Large Square Baler BiG Pack

Driver Training

Name: _____

Company: _____

Date of training: _____

Version: 20_01

2. Design Construction

Product programme

Type	Working width Pick-up, m	Channel dimension Width x height, m	Bale length, m	Power requirement, kW / HP	Tying	Running Gear
BiG Pack 870 HDP MultiBale	Easy Flow Active pick-up (with actively driven feed roller) 2.35	0.80 x 0.70	0.50 – 2.70 MultiBale 0.30 - 1.35	from 105 / 143	Five double knotters	Rigid tandem axle (standard equipment) Steered tandem axle
BiG Pack 870 HDP XC MultiBale				from 120 / 163		Rigid tandem axle (standard equipment) Steered tandem axle

2. Design Construction

Product programme

Type	Working width Pick-up, m	Channel dimension Width x height, m	Bale length, m	Power requirement, kW / HP	Tying	Running Gear
BiG Pack 890	Easy Flow Active pick-up (with actively driven feed roller) 2.35	0.80 x 0.90	1.00 - 2.70	from 80 / 109	Four double knotters	Single axle (standard equipment) Rigid tandem axle Steered tandem axle
BiG Pack 890 XC				from 95 / 129		Rigid tandem axle (standard equipment) Steered tandem axle

2. Design Construction

Product programme

Type	Working width Pick-up, m	Channel dimension Width x height, m	Bale length, m	Power requirement, kW / HP	Tying	Running Gear
BiG Pack 1270	Easy Flow Active pick-up (with actively driven feed roller) 2.35	1.20 x 0.70	1.00 – 2.70	from 85 / 116	Standard: 6 single knotters Option: 6 double knotters	Rigid tandem axle (standard) Steered tandem axle
BiG Pack 1270 MultiBale			1.00 – 2.70 MultiBale 0.30 - 1.35		6 double knotters	Rigid tandem axle (standard) Steered tandem axle
BiG Pack 1270 XC			1.00 – 2.70	from 100 / 136	Standard: 6 single knotters Option: 6 double knotters	Rigid tandem axle (standard) Steered tandem axle
BiG Pack 1270 XC MultiBale			1.00 – 2.70 MultiBale 0.30 - 1.35		6 double knotters	Rigid tandem axle (standard) Steered tandem axle
BiG Pack 1270 VC			1.00 – 2.70	from 138 / 185	Standard: 6 single knotters Option: 6 double knotters	Rigid tandem axle (standard) Steered tandem axle
BiG Pack 1270 VC MultiBale			1.00 – 2.70 MultiBale 0.30 - 1.35		6 double knotters	Rigid tandem axle (standard) Steered tandem axle

2. Design Construction

Product programme

Type	Working width Pick-up, m	Channel dimension Width x height, m	Bale length, m	Power requirement, kW / HP	Tying	Running Gear
BiG Pack 1290	Easy Flow Active pick-up (with actively driven feed roller) 2.35	1.20 x 0.90	1.00 – 2.70	from 90 / 122	Six double knotters	Rigid tandem axle (standard) Steered tandem axle
BiG Pack 1290 XC				from 105 / 143		Rigid tandem axle (standard) Steered tandem axle
BiG Pack 1290 HDP			1.00 – 3.20	from 130 / 177		Rigid tandem axle (standard) Steered tandem axle
BiG Pack 1290 HDP XC				from 145 / 197		Steered tandem axle
BiG Pack 1290 HDP VC				from 182 / 243		Steered tandem axle

2. Design Construction

Product programme

Type	Working width Pick-up, m	Channel dimension Width x height, m	Bale length, m	Power requirement, kW / HP	Tying	Running Gear
BiG Pack 4x4	Easy Flow Active pick-up (with actively driven feed roller) 2.35	1.20 x 1.30	1.00 – 3.20	from 130 / 177	Six double knotters	Steered tandem axle
BiG Pack 4x4 XC				from 145 / 197		

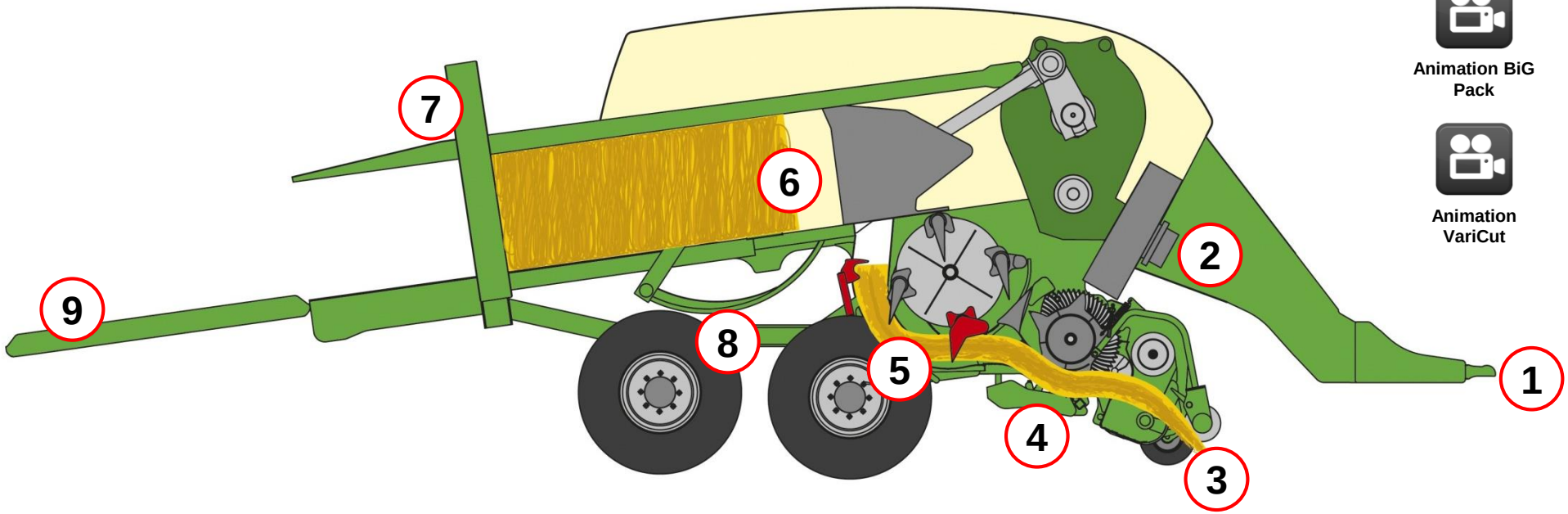
2. Design Construction

Type	Working width Pick-up, mm	Chamber width Width x height, mm	Bale length, mm	Power requirement, kW / hp	Tying	Chassis
BiG Pack 1290 HDP II	EasyFlow Active pick-up 2,350 (with actively driven feed roller)	1,200 x 900	1,000 - 3,200	170 / 230	Eight double knotters	16 tons tandem axle steered
BiG Pack 1290 HDP II XC				190 / 260		

2. Design Construction

Functional description of large square baler

1. Hitch at tow coupling or swinging drawbar **(1)**.
2. Drive via universal shafts - Torque transmission to a flywheel **(2)** into the main gearbox.
3. A pick-up receives the crops **(3)** - a crop press roller unit and a feed roller **(4)** ensure continuous crop flow.
4. A cutting rotor ensures even cutting.
5. A packer **(5)** collects the crops and transports even layers into the bale channel **(6)**.
6. A plunger presses the individual layers to a highly compacted big bale.
7. Up to six hydraulic cylinders force three baling flaps against the big bale thus creating a resistance **(7)**. The force with which the plunger acts on the crops is electronically controlled by changing the pressure in the hydraulic cylinders at the bale channel flaps.
8. When the adjusted bale length has been reached, the star wheel projecting into the bale channel triggers the knotting mechanism. The knotter ties the big bales to individual bales.
9. A bale chute deposits the individual bales **(9)**.



Animation BiG Pack

Animation VariCut

2. Design Construction

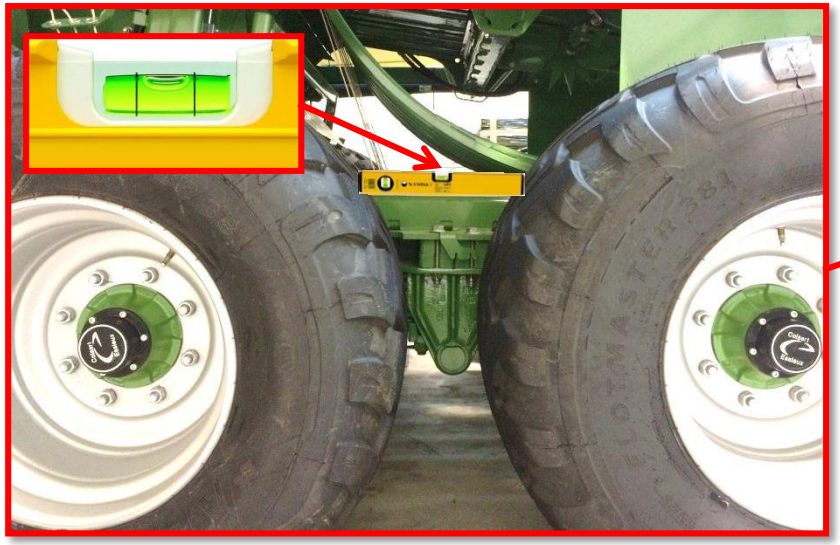
Aligning the machine

To ensure that the crops are optimally picked up and a higher throughput is achieved, the large square baler must be hitched **horizontally**.

The cross member of all BiG Pack models can be used as the alignment edge for the purpose.

Procedure:

– Align the machine horizontally with the help of the support jack.
– If the height of the BiG Pack does not match to hitch height of the tractor, the front part **(1)** must be screwed higher or deeper.



2. Design Construction

Hydraulic connections

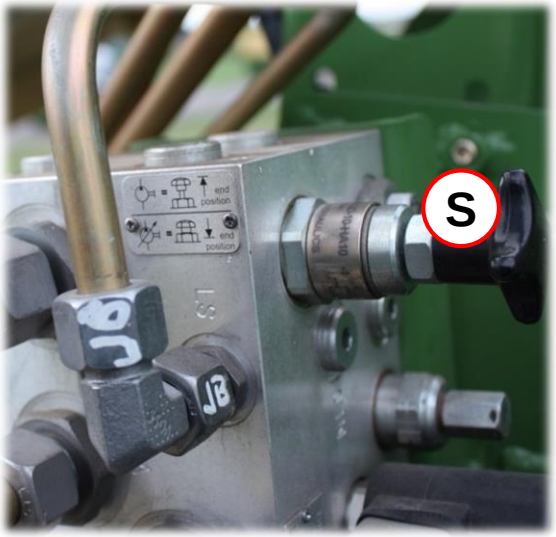
The hydraulic connections have handles marked in colours. The marking depends on the function. Depending on the delivered design, different connections are required for the large square baler.

The comfort hydraulics is suitable for the Load Sensing system.

Oil is supplied via the Power Beyond system connection of the tractor hydraulics for using the Load Sensing system. The comfort hydraulics of the machines must be adapted to the tractor and is designed for recirculation. The system screw **(S)** on the valve block is used for adjustment.

