick-up instead of the OPTICUT cutting system (AUTOFORM only)

The electronic control must be OFF or the pick-up must be selected (activated) on the control box.



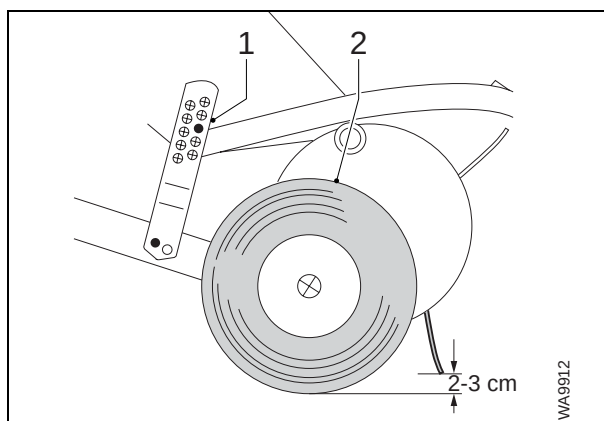
7.2 Adjustments

7.2.1 Height

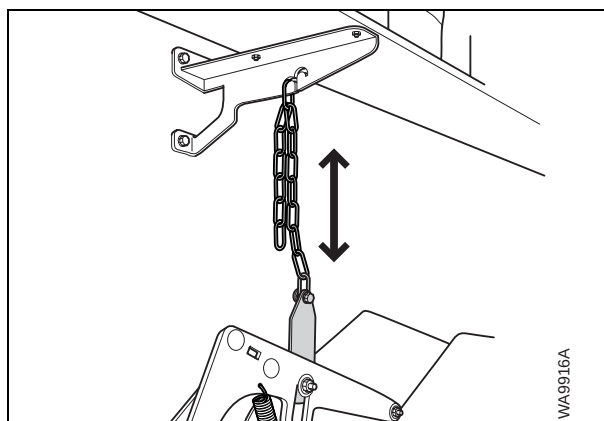
The pick-up must be set to ensure the pick-up tines just run clear of the ground. This can be achieved by means of the pick-up support wheels.

Procedure:

- 1 Place the baler horizontally behind the tractor.
- 2 Using the adjustment (1) set the pick-up wheels (2) to such a position that the tines pass **2 - 3 cm (3/4 - 1-1/8")** over the ground.



- 3 Attach the chains, lh and rh in such a position that the pick-up just is not yet lifted.

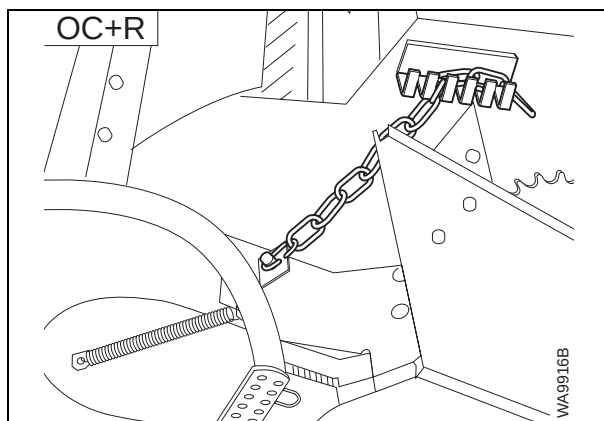


In rough and/or stoney terrain we recommend just use only the chains and not the wheels. In that case the wheels must be lifted high enough not to interfere.



Attention:

- The mentioned height above ground is just a recommendation since the correct value depends much on ground and crop conditions!
- Both sides of the pick-up shall be set to the same height!

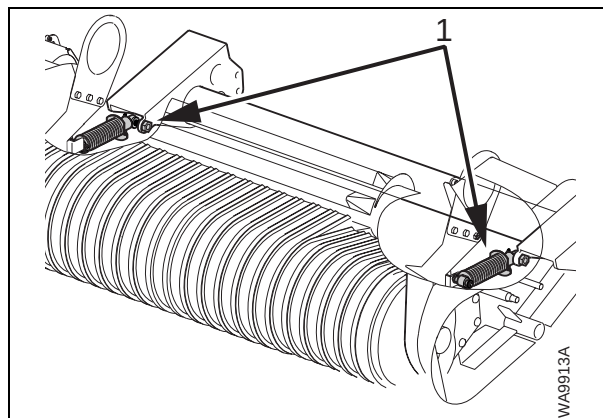


7.2.2 Spring compensation

In order to have not the full weight on the wheels, the pick-up weight is compensated by springs. These two springs are positioned around the pick-up cylinders at either side. The spring tension can be adjusted by moving the setting ring to one of four possible setting slots.



Adjust pick-up as light as possible although preventing pick-up dancing.

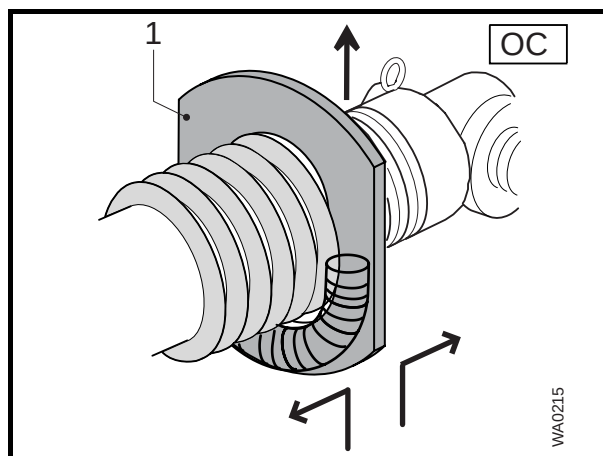
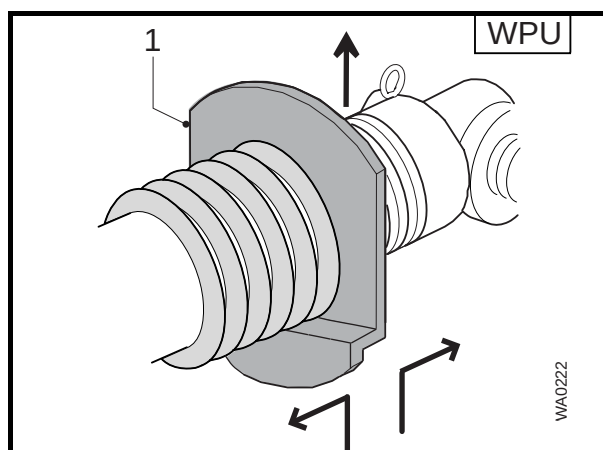


Procedure:

- 1 Fully lift pick-up.
- 2 Move the setting rings to one of the setting slots.
- 3 Lower pick-up.

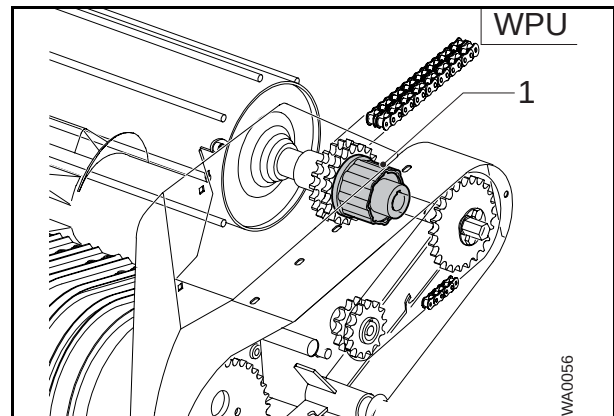
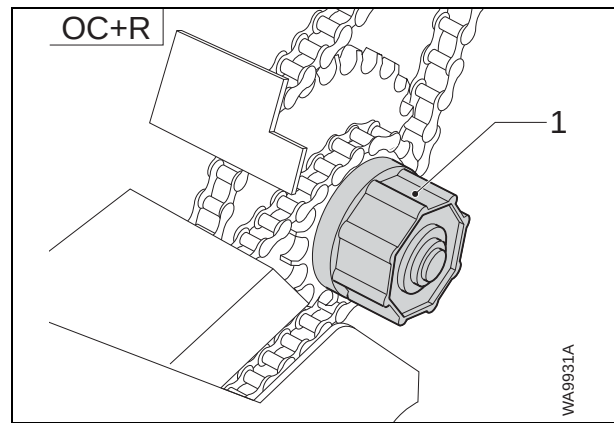
Position of the setting rings:

- on **soft ground**:
- rings more **forward** (= more compensation)
-
- **hard ground** and bumpy pick-up:
- rings more **afterward** (= less compensation)



7.3 Overload protection

The pick-up is provided with an overload protection in order to prevent damages. In case of overload a safety clutch is activated and the pick-up stops.



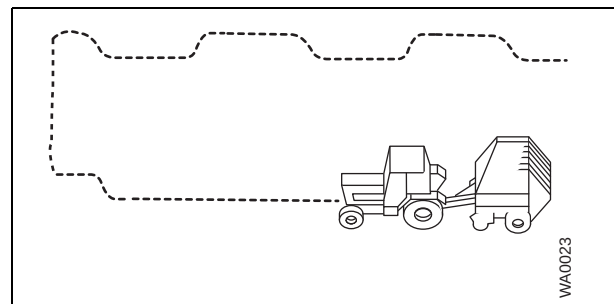
7.4 Open throat pick-up (no rotor intake)



Attention:

When starting a bale in very short and dry crop or short, wet silage the windrow must be fed in the centre of the pick-up. As soon as there is sufficient crop inside the bale chamber and the bale is rotating, start feeding alternating left and right.

A roller provided with an auger at either end adapts the windrow to the width of the bale chamber.



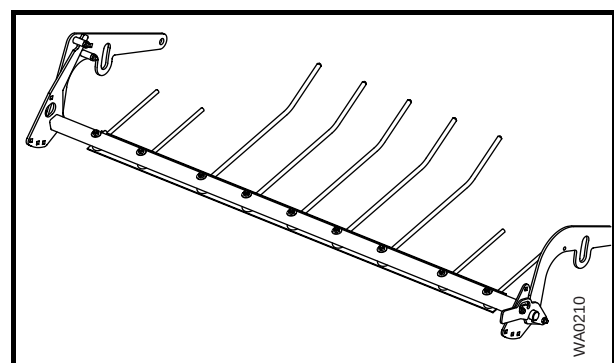
7.4.1 Wind guard

The wind guard ensures the entering crop is pressed down and is fed uniformly by the feed rollers to the bale chamber. A correct setting of the wind guard provides easy intake of the crop and has a positive influence on the bale forming.



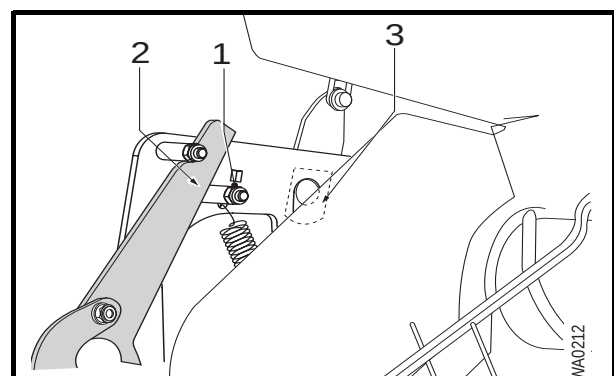
Attention:

When setting the wind guard ensure it does neither touch auger nor bale chamber rollers!



General rules:

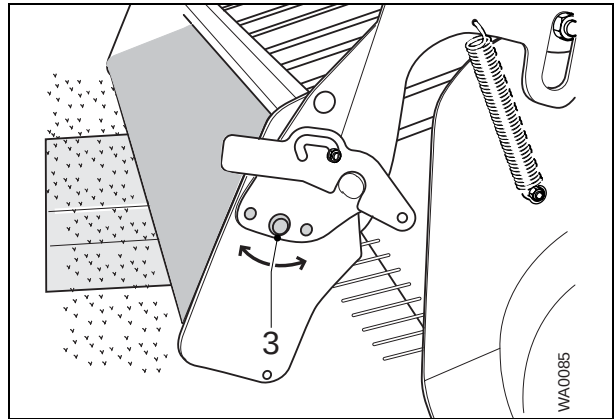
- In silage best results are obtained with a low pressure of the wind guard (some of the central tines may be removed to obtain this).
- Use a floating position of the wind guard if the windrow is not consistent. When the screw (1) is slackened the wind guard can move freely over the windrow.
- Straw and other fry crops having a great volume shall be compressed by the wind guard. To do this the wind guard must be fixed.



- In case of extraordinary windrow height the stop (3) can be moved in order to enlarge the distance between wind guard and pick-up.

7.4.2 Crop guard

The crop guard favors a good crop feed. The adjustment is of special importance in short crop and windy weather. Adjust the crop guard through screw (3) (three positions) that the bottom side of the crop guard just touches the windrow.



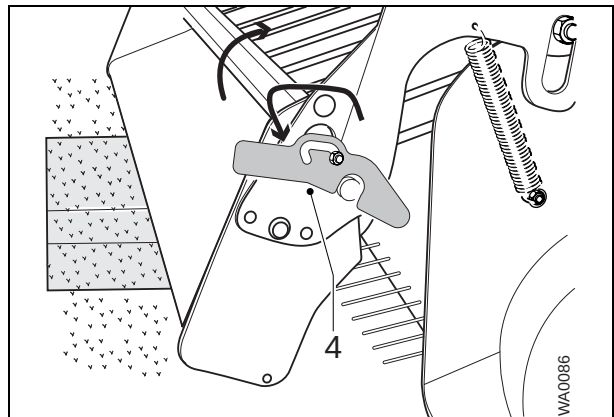
7.4.3 Blockages



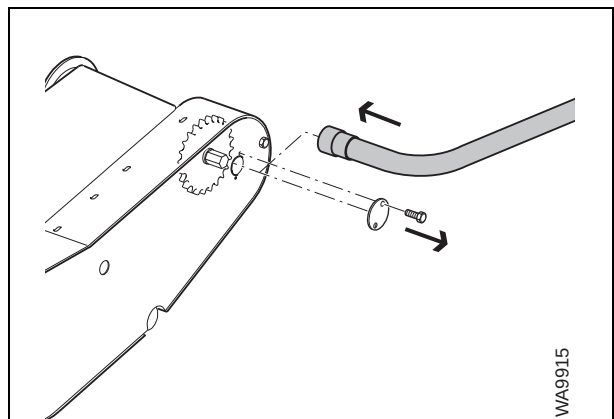
DANGER:

Take special care of the safety precautions in case of blockages!

To remove a blockage the complete wind guard must be removed. This can be done by moving handle (4) up.

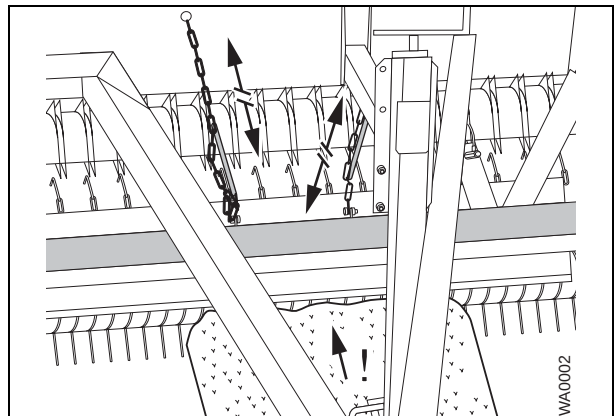


Furthermore the pick-up can be reversed using the wrench provided.



7.5 Crop guard adjustment in OPTICUT/ Rotorsystem

This plate ensures a uniform feed of crop in windy conditions: therefore the adjustment is very important. With the OPTICUT-Rotorsystem the crop guard is adjusted through two chains just to touch the windrow. Adjustment should be identical at either side.

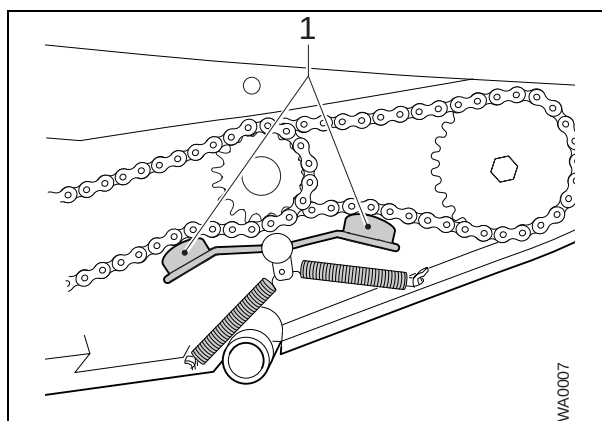


7.6 Maintenance

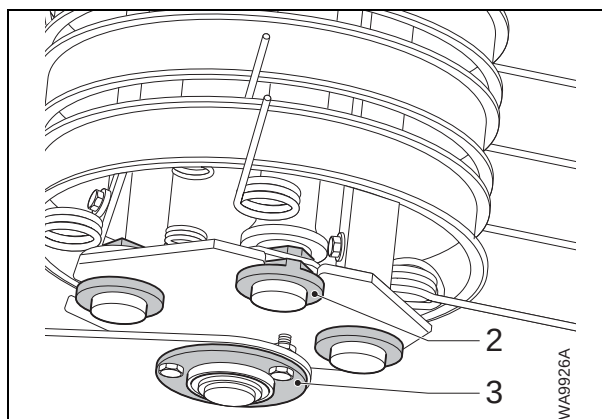
Except regular lubrication the pick-up does not require special maintenance.

Check at the beginning of the season:

1 Nylon chain tensioners (1): replace at excessive wear.



2 Bearing blocks (2) at the rh pick-up side: play shall not be more than **1 mm (5/128")**.



7.7 Trouble shooting

Problem	Cause	Solution
Windrow is not picked up.	- Pick-up is up or is set too high. - Overload safety activated. - Drive chain broken or jumped off sprocket. - Too high a forward speed. - Windrow too small / thin. - Pick-up tines bent or broken.	- Lower pick-up or set pick-up wheels or chains. - Remove blockage. - Check chain, replace as required. - Adapt speed. - Make bigger windrows. - Straighten tines or replace.
Irregular crop feed.	- Too high a pressure of wind guard.	- Reduce pressure of wind guard.
Wind guard bounces.	- Wind guard rides on windrow.	- Adjust wind guard to higher position.

8 OPTICUT CUTTING UNIT AND ROTOR SYSTEM

The characteristic feature of both OPTICUT and Rotor system is the dosed and forced intake of the crop. Both systems have the same construction except the cutting device that is not installed in the rotor system machines.

8.1 OPTICUT system

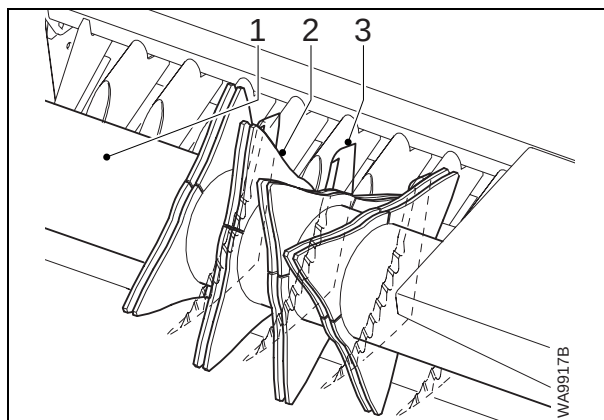
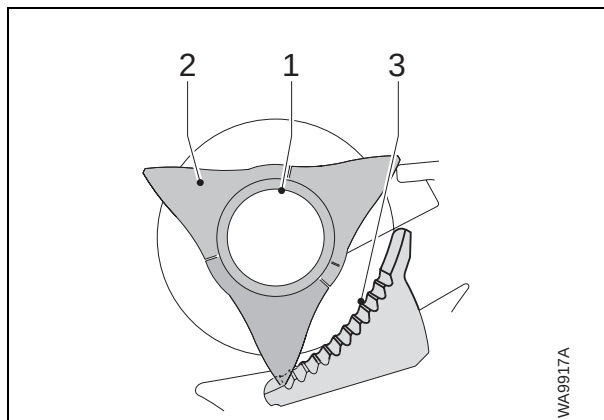
The rotating rotor (1) with helically fitted twin tines (2) generate a continuous draw cut over the knives (3). The OPTICUT system provides the possibility to cut the crop at different settings.

The knives are controlled fully hydraulically. The number of knives, and thus the cutting length can be chosen upon desire. The knife attachment prevents the knives from being blocked by foreign objects; every knife gives way upon extraordinary load and then automatically revert in the original working position.



DANGER:

- Stay clear of the OPTICUT system of a working baler!
- If the OPTICUT system blocks, stop the tractor engine, remove the ignition key and wait until all parts of the baler have come to stand still!
- Never try to push crop into or pull crop out of a running baler: **danger of life!**
- Always wear safety gloves when working at the cutting mechanism!



8.2 Control of the knife frame (Autoform only)

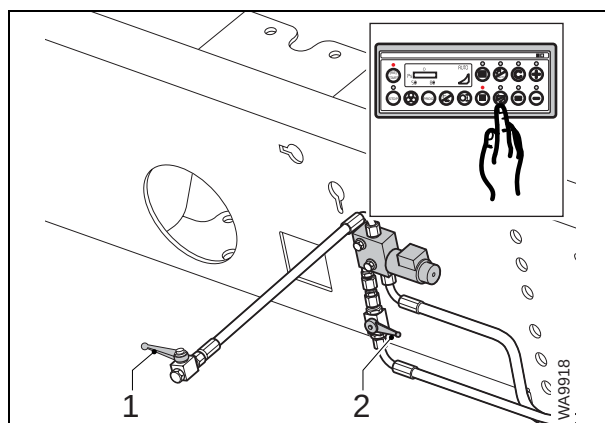
- 1 Open the cock (1) in the hydraulic hose.
- 2 Open cock (2).
- 3 Switch on electrical control box and select knife control.
- 4 Control by the tractor control valve.

When the knife control has been selected this is shown with a knife symbol on the display of the control box.



Attention:

Prior to detaching the baler from the tractor close both the cock (1) in the hydr. hoses and cock (2) in order to avoid hydr. fluid leaking from cutting unit cylinder to the pick-up cylinder.



8.3 Settings

8.3.1 Cutting angle setting of the knives

The knives can be set into two different settings:

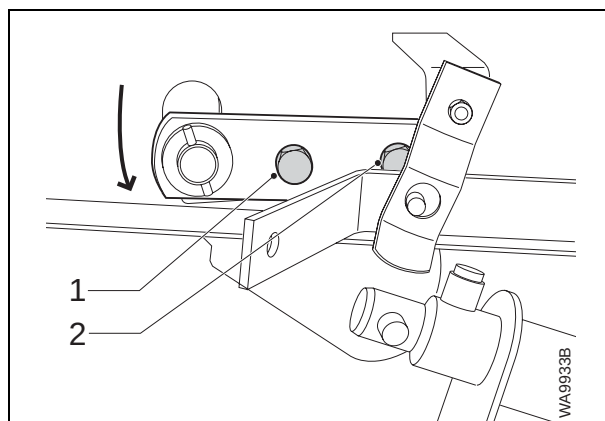
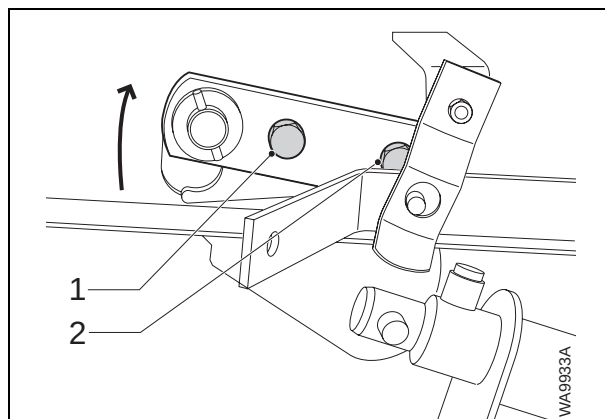
Setting 1:	Exact cut ; in this position all crop is cut even in difficult conditions.
Setting 2:	Standard cut , this setting requires about 20% less power.

Changing to setting 1

- 1 Hydraulically lower cutting unit (disconnect hydr. system).
- 2 Shut down tractor engine and remove ignition key.
- 3 Remove fixating bolt (1) both at lh and rh side of the baler.
- 4 Slacken hinge bolts (2) on lh and rh side.
- 5 Hydraulically lift cutting unit (connect hydr. system).
- 6 Shut down tractor engine and remove ignition key.
- 7 Install fixating bolts (2) at either side in the upper position.
- 8 Tighten fixating (1) and hinge bolts (2) at either side.

Changing to setting 2

- 1 Hydraulically lower cutting unit (disconnect hydr. system).
- 2 Shut down tractor engine and remove ignition key.
- 3 Remove fixating bolt (1) both at lh and rh side of the baler.
- 4 Slacken hinge bolts (2) on lh and rh side.
- 5 Hydraulically lift cutting unit (connect hydr. system).
- 6 Shut down tractor engine and remove ignition key.
- 7 Install fixating bolts (1) at either side in the lower position.
- 8 Tighten fixating (1) and hinge bolts (2) at either side.