Connections	Comfort equipment
P	Pressure line (NW 15)
T	Return line (NW 18)
LS	LS signal line (NW 12)
1+	Raise/lower pick-up
2+	Raising support jack
2-	Lowering support jack

Connections	Medium equipment
2+	Closing the blade cassette; Raise/lower support jack; Move in/out bale ejector; Open/close bale chute
2-	Open blade cassette;
1+	Raise/lower pick-up
3+	Lock/release steering axle
5+	Starter aid pressure
5-	Starter aid return flow



Screw system screw **(S)** out up to the stop for:
– tractors with an open (constant flow) hydraulic system
– tractors with an LS pump and not connected LS signal line

Screw system screw **(S)** in up to the stop for:
– tractors with a closed (constant pressure and/or Load Sensing) hydraulic system
– tractors equipped with an LS pump and at the same time connected signal line

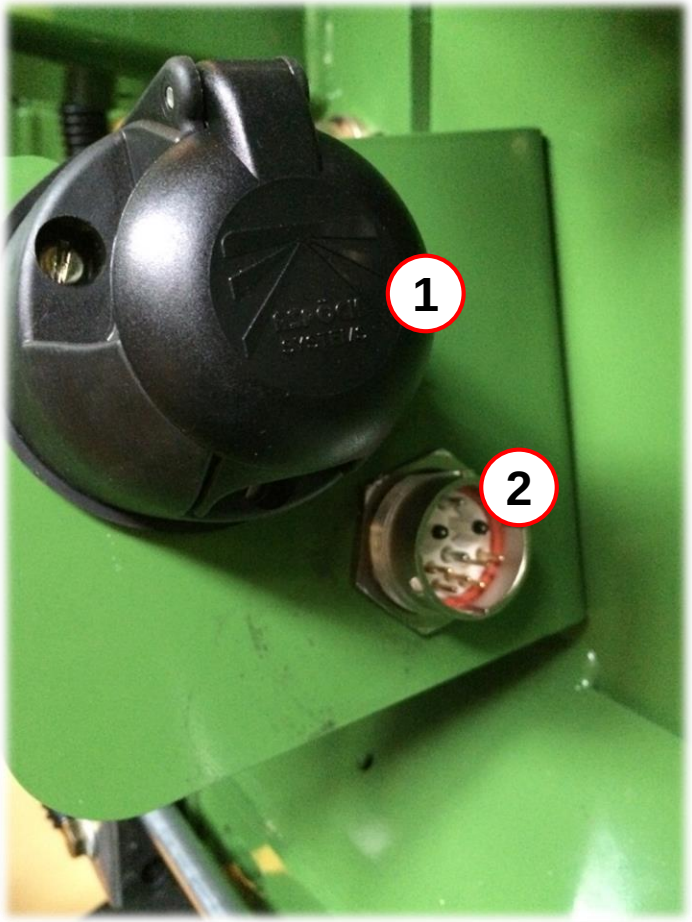
Never adjust the system screw under pressure! Risk of damage!

2. Design Construction

Electrical connections

- Lighting of the large square baler via the 7-pin socket **(1)**
- Connection of tractor and machine CAN & voltage via the 11-pin plug **(2)**

ISOBUS cable 1.0



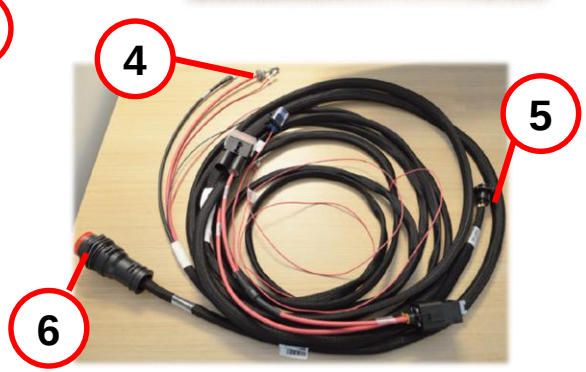
2. Design Construction

Connection terminal → machine

Tractors with ISOBUS system

The terminal is connected with the In-Cab socket of the tractor via the connection cable **(2)**.

The ISOBUS socket at the rear of the tractor is connected with the interface on the baler via the ISOBUS cable 1.0 **(3)**.



Tractors without ISOBUS system

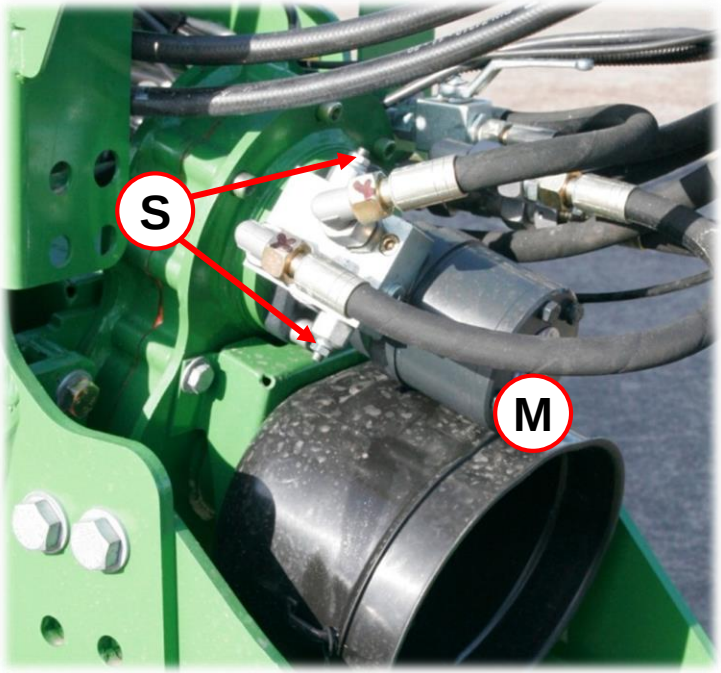
The tractor must be equipped with the KRONE ISOBUS retrofit kit. It includes an ISOBUS socket **(6)** for the rear of the tractor, an In-Cab socket **(5)** and is connected directly with the tractor battery **(4)**.

The ISOBUS socket at the rear of the tractor is connected with the interface on the baler via the ISOBUS cable 1.0 **(3)**.

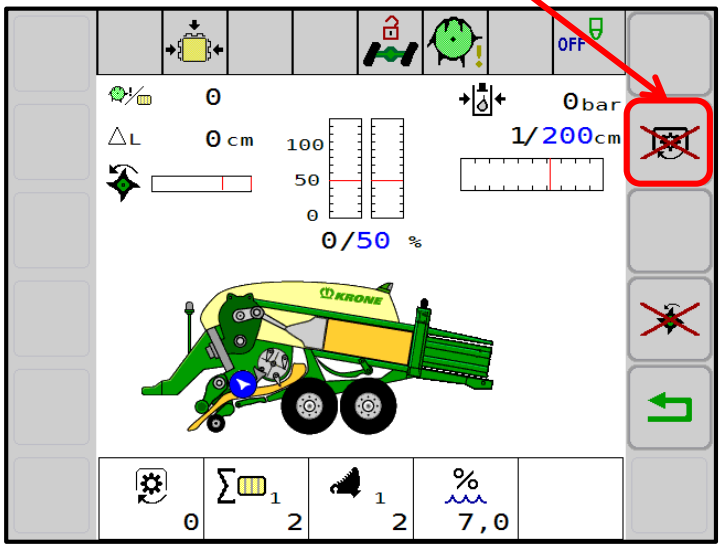
3. Assistance Systems

Starter aid (option)

When the machine is started, high load peaks and load torques are produced in the PTO drive train of the tractor. By installing the optional start-up device the flywheel of the baler is started and pre-accelerated by the hydraulic motor **(M)**. Then the PTO shaft of the tractor is connected and accelerated further to **1000 rpm**. When the main gearbox has reached the rotational speed of **350 rpm**, the starter aid turns off automatically. The automatic switch-off can be implemented only for the comfort hydraulics. For the medium hydraulics, a double-acting control unit of the tractor is used for supply. The shock valves **(S)** protect the motor **(M)** from pressure peaks.



Button Starting aid activate



The freewheel included in the scope of delivery must be additionally integrated in the universal shaft between the tractor and starter aid for tractors with a braked PTO shaft end. It may also be necessary to replace the universal joint of the universal shaft.

The displacement of the hydraulic motor is 315 cm³.

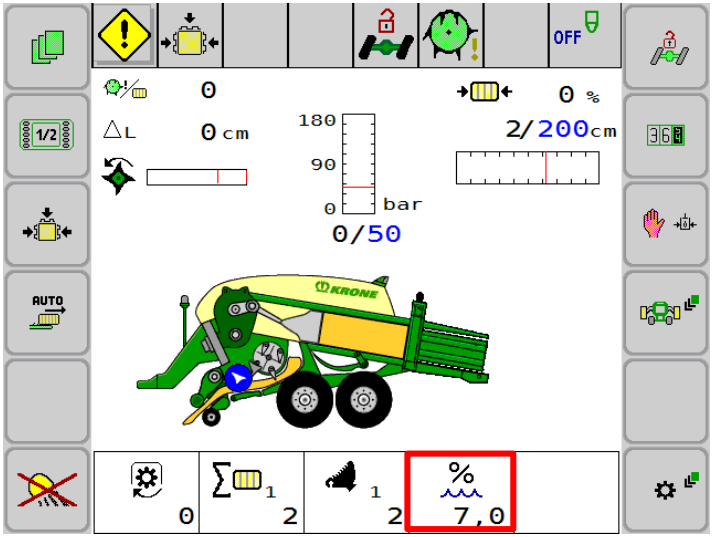
For the **BiG Pack with PreChop** machine, two hydraulic motors connected in parallel with 250 cm³ each are used for the starter aid!

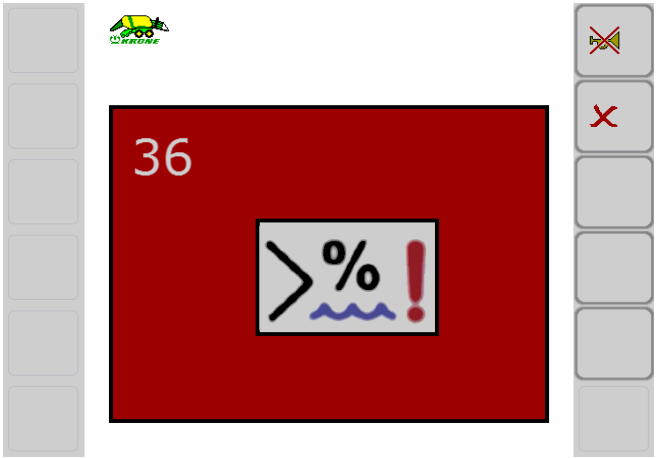
3. Assistance Systems

Bale moisture measuring device (option)

An optional bale moisture measuring device can be mounted on the BiG Pack machine. It is integrated in the on-board electronic system to allow reading the measured values on the screen. It is possible to set a desired threshold. It the threshold is exceeded, a warning is shown automatically.

The moisture measurement is of informative nature and has no influence on the operating functions of the baler.





3. Assistance Systems

Bale scale (option)

The weight of the individual bales is measured on the bale chute. A bale chute with an integrated bale scale is installed for the purpose. The additional sensors are integrated in the on-board electronic system and each bale weight is communicated in the terminal.

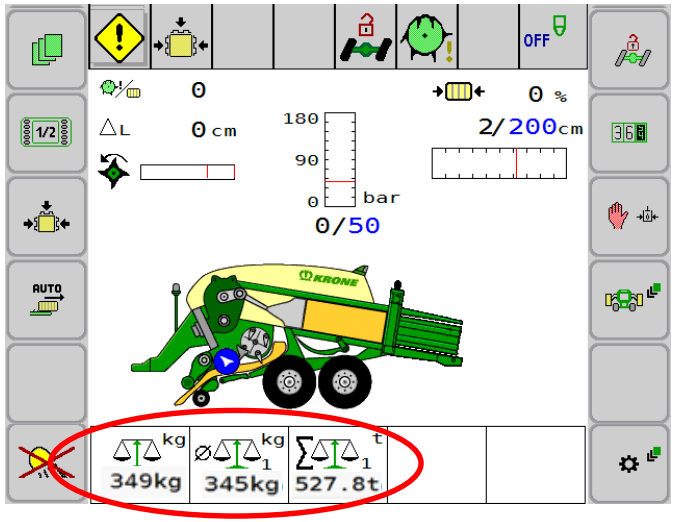
Working screen displays:

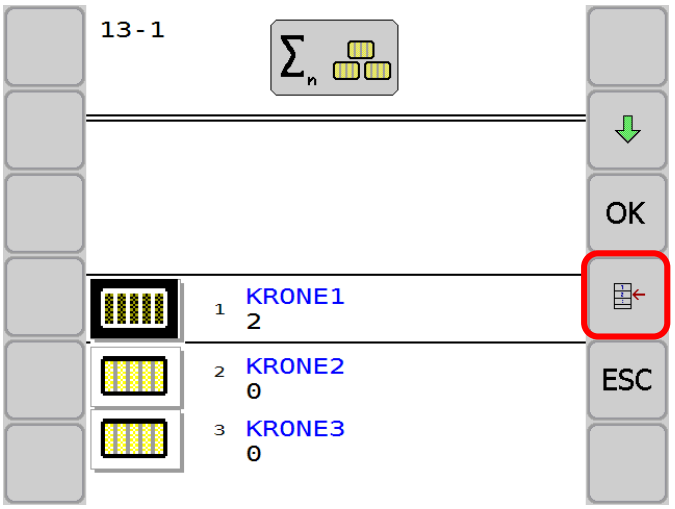
- Bale weight of the bale weighted last. If a current weighing process is going on, the scale icon rocks back and forth.
- Average bale weight of the selected customer
- Total weight of the bales of the selected customer

Displays of the detailed screen of the customer counter:

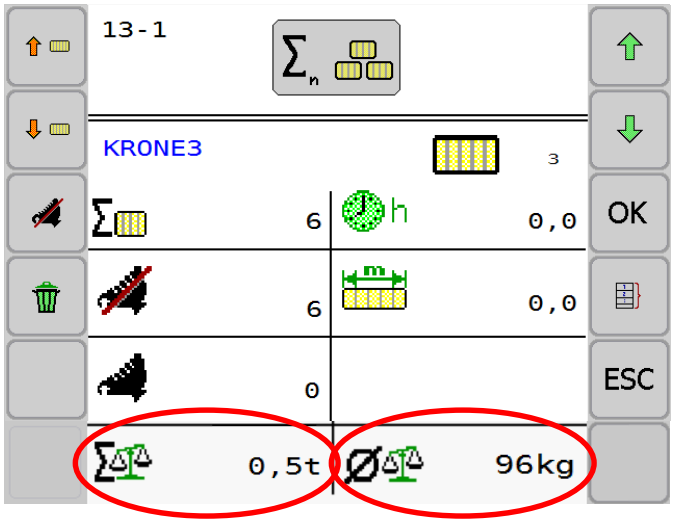
- Average bale weight of the selected customer
- Total weight of the bales of the selected customer

Working screen





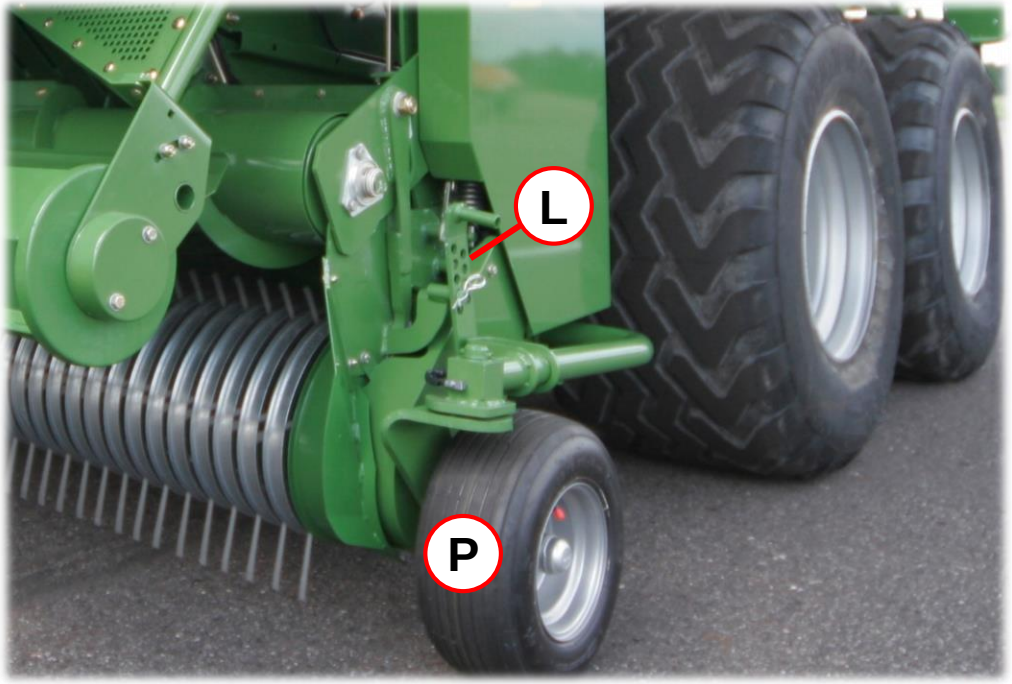
Detailed screen

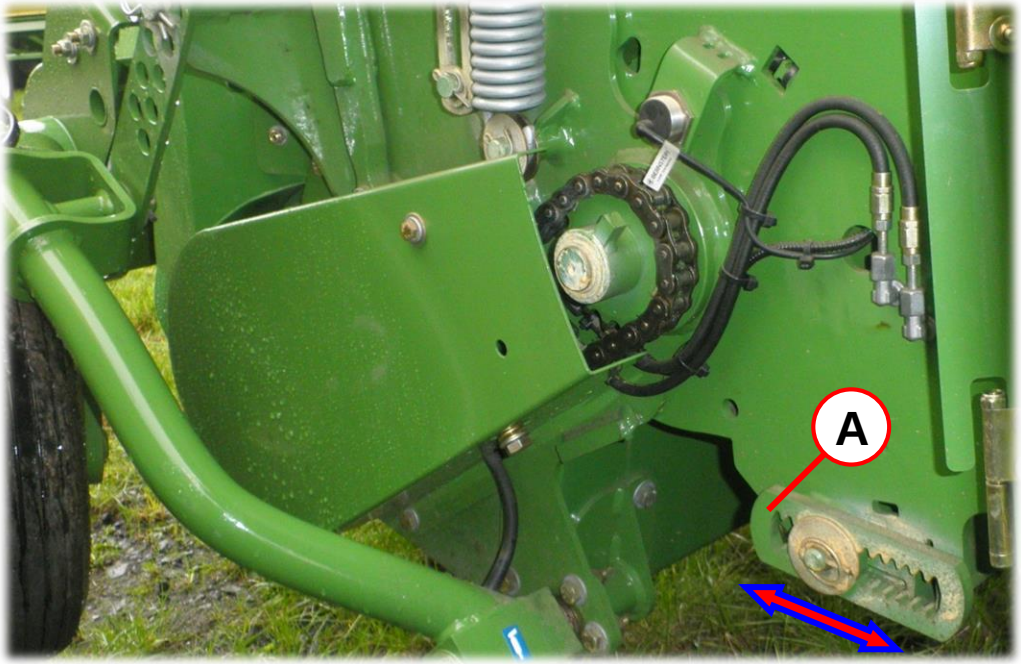


4. Crop Flow

Pick-up: castor-mounted guide wheels height setting

- The castor-mounted guide wheels **(F)** ensure fast adjustment of the pick-up to the ground.
- No rubbing effects due to the pendulum suspension of the guide wheels.
- Setting of the working height without tools via the perforated bar **(L).**





Pick-up: depth limiter

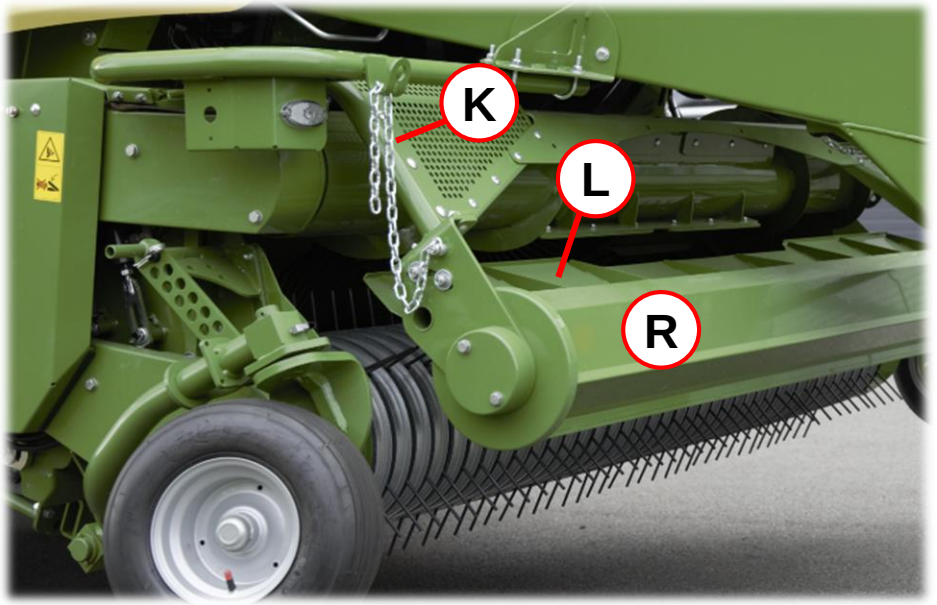
- Setting of the working height of the pick-up without tools by the depth limiter **(A)** on both sides of the machine.
- Allows driving the machine without guide wheels (e.g. when used for straw).

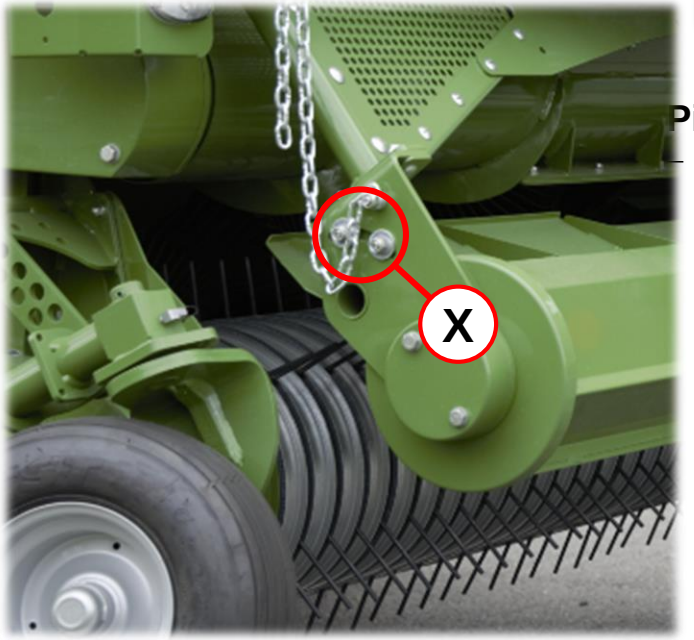
4. Crop Flow

Pick-up: crop press roller unit

- The crop press roller unit **(R)** and the deflector sheet **(L)** ensure continuous crop flow.
- The crop press roller unit presses the crops together to achieve that a larger number of stalks is in contact with the pick-up tines.
- The height of the crop press roller unit is set by the supporting chains **(K)**.
- The crop press roller unit should travel continuously over the swath with a light pressure.
- The spring **(F)** is used to adjust the bearing pressure of the crop press roller unit on the swath.

Dry forage - increase the bearing pressure
Humid forage - reduce the bearing pressure





Pick-up: deflector sheet

- The angle of the deflector sheet **(X)** can be adjusted to the swath size.

The crop flow should maximally strike at auger centre height and never above!