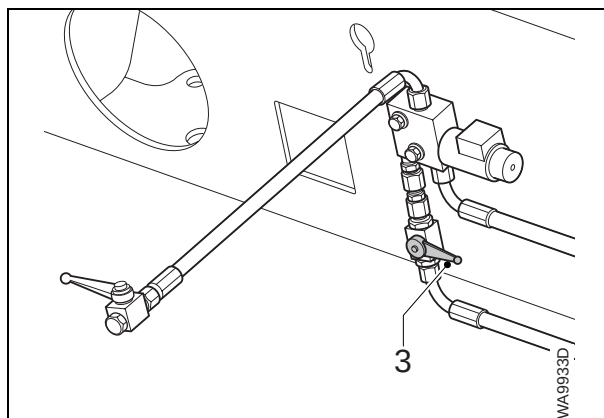
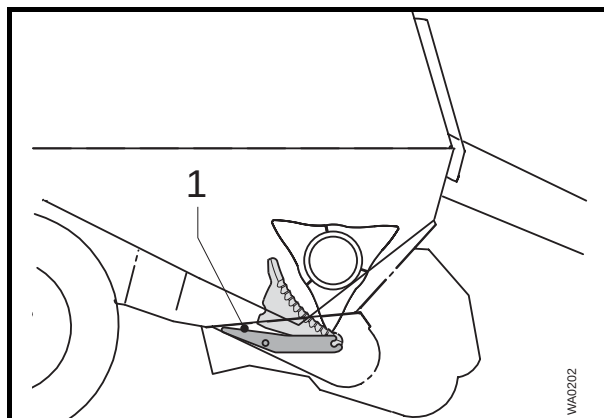


8.3.2 Exchange of knives / filler plates

In order to provide the necessary lateral stability of the bale in extraordinary circumstances we recommend installing filler plates (1) in the lh and rh outer knife positions.

Knife removal procedure

- 1 Hydraulically lower cutting unit.
- 2 Open tail gate and close hydraulic safety valve.
- 3 Close cock (3).
- 4 Shut down tractor engine and remove ignition key.



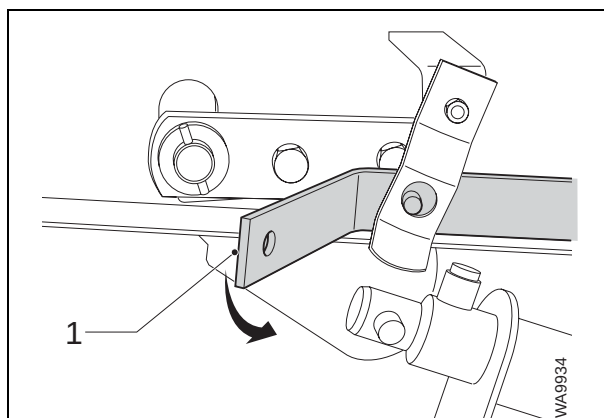
- 5 Move lever (1) down to release the knife lock.
 - 6 Carefully remove knife, holding it at the upper end.
Rotate rotor as required.
- Now a blunt knife can be sharpened (see maintenance). A knife or a replacing filler plate is (re)installed in the reverse order of removal.



Attention:

Never forget to re-lock the knives using lever (1)!

Sharp knives save power and provides higher capacity!



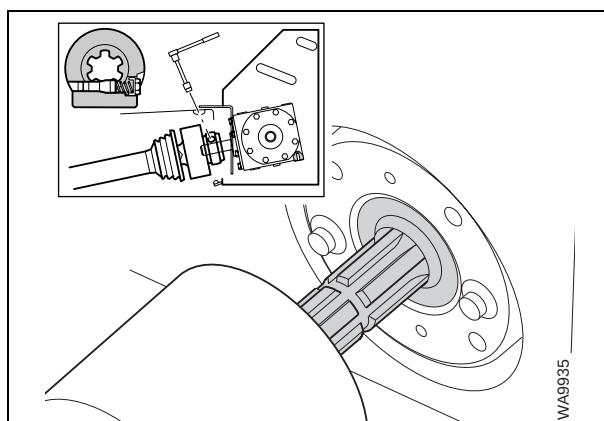
8.4 Overload safety

Apart of the already mentioned individual safety of the knives the complete rotor unit is protected through a cam-type slip clutch in the pto drive shaft. In case of an overload this clutch slips announcing this by an audible rattling.

8.4.1 Blockage and reversing

In case of a feed channel blockage proceed as follows:

- 1 Stop the pto.
- 2 Retract knives
- 3 Try to reengage at lower pto speed.
- 4 If the blockage stays effective, stop engine and remove ignition key, then proceed to reversing procedure.



Reversing the OPTICUT drive

- 1 Disengage the coupling dog (1) using lever (2).
- 2 Engage the special wrench (4) onto the hexagonal shaft (3).
- 3 Rotate that shaft ccw using the wrench.
- 4 Remove the crop (blockage) from the intake area.
- 5 Place the wrench back into its stowing position.
- 6 Reengage the coupling dog with the lever.



When the blockage occurs at a moment when the desired bale diameter has been obtained, wrap and eject the bale as follows:

Procedure:

- 1 Disengage the coupling dog (1) using lever (2).
- 2 Reengage pto at low speed.
- 3 Wrap and subsequently eject bale.
- 4 Disengage pto drive.
- 5 Reengage the coupling dog with the lever.
- 6 Try to remove blockage through reengaging at lower pto speed.

8.5 Maintenance**8.5.1 Knives (OPTICUT)**

Depending upon the crop the knives have to be sharpened more or less often.

**DANGER:**

Always wear protective goggles when sharpening the knives!

Procedure of sharpening:

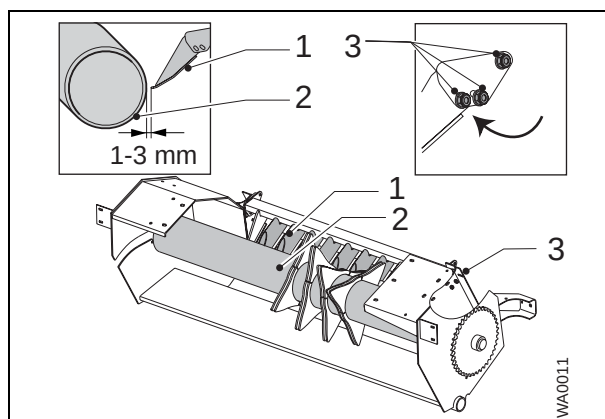
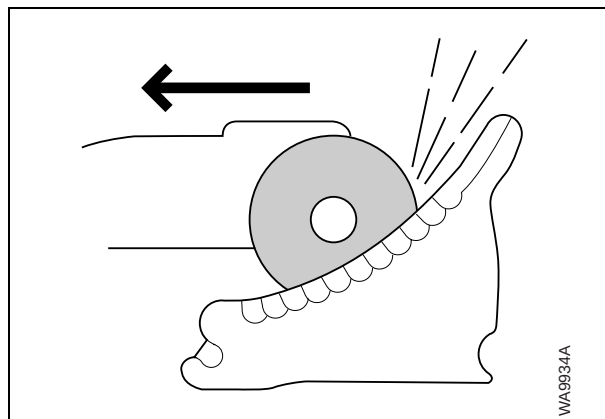
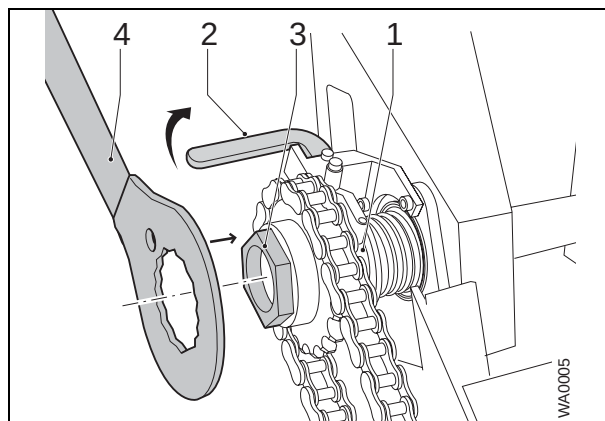
- 1 Remove the knife (see 7.3.2)
- 2 Clamp knife in vice and sharpen on smooth side only (i.e. do not sharpen the undulated side).
- 3 Reinstall the knife and secure.

**Attention:**

Ensure the knife is not getting hot during grinding, since that may weaken the steel! It is better to grind more frequently than a lot at once!

8.5.2 Stripper frame

Regularly check position of the strippers (1) to the rotor tube (2). The distance shall be **1 - 3 mm (5/128" - 1/8")**. The stripper frame can be adjusted by slackening the M10-bolts (3).

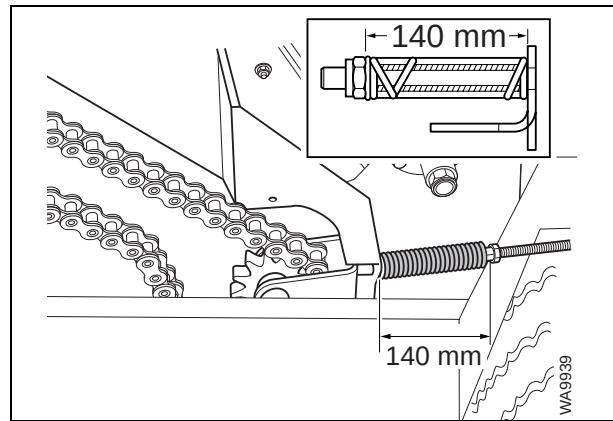


8.5.3 Chain tensioner

The drive chains are tensioned through spring loaded tensioners. In order to ensure minimum wear at chains and sprockets the spring of the chain tensioner must be adjusted to keep the distance **140 mm (5-1/2")**.

8.5.4 Lubrication

Lubricate the bearings of the rotor system once per season and after every use of a high pressure cleaner.
Lubricate the chain drive every 10 working hours using a chain lubricant.



8.6 Trouble shooting

Trouble	Probable cause	Solution
Blockage in front of the rotor.	- Too high a forward speed. - Low rpm. - Machine set too low.	- Decrease speed of travel. - Increase rpm. - Level machine (see 3.3).
Blockage behind rotor.	- Material cut too short.	- Take out one or more knives.
Rotor wrapping.	- Mis-adjustment of stripper frame.	- Re-adjust (see 7.5.2).
Machine requires too much power.	- Knives dull. - Too many knives - High rpm. - Stripper frame contaminated or set wrong.	- Sharpen knives. - Remove one or more knives. - Reduce rpm speed to 540 rpm. - Clean and/or readjust.

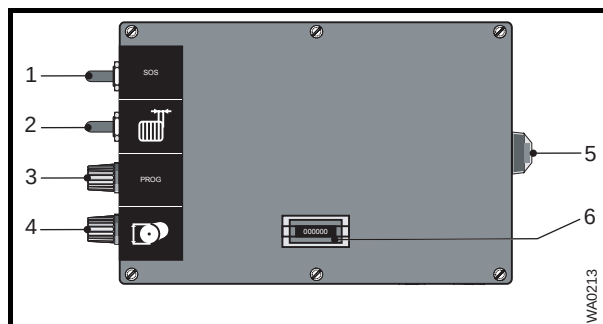
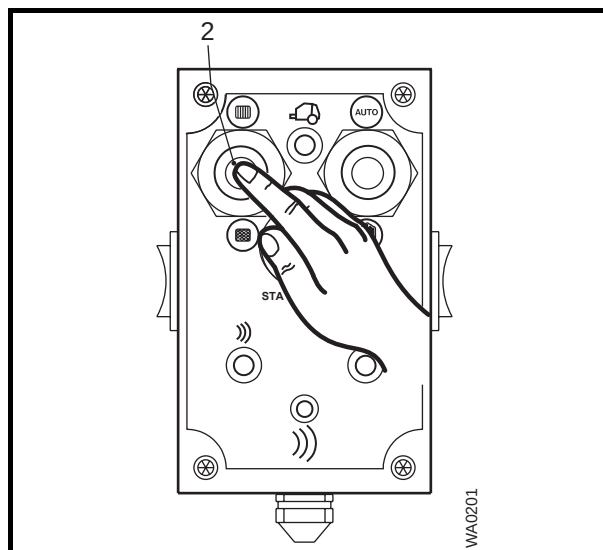
9 TWINE TIE

The baler can be equipped with twine tie and net wrap systems; both systems are fully independent. The wrapping systems are required to prevent the ejected bale from desintegrating.

9.1 INFOBALE

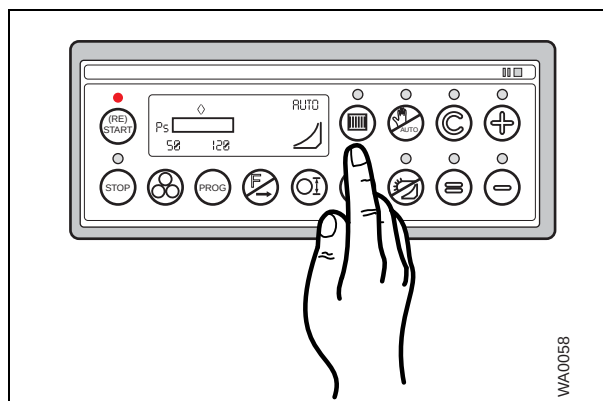
You can select the system on the control box. Setting the toggle switches (2 on the control box).

Choice 1 of emergency control is only available if toggle switch (1) is in position 2.



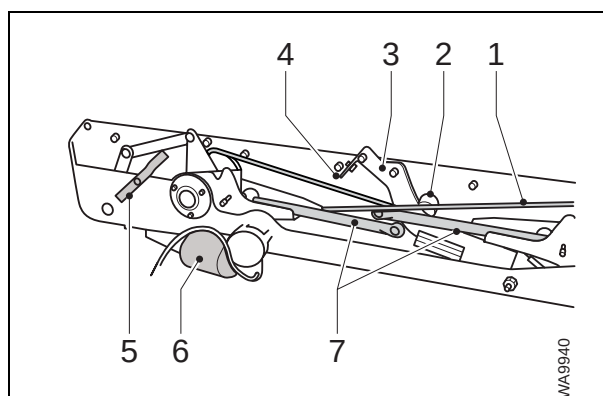
9.2 AUTOFORM

You can select the system on the control box. Pushing the button you select twine tie, the LED above the button is then on. For selection and working with the twine tie see 6.3.1.



9.3 Main elements of the twine tie

- 1 Steel cable
- 2 Guidance block
- 3 Knife arm
- 4 Knife
- 5 Twine brake control
- 6 Drive
- 7 Tying tubes



9.4 How the twine tie works

During baling the twine tie system remains stand by.

Upon activation of the tying system the tying tubes move to the borders of the bale.

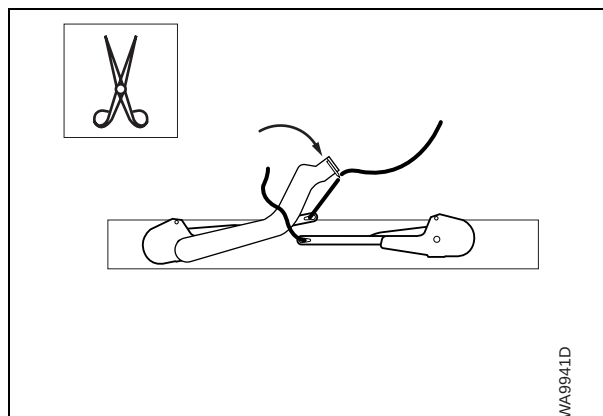
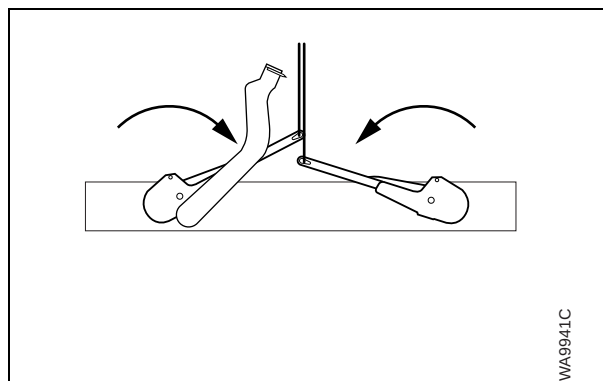
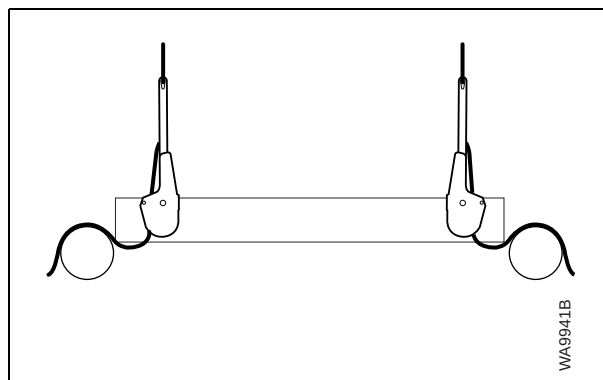
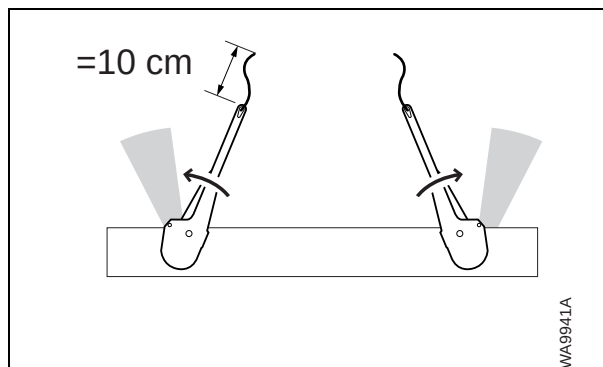
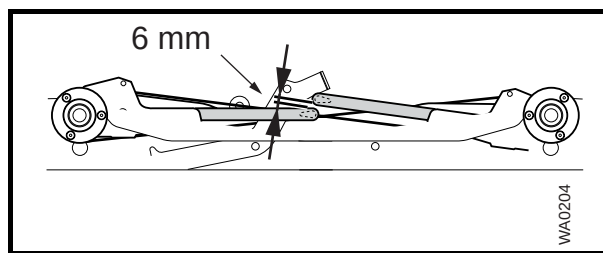


In order to ensure a good twine tie starting it is necessary that the twine ends protrude about 10 cm (4") out of the tying tubes!

The twine brake is released momentarily in order to allow the twine to start running. As soon as the twine has been caught by the bale the twine indication rollers rotate and the primary wraps are laid around the outer sides of the bale.

Both tying tubes move simultaneously to the center where they lay the final wraps over each other, then the twines are automatically cut. The movement of the tying tubes can be set using the control box, thus enabling several tying patterns.

A protective curtain keeps the system free of excessive dirt.



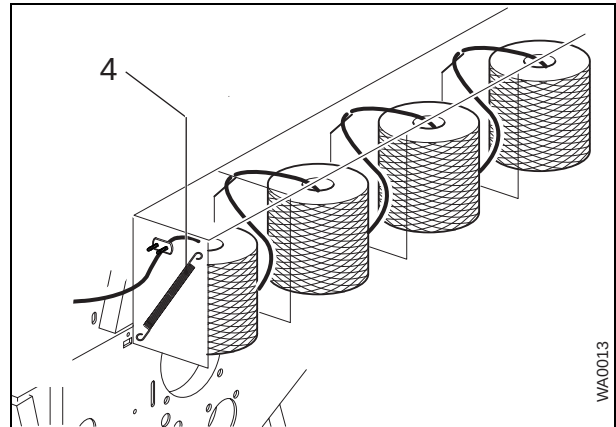
9.5 Choice of the twine

Choose a good quality twine in order to ensure a satisfactory wrapping function.

The system is suitable for sisal twine (200 through 330 m/kg; 100 - 164 yd/lb) and for synthetic twine (400 through 700 m/kg; 200 - 350 yd/lb).

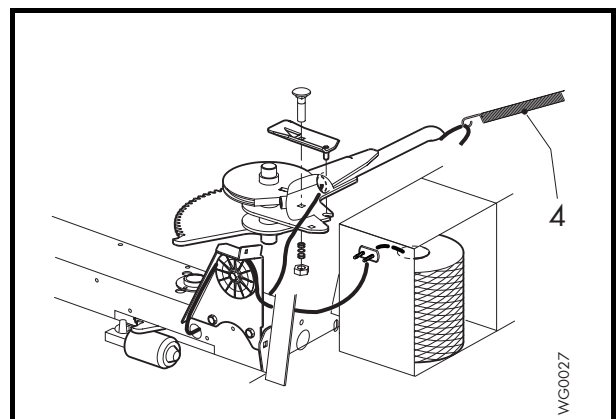
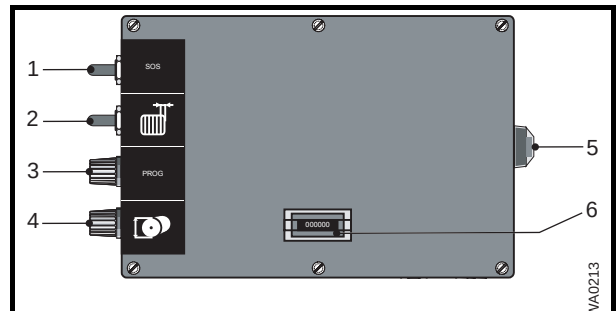
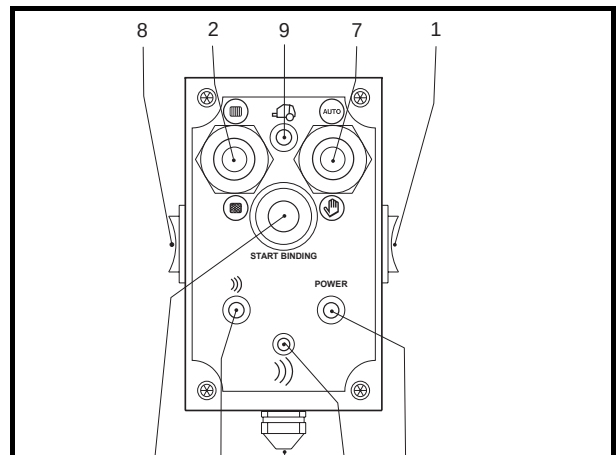
9.5.1 Positioning the twine spools into the boxes

- 1 Place the spools into the box.
- 2 Connect the twine ends of the spools.
- 3 Guide the twine through the twine brake.



9.5.2 Routing the twine - INFOBALE

- 1 Set the main switch (1) of the control box to II (emergency control).
- 2 Flip switch (1) on the machine box to emergency control (II).
- 3 Control the twine tying tube using toggle button (8) on the control box.
- 4 Guide the twine both at lh and rh side through the mechanism as shown in the fig.
Use the spring (4) to guide the twine through the tube.
The end of the twine shall protrude about 10 cm the tying tubes (also see 9.4).



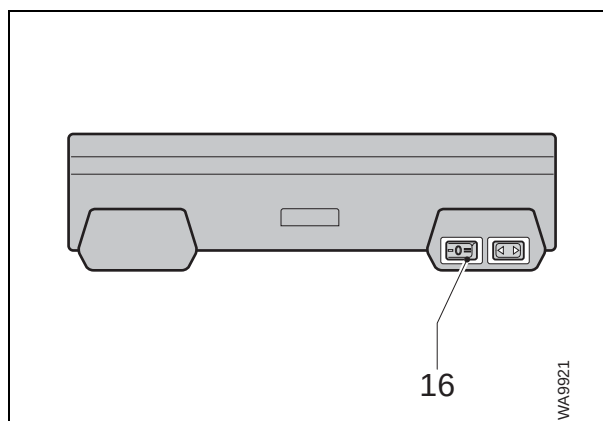
DANGER

Special caution is required within in the area of the very sharp twine cutting knife that cuts the twine at the end of every cycle!

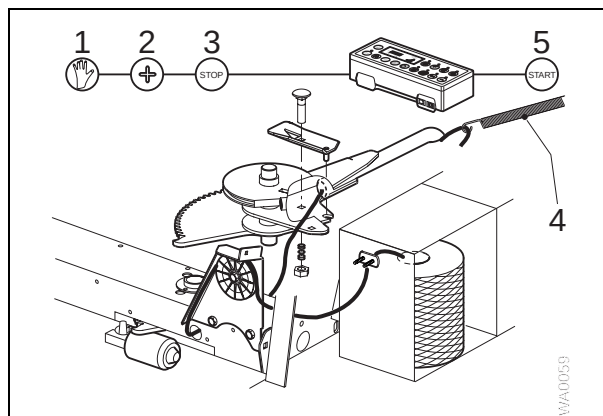
- 5 Using button (8) on the control box set the system into its basic position.

9.5.3 Routing the twine - AUTOFORM

- 1 Set the main switch of the control box to 1 (ON).



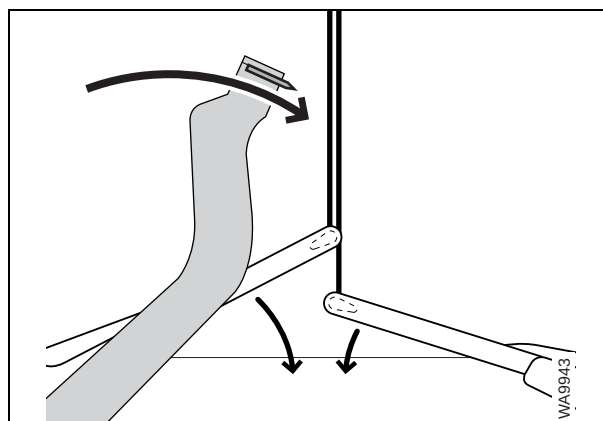
- 2 Push button  to go to manual mode.
- 3 Push button  until arms are pointing straight backward into bale chamber.
- 4 Push button  to shut down the system.