4. Crop Flow

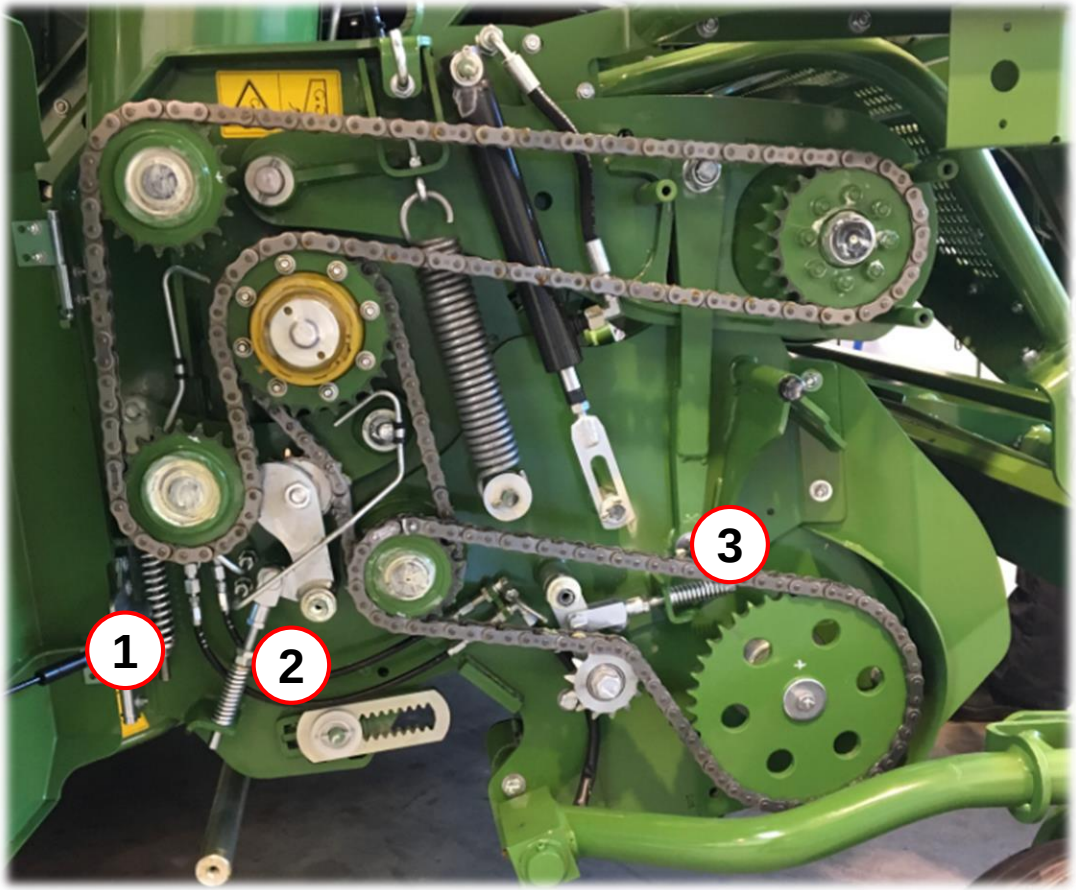
Pick-up: chain tension

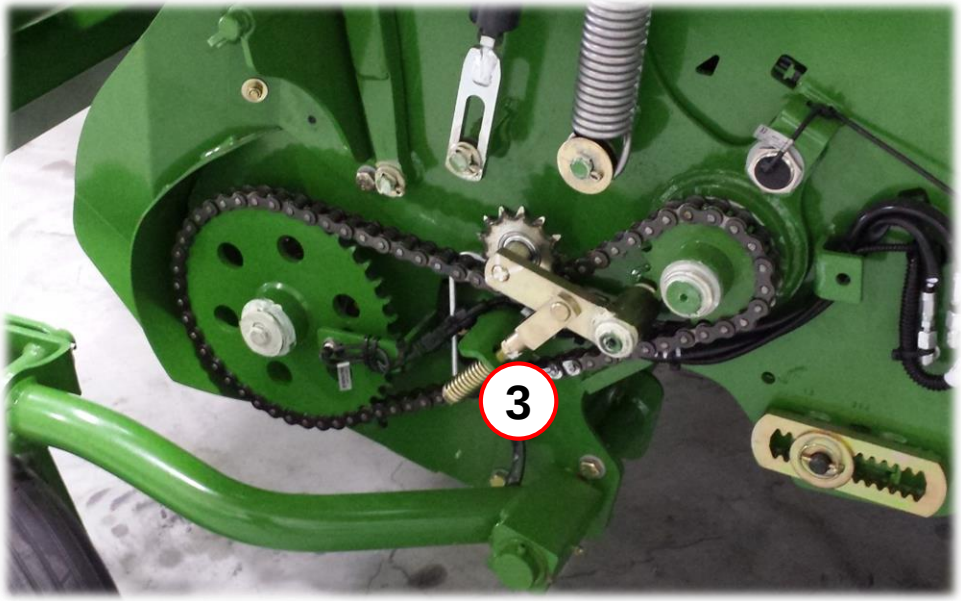
- Check the pretension of the drive chains periodically.
- Shorten the chains when they became too long.
- All drive chains are lubricated by the central lubrication.

1. Feed roller drive compression spring length = 100 mm

2. Pick-up drive compression spring length = 60 mm

3. Pick-up drive right and left machine side compression spring length = 60 mm

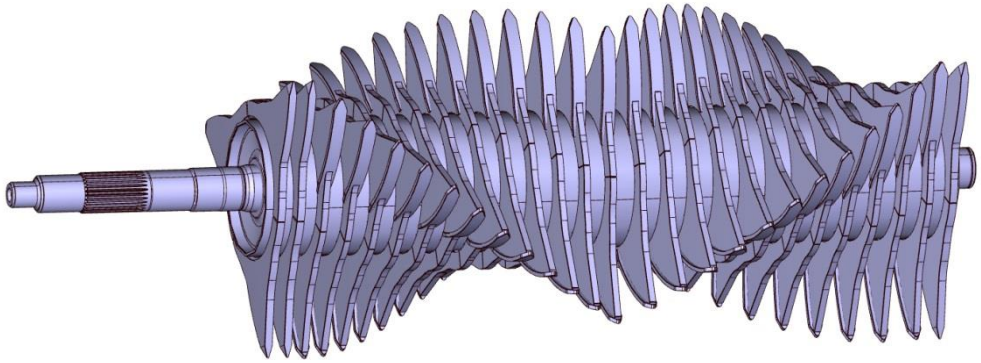




4. Crop Flow

XCut (XC) cutting mechanism: rotor

BiG Pack XC has a cutting unit with a cutting rotor and stationary blades. The cutting process is used to improve further processing of the big bale and increase baling density. The cutting rotor is also used for conveying between the pick-up and packer.
The narrow distance between the conveyor tines and the cutting blades causes the cutting rotor to perform **a drawing cut**.
The V-shape arrangement of the tines coiled towards the outside ensures that the channel is evenly filled especially when small swaths are processed.



Details:
- Cutting rotor diameter **550 mm**
- Rotational speed **154 rpm**
- **3** rows of tines
- **21 mm** wide conveyor supports of **Hardox 500**

XCut (XC) cutting mechanism: blade cassette

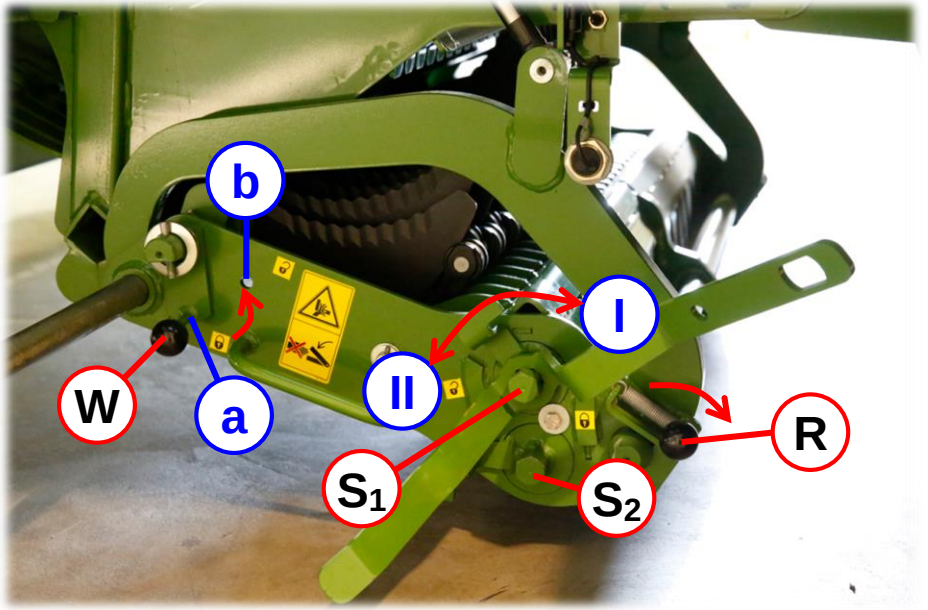
BiG Pack XC has a split blade cassette. One half can be drawn out respectively to the two sides. Every half has two blade control shafts to activate an individual number of blades. The blade cassettes can be swung down hydraulically to change blades or eliminate blockage.

Details:
- BiG Pack 870 & 890 XC with **16** blades
- BiG Pack 1270, 1290 & 4x4 with **26** blades
- Single blade locking device
- Smallest theoretical cutting length = 44 mm

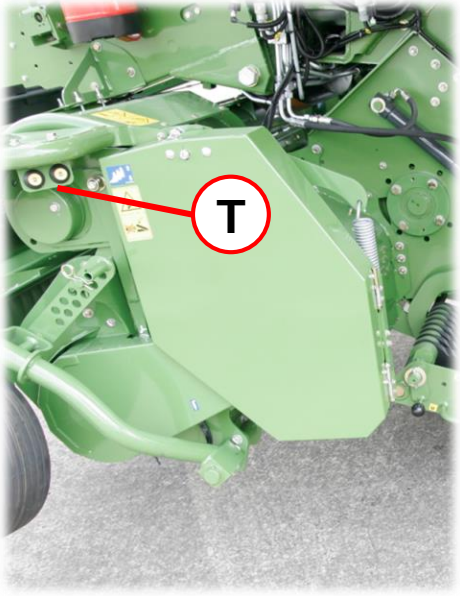
4. Crop Flow

XCut (XC) cutting mechanism: changing blades

- The blade cassette can be lowered hydraulically using the momentary switches **(T)** (with the comfort version only).
- Set the two blade control shafts **(S_1)** and **(S_2)** from position **(I)** in position **(II)** using a wrench **(SW30)**
- Unlock the blade cassette by operating the lever **(R)** and withdraw to the side up to the stop.
- Unlock the blade control shaft by setting the locking lever **(W)** from position **(a)** in position **(b)**.
- Now the blades can be removed vertically upwards.



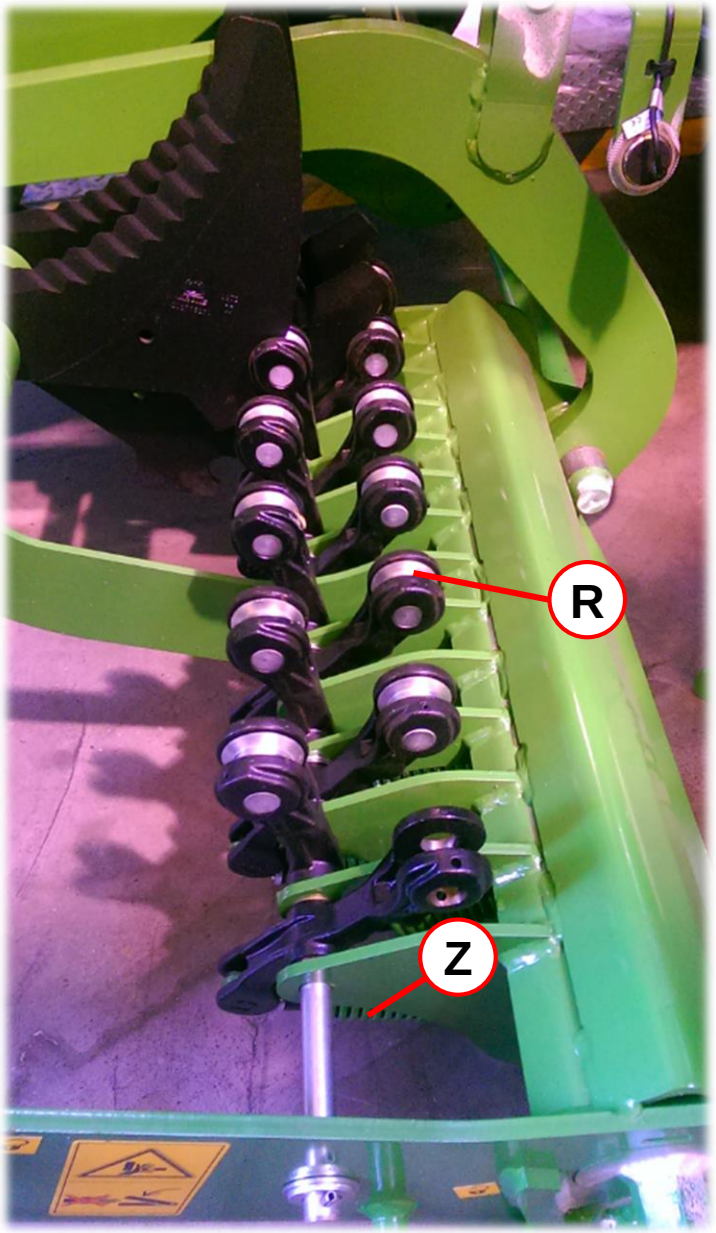
Wear gloves when working on the cutting unit. Risk of injury! The cutting unit must be moved up only after the two halves of the cutting unit have been inserted from the sides and locked.