DANGER

Special caution is required within in the area of the very sharp twine cutting knife that cuts the twine at the end of every cycle!

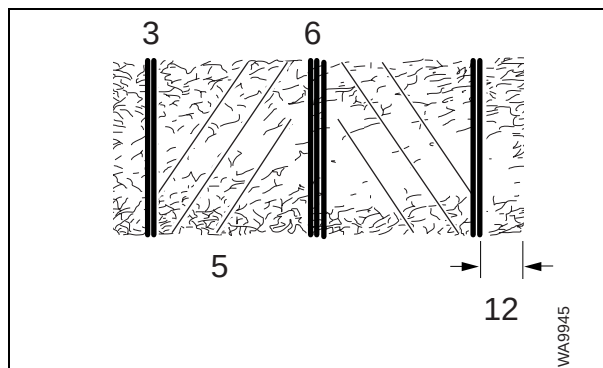
- 5 Guide the twine in accordance with the diagram through the mechanism (both lh and rh sides). Use spring (4) to run the twine through the tube. The twine ends shall protrude about 10 cm (4") out of the tying tubes.



- 6 Push button  to move the system in its starting position.

9.6 Electronic settings for twine tie - IN-FOBALE

The distance of twine end wraps is pre-set with the toggle switch (2) on the machine control box (positions 1, 2 and 3). These programmes can be selected and set on the control box, they work independent of the bale diameter.

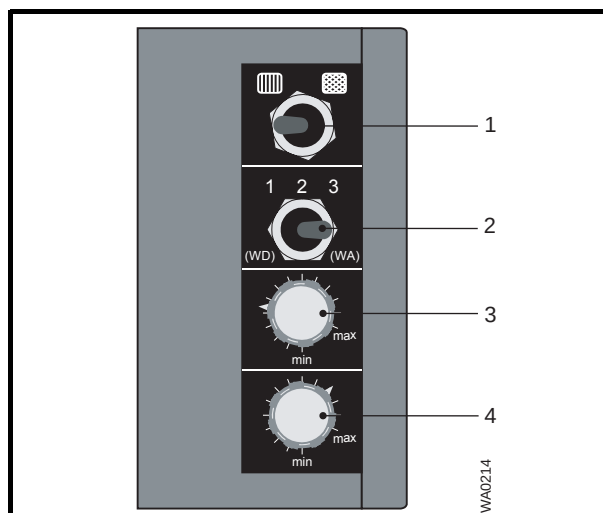
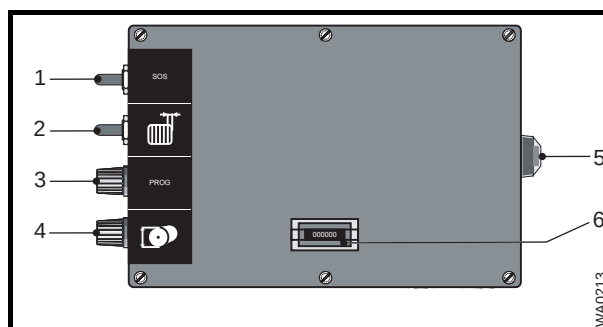


9.6.1 Changing the wrapping programmes

- 1 Set toggle switch (2) to the desired position:
Position 1: twine end distance = 10.5 cm resp.
Position 2: twine end distance = 13.5 cm resp.
Position 3: twine end distance = 15.5 cm.
- 2 Set rotatable knob (3) to set the amount of twine as follows:
 - Position minimum: 3 lateral wraps, 4 central wraps and 3 end wraps in between at either side
 - Position middle: 3 lateral wraps, 6 central wraps and 3 end wraps in between at either side
 - Position maximum: 3.5 lateral wraps, 8 central wraps and 3.5 end wraps in between at either side

The amount of wraps is can be set fluent between minimum and maximum position. The standard twine tie programmes P1/P2/P3 can be selected on the machine box. Each programme has its own wrapping pattern, which you select using the PROG toggle switch (2) positions 1 through 3:

- Position 1:
3 lateral wraps, 4 central wraps and 3 wraps in between at either side (end wraps at 12 cm).
- Position 2:
3 lateral wraps, 6 central wraps and 3 wraps in between at either side (end wraps at 15 cm).
- Position 3:
3.5 lateral wraps, 8 central wraps and 3.5 wraps in between at either side (end wraps at 18 cm).



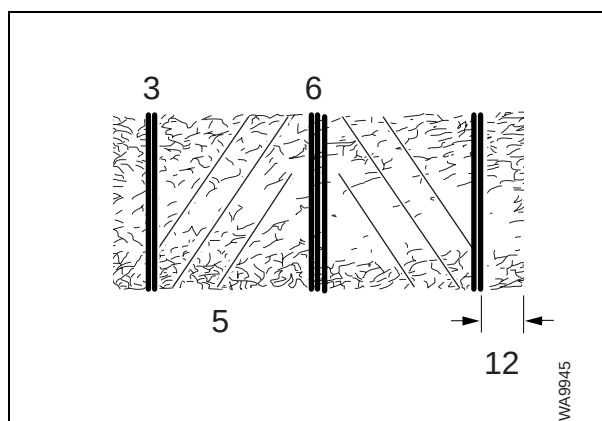
Attention:

The number of wraps does not depend upon the bale diameter. At the start of wrapping the control system automatically calculates the quantity taking into account the actual bale diameter.

Only the pto speed influences the real number of wraps: it is based upon a pto speed of 540 rpm.

9.7 Electronic settings for twine tie - AUTOFORM

The electronic control provides four twine tie programme selections (P1 through P4). These programmes can be selected and set on the control box, they work independent of the bale diameter.



9.7.1 Changing the wrapping programmes

The standard twine tie programmes P1/P2/P3 can be changed upon desire.



All dimension settings on the control box are metric (length in cm; see conversion table sect. 14.3)!

Adjustable are:

- Number of wraps near the bale sides (starting wraps);
- Number of intermediate wraps;
- Number of final wraps;
- Distance from lateral wraps to the side of the bale in cm (1 cm = 25/64").

Procedure for twine tie:

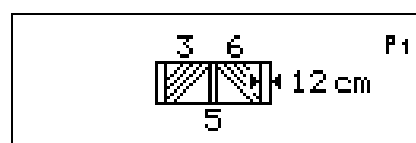
- 1 Push button to reach twine tie programme P1.
- 2 If you want to go to the programmes P2 or P3 push the button once or twice more resp.
- 3 Push button to select the value that has to be changed (that value starts blinking).
- 4 Adjust the desired value with the buttons and .
- 5 Confirm pushing button (the value stops blinking).
- 6 Pushing button you leave this function.



Attention:

The number of wraps does not depend upon the bale diameter. At the start of wrapping the control system automatically calculates the quantity taking into account the actual bale diameter!

Only the pto speed influences the real number of wraps: it is based upon a pto speed of 540 rpm!



9.7.2 Changing the flax wrapping programme



Attention:

Flax twine tie programme only can work when electronic twine running sensors are installed and connected!

- The twine tie programme P4 (flax programme) can be set as desired as well.



- All dimension settings on the control box are metric (length in cm: 1 cm = 10 mm = 25/64", 1" = 2.54 cm; also see conversion table sect. 14.3)!

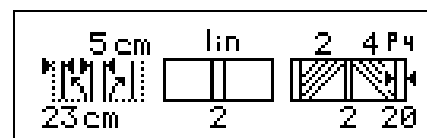
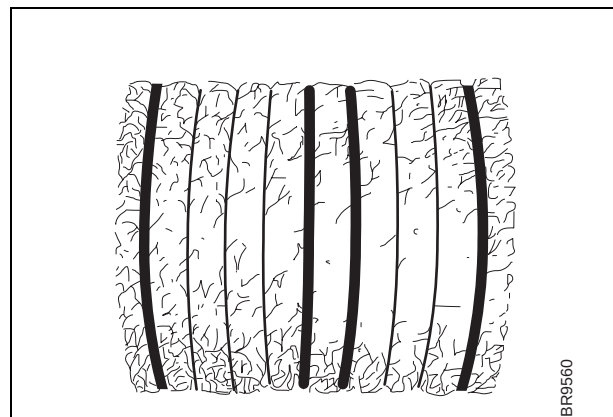
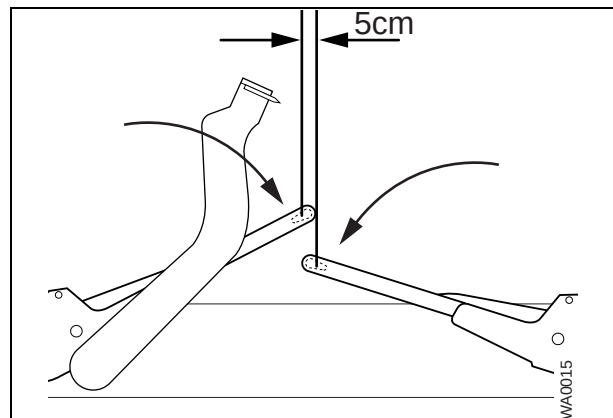
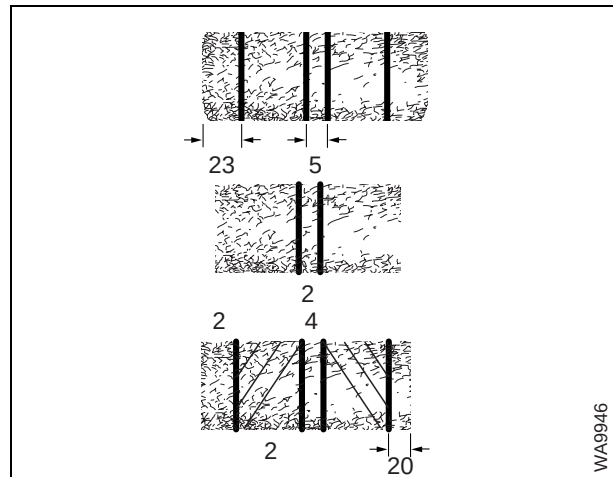
0

Adjustable are:

- Distance of the side wraps to the side of the bale in cm (1 cm = 25/64"), shown at the rh in the display;
- Distance between the wraps when baling (e.g. 5 cm; 2");
- Number of final wraps when bale has reached its final diameter (center of the display);
- Wrapping pattern (left side of display).

Procedure:

- 1 Push .
- 2 Four times push button  to move to twine tie programme P4.
- 3 Select value to change by pushing button, value will blink.
- 4 Change value by pushing buttons  and .
- 5 Confirm new value by pushing button .

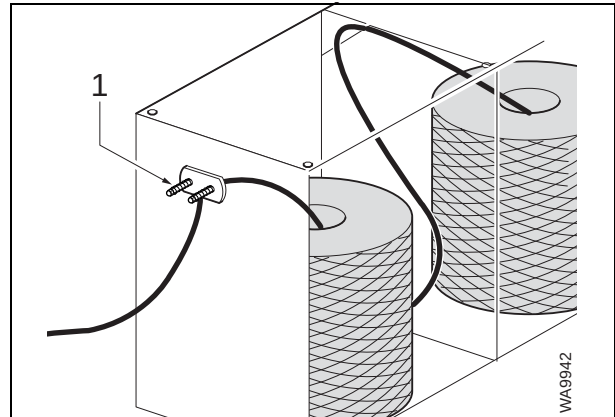


9.8 Mechanical twine tie adjustments

9.8.1 Twine brake on the spool box

Adjust this twine brake to such an extent that the spring (1) just stay without pressure when there is no twine in the brake.

Do not use the twine brake on the spool box to increase twine tension. This twine brake just serves to prevent the twine from unnecessary rolling off the spools during transport and work.

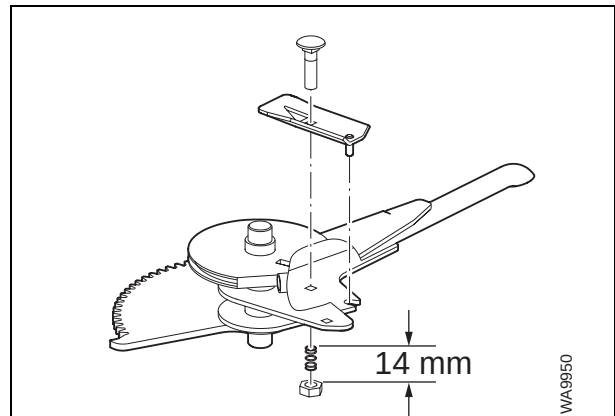


9.8.2 Twine brake on the tying tubes

Basic setting is **14 mm (35/64")**.



Do not divert too far from the basic setting. The spring is quite stiff and thus you easily reach a too high or too low tension!



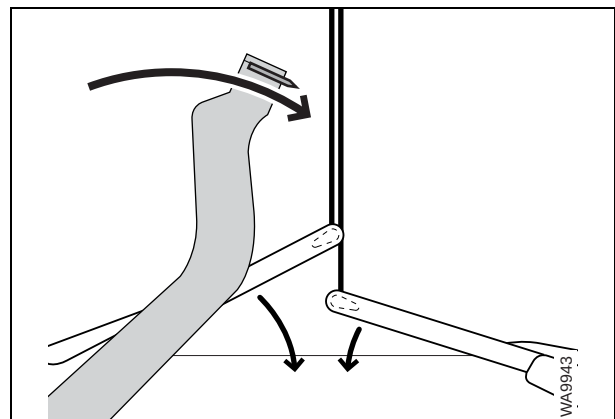
9.8.3 Twine knife

At the end of the twine tie cycle the knife arm moves to both twine threads cutting them almost simultaneously. The setting is only possible via the dealer functions (sect. 5.7) on the control box.



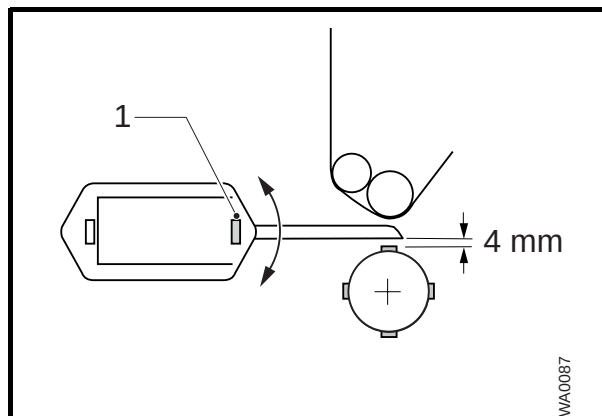
Attention:

- Ensure the cutting edge is sharp since the correct function depends on it!
- If one or both twine threads are not cut, or the cutting profile is long and fuzzy: this is an indication of a dull knife!

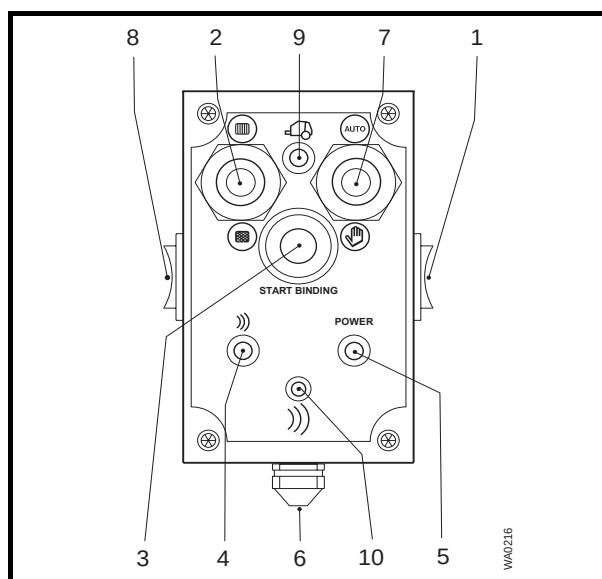


9.8.4 Position of the tying tubes - INFOBALE

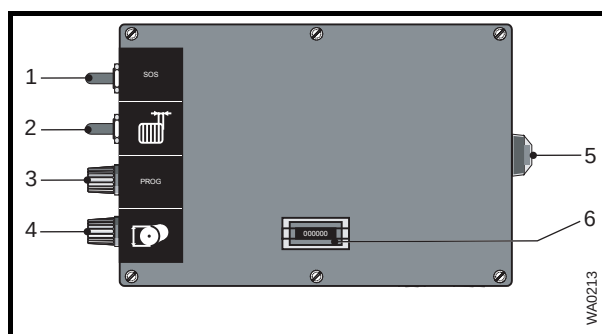
The position of the tying tubes with respect to the bale chamber roller is important. The distance between belts and bale chamber roller is small. A correct adjustment prevents the tying tubes from touching the belts or the bale chamber roller.



- 1 Set main switch (1) on the control box to II (emergency control).

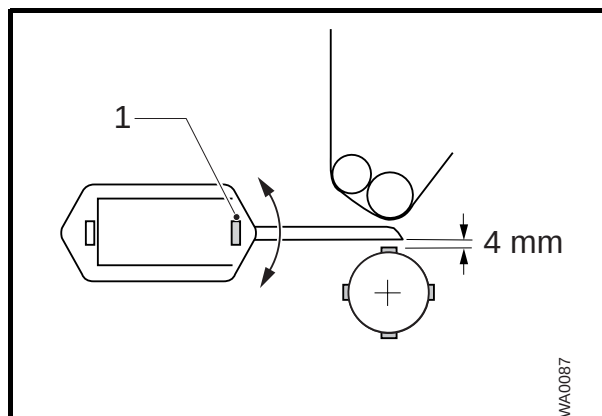


- 2 Flip switch (1) on the machine box to the position twine tie.
- 3 Control twine tying tubes using toggle button (8) on the (1) to 0.
- 4 Adjust the tying tubes using the screws (1) to such an extend that the play between the max. diameter of the bale chamber roller and the tying tube is **4 mm (5/32")**.



9.8.5 Position of the tying tubes - AUTOFORM

The position of the tying tubes with respect to the bale chamber roller is important. The distance between belts and bale chamber roller is small. A correct adjustment prevents the tying tubes from touching the belts or the bale chamber roller.



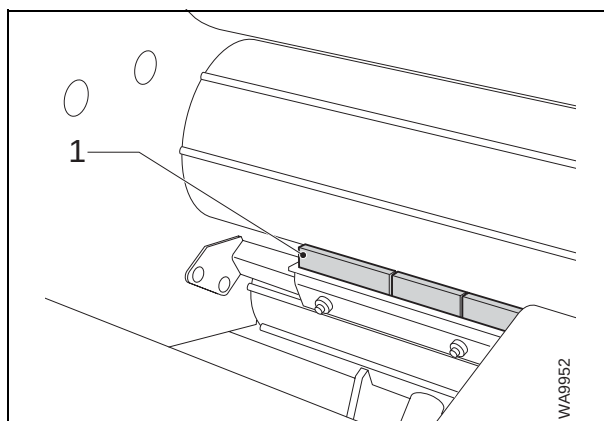
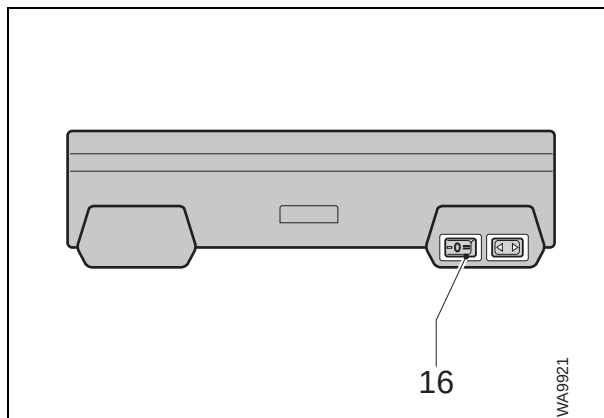
Set the main switch (16) on the control box to 1 (ON).

- 1 Switch the system to manual mode by pushing button .
- 2 Push button  till the arms be in the longitudinal direction of the baler.
- 3 Shut down the system by pushing the - button.
- 4 Adjust the tying tubes using the screws (1) to such an extend that the play between the max. diameter of the bale chamber roller and the tying tube is **4 mm (5/32")**.

9.8.6 Rubber stripper

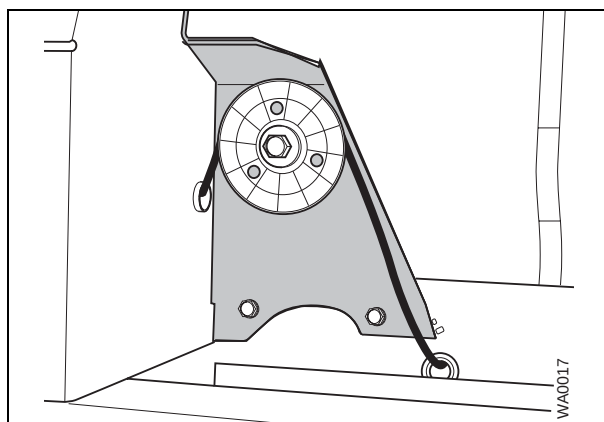
In order to prevent twine from wrapping around the bale chamber roller the correct setting of the rubber stripper is important.

Adjust the rubber stripper (1) using the screws to such an extend that the rubber just touches the roller.



9.8.7 Twine run indication

By means of the twine run indication you can watch from the tractor seat whether the twine is running or not.



9.9 Maintenance

Regularly check the twine tie system for dirt and excessive wear.

Tension of the steel cable:

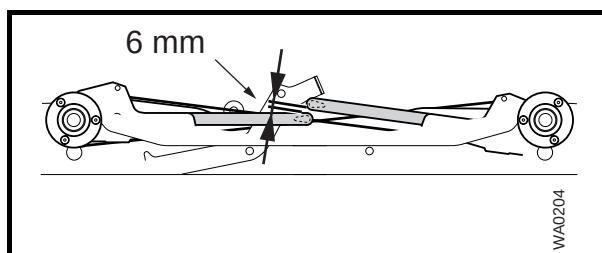
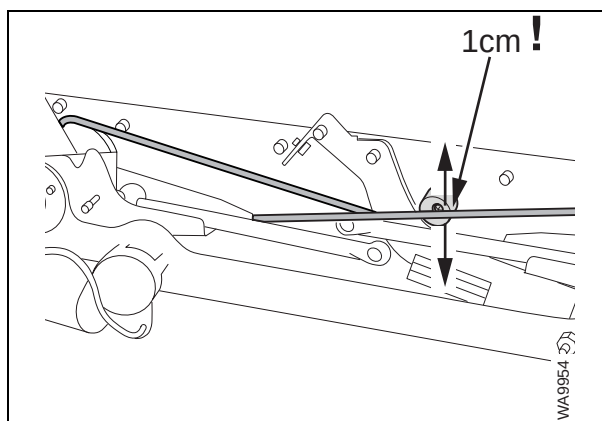
The steel cable shall be tensioned to ensure a play of 1 cm (25/64") at the nylon guide when a force of 55 N (5.6 kgf; 12.4 lbf) is applied onto the cable.

Checks on the cable:

First check after 1,000 bales
next checks every 5,000 bales

After (re)tensioning the cable recheck the synchronism of the tying tubes.

When the forward tying tube is on the stop, the play between the tying tube ends must be 6 mm (15/64").



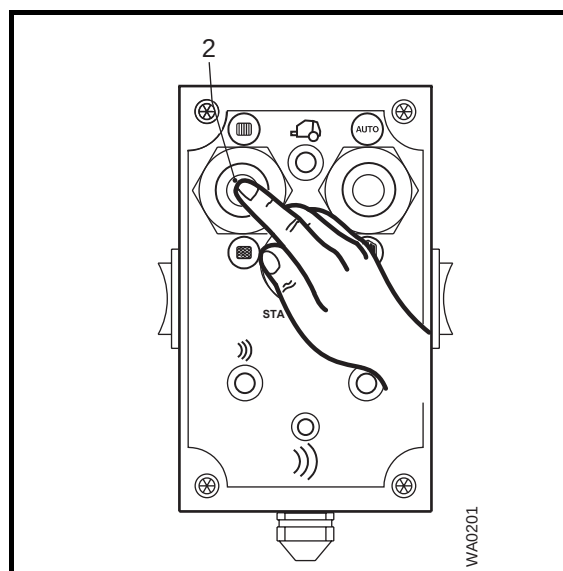
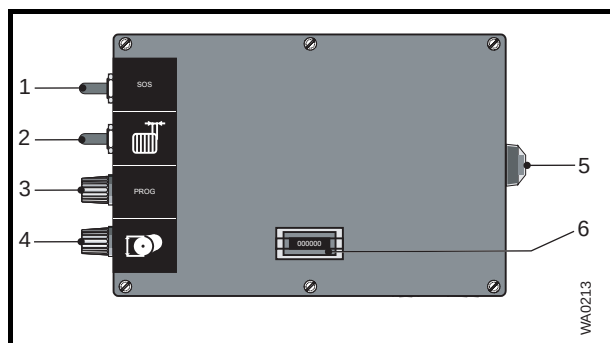
9.10 Trouble shooting

Trouble	Cause	Solution
Tying tubes do not move.	- Battery tension (voltage) not sufficient. - Poor electr. connections. - Mechanical block. - Drive faulty.	- Check battery and power supply connections. - Check cables and connections. - Check mechanism. - Renew faulty parts.
Bad tying tube timing.	- Steel cable with too much play. - Steel cable broken.	- Retension steel cable. - Renew steel cable.
Twine does not run.	- Twine end too short. - Twine end too long. - Resistance of twine trajectory too high. - Bale too small (diameter less than 80 cm; 32").	- Reduce tension of twine brakes. - Renew knife. - Check trajectory and clear. - Make larger bale diameter.
Twine is not positioned with the correct distance to the side(s).	- Calibration value has been changed. - Twine wraps move.	- Check settings of wrapping programmes. - Increase distance to side(s). - Clean system. - Test system: push buttons  and .
Twine cut too early.	- Position of the final wraps in relation to the cutting path. - Twine brake tension too high.	- Correct position of the final wraps (dealer functions). - Reduce tension of the twine brake.
Twine not cut.	- Knife dull. - Twine tie does not reach the final position due to dirt. - Twine tension too low	- Renew knife. - Clean system. - Test system: push buttons  and . - Increase tension of twine brake.
Tying pattern not as desired.	- Pto speed not correct	- Ensure pto speed is 540 rpm.