4. Crop Flow

XCut (XC) cutting mechanism: single blade locking device

- Single blade locking device against foreign objects or overload
- Automatic retraction of the blades
- No electric monitoring
- Keep the area of the tension springs **(Z)** clean
- Grind the blades from the smooth side **only**
- Flying sparks (dissipation of heat) into the blade – not towards the sharp edge



4. Crop Flow

XCut (XC) cutting mechanism: BiG Pack cutting length

The cutting length of the crops is determined by the number of cutting blades used. The theoretical cutting length with the full number of blades is **44 mm**. Two control shafts allow fast changeover of the theoretical cutting length from **44 mm** to **88 mm**.

The cutting length of the crops can also be varied by the number of the cutting blades used (see table below).

Theoretical cutting length	BiG Pack 870 / 890 blade arrangement
	Left blade cassette / Right blade cassette
16 blades = 44	
8 blades = 88	
5 blades = 132	
4 blades = 176	

Theoretical cutting length	Blade arrangement BiG Pack 1270 / 1290 / 4x4
	Left blade cassette / Right blade cassette
26 blades = 44 mm	
13 blades = 88 mm	
8 blades = 132 mm	
6 blades = 176 mm	

4. Crop Flow

Variable Fill System: function

– The Variable Fill System **(VFS)** collects the crops independent of the swath size and the driving speed in a pre-baling chamber.
– When the maximum filling quantity has been reached, the fully mechanical system always conveys even layers into the bale channel.

Figs. 1 and 2:

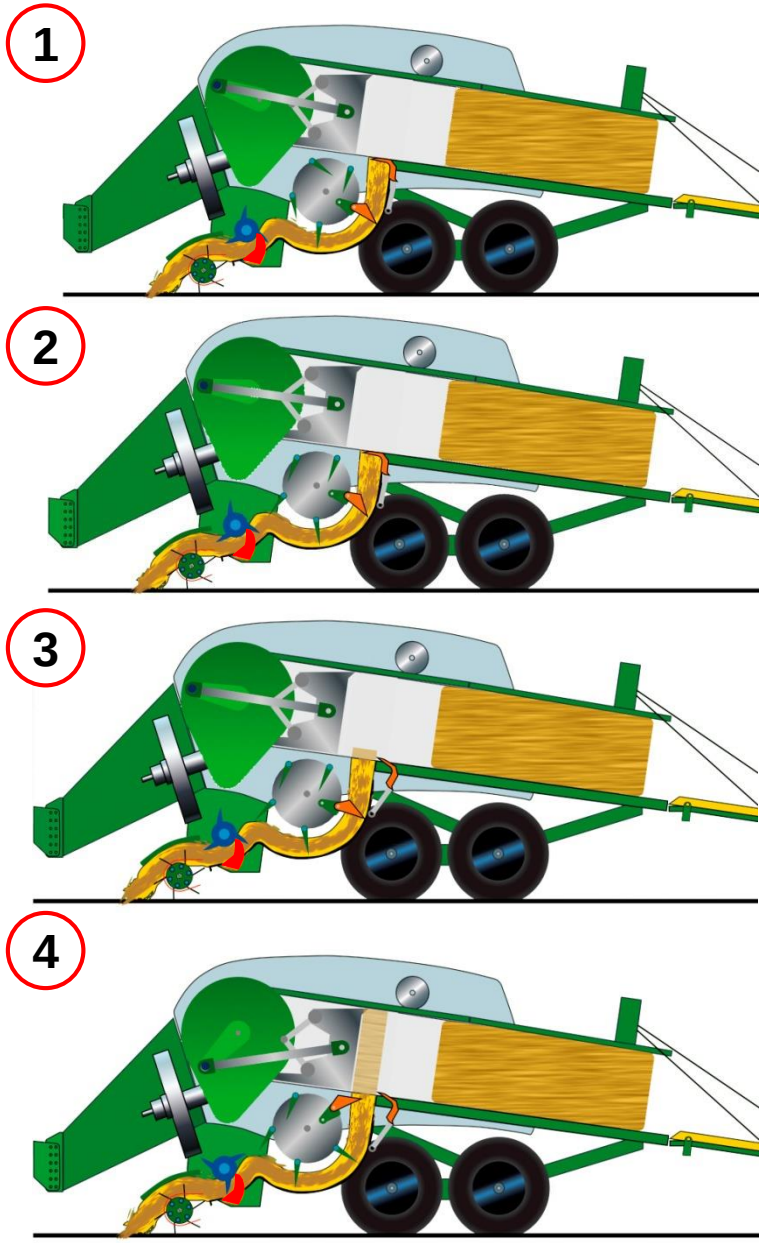
– The VFS operates with **four** packer strips, **a** feeder strip (orange) and **a** sensing rake (orange).
– The **four packer strips** are controlled by a common stationary cam track.
– The feeder strip is controlled by a swivelling cam track.
– The four strips convey the crops into the pre-baling chamber.
– At this time the circular path of the five strips is the same.
– The sensing rake measures the fill level in the pre-baling chamber.

Fig. 3:

– When the pre-baling chamber is filled completely, the sensing rake swivels back.
– By swivelling back the sensing rake triggers a sequence of movements in which the cam track of the feeder strip is swivelled and the feeder strip now follows the new circular path.

Fig. 4:

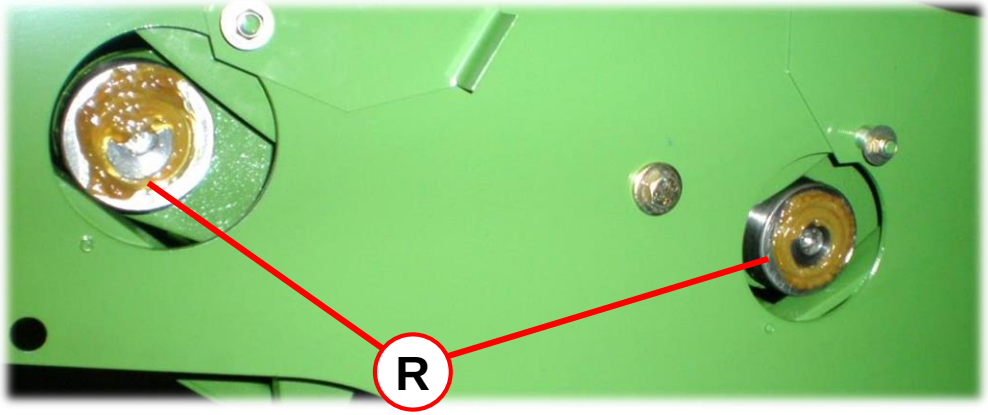
– The feeder strip on the new circular path conveys the collected crops into the bale channel.
– The plunger forces the crops against the bale strand.
– After filling the sensing rake swivels back again and the cam track of the feeder strip swivels back in the initial position.
– This is to ensure that evenly compacted bales with high stability are always produced even from small swaths.



4. Crop Flow

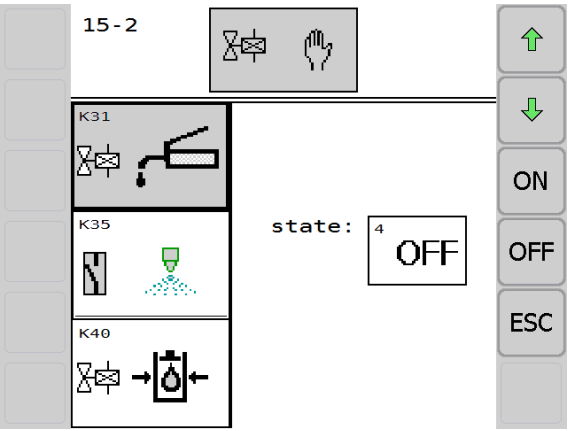
Variable Fill System: points to be checked periodically

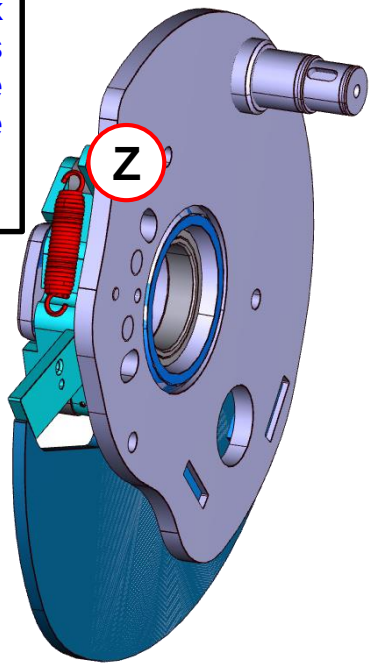
– **Checking the central lubrication**
→ Check the lubrication joint of the packer shaft and the packer levers periodically for leakage.
→ Check lubrication of the rolls **(R)**.
→ The central lubrication pump can be turned on for a longer period of time in the actuator test **15-2** to check the lubrication points.
– **Check zero adjuster roll and spherical plain bearings of the coupling rods periodically for wear.**
– **Check rolls for higher wear**
→ Roll broken or distorted
→ Roll moving very sluggishly
→ Roll tipples or has an axial backlash ≥ 1 mm
→ Shell surface of roll shows traces of wear Ø 47mm ≥ 2 mm, Ø 72 mm ≥ 3 mm, Ø 80 mm ≥ 3 mm



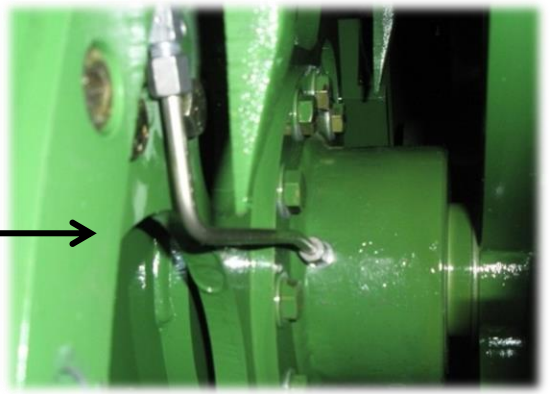
Tightening torques:
Roll small Ø **47 mm (M20x1.5) – 120 Nm**
Roll big Ø **72 mm (M24x1.5) – 220 Nm**
Roll big Ø **80 mm (M30x1.5) – 450 Nm**

The tension spring **(Z)** in the crank disc is subjected to high loads and is essential for proper functioning of the machine (automatic mode, bale shape).
Recommendation: replace periodically!