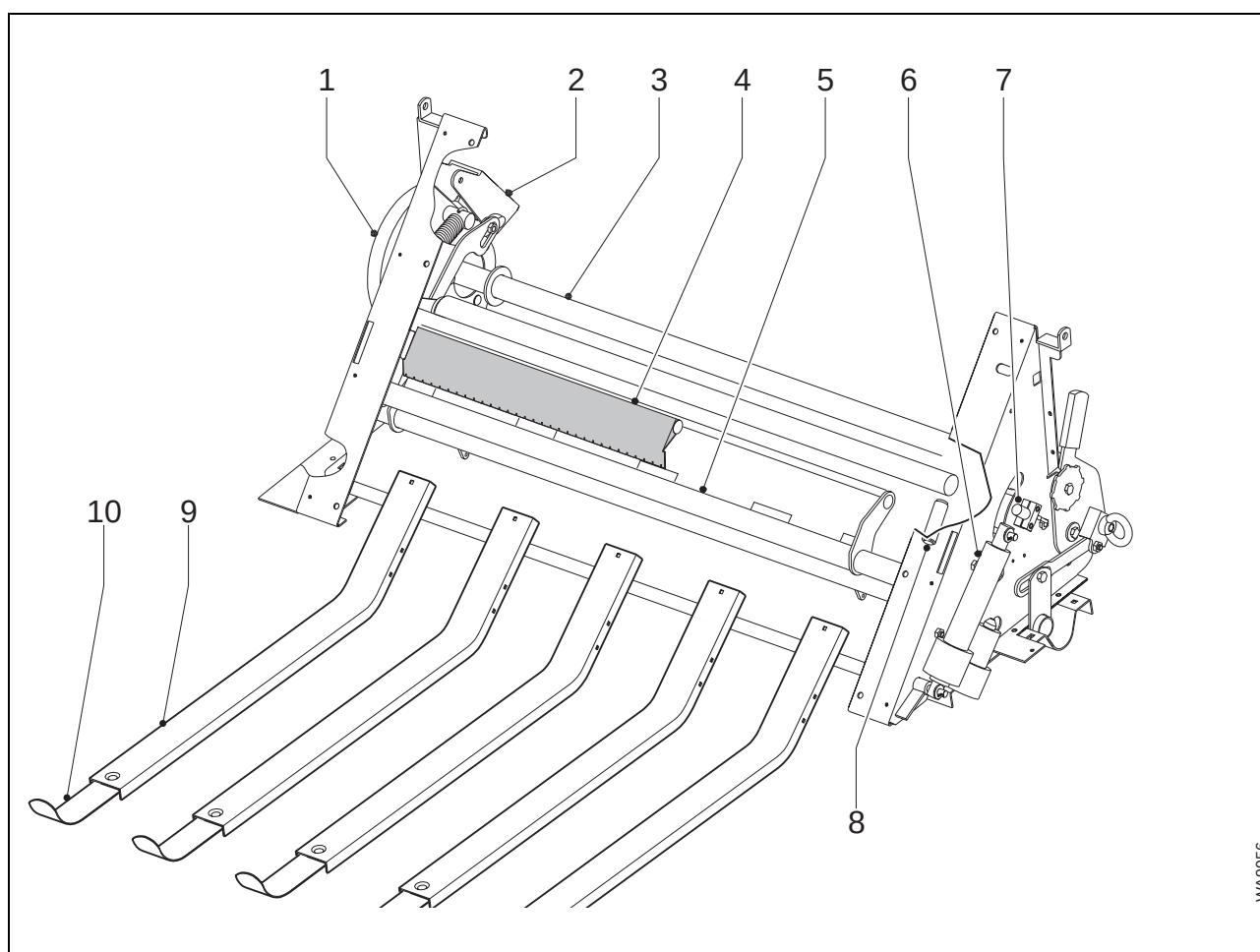
10 NET WRAP

10.1 INFOBALE

The baler can be equipped with a twine tie or a net wrap system or both; both systems function completely independent from each other. You can select the system on the control box. Setting the toggle switches (2 on the control box).



10.2 Main components of the net wrap system



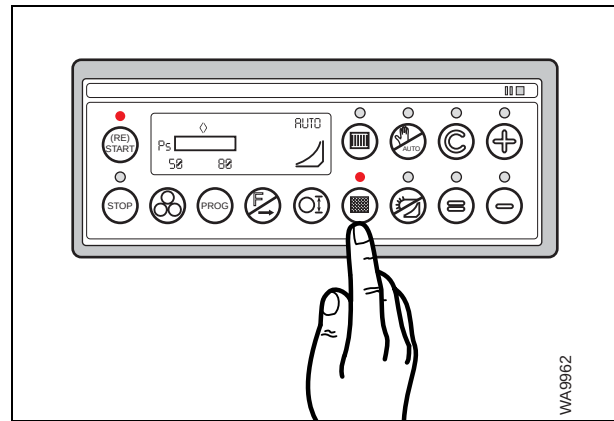
- 1 Brake drum
- 2 Net brake
- 3 Net roll holder
- 4 Cutting plate
- 5 Pressure plate

- 6 Actuator
- 7 Net brake position sensor
- 8 Used net metering roller sensor
- 9 Net guide
- 10 Leaf springs

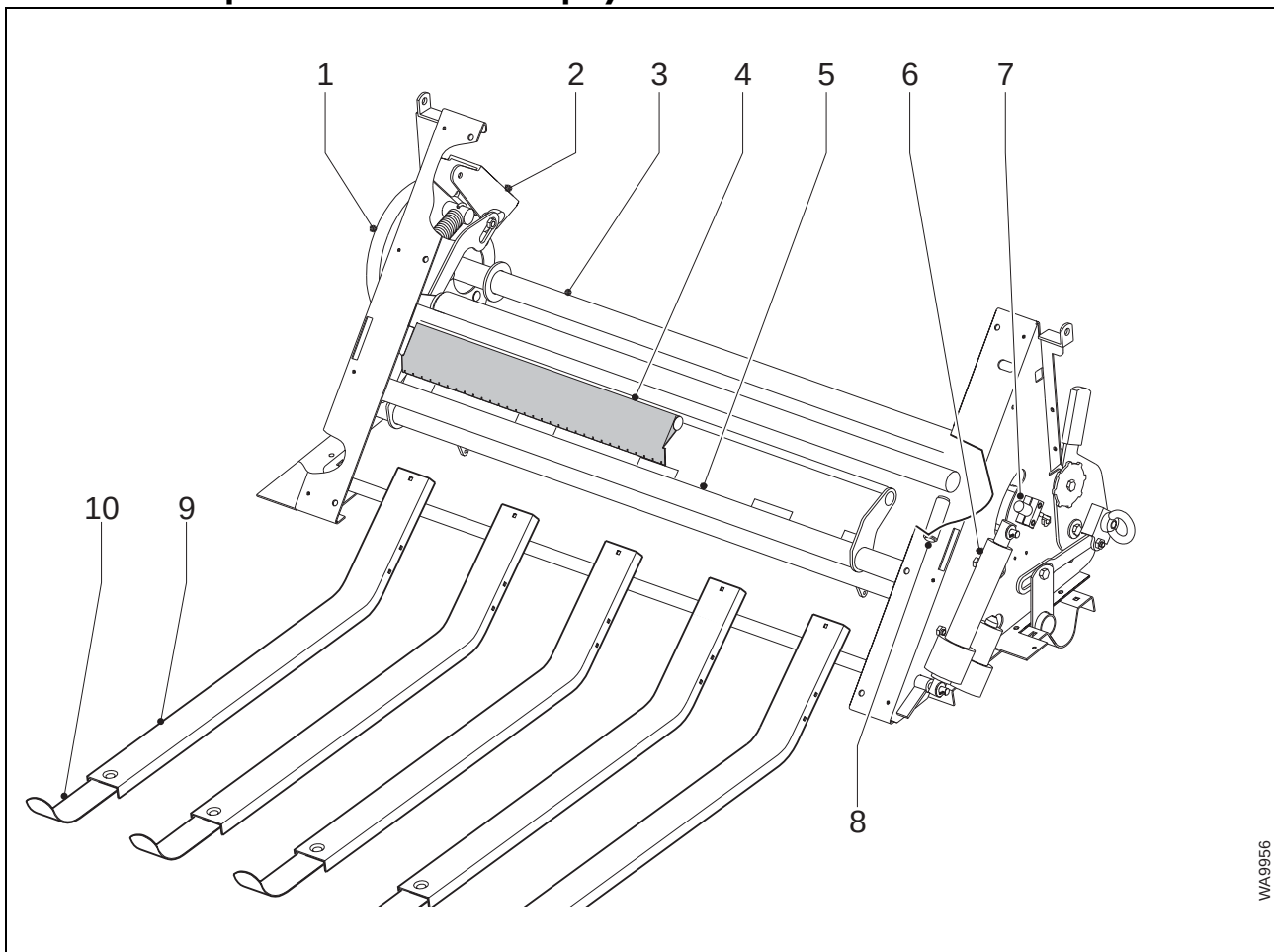
10.3 AUTOFORM

The baler can be equipped with a twine tie or a net wrap system or both; both systems function completely independent from each other. You can select the system on the control box. Pushing the button  you select the net wrap, the LED above the button goes on then.

For switching the system on and working with it see section 5.3.1.



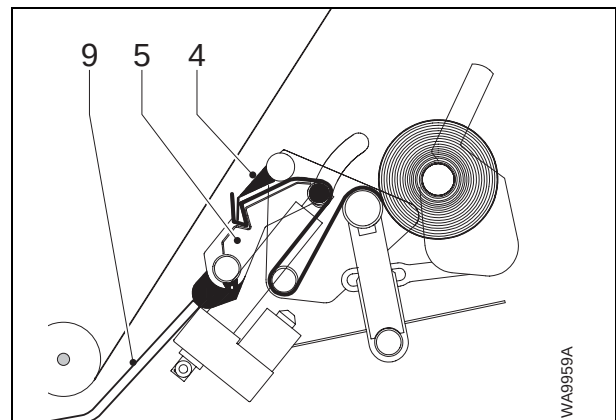
10.4 Main components of the net wrap system



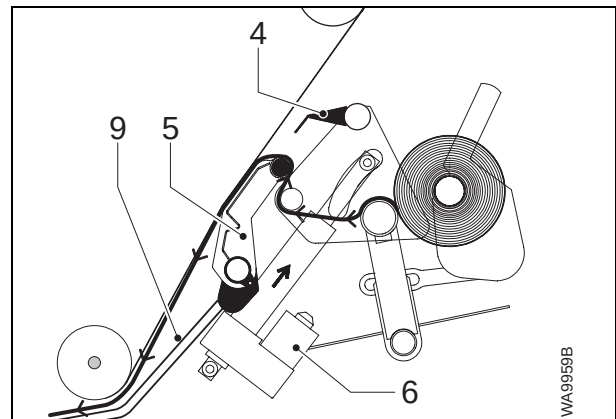
- | | |
|-------------------|-----------------------------------|
| 1 Brake drum | 6 Actuator |
| 2 Net brake | 7 Net brake position sensor |
| 3 Net roll holder | 8 Used net metering roller sensor |
| 4 Cutting plate | 9 Net guide |
| 5 Pressure plate | 10 Leaf springs |

10.5 Function of the net wrap

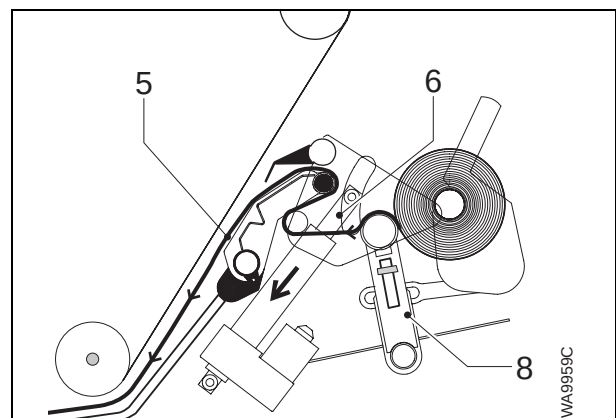
During baling the net wrap system remains in the hold position. The cutting plate (4) is in the bottom position shielding net and pressure plate (5). The net brake is applied and the net guide (9) free from the belts.



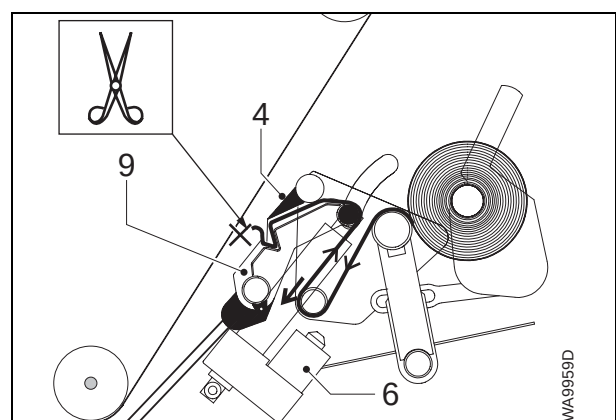
Upon activation of the net wrap the actuator spindle (6) fully extends and the knife (4) moves up. The net brake is released in order to allow free net movement. At the same time the pressure plate (5) and net guide (9) are pressed against the belts: the running belts take the net with them.



As soon as sufficient net has been applied the actuator retracts so far that the net brake is applied in order to keep the net tensioned. The pressure plate now has been moved free from the belts. Through net metering roller and sensor (8) the quantity of applied net is measured.



After application of the preset quantity of net the actuator fully retracts, the knife (4) moves down and cuts the net. Now the net guide (9) is released from the belts going into hold position.



10.6 Loading the net roll



Attention:

Choose a good quality of net in order to ensure troublefree functioning of the net wrap system. We recommend e.g. Polydress Rondotex MX1000 or TAMA edge to edge (2000 or 3000 m; 2190 or 3280 yd rolls).

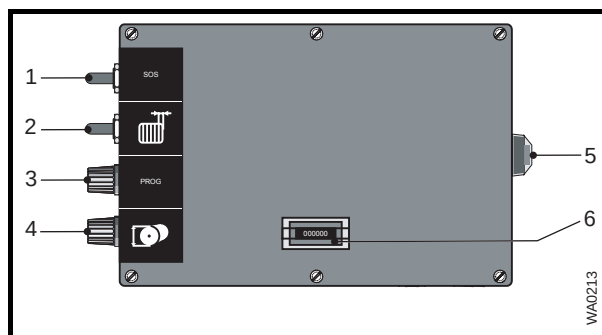
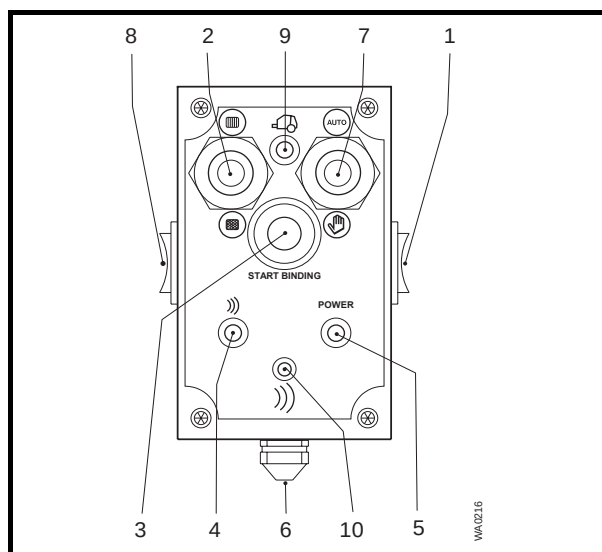
Dimensions of the roll:

Max. diameter: **32 cm (12-1/2")**

Width: **122 through 130 cm
(4' up to 4'3")**

10.6.1 Loading a net roll into the baler - INFO-BALE

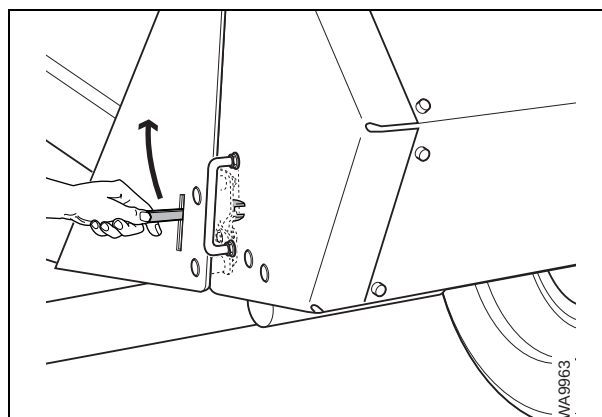
- 1 Shut down tractor engine.
- 2 Remove ignition key.
- 3 Set main switch (1) on the control box to II (emergency control).
- 4 Flip switch (1) on the machine box to the position net wrap.
- 5 Control the actuator using the toggle button (8) on the control box.
- 6 Shut down the system through setting main switch (1) on the control box to 0.



DANGER

It is implicitly necessary to set the main switch (1) to 0 in order to stop all cycles!

- 7 Open net roll compartment cover using an open-ended wrench (size of jaw 13 mm; 1/2").

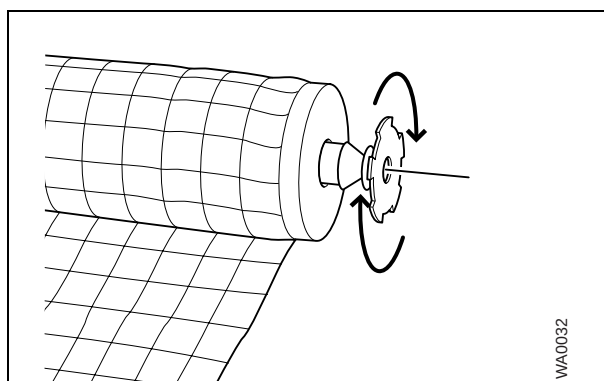
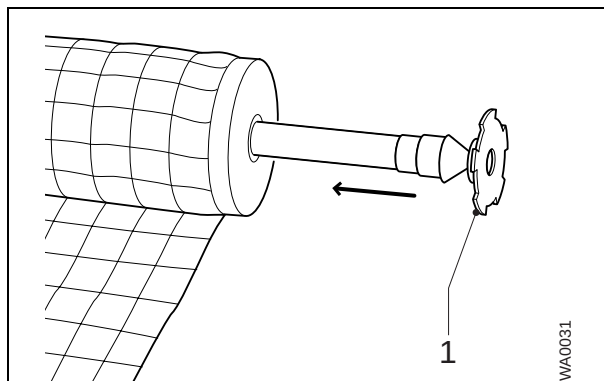
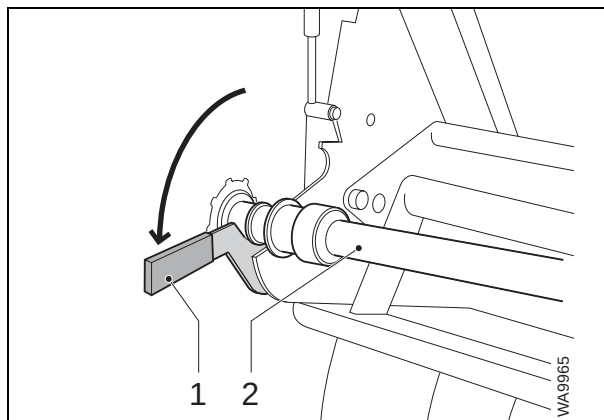


- 8 Move lever (1) down, now the net roll holder rotates outward at the lh side (release by ring bolt).
- 9 Rotate the disc of the holder a couple of turns ccw. Now a present net roll lies free in the holder.
- 10 Take holder (2) with roll out of the machine.

**Attention:**

Take into account the correct roll-off direction of the net!

- 11 Slide holder into the new net roll.
- 12 Position the holder with the roll back into the machine, ensuring the holder end is placed correctly at the brake side.

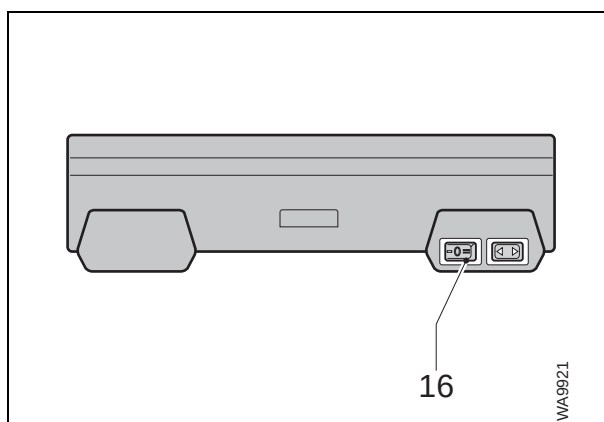


10.6.2 Loading a net roll into the baler - AUTO-FORM

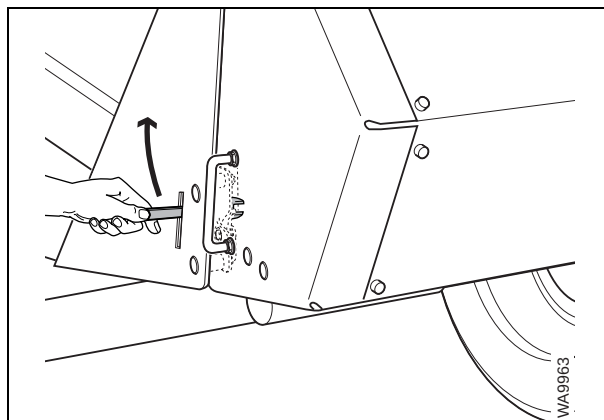
- 1 Shut down tractor engine.
- 2 Remove ignition key.
- 3 Set main switch (16) of control box to 1 (ON).
- 4 Select net wrap push button  (if still required).
- 5 Select manual mode by pushing button .
- 6 Push button  and hold this for some seconds in order to allow the actuator to extend.
- 7 Shut down the system by pushing button .

**DANGER**

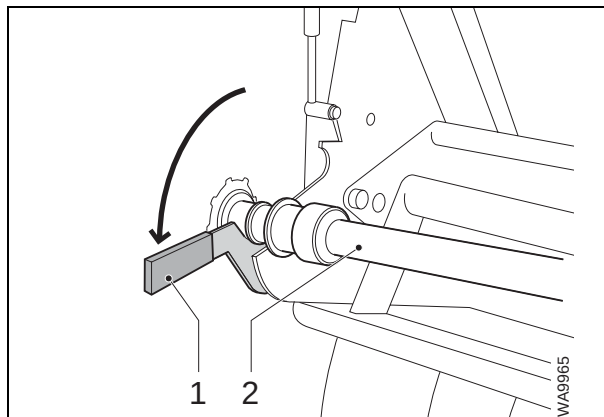
Always push  in order to interrupt the automatic cycle!



- 8 Open net roll compartment cover using an open-ended wrench (size of jaw 13 mm; 1/2").



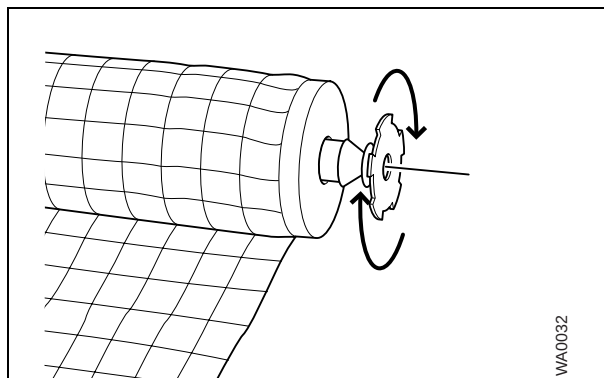
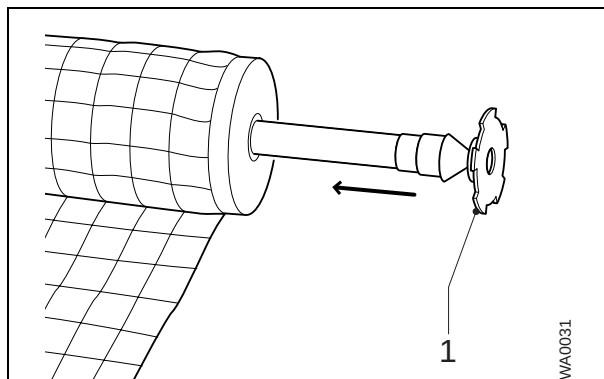
- 9 Move lever (1) down, now the net roll holder rotates outward at the lh side (release by ring bolt).
 10 Rotate the disc of the holder a couple of turns ccw. Now a present net roll lies free in the holder.
 11 Take holder (2) with roll out of the machine.



Attention:

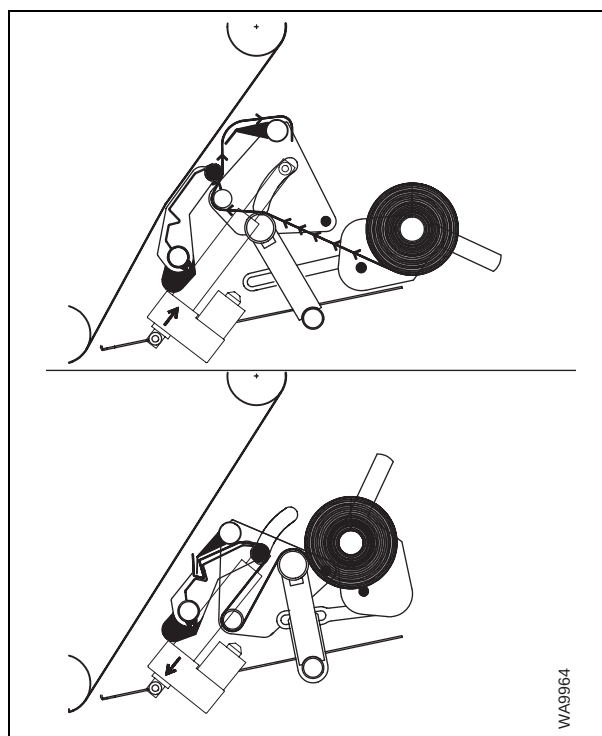
Take into account the correct roll-off direction of the net!

- 12 Slide holder into the new net roll.
 13 Position the holder with the roll back into the machine, ensuring the holder end is placed correctly at the brake side.



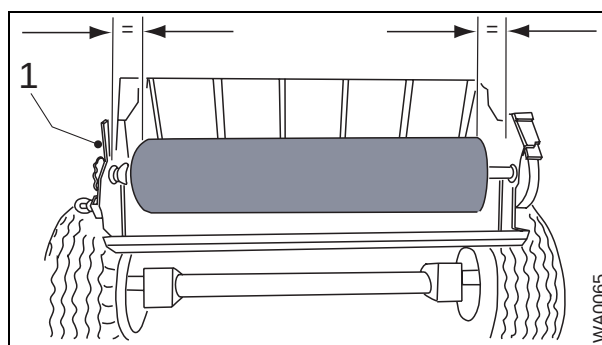
10.6.3 Routing the net

- 1 Route the net in accordance with the diagram. This diagram can be found inside the net roll compartment cover as well.
- 2 Move lever up again and centre the net roll with respect to the bale chamber.
- 3 Tighten disc (1) in order to ensure the roll is tightened.
- 4 Close cover: this locks automatically when closing.
AUTOFORM: Push button (REI START) on the control box: the system is ready for use now.
INFOBALE: Push reset button on the machine box: the system is ready for use now.



Attention:

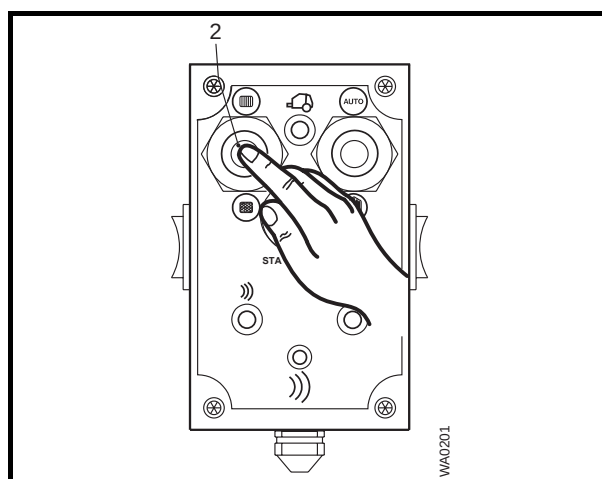
Ensure the net roll is in the centre of the mechanism, check after tightening holder (1)!



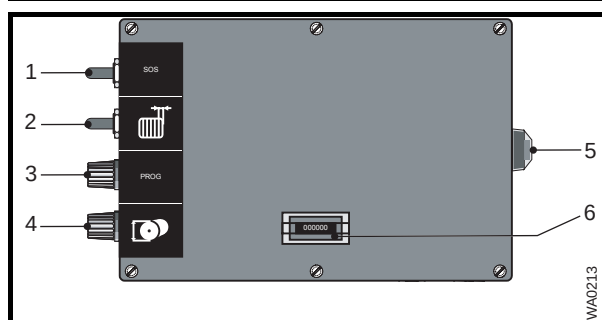
10.7 Electronic settings of the net wrap - INFOBALE

10.7.1 Setting the number of wraps

- 1 The toggle switch (2) on the control box shall be set to net wrap .



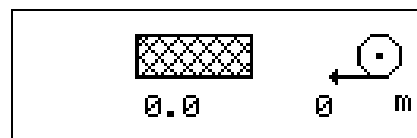
- 2 Select the number of net wraps using rotatable knob (3) on the machine control box:
 - minimum: 2 wraps.
 - maximum: 5 wraps.



10.8 Electronic settings of the net wrap - AUTOFORM

10.8.1 Changing the number of wraps

- 1 Select net wrap push button  (if still required).
- 2 With button  select wrapping programme P5.
- 3 The number below the lh picture gives the number of net wraps.
- 4 Push button  till the value underneath the lh picture starts blinking.
- 5 Set the desired value pushing the buttons  and .
- 6 Confirm that new value pushing button .

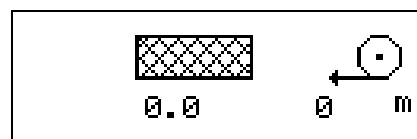


10.8.2 Resetting the net used indication



The number of metres net used since the last resetting is shown on the display during work.

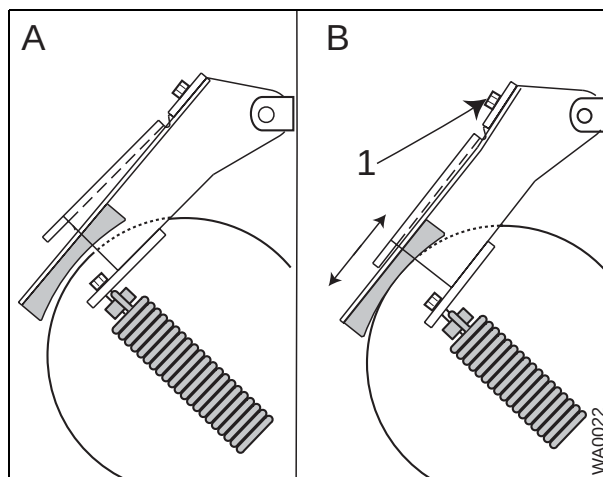
- 1 Select net wrap pushing button  (if still required).
- 2 With button  select wrapping programme P5.
- 3 The number below the rh picture gives the number of metres of net used since the last resetting.
- 4 Push button  till the value underneath the rh picture starts blinking.
- 5 Push button , the value now is reset to zero.
- 6 Confirm by pushing button .



10.9 Mechanical adjustments of the net wrap

10.9.1 Adjustment of net brake

- 1 Slacken bolts (1) two turns only.
- 2 Take care that net brake is on full load (actuator fully retracted) see position B.
- 3 Move radius of net brake in relation to radius disc.
- 4 Tighten bolts (1).

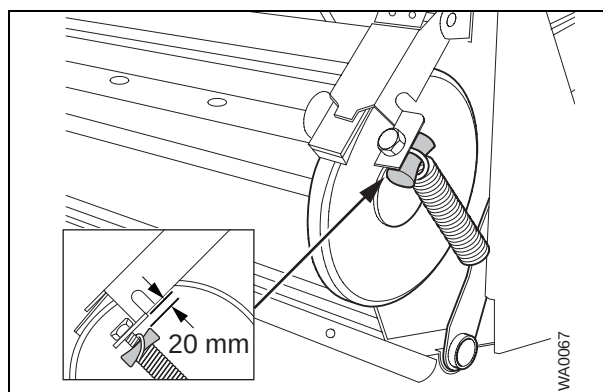


10.9.2 Tension of the net brake

Net tension is adjusted through the net brake. Standard setting is 20 mm (25/32") with the spring in the last but one position at the front side.



The above-mentioned setting is a nominal value. This value depends on e.g. quality of the net, wastage. If the brake is still cold wrap with lower rpm till the brake has reached operation temperature.

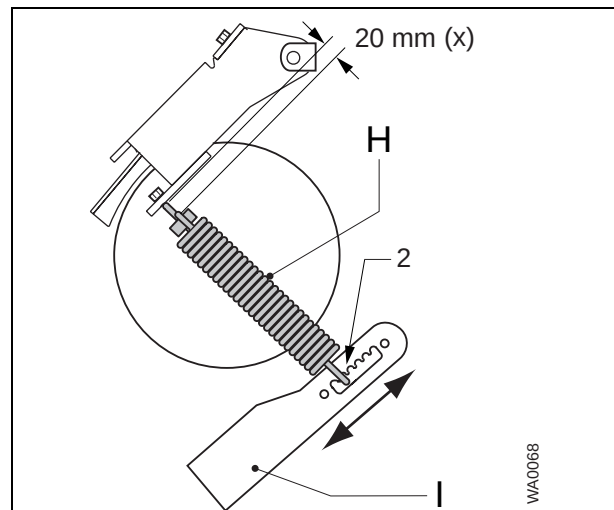


10.9.3 Net roll diameter setting

An incorrect adjustment of the net roll diameter tension characteristics may cause net rupture. The type of net used also must be taken into account. Adjacent figure shows standard setting

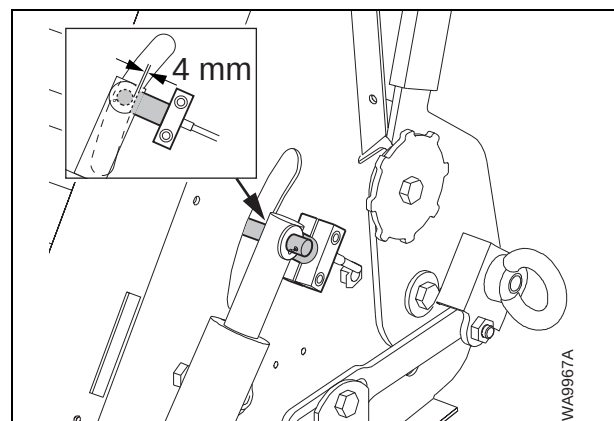
The tension character of the net can be adjusted through spring.

- 1 Set spring upward when the net breaks with decreasing net roll diameter.
- 2 Set spring downward when net breaks at new net roll or when net tension is decreasing with decreasing net roll diameter.

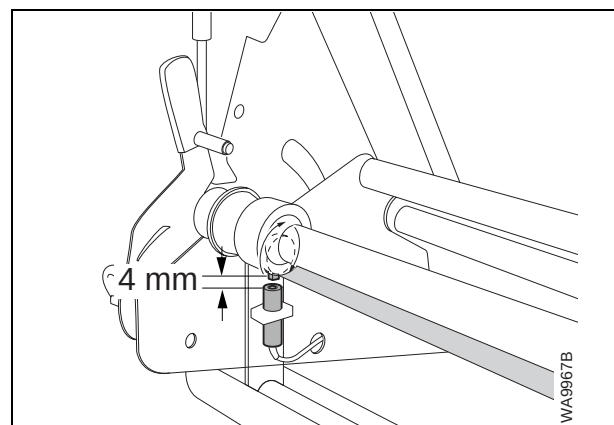


10.9.4 Sensors

Sensor distance of actuator brake position: **4 mm (5/32")**.

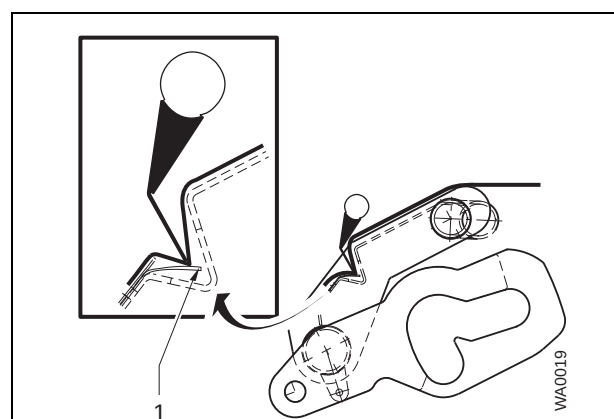


Sensor distance of net metering roller: **4 mm (5/32")**.



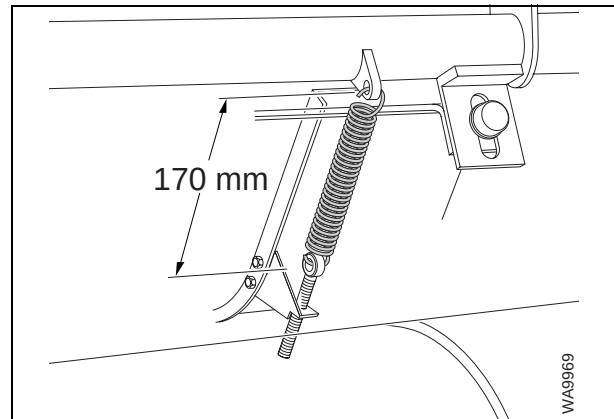
10.9.5 Net clamping plate

In hold position the knife must rest against the plate below (1). Therefore the net does not fall off the pressure plate, the net is held in the right position by the knife.



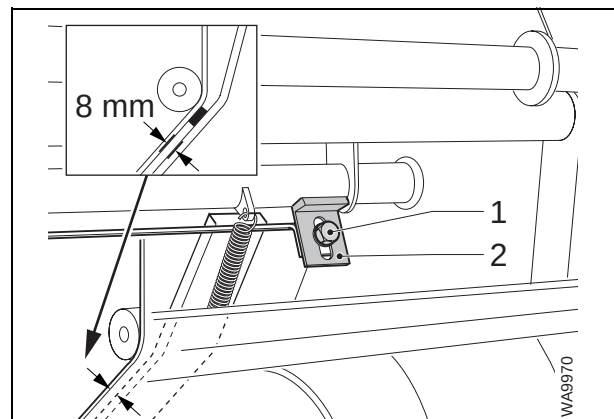
10.9.6 Net guide

Spring tension setting of the net guide: **170 mm**
(6-11/16")



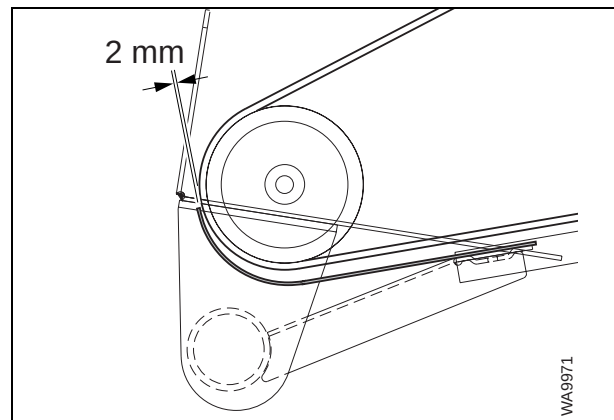
10.9.7 Net guide release unit

- 1 Ensure the actuator spindle is fully retracted.
- 2 Fill up net guide with **8 mm** (5/16").
- 3 Move stop (2) against the stop tube.
- 4 Tighten bolt (1).



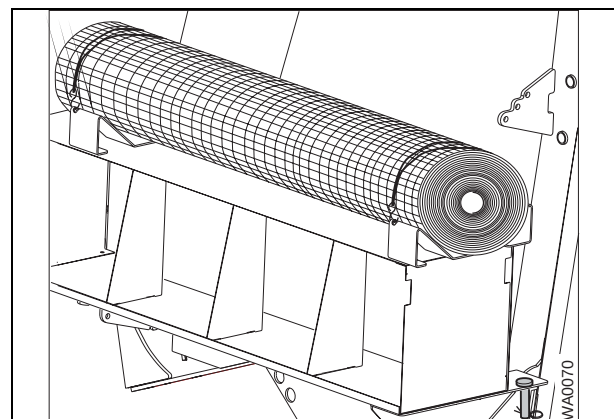
10.9.8 Net guide leaf springs

The play between leaf springs and belts shall be **2 mm**
(5/64").



10.10 Extra net roll storage

For machines having both twine tie and net wrap there is a net roll storage support behind the lh lateral door. On machines with only net wrap this is also possible but on the rh side.



10.11 Maintenance

In order to ensure good functioning of the net wrap observe the following maintenance schedule:

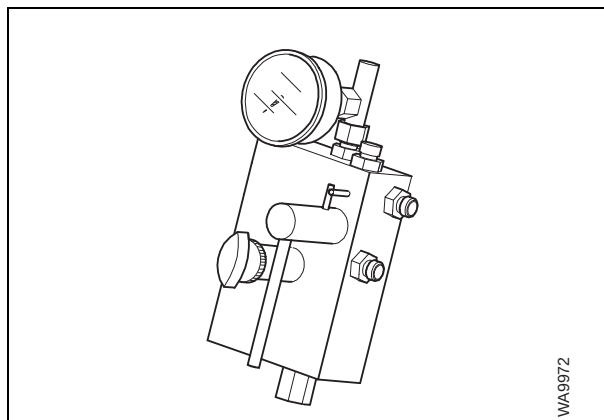
Part / Assy	Check	Adjust	Clean	After no. of bales
Net brake tension	X	X		as required
Net roll diameter	X	X		as required
Sensors	X	X	X	3,000
Net guide	X	X		3,000
Net guide release unit	X	X		3,000
Net guide leaf springs	X	X		3,000
Knife and net clamping plate	X		X	3,000
Net roll bearing block	X			10,000
Net brake pad	X			10,000

10.12 Trouble shooting

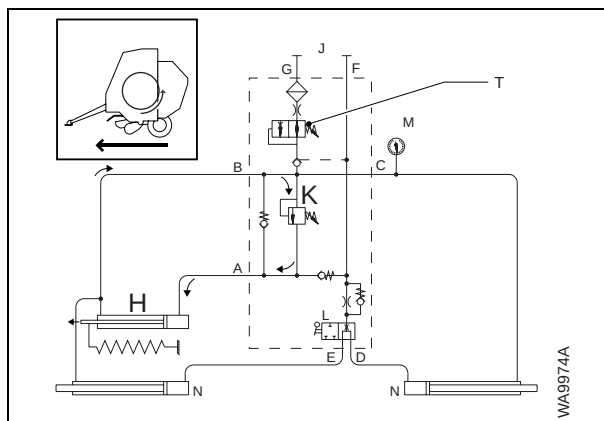
Problem	Cause	Solution
Actuator spindle moves too slow.	- Too low a battery tension (voltage). - Poor electrical connections. - Hinges of too difficult motion.	- Check battery. - Check electrical connections. - Clear to free motion.
Net around bale but lacerated.	- Bad quality of net. - Net guides clogged. - Net guides bent.	- Use recommended net quality. - Clean belts and guides. - Repair net guides.
Net does not cover full bale width.	- Net guides not adjusted correctly. - Belts and net guides dirty. - Bale conical. - Net tension not sufficient.	- Re-adjust net guides. - Clean belts and guides. - Ensure uniform feed. - Increase brake force.
Net not tight around the bale.	- Insufficient quantity of net around the bale. - Brake force not sufficient.	- Correct number of wraps. - Increase brake force.
Net not transported by the belts.	- Net slipped off the pressure plate. - Dirt behind cutting plate and clamping plate. - Spindle does not move far enough. - No belt tension.	- Re-feed net. - Remove plates and clean area. - Check mechanism. - Check tailgate locks. Only when tailgate has been locked correctly hydraulic pressure is set free for belt tensioning.
Net on the ground instead of around the bale.	- Too great a distance between net guides and belts. - Too low a pto speed.	- Adjust net guides. - Increase pto speed to 540 rpm.
Net wrap system stays inactive	- System set in manual mode. - No electrical connection.	- Set to automatic mode. - Ensure electrical supply.
Net tears prior to end of wrapping cycle.	- Net brake force set too high. - Net brake force deviates when net roll diameter changes. - Poor net catching.	- Decrease brake force. - Adjust spring position on lever. - Check adjustment of net guides.
Net is not cut.	- Cutting plate dirty. - Mechanical obstruction when retracting. - Electrical power supply not sufficient. - No net tension.	- Clean mechanism. - Check mechanism. - Ensure power supply. - Check net tension during cutting procedure.

11.2 Function of the hydraulic system

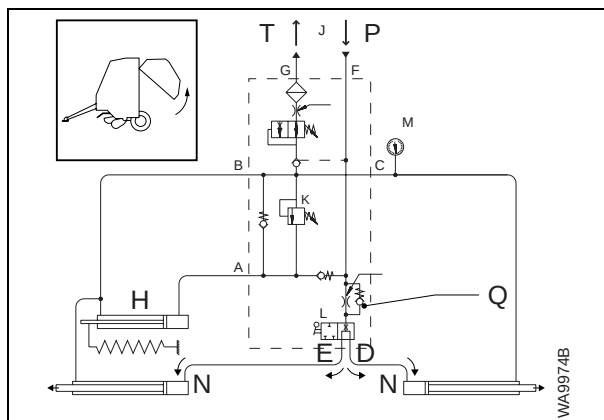
The hydraulic control unit is the central control part of the hydraulic system. Via this control unit the hydr. pressure is directed through lines to activate functions.



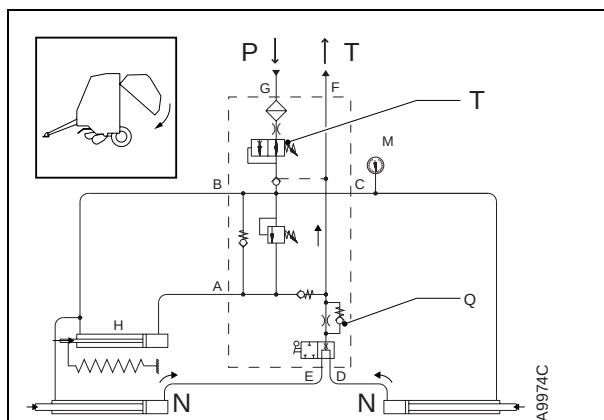
The bale growth in the bale chamber extends the tension cylinder (H). Hydraulic fluid from the top side of the piston is pressed through an adjustable pressure valve (K) and then flows back into the cylinder (H) underneath the piston.



The hydr. control unit directs the hydr. pressure through line (E and D) to the tailgate cylinders (N). When the tailgate opens the tension cylinders (H) move freely up. A throttle non-return valve (Q) in the hydr. system enables a sufficient flow in order to open the tailgate quickly.



When the tailgate is to close the hydr. pressure is directed on top of the tailgate cylinder (N): the tailgate closes. Just before the tailgate is closed the flow valve (T) is connected in between (little flow) and acts to brake the motion of the tailgate and at once prevents a sudden depression in the system.



11.3 Adjustments

The set pressure can be controlled by closing the tailgate via the control valve of the tractor. When the tailgate has been closed completely the set pressure can be read on the pressure gauge. The pressure can be adjusted by knob (1). Rotate knob (1) **cw: pressure increases**
Rotate knob (1) **ccw: pressure decreases.**

Adjustable pressure range: **60 - 200 bar (870 - 2900 psi).**

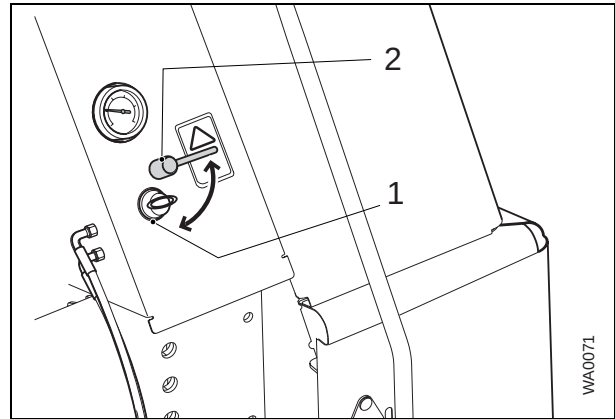
Setting examples:

Very dry hay or dry straw: **200 bar (2900 psi)**

Normal dry hay: **180 bar (2610 psi)**

Silage: **140 - 180 bar (2030 - 2610 psi) ***

*(depends on humidity contents)



Attention:

The above given pressures are only standard values, the real values required depend on type of crop and baling conditions and therefore may differ quite a lot.

When working with a tractor that cannot provide the set pressure you only can verify the pressure setting when making the next bale.



The set pressure may not be reached if the crop quantity taken in is too little!