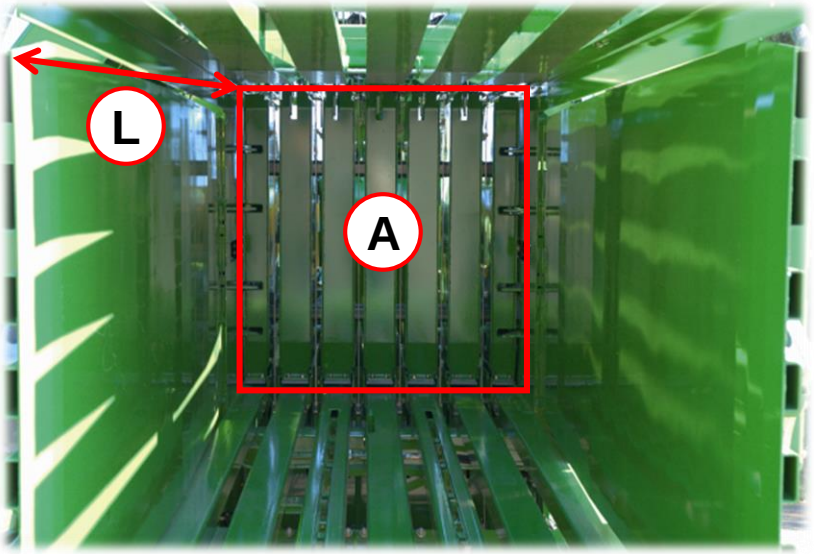
The only grease nipple of the VFS is located at the feed conveyor control. It is used to lubricate the bearing flange of the swivelling cam track. **Lubricate every 200 h!!!**

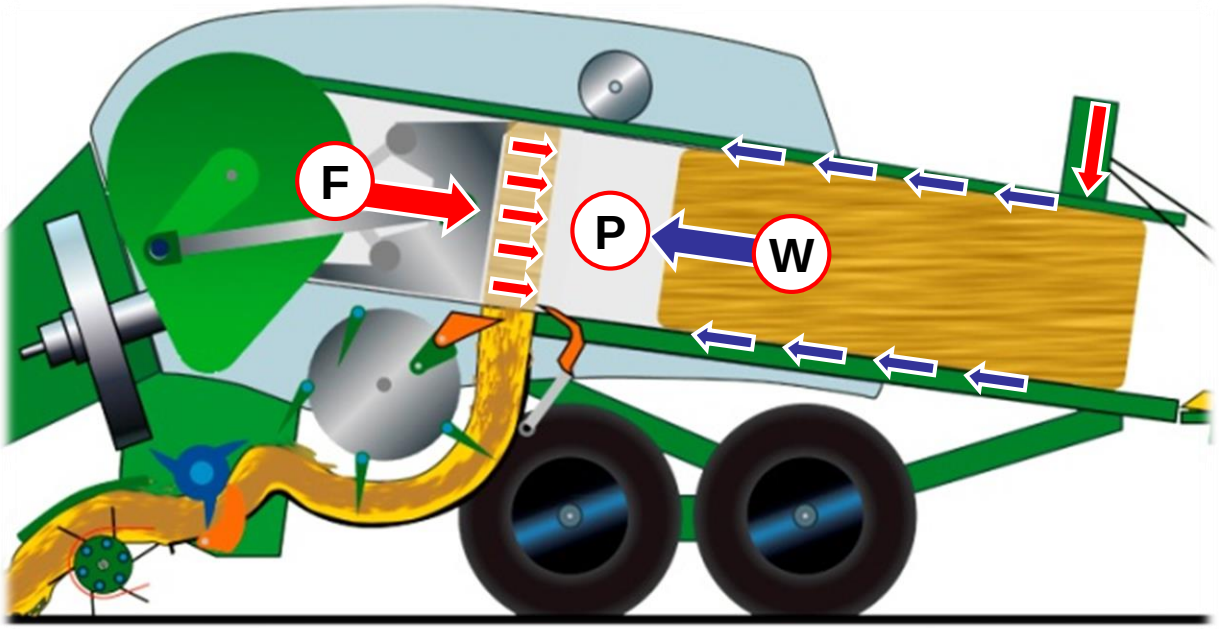


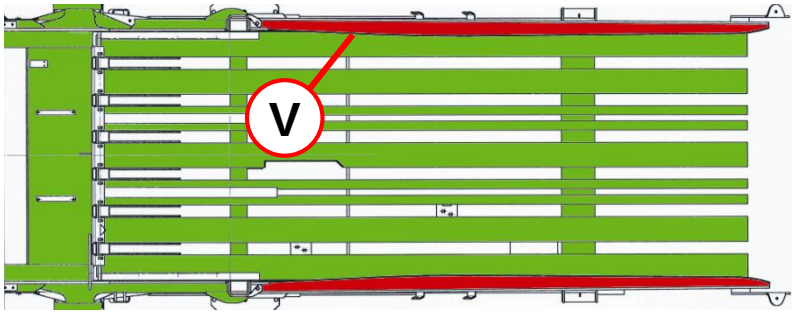
4. Crop Flow

Bale channel: baling density

The baling density is the density of a bale after a baling process and depends on the material (crops) and the pressure **(P)** exerted on the bale.
P = F / A , P – pressure, **F** – force, **A** – area.







Bale channel: baling force

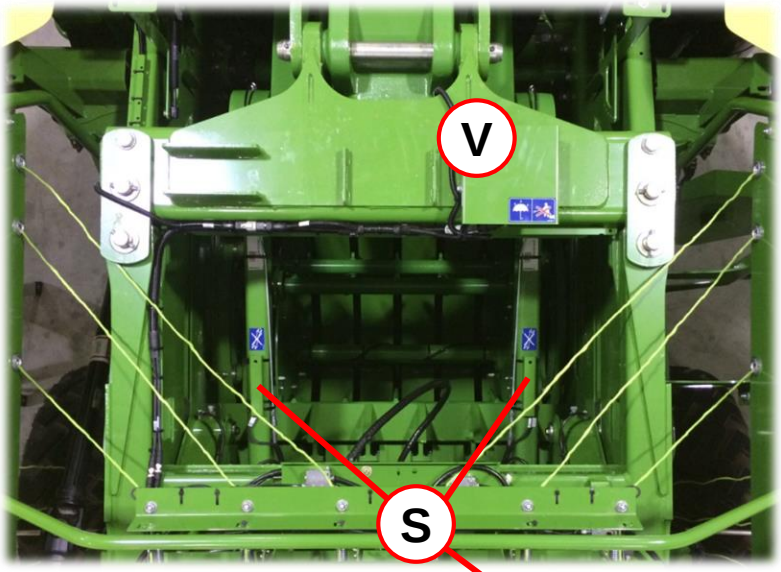
The baling force **(F)** depends on the resistance **(W)** the plunger has to overcome to push the bale backwards in the channel. The resistance depends on a variety of factors, such as for example the condition of the crops (the more humid it is the bigger the frictional resistance), the condition of the bale channel (painted, bright, rusted), the length **(L)** and shape **(V)** of the bale channel, and the force pressing the baling flaps together. The driver can influence this by a single parameter only – the force used to press the baling flaps together.

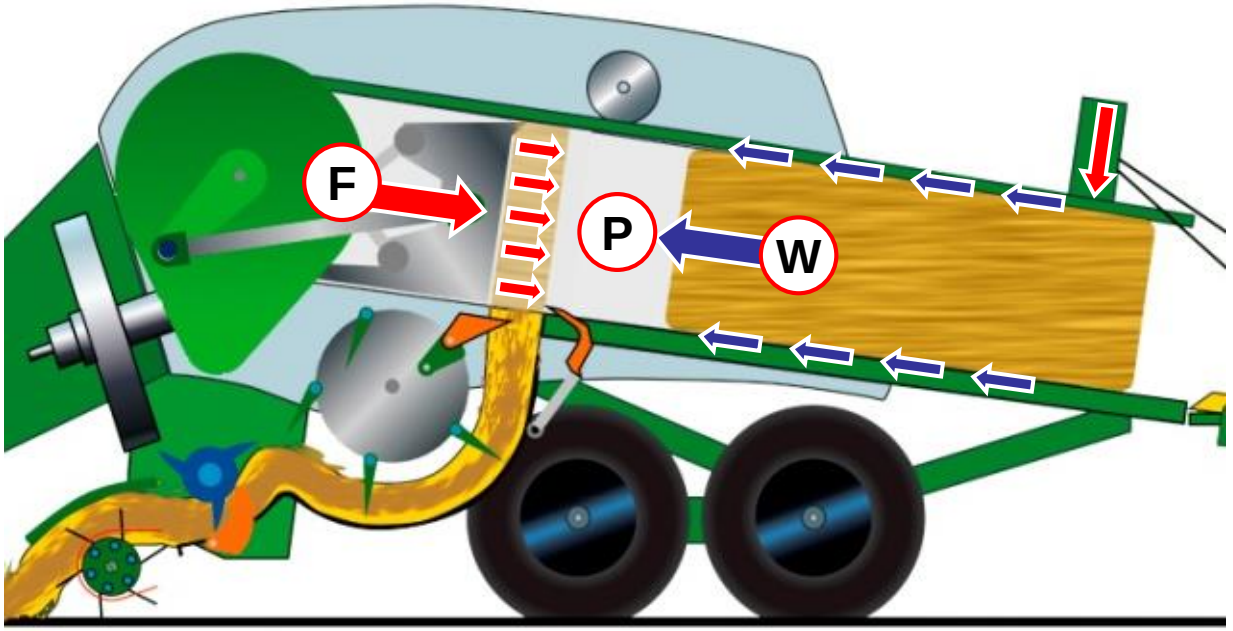
4. Crop Flow

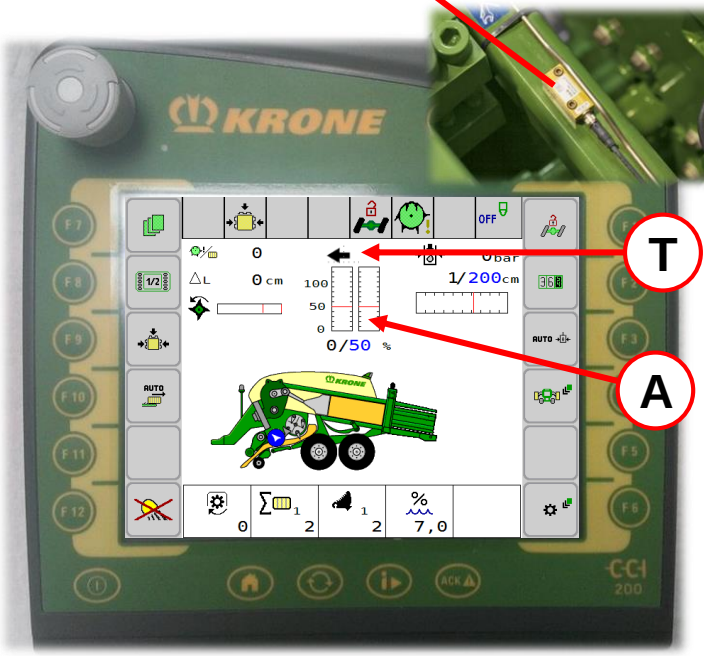
Bale channel: baling force

The baling force **(F)** is permanently measured during baling and displayed in the terminal **(A)**.

Force sensors **(S)** are bonded on the connecting rods and measure the stresses generated by the main gearbox on the connecting rods during baling. The signal of the force sensors measured in the amplifier **(V)** is sent to the job computer and converted in force of pressure as a percentage. The values are used for the hydraulic baling pressure control in the automatic mode. In addition, the values are displayed for each operating mode for the direction display **(T)** and the display of the baling force **(A)** in the terminal display.