Attention:

Any modification to obtain a higher pressure may cause damage to the machine! Even at the attempt of such a modification all liability and warranty become extinct!



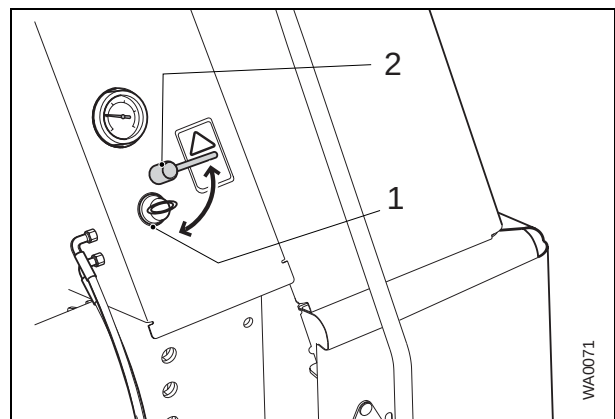
DANGER:

Always close the tailgate safety valve prior to going under an opened tailgate!

Lever (2) points to the **right: valve closed = safe!**

Lever (2) points **downward: valve open = baling position = unsafe for working!**

A hydraulic system is under high pressure! Never attempt to find or even to stop a hydr. leakage with your hands. High pressure fluid easily penetrates skin and clothes, causing severe injuries: see a doctor immediately when injured!



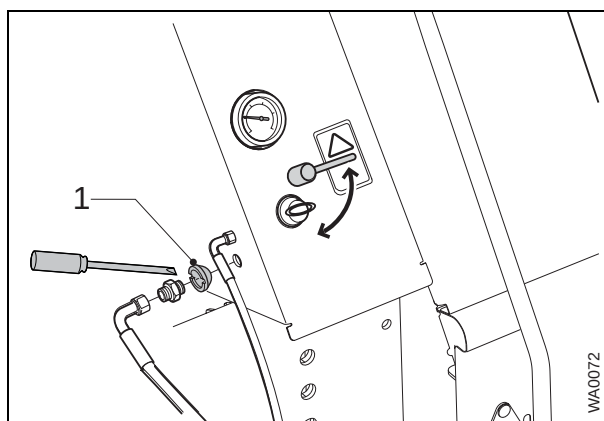
11.4 Maintenance

Take care the hydraulic system stays clean. Cautiously (dis)connect the quick disconnect couplings. Dust, sand, metallic particles and other contamination destroy a hydraulic system; trapped air disables the control. Renew worn, cut, abraded, squeezed or otherwise damaged/defective hydraulic lines as well as aged hoses!



Attention:

Clean the screen (1) every 10,000 bales or once per season, whatever occurs first! The screen can be removed using a screw driver after removing the hose connection G.



11.5 In-cab “mixed chamber” control (optional equipment, AUTOFORM only)

With this option it is possible to control the hydraulic settings of the control box (also see sect. 5.4).

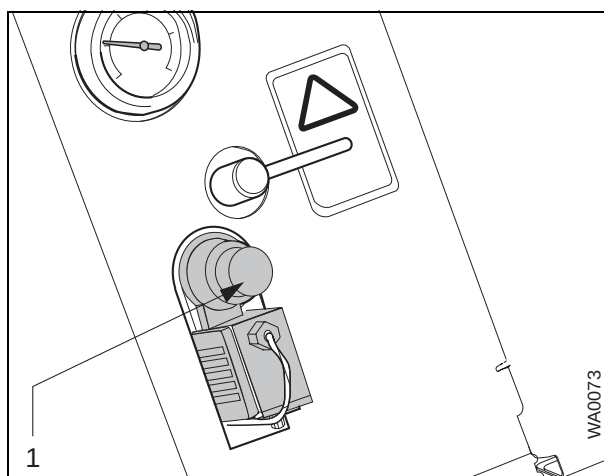
11.5.1 Emergency control

In standard cases manual setting (1) is not used during function and is turned fully ccw (= lowest pressure setting). In case of electronic failure it is possible to control pressure manually with valve (1).



Attention:

Switch off electronics when finished working in order to prevent an empty battery!



11.6 Trouble shooting

Trouble	Cause	Solution
Tailgate opens during baling.	- Tailgate not locked. - Tailgate cylinder leaking. - Tension cylinder leaking.	- Apply tractor valve longer when closing. - Renew cylinder seal(s). - Renew cylinder seal.
Pressure gauge shows pressure drop.	- Pressure valve leaking. - Tailgate cylinder leaking. - Tension cylinder leaking. - Line leakage.	- Clean or renew valve. - Renew cylinder seal(s). - Renew cylinder seal. - Inspect hoses and tubes for leakage and repair.

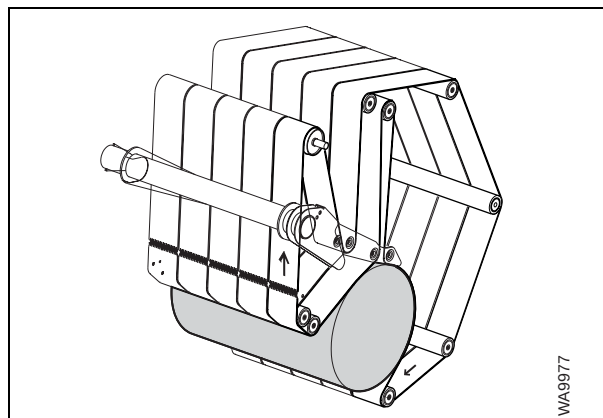
12 BALE CHAMBER

The bale chamber is build up by rollers, belts, tension arm and the lateral walls, this assembly ensures a controllable growth of the bale.

12.1 Belts and belt alignment

In this round baler one set of belt takes care of the forming of the bales. The belts are driven by a rubber roller in the front section of the machine.

This roller is shaped slightly convex in every belt track thus assisting the belt alignment.



12.1.1 Adjustment of belt alignment

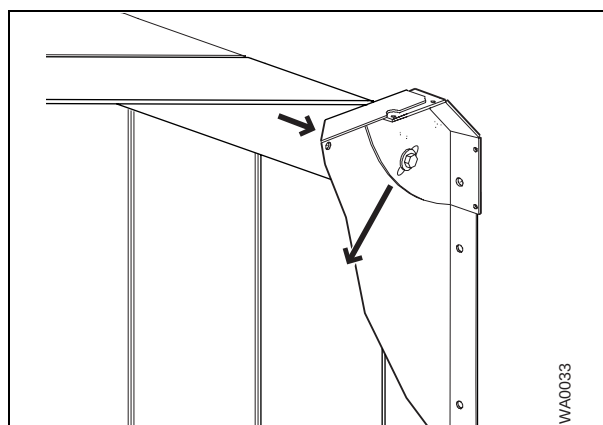
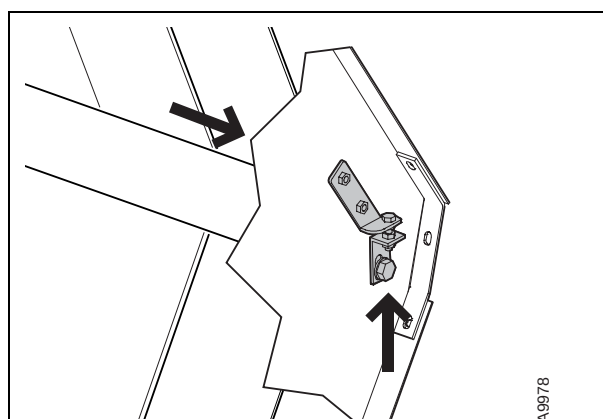
It is important the belts run aligned and do not wear through rubbing along the belt guides. An adjustable tension roller, the guide roller, in the rear section of the baler enables correction of the belt alignment. On the WA-type balers this can be adjusted in two positions.

Adjustment of the guide roller

- 1 Slacken bolt one turn.
- 2 Adjust the roller into the desired direction using nuts.
- 3 Tighten bolt.

The picture illustrates the belt behaviour.

On the baler modell WA a second guide roller can be adjusted as well, this in order to get optimum belt alignment. If the belt alignment can not be corrected sufficiently when adjusting at one side, the guide roller can be adjusted at the other side as well.



12.1.2 Endless belts (depending upon machine version)

Belts without lacings provide an exceptional long life span in heavy conditions. When exchanging these belts some rollers must be removed (ask your dealer).



Attention:

Install endless belts in such a way that the side with the most profile will be at the bale. Additionally pay attention to the marked running direction.

12.1.3 Maintenance of belts and lacings

Daily inspect the condition of belts and lacings, pay special attention to wear.



Attention:

Renew lacing pins every 2,000 bales! If you don't you risk belt breaking!

Since the pins wear in the exchanges gets more and more difficult after 2,000 bales.

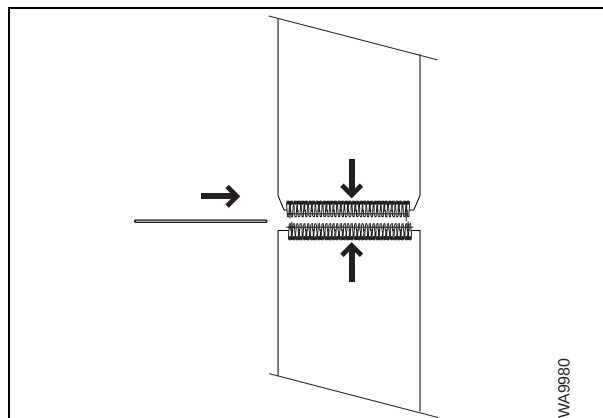


In order to facilitate exchange of the pins clean the lacings prior to the removal with a high pressure cleaner! In every case release the belts.

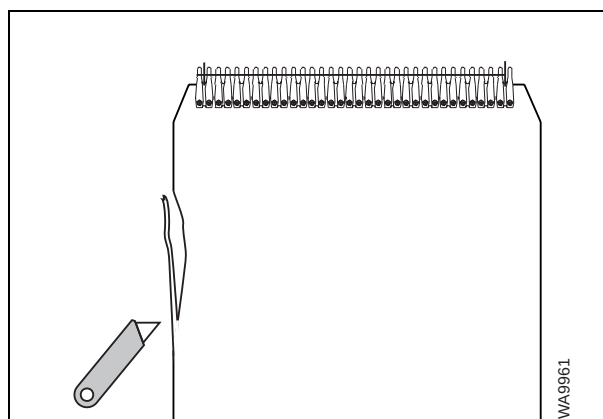


Attention:

- Regularly inspect belts for wear, cut away frain parts with a knife. Sharp stones may damage belts!
- Check belt length after every 10,000 bales (disassemble and check length, then re-assemble). The difference shall not exceed **5 cm (2")**!



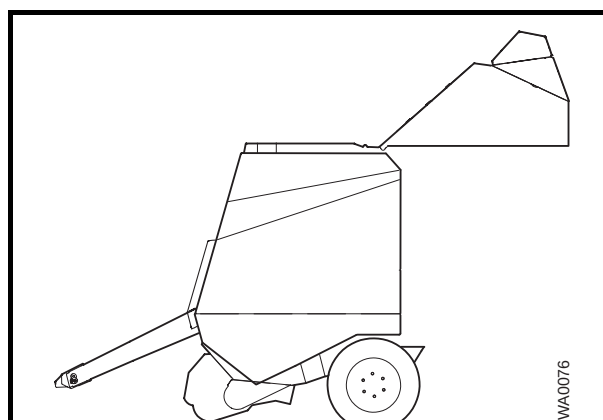
WA9980



WA9961

12.1.4 Belt exchange

- 1 Fully open tailgate.



WA0076

- 2 Fit stop pins into the lateral wall of the bale chamber.
- 3 Lower the tailgate pressureless, the tension arm will rest on that stop bolt and slacken the belts.

**Attention:**

Do not lower the tailgate too far: the bale chamber must stay accessible!

**DANGER:**

Always safety the tailgate hydraulically when you go under the opened tailgate!

- 4 Remove the belt(s): this can be done now because they are released.
- 5 Install new belt(s) paying attention to the direction of running (see picture).
- 6 Unlock tailgate safety, then fully open tailgate.
- 7 Remove stop pin out of wall and replace it in its holder.
- 8 Close tailgate.
- 9 Check belt alignment, correct as necessary.

**Attention:**

When installing a belt the direction of running is important! For this reason the leading edge of a belt has trimmed off corners!

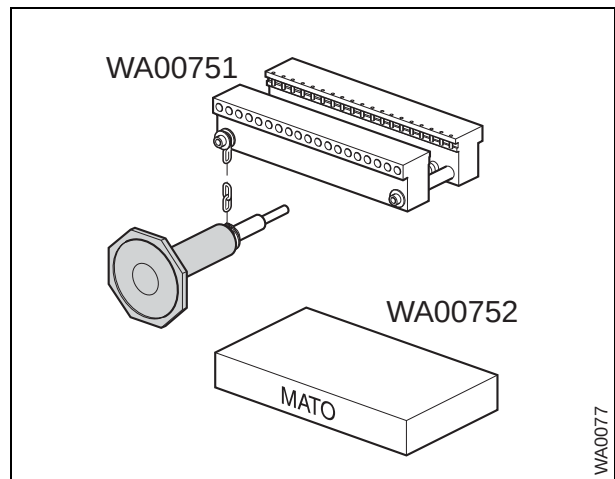
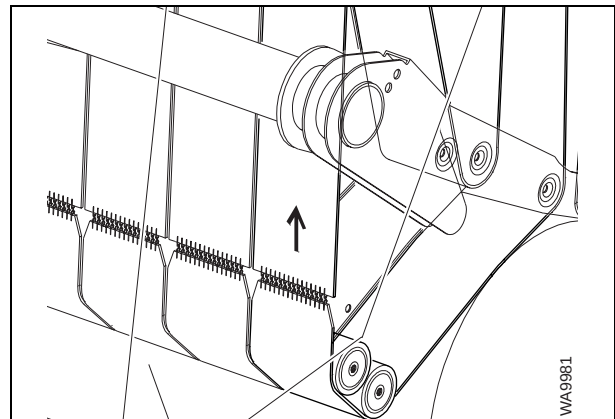
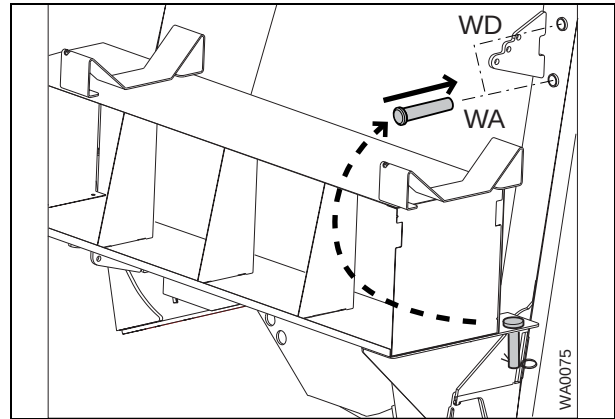
12.1.5 Renewing /exchanging of a lacing

For renewing the belt lacings the following tools and parts are necessary:

- Lacing tool: part no. WA00751
 Set of lacings (for 5 belts): part no. WA00752

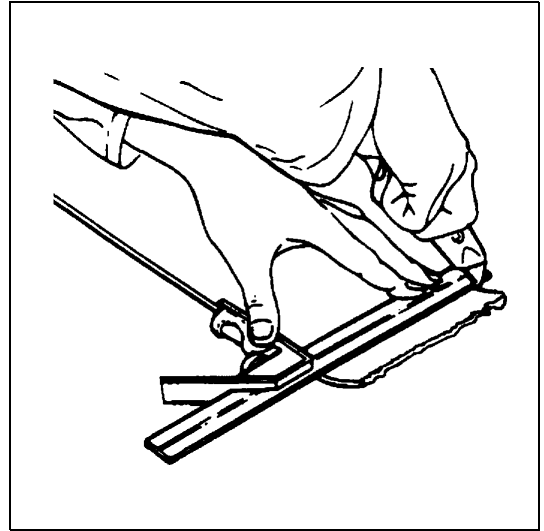
**Attention:**

- Never shorten a belt more than **10 cm (3-15/16")** with respect to the original length!
- The difference in length between two belts of one baler shall not exceed **5 cm (1-31/32")**!

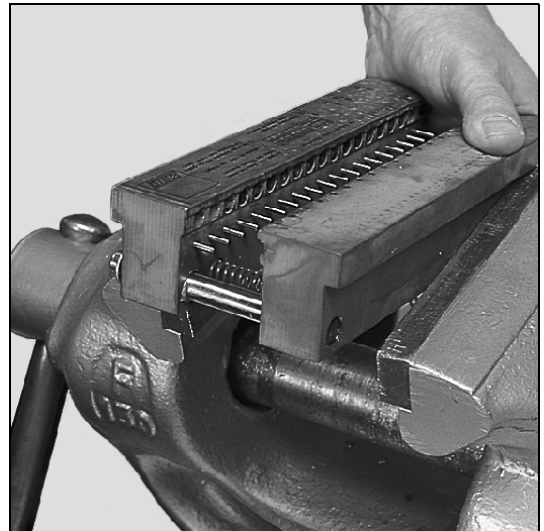


Procedure:

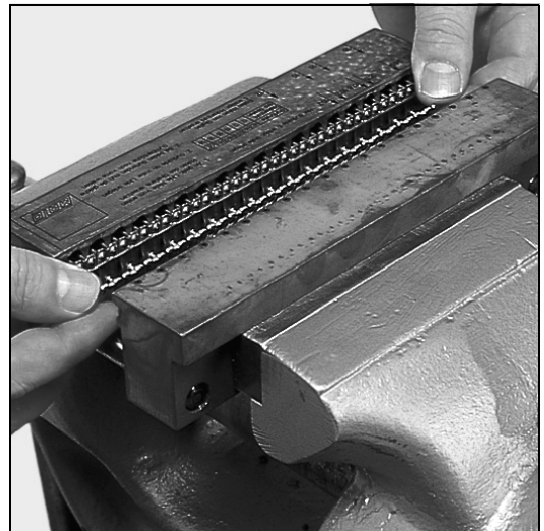
- 1 Cut the belts square as close as possible to the lacing.



- 2 Position the lacing tool into a vice: the holes pointing to you, the tool must be fully opened.



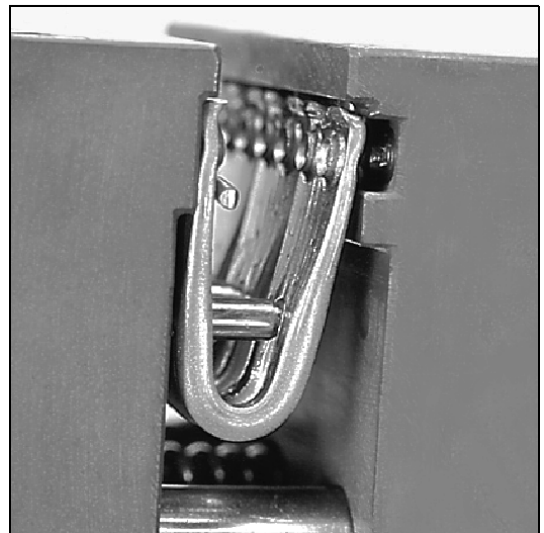
- 3 Position a lacing strip into the tool.



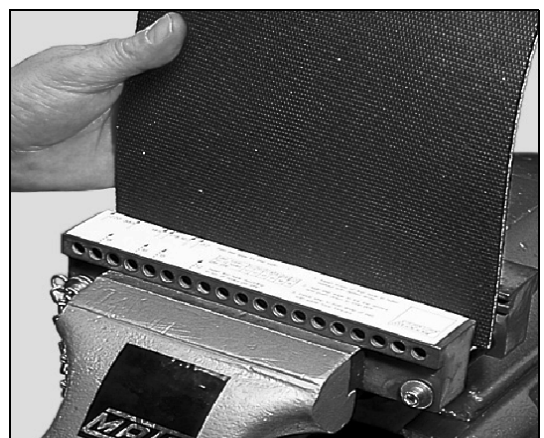
- 4 Every hole shall contain two rivets.



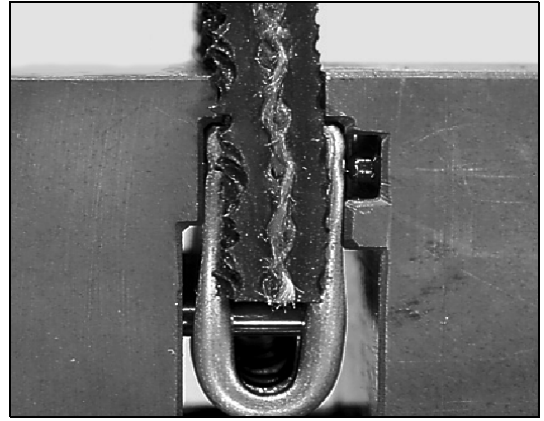
- 5 Close the vice just to allow the belt fit between the lacings.



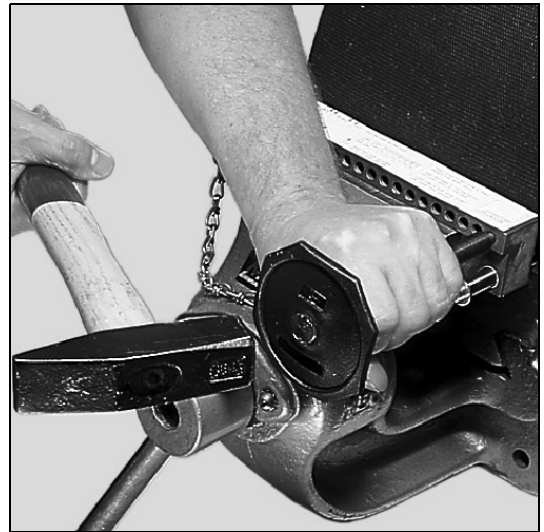
- 6 Slide the belt end between the lacings paying attention to the correct position of the belt: see picture.



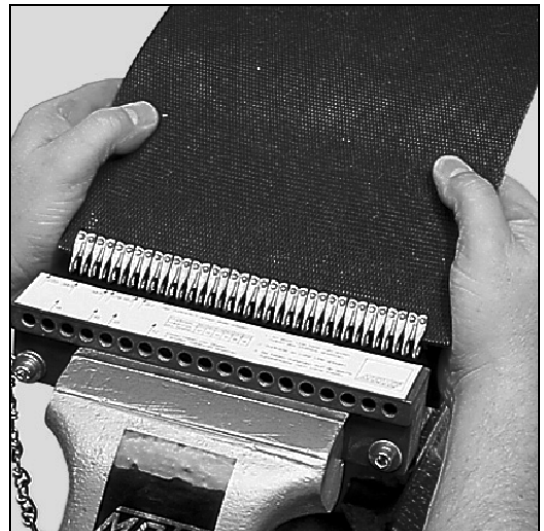
- 7 Force the belt down onto the stop, then close the vice till the lacings sit against the belt.



- 8 Using a hammer and a punch drive the first and the last and thereafter all the other rivets through the belt till the punch hits the stop.



- 9 Open vice and take belt out.



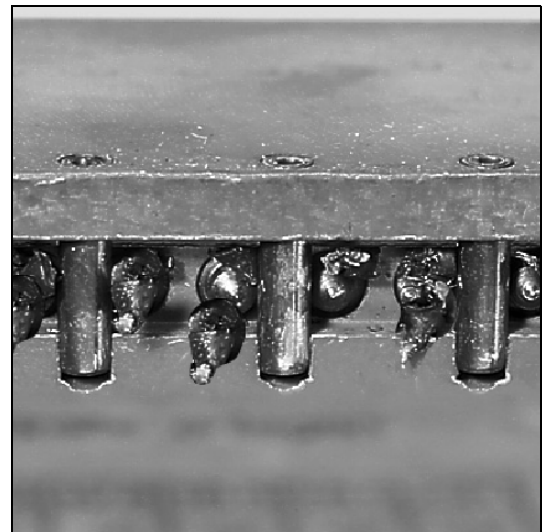
- 10 Put the belt with the lacing on a solid surface then flatten the rivet heads ensuring the lacing ayes are not damaged.
- 11 Repeat the procedure at the other end of the belt. The belt must be positioned into the vice with same side forward.



- 12 Trim off the leading edge corners of the belt with a size of 0.5 x 2 cm.



In order to ensure good working thoroughly clean the special tool after every lacing removing all dust and crumbled material (rubber)! Use a small but not too hard a steel brush to do so!



12.2 Tension arm

The tension arm provides the following functions in the bale chamber:

- builds up the starting chamber;
- determines the belt tension.

The set-up ensures the most effective build up of the bale pressure with help of the hydraulic tension cylinder and a spring. In order to ensure no tension variations occur in the starting phase a lever has been added to the tension arm.

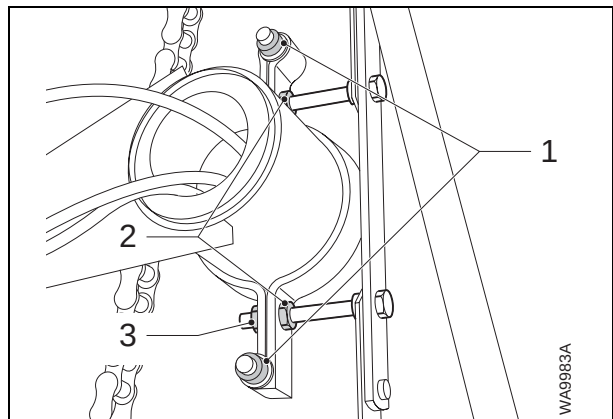
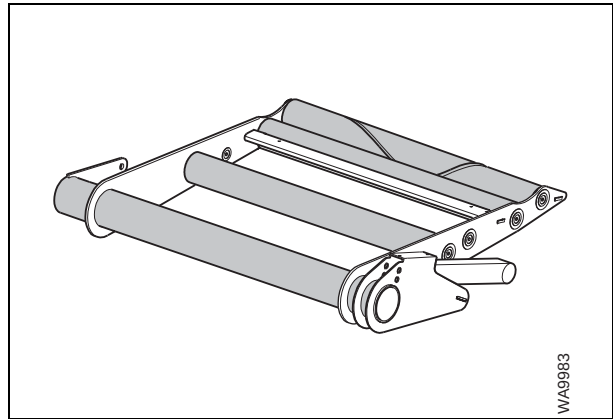
12.2.1 Alignment of the tension arm

The tension arm can be aligned by adjusting the tension arm hinge at the rh side of the machine.

The tension arm has to be adjusted to ensure the **distance** between tension arm and machine wall is **identical at either side**.

Procedure:

- 1 Open tailgate and close hydraulic safety.
 - 2 Slacken nuts of both carriage bolts (1) above and below.
 - 3 Slacken nuts (2).
 - 4 Slacken nut (3).
 - 5 Align tension arm (use shims as required).
- Retighten the nuts in opposite sequence.



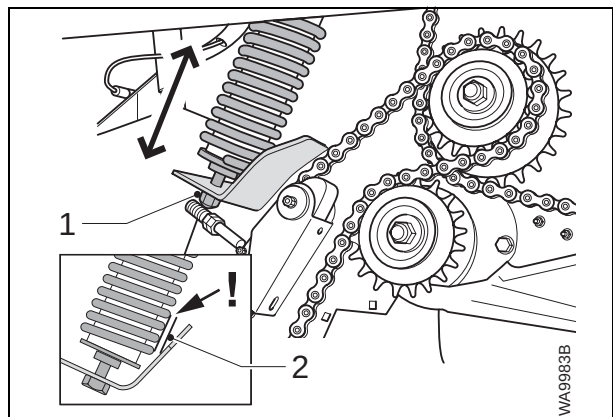
12.2.2 Spring tension

The tension of the tension spring of the tension arm can be adjusted using bolt (1).

- 1 The tension arm must be in the bottom position.
- 2 Adjust the spring to such an extend the spring guide just does not hit point (2).

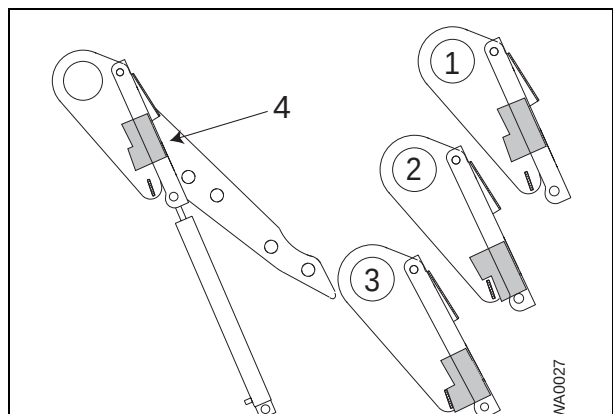
12.2.3 Maintenance

The tension arm hinge nuts must be checked and tightened as required after 100 bales after aligning the tension arm.



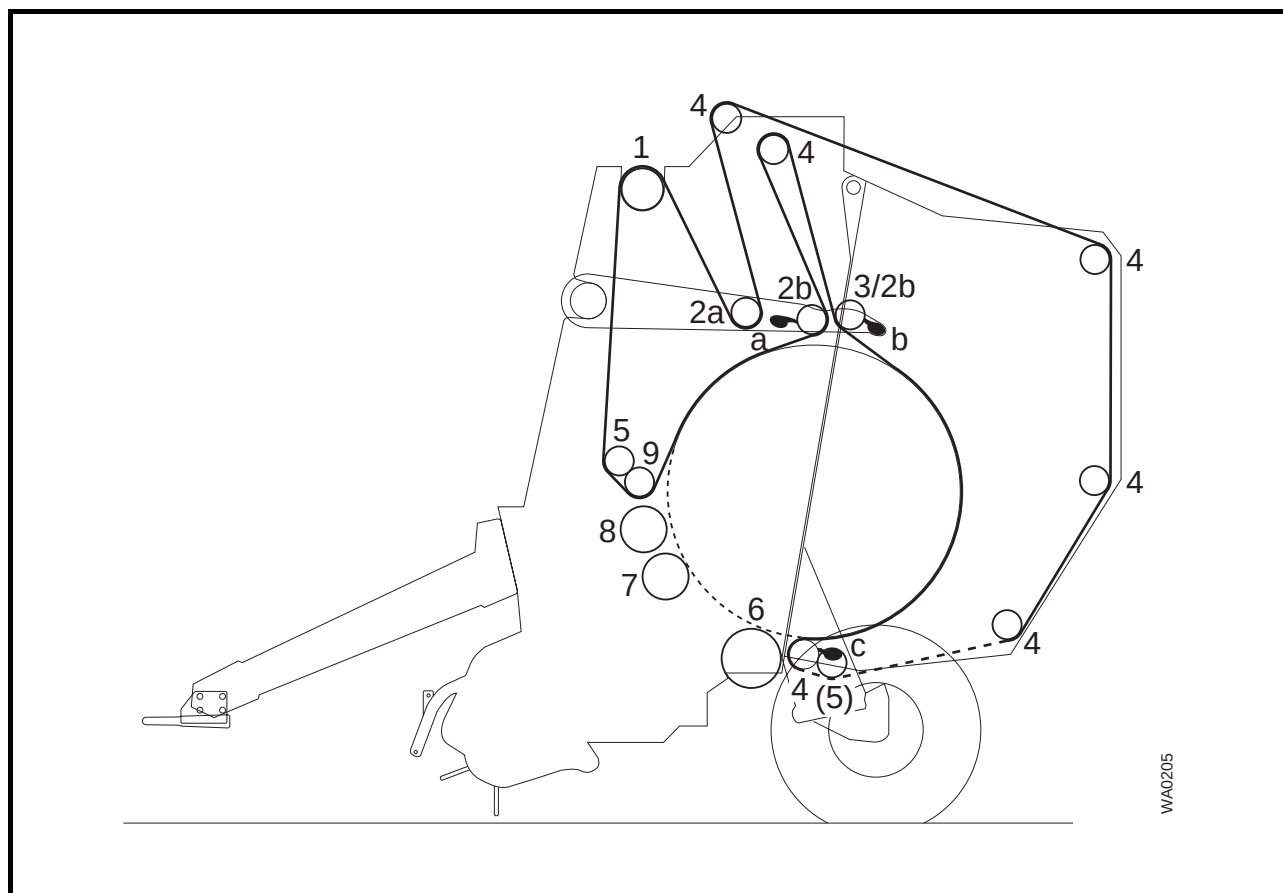
12.2.4 Adjustment of core density

- In standard case the tension arm is not hydraulically loaded when the bale chamber is empty. This in order to create a uniform "breathing" core (setting 1).
- For having a smaller core support 4 can be put in position 2 or 3.

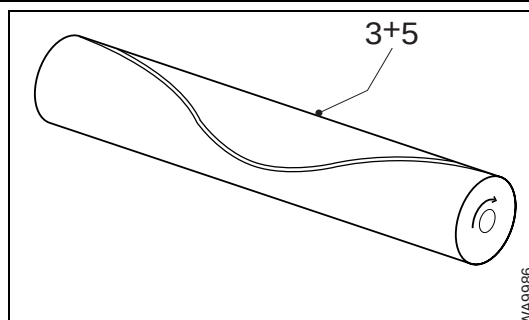
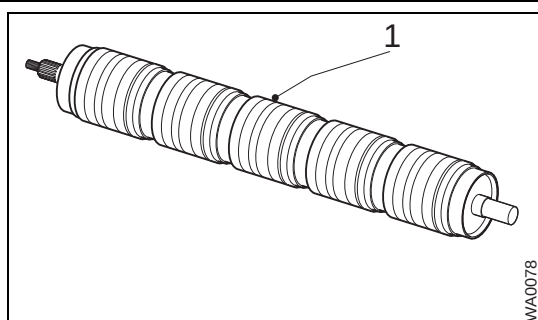


12.3 Rollers and scrapers

12.3.1 List of rollers and scrapers



Roller No.	Qty.	Denomination	Function
1	1	Rubber roller	- Drive. - Corrects the belt alignment through a concave roller section per belt.
2a	1	Tension roller	- Transmits hydr. pressure onto belts.
2b	2	Starting chamber roller	- Build up starting chamber; geometry like tension roller.
3	1	Spiral roller	- More wrap proof in heavy crop.
4	4	Guide roller	- Guides the belts.
5	1	Spiral roller	- Like no. 3, keeps the belt segment clean (replaced by scraper on INFOBALE).
6	1	Starter roller	- Compresses the intaken crop together with the bale.
7 + 8	1 + 1	Bale chamber profile roller	- Builds up an optimum bale chamber. - Increases stability of the bale. - Improves bale shape.
9	2	Guide roller	- An extra heavy guide roller.
10	1	Guide roller	- Special guide roller.

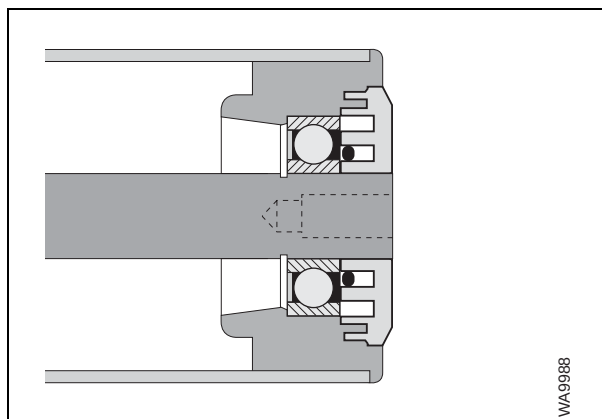
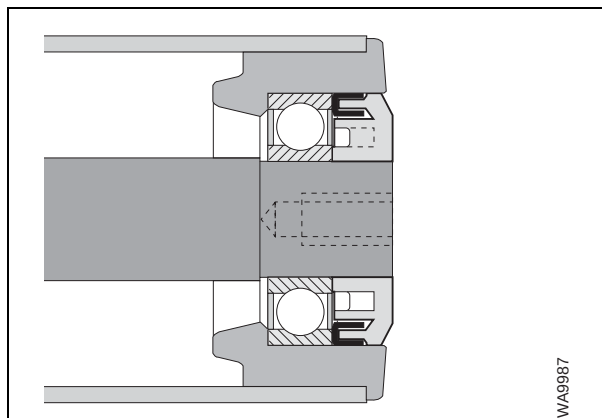


12.3.2 Maintenance of the rollers

Daily check bearing sealing areas of the tension rollers for crop residues, clean as required. Also check light running of the rollers, pay attention to poor running sound. In case of finding: find cause, renew bearings, seals or roller as required.



For repair set see parts manual.



12.3.3 Lubrication of the drive roller



DANGER:

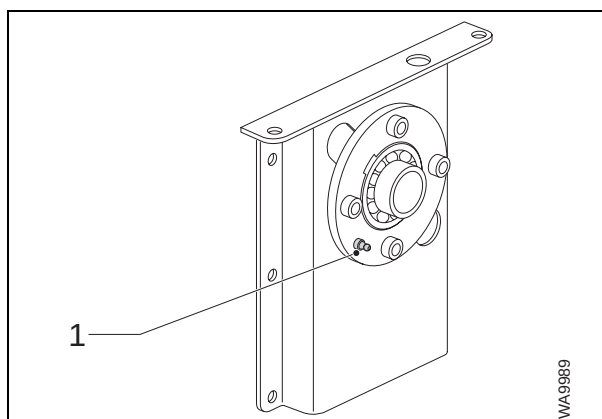
Never lubricate on a running machine!



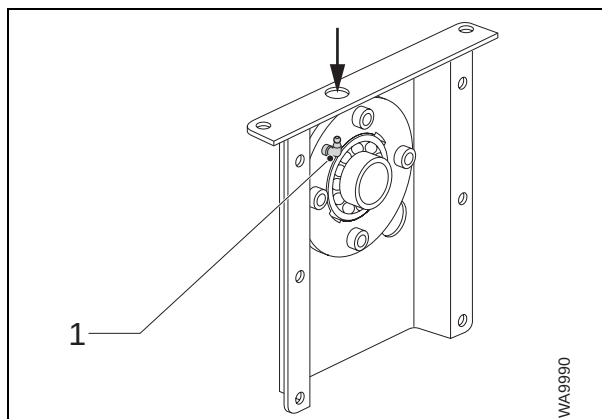
Attention:

Lubricate the drive roller every 10 working hours.

The bearings can be lubricated through grease nipples (1).



At the rh side thegreasenipple (1) can be reached through an opening on top of the bearing support.
Required grease type: class NLGI2, K2k in acc. with DIN51825.



12.3.4 Scrapers

In order to ensure the crop does not stick onto the rollers the baler has been equipped with scrapers. The positions a, b and c indicate scrapers.

The following types of scrapers have been installed:

- standard scrapers (for dry crop)
- silage scrapers:
- sharp scrapers
- scrapers of the profiled rollers

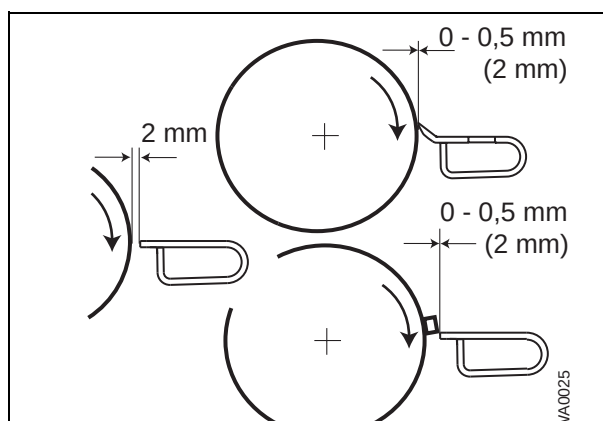
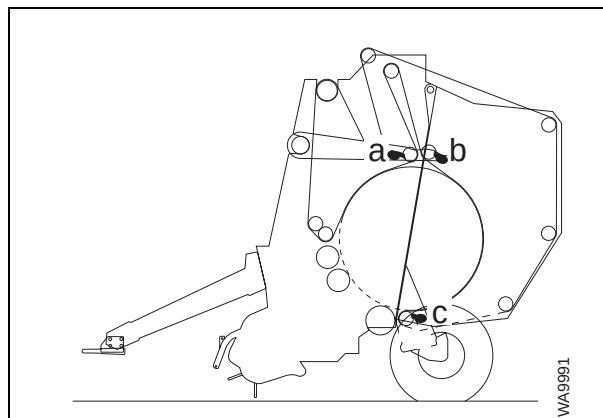
Scraper adjustment

Standard scrapers (hay and straw): **2 mm (5/64")**

If crop accumulates at the scraper decrease distance.

Silage scrapers: **0 - 0.5 mm (0 - 5/256")**

If crop accumulates at the scraper decrease distance. The scraper shall just touch.

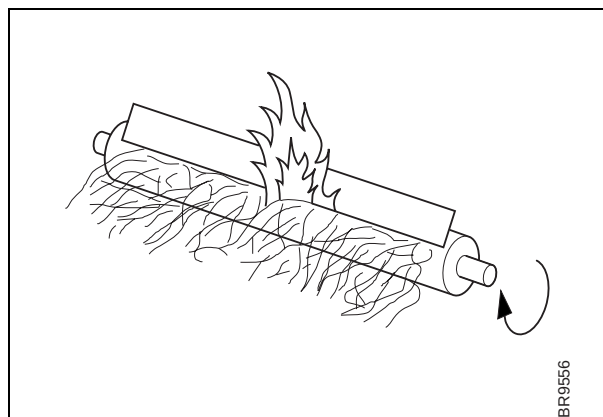


DANGER:

When dry crop (hay and straw) is baled, all scrapers **shall be set** to a distance of **2 mm (5/64")**, this in order to avoid fire!



We recommend having a fire extinguisher at hand in the tractor with a capacity of **at least 5 kg (11 lb)**. Have the extinguisher checked every year by the approved authority.



12.3.5 Trouble shooting

Trouble	Cause	Solution
Crop sticks onto the rollers.	- Crop is wet and sticky.	- Check scraper settings. - Add another set of scrapers as required.

12.4 Tailgate

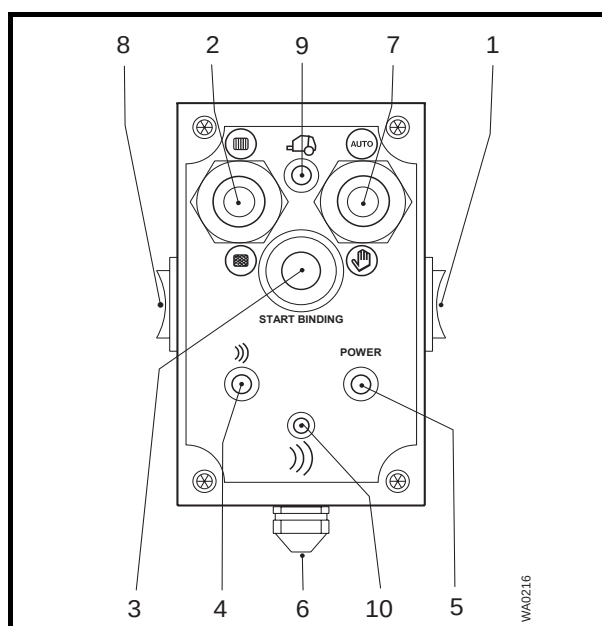
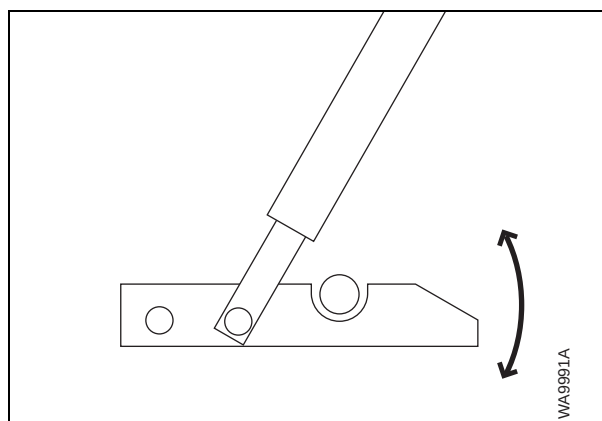
12.4.1 Tailgate locks

The tailgate is locked by locks that are controlled by the tailgate cylinders. The locking is indicated electronically on the control box display.



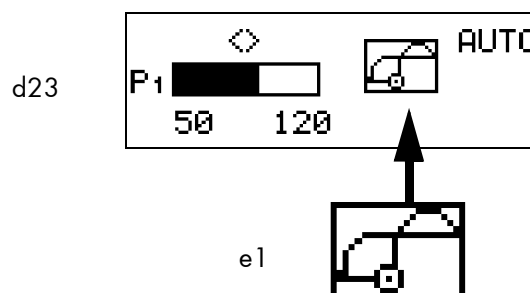
Attention: INFOBALE

Never bale when the indication light (9) on the control box is extinguished! Immediately disengage the pto and find the cause! This may indicate an unlocked tailgate.



AUTOFORM

Never bale when the tailgate unlocked warning (e1) appears in the display! Immediately disengage the pto and find the cause!



12.4.2 Maintenance

The tailgate hinges must be lubricated every 10 working hours. Oil attaching points of tailgate and locks.

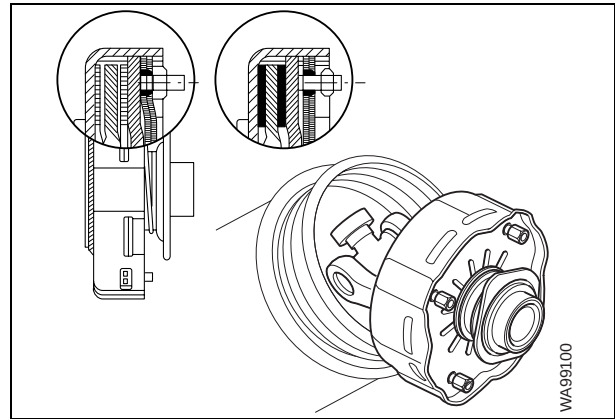
12.4.3 Trouble shooting

Trouble	Cause	Solution
Tailgate opens during baling.	- Tailgate not correctly closed and locked.	- Inspect locking hooks. - If tailgate is really closed and locked then check electronic system. - Cylinder seals leaking: renew seals. - Thoroughly clean closing sills of tailgate.
Tailgate does not lock when closed.	- Locks dirty.	- Thoroughly clean locks.

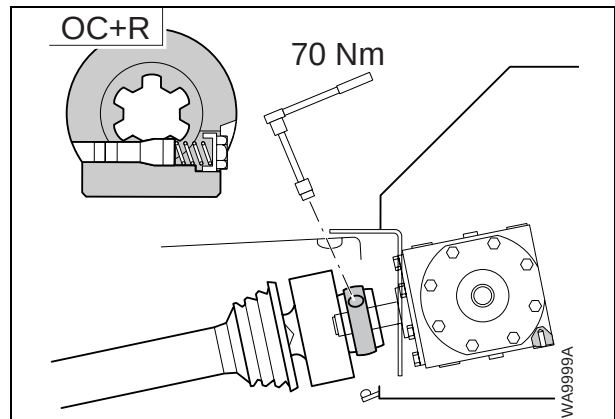
12.5 Bale chamber drive

The baler is powered by the tractor through pto and pto drive shaft. There are two types of pto drive shafts used: Immediately behind the pto drive shaft with the slip clutch

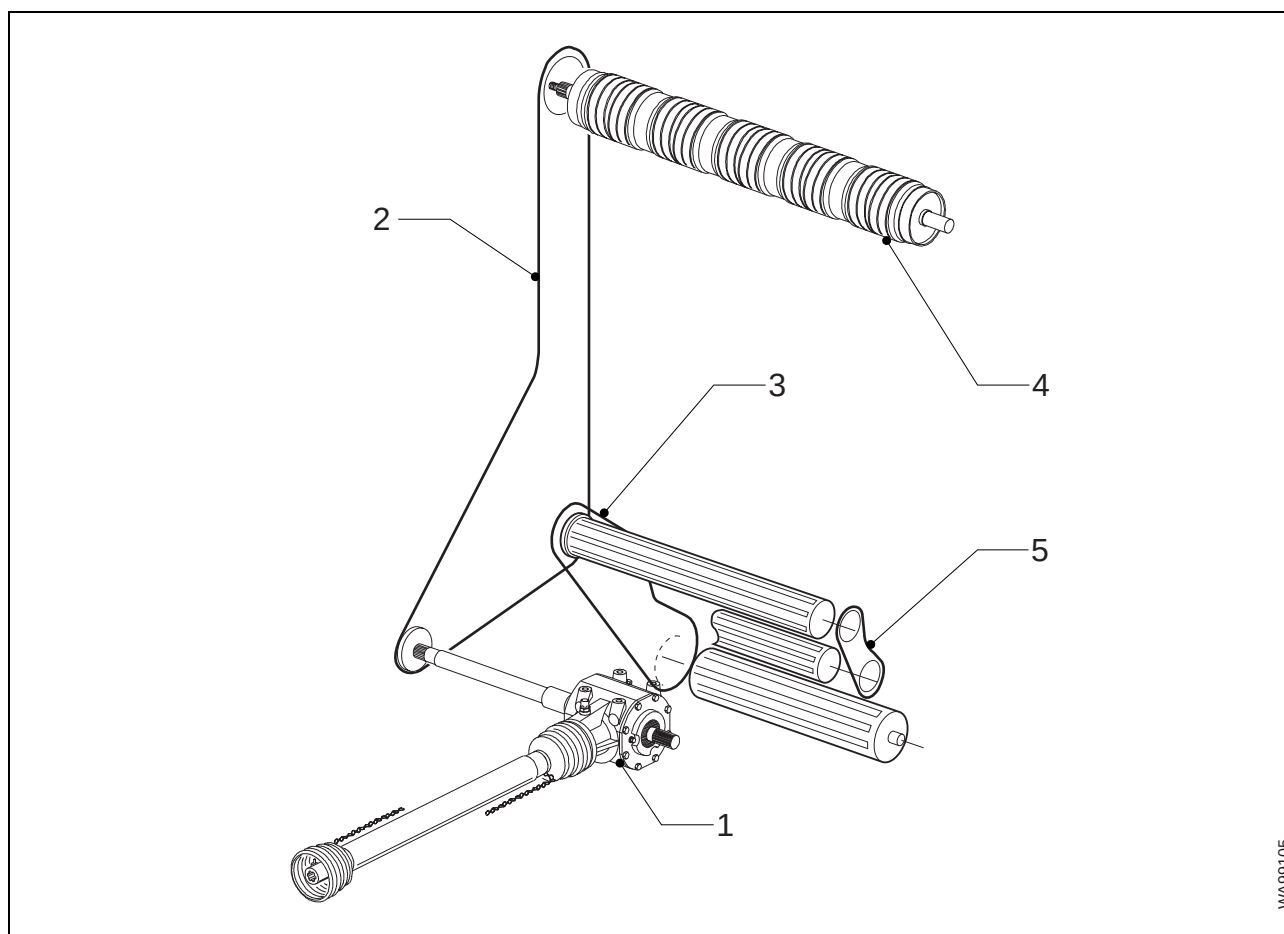
- with **slip clutch**: only on open throat intake i.e. without rotor;



- with **cam type slip clutch**: used on OPTICUT and rotor intake balers.