4. Crop Flow

Bale channel: baling pressure

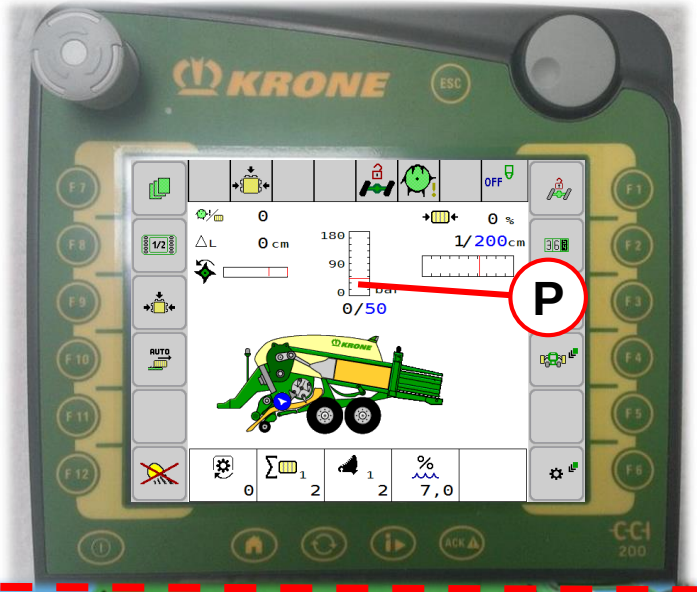
The force acting on the baling flaps depends on the hydraulic pressure in the cylinders **(H)** and the entire piston surface of the hydraulic cylinders.

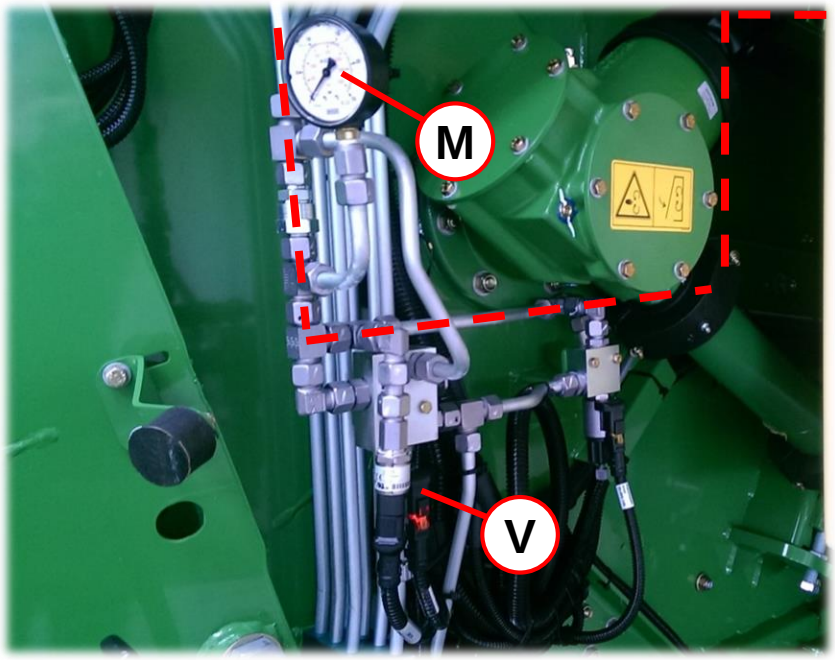
F = P x A , A = (A1 + A2 + An)

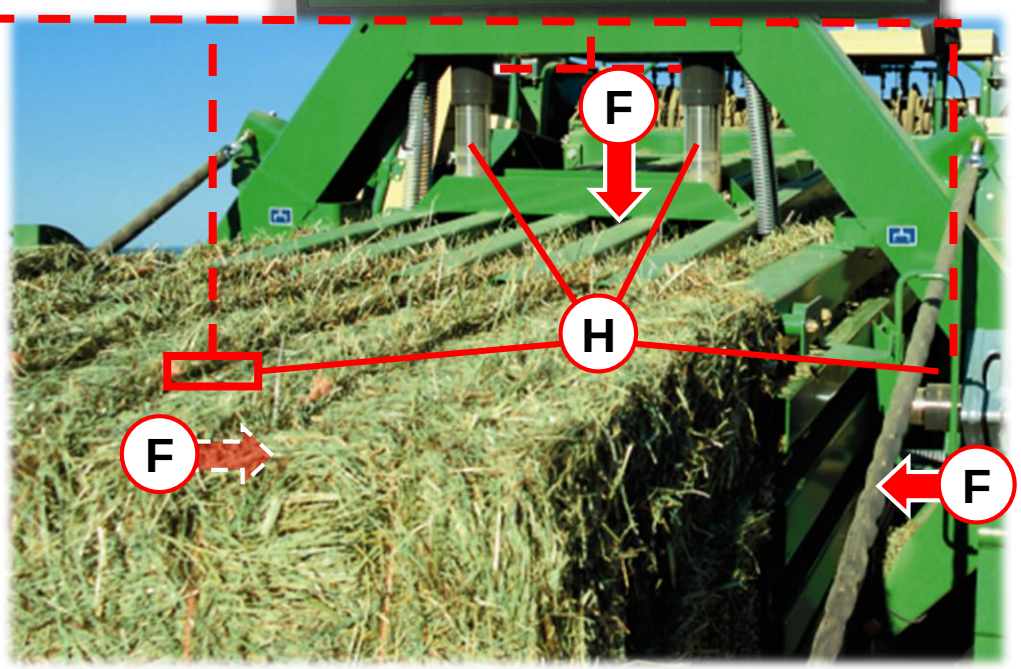
F – force, **P** – hydraulic pressure, **A** – entire piston surface of the hydraulic cylinder, **n** – number of hydraulic cylinders

The baling pressure regulated by the solenoid valve **(V)** can be read on the pressure gauge **(M)** and the terminal display.

In manual mode, the baling pressure is set manually and constant pressure is used regardless of the baling force.





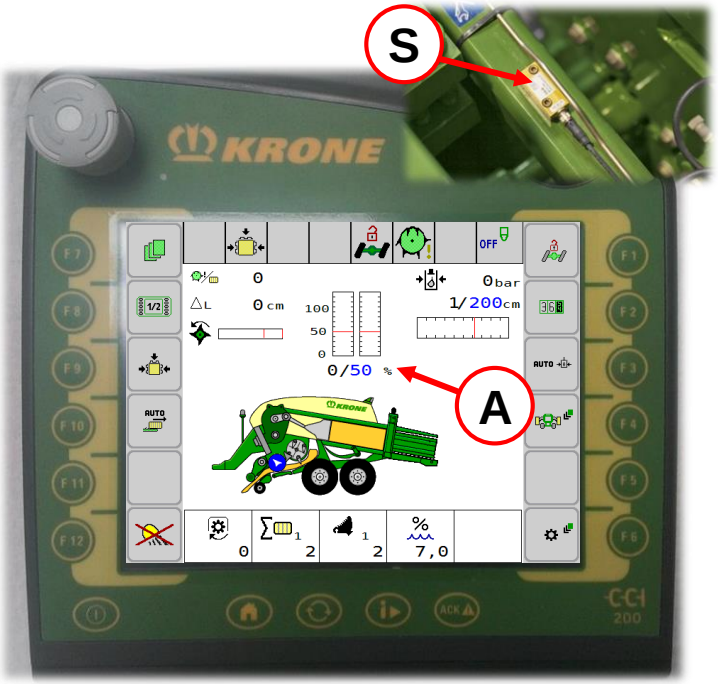


4. Crop Flow

Bale channel: operating modes

Manual operation

- Fixedly set baling pressure of **0** to **180** bar at the baling flaps
- No adaptation of the baling force to the humidity of the crops
- Constant baling pressure but different baling forces
- Specified operating mode for filling the bale channel when the machine is completely empty (approx. 50 bar).



Automatic mode

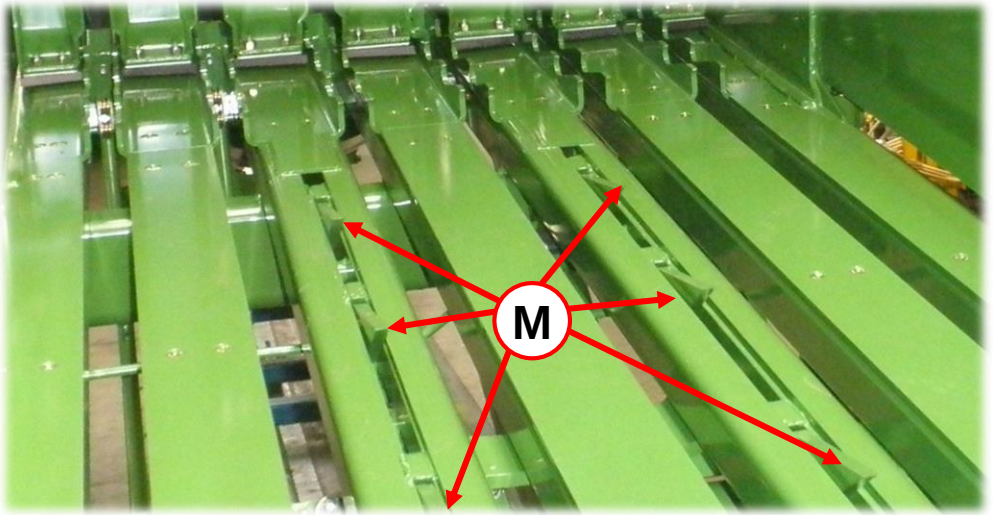
- The desired baling force is set in the operation unit
- Continuous measurement of the baling force → depending on the humidity of the crops
- Control of the baling pressure at the baling flaps
- Constant baling density is achieved by continuous control
- Normal (predominant) baling operation
- Measurement by force sensors **(S)** for filling of channel left/right.

4. Crop Flow

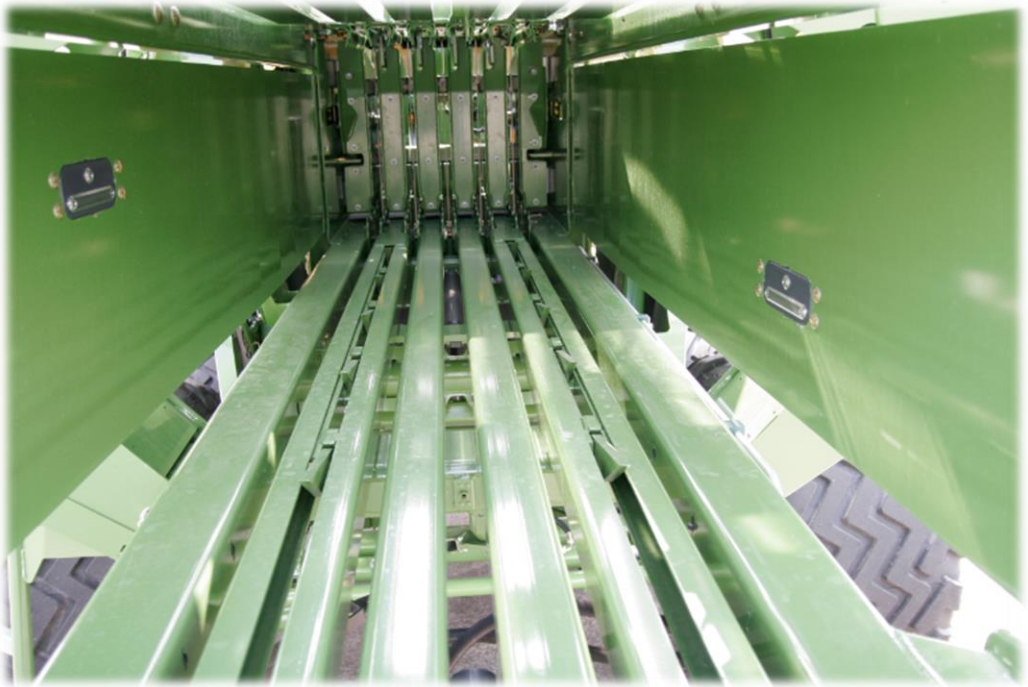
Bale channel: bale ejector

The hydraulic bale ejector pushes the remaining crops completely out of the bale channel. Bale drivers **(M)** positioned in two rows on the channel floor grip the bale along the entire length thus ensuring reliable bale ejection.

Bales located in the bale channel should be tied before the bale channel is emptied.