12.5.1 Drive schematic



Immediately behind the pto drive shaft with the slip clutch the drive is via an angle drive gear box (1), at the rh side of the machine, to the main chain (2).

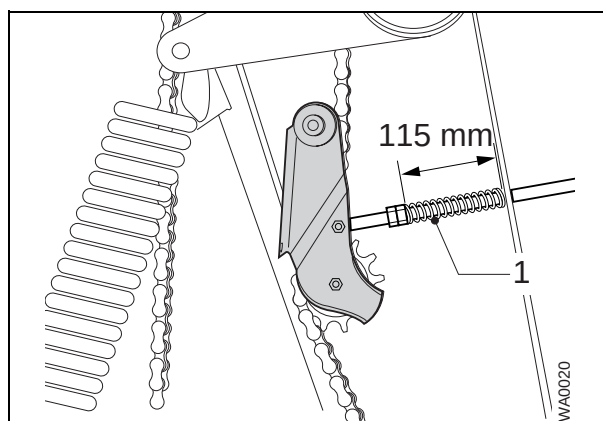
This main chain passes over two sprockets and through that it powers the drive roller (4) on top of the machine as well as the roller at the bottom of the machine. On machines with open throat intake an additional sprocket pushes the chain to the machine.

The powered starter roller transmits the power onto the lh machine side through a chain (5) to the other starter roller.

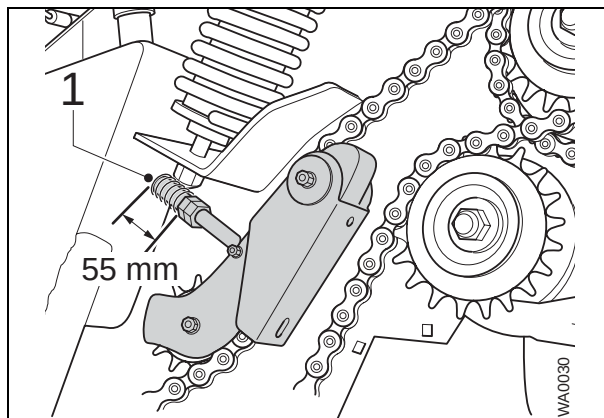
12.5.2 Adjustments

Two drive chains on the rh side of the machine are tensioned by spring loaded tensioners. Check the chain tension **every 1,000 bales** measuring the spring length.

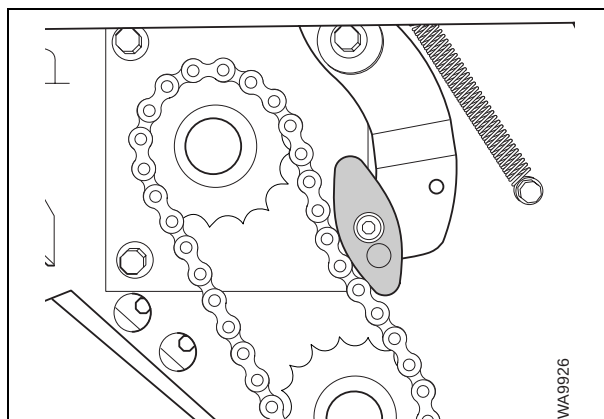
- 1 Setting of spring (1) (main drive): **115 mm (4-17/32")**.



- 2 Setting of spring (1) (starter roller drive): **55 mm (2-5/32")**



- 3 The chain on the lh side is tensioned as well by a spring load but it can not be retensioned.



12.6 Lubrication



DANGER:

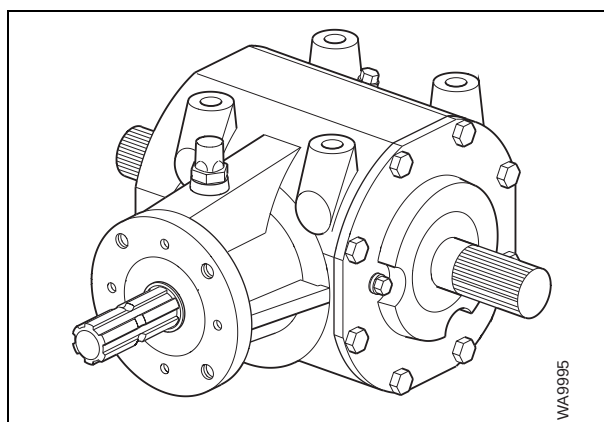
Never lubricate a running chain!

When the optional automatic chain lubrication system is installed the chains are lubricated automatically. If your machine has not installed this option the chains of the bale chamber must be lubricated once a day or after 200 bales, whatever occurs first, using a chain lubricant.

12.6.1 Gear box

The gear box has been filled in the factory with 2.3 l (2 Imp.qt., 2.4 US qt) of oil.

This oil must be exchanged in the first year after 50 working hours, after that check once a year and renew every 2 years or after 20,000 bales, whatever occurs first.



13 BALE RAMP (OPTION)

A bale ramp on the rear of the baler ensures the ejected bale rolls far enough to enable closing the tailgate.

13.1 Main components of the bale ramp

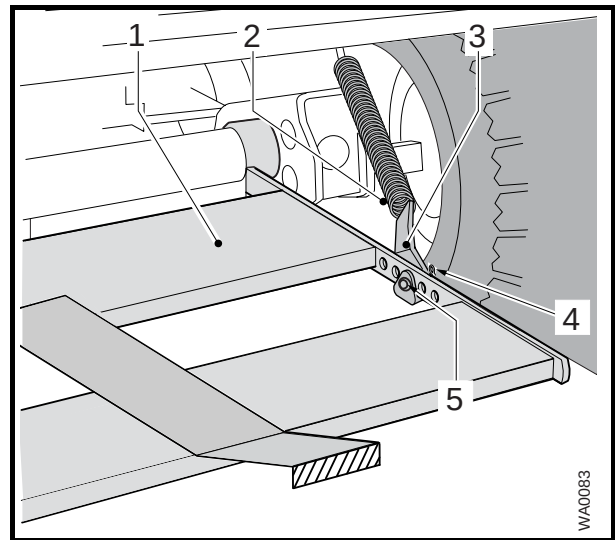
- 1 Ramp
- 2 Spring
- 3 Adjustment bracket
- 4 Spring clip
- 5 Bolt

13.2 Adjustment of the ejection force

13.2.1 Ejection force

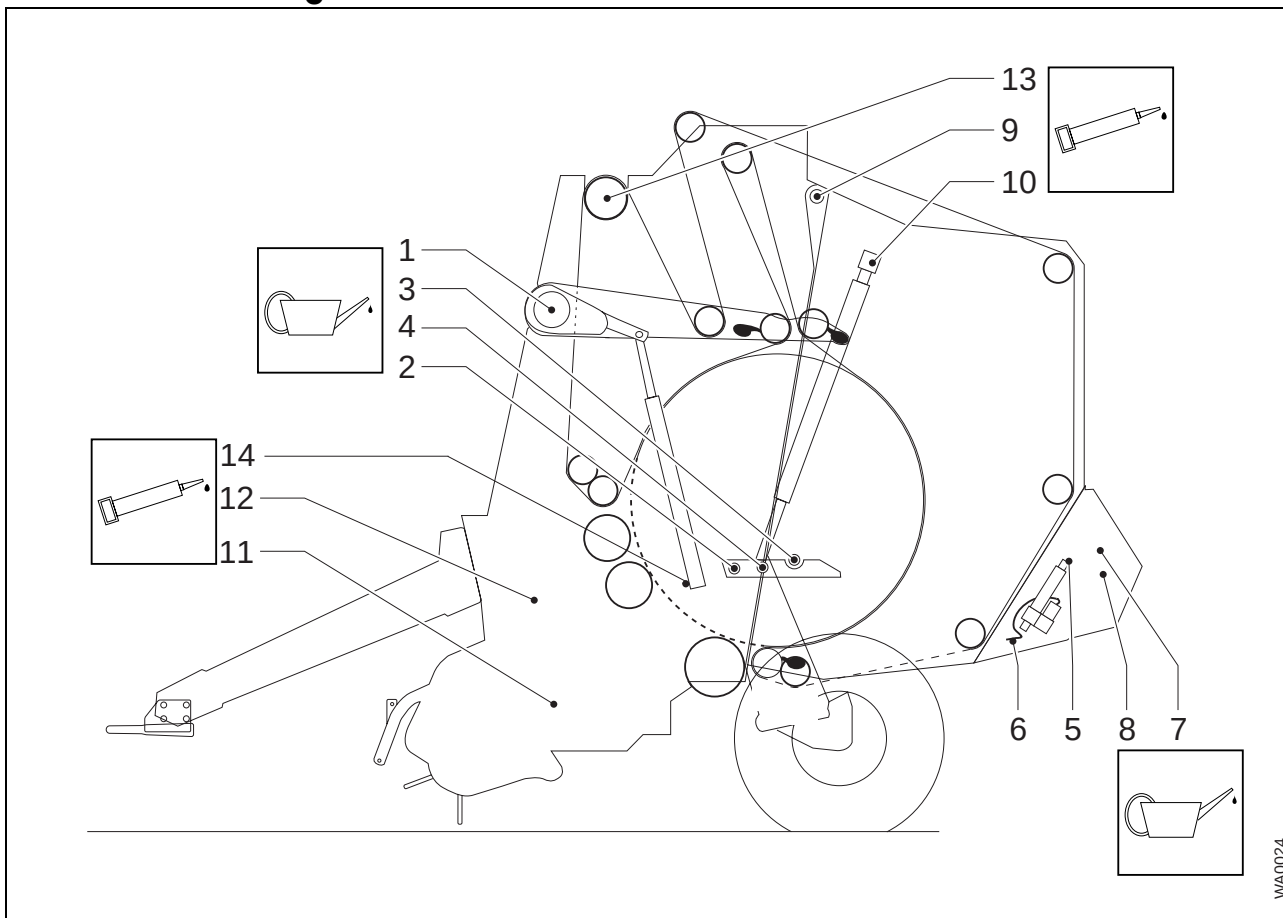
Bale weight may strongly vary. Depending upon type of crop, humidity contents and bale diameter the ejection force must be quite different.

- 1 Remove spring clip (4).
- 2 Remove bolt (5)
- 3 Move bracket (3) forward or backward as required.
- 4 Place the bolt into the next of the five holes.
- 5 Reposition spring clip (4).
- 6 Check ejection force with next bale.
- 7 Readjust ejection force if required (repeat steps starting at step 1).



14 GENERAL MAINTENANCE

14.1 Lubrication diagram



- | | |
|--------------------------------|--------------------------------------|
| 1 Tension arm | 8 Pressure plate hinge |
| 2 Hinge of tailgate lock | 9 Tailgate hinges |
| 3 Tailgate locking pin | 10 Top tailgate cylinder |
| 4 Attachment tailgate cylinder | 11 Rotor/cutting unit |
| 5 Top of actuator spindle | 12 Coupling cutting unit |
| 6 Bottom of actuator | 13 Drive roller |
| 7 Cutting plate hinge | 14 Bottom end of tensioning cylinder |

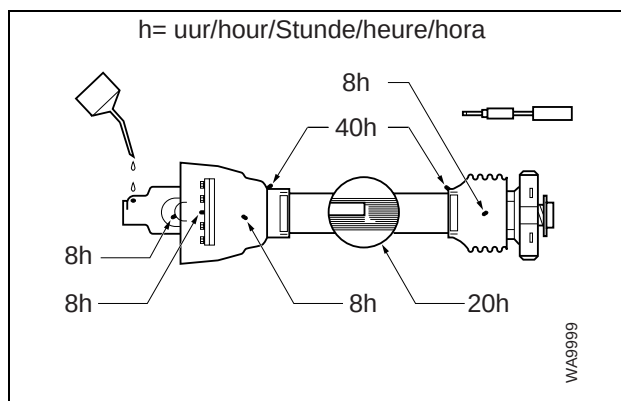
Lubricate following points every 10 working hours:

Part/assy	Oil	Grease
All hinges 1 through 8	X	
Hinges 9 through 10		X
Drive roller		X

Oil: class NLGI2, K2k in acc. with DIN51825

Grease: Multipurpose grease

For the pto drive shaft this lubrication diagram applies.



14.2 Torque values for international metric thread joints

All bolted joints on this machine must be torqued in accordance with the values given in this table below unless indicated otherwise (e.g. in Parts List or Installation Instruction, etc.)

On all Kverneland Geldrop machines 8.8 is both standard and minimum quality used. If not indicated anyhow use this quality for determination of torque (in most cases the quality can be found on the head of the respective bolt).

Thread	Torque value						Size of jaw***	
	8.8*		10.9*		12.9*			
	Nm	ft-lb**	Nm	ft-lb**	Nm	ft-lb**	mm	inch
M3	1.3	(11.5)	1.8	(16)	2.1	(18.6)	6	7/32
M4	2.9	(25.5)	4.1	(36.5)	4.9	(43.5)	7	9/32
M5	5.7	(50.5)	8.1	(71.5)	9.7	(86)	8	5/16
M6	9.9	7.3	14	10.3	17	12.5	10	13/32
M8	24	17.7	34	25	41	30.3	13	33/64
M10	48	35.4	68	50.2	81	59.8	17 (15)	11/16
M12	85	62.7	120	88.6	145	107	19 (17)	3/4
M14	135	99.6	190	140	225	166	22 (19)	7/8
M16	210	155	290	214	350	258	24 (22)	1 1/8
M18	290	214	400	295	480	354	27	1 9/16
M20	400	295	570	421	680	502	30	1 3/8
M22	550	406	770	568	920	679	32	1 7/8
M24	700	517	980	723	1180	871	36	1 7/8
M27	1040	767	1460	1077	1750	1291	41	1 7/8
M30	1410	1041	1980	1461	2350	1734	46	1 13/16
M33	1910	1410	2700	1996	3200	2362	50	1 31/32
M36	2450	1808	3450	2546	4150	3063	55	2 11/16
M39	3200	2362	4500	3321	5400	3985	60	2 3/8



* Material quality in acc. with DIN ISO 898.

** Value in brackets means inch-pounds (in-lb).

*** Size of jaw of lock bolts and nuts with toothed flange are given (metric values only) in brackets if different from standard.

- The listed values are applicable for dry or slightly oiled joints.
- When a stiff grease is applied decrease the given value by 10%. Do not use plated bolts/screws/nuts without grease.
- In case lock nuts, lock screws or lock bolts are used the given value must be increased by 10%.
- Torque value of wheel nuts M18x1,5 shall be 270 Nm (200 ft-lb)!

Tensile strength	Material quality acc. to DIN ISO 898			
	8.8		10.9	12.9
	up to and incl. M16	over M16		
N/mm ²	808	830	1040	1220
lbf/sq.in.	117,222	120,414	150,880	176,994

14.3 Conversion table for units of measurement



SI-units have been printed in *italic characters*

Length

1 <i>m</i>	1000 <i>mm</i>	39 3/8 in	3.2809 ft	
1 <i>mm</i>	0.03937 in	5/128 in		
1 <i>km</i>	3280.9 ft	0.6214 mi	0.5396 NM	
1 mi	1.6093 <i>km</i>	1609.3 <i>m</i>		
1 NM	1.8532 <i>km</i>	1.1515 mi	6080 ft	
1 yd	36 in	3 ft	0.914 <i>m</i>	
1 in	1"	25.4 <i>mm</i>	0.0833 ft	1/12 ft
1 ft	1'	12 in	304.8 <i>mm</i>	30.48 <i>cm</i>

Area

1 <i>m</i> ²	0.01 a	10.764 sq.ft.
1 a	100 <i>m</i> ²	1076.4 sq.ft.
1 ha	100 a	2.47 acre
1 acre	0.4 ha	

Volume

1 <i>m</i> ³	1000 <i>dm</i> ³	35.3 cu.ft.	
1 <i>dm</i> ³	1 l	1.057 US qt(fl)	0.88 Imp.qt.
1 cu.in.	16.387 <i>cm</i> ³		
1 cu.ft.	28.317 <i>dm</i> ³		
1 Imp.bu.	8 Imp.gal.	36.368 l	
1 US bu	8 US gal(dry)	9.308 US gal(fl)	35.232 l

Force and weight

1 N	0.102 kg(f)	0.22487 lb(f)
1 kg(f)	9.8 N	2.2046 lb(f)
1 lb(f)	4.4447 N	

Pressure and tension

1 bar	1.02 at	0.987 atm	14.5 psi	100 kPa
1 psi	0.0689 bar	6.89 kPa		

Work and torque

1 Nm	1 J	0.102 kg(f)m	1 Ws	0.738 ft-lb(f)
1 ft-lb(f)	1.356 Nm	12 in-lb(f)		
1 in-lb(f)	0.113 Nm			

Power

1 kW	1000 W	0.738 ft-lb(f)/s	1.36 pk	1.34 hp	
1 pk	1 PS	1 cv	1 cf	0.7355 kW	0.986 hp
1 hp	0.7457 kW				
1 Btu/h	0.2930 W				

Speed of rotation

1 rpm	1/min	1/60 Hz	
1 Hz	1 cps	1/s	60 rpm

Forward speed

1 km/h	0.27778 m/s	0.6214 mph	1 kph	0.9113 fps
1 mph	1.609 km/h	0.4470 m/s	1.466 fps	

14.4 End of season storage

Store the baler at the end of the season in a dry space. Take care that the machine can not be damaged by rodents or martens (martens like rubber parts).

14.5 Prior to storing the machine perform the following:

- 1 Thoroughly clean the baler, remove all crop residues.
- 2 Release pick-up springs and lower pick-up.
- 3 Remove all twine and/or net.
- 4 Protect the bright metall parts on
 - rollers,
 - pick-up,
 - pick-up guide tracks,
 - cylinder and piston rods
 - pick-up guides;
 - pistons of cylinders.
- 5 using oil, grease or a corrosion preventive.
- 6 Store the control box in a dry and dust free room free from rodents, insects and martens.

14.6 Checks at beginning of the season

Slip clutch (on open throat intake only).

Prior to beginning the new season with your baler check the function of the slip clutch.

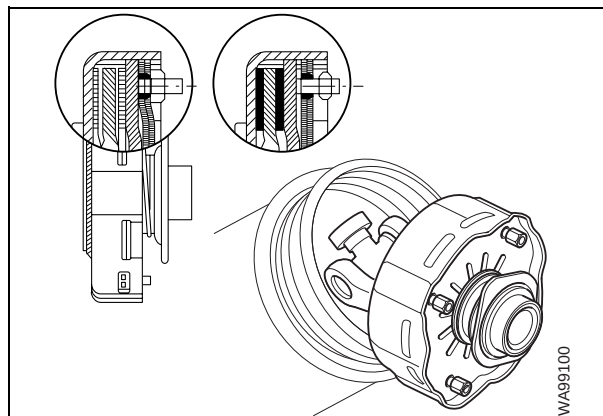
Procedure:

- 1 Tighten the four tension nuts.
- 2 Rotate the clutch by hand: it must rotate freely.
- 3 Release the tension nuts in order to make the clutch ready for use.



Attention:

If the clutch cannot be rotated when all nuts are tightened the clutch must be renewed!



14.7 Technical specification

Model	WD			WA		
Type	RV1601	RV1601R	RV1601OC	RV1901	RV1901R	RV1901OC
Length	4.02 m (13'3")			4.12 m (13'6")		
Length (with net wrap)	4.26 m			4.38 m		
Width	2.56 m (8'5")			2.56 m (8'5")		
Heigth	2.67 m (8'9")			2.87 m (9'5")		
Heigth (tail-gate open)	3.74 m (12'4")			3.77 m (12'5")		
Mass	2170 kg (4784 lb)	2450 kg (5402 lb)	2555 kg (5633 lb)	2220 kg (4895 lb)	2500 kg (5512 lb)	2610 kg (5754 lb)
Mass of net wrap	130 kg (287 lb)			130 kg (287 lb)		
Max. transport speed	30 km/h (18 mph)			30 km/h (18 mph)		
Tyres	15.0/55-17			15.0/55-17		
Pick-up:						
Pick-up width	2.10 m (6'11")			2.10 m (6'11")		
Number of tine bars	4			4		
Control	Hydraulic			Hydraulic		
Gauge wheels	Pneumatic			Pneumatic		
Overload protection	Slip clutch			Slip clutch		
Intake system	Open throat	Rotor	Rotor	Open throat	Rotor	Rotor
Cutting possibilities	-	-	14 / 23	-	-	14 / 23
Knife distance	-	-	100 / 70 mm (3.93/2.75")	-	-	100 / 70 mm (3.93/2.75")
Filler plates	-	-	Option	-	-	Option
Bale chamber						
Number of belts	5			5		
Number of rollers	3			3		
Net wrap	Option			Option		
Twine	Sisal 200 - 330 m/kg (100 -164 yd/lb) Synthetic yarn 400 - 700 m/kg (220 - 350 yd/lb)			Sisal 200 - 330 m/kg (100 -164 yd/lb) Synthetic yarn 400 - 700 m/kg (220 - 350 yd/lb)		
Net:	Recommended: Tama edge-to-edge or Polydress Rondotex MX 1000					

Max. roll diameter	32 cm (12 1/2") (3000 m; 3280 yd)			32 cm (12 1/2") (3000 m; 3280 yd)		
Width	123 - 130 cm (4' - 4'3")			123 - 130 cm (4' - 4'3")		
Pto drive shaft:						
Shearbolt	Infobale only	-	-	Infobale only	-	-
Slipclutch	Standard	-	-	Standard	-	-
Camclutch	Option	Standard	Standard	Option	Standard	Standard

14.8 Tractor requirements

Power req.	40 kW (54 hp)	50 kW (67 hp)	60 kW (80.5 hp)	40 kW (54 hp)	50 kW (67 hp)	60 kW (80.5 hp)
Pto speed	540 rpm			540 rpm		
Electr. system	12 V DC (minus pole connected to mass)			12 V DC (minus pole connected to mass)		
Hydr. system	1 double act. valve 1 single act. valve Opticut 23 knives: 2 double acting valves.			1 double act. valve 1 single act. valve Opticut 23 knives: 2 double acting valves.		
Max. hydr. pressure	200 bar (2900 psi)			200 bar (2900 psi)		
Hitch height	33 - 56 cm (12.9" - 22") 81 - 109 cm (31.9 " - 42.9")			33 - 56 cm (12.9" - 22") 81 - 109 cm (31.9 " - 42.9")		

15 OPTIONAL EQUIPMENT**15.1 INFOBALE**

ITEM WITH PN	WD1601	WD1601R	WD1601OC	WA1901	WA1901R	WA1901OC
Draw bar swivel hitch 25265014	X	X	X	X	X	X
Draw bar clevis 2527645	X	X	X	X	X	X
Wheel chocks, set BR00502	X	X	X	X	X	X
1 wheel with extra wide tyre (19.0/45x17) 1661526800	X	X	X	X	X	X
Bale kicker WA00501	X	X	X	X	X	X
Lubrication system WA00725	X	X	X	X	X	X
Mechanical soft core WA0039	X	X	X	X	X	X
Belt repair tool (MATO) WA00751	X	X	X	X	X	X
Belt repair set (5 belts) WA00752	X	X	X	X	X	X
14 Dummy knives, set WA001046	-	-	X	-	-	X
Hitch assy WA00784	X	X	X	X	X	X

15.2 AUTOFORM

ITEM WITH PN	WD1601	WD1601R	WD1601OC	WA1901	WA1901R	WA1901OC
Draw bar swivel hitch 25265014	X	X	X	X	X	X
Draw bar clevis 2527645	X	X	X	X	X	X
Wheel chocks, set BR00502	X	X	X	X	X	X
1 wheel with extra wide tyre (19.0/45x17) 1661526800	X	X	X	X	X	X
Electric twine run control WA00384	X	X	X	X	X	X
Bale kicker WA00501	X	X	X	X	X	X
Lubrication system WA00725	X	X	X	X	X	X
Mixed chamber in-cab control WA00750	X	X	X	X	X	X
Belt repair tool (MATO) WA00751	X	X	X	X	X	X
Belt repair set (5 belts) WA00752	X	X	X	X	X	X
14 Dummy knives, set WA001046	-	-	X	-	-	X
Flax kit WA001035	X	-	-	X	-	-
Hitch assy WA00784	X	X	X	X	X	X



KVERNELAND GELDROP BV
Nuenenseweg 165
Postbus 9
NL-5660AA Geldrop
The Netherlands

Tel. +31 40 289 33 00
Fax +31 40 285 32 15

Production series number (PSN): 04WA02 / 04WD02 / 04WN01

Product Identification Number (PIN):

WA000778
WD001069
WN000959