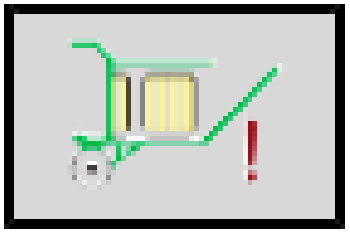
⚠ Ensure that the bale ejector is returned in the front position after the bale was ejected.

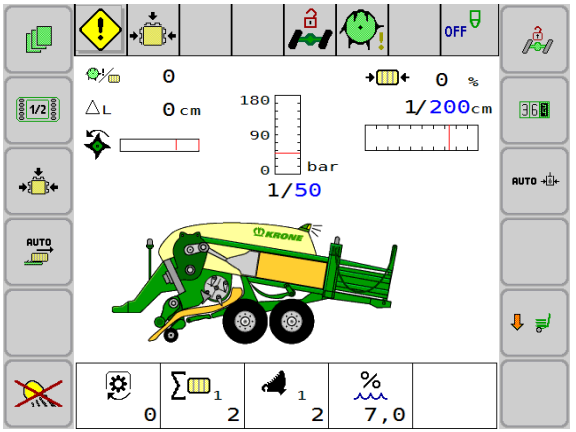


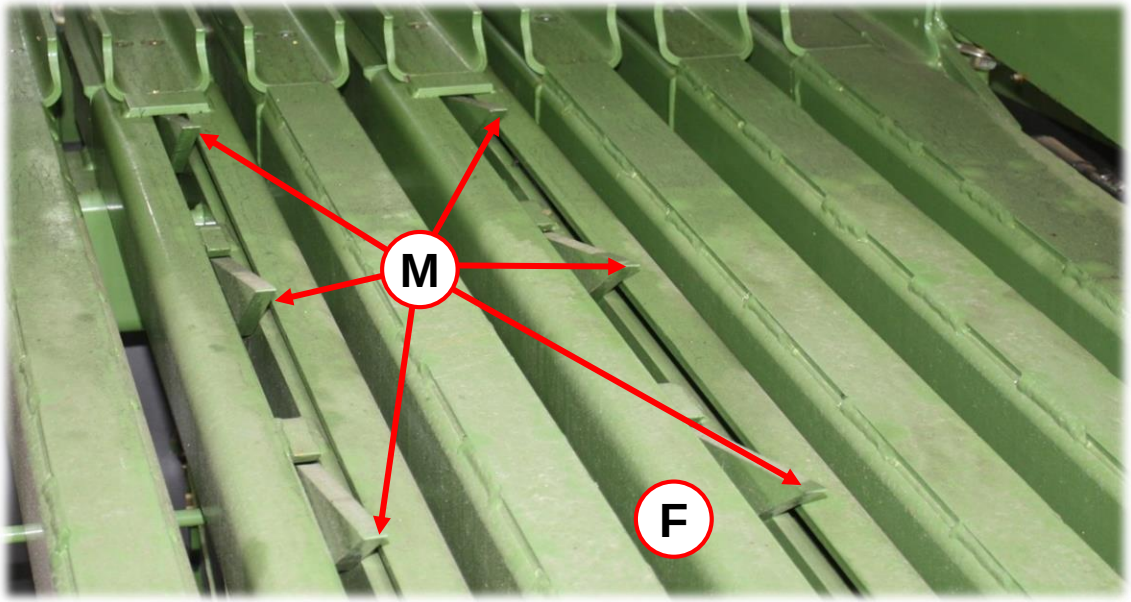
Bale chute

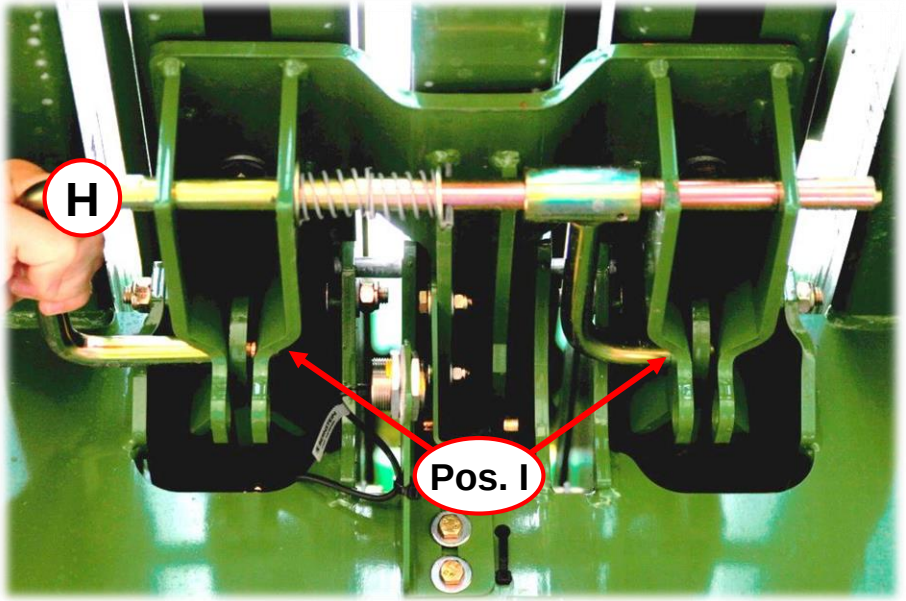
The bale chute is included in the standard equipment and ensures that the bales are set down immediately when they have left the bale channel.

The bale chute position is displayed in the terminal. When the PTO shaft is operating with the bale chute closed, a message is given.





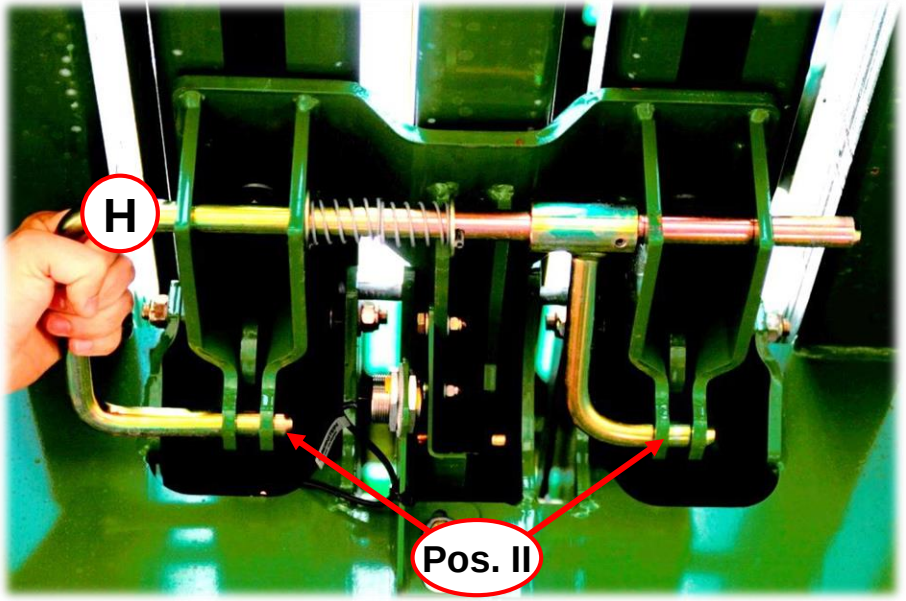




Bale ejector

- The hydraulic bale ejector pushes the remaining crop completely out of the bale channel
- The bale drivers **(M)** positioned on two rows of the channel bottom catch the bale on its entire length
- The bale ejector can be divided via lever **(H)** in order to eject just the last bale

Position I = bale ejector coupled
Position II = bale ejector uncoupled



After ejecting the big bale, it is absolutely necessary to move the bale ejector into the front position again.

4. Crop Flow

Medium equipment

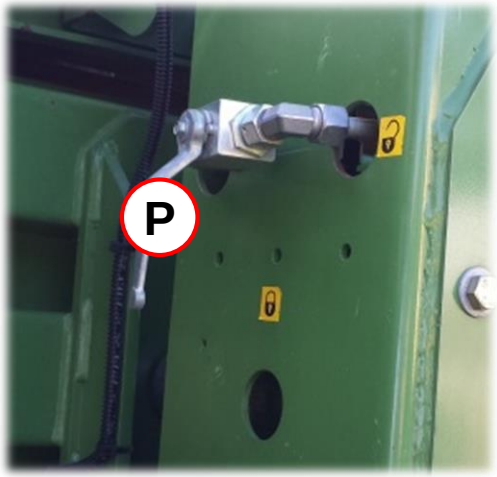
Bale ejector control

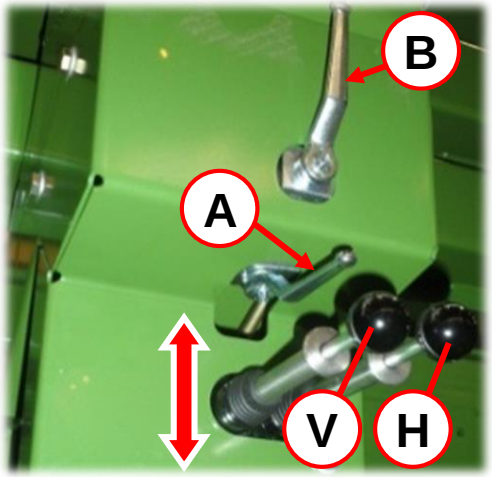
– The bale ejector is supplied with oil through a double-acting control unit of the tractor.
– First release the baling flap pressure via the ball valve **(P)** (on the left side on the yoke in direction of travel).
– The bale ejector is operated by the hand-operated lever **(H)** at the rear.
– Open the two stop cocks **(A)** and **(B)** before operating the lever.
– Then close the two stop cocks **(A)** and **(B)**.

Bale chute control

– Open stop cock **(B)**.
– The bale chute is operated by the hand-operated lever **(V)** at the front.

Open the ball valve **(B)** for using the bale ejector and the bale chute only! Close it while the baling process is going on!





Comfort equipment

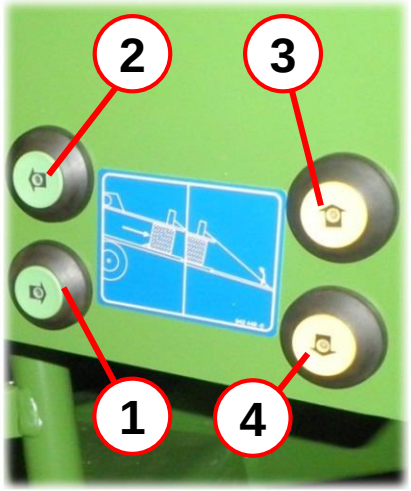
Bale ejector control

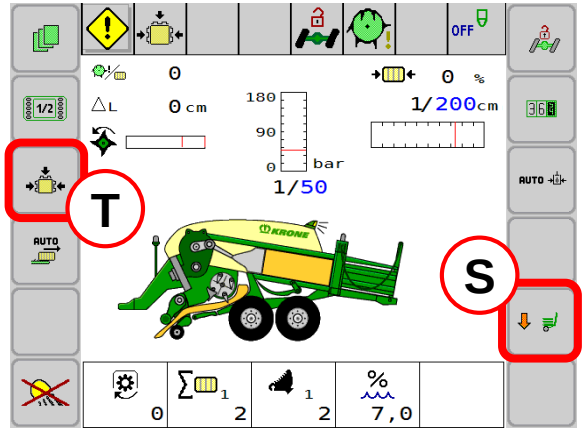
– Operation by buttons **(1)** and **(2)**.
– The baling pressure is released when the button **(1)** is pressed briefly. When pressing the button **(1)** briefly the second time, 10 cycles will be run automatically.
– The baling pressure is also released automatically and 10 cycles started when being actuated from the terminal **(T)**.

Bale chute control

– The bale chute is operated by buttons **(3)** and **(4)**.
– From the terminal **(S)**, the bale chute can for safety reasons only be lowered.

As soon as the rotational speed of the machine is over 300 rpm, the baling pressure is built up again automatically.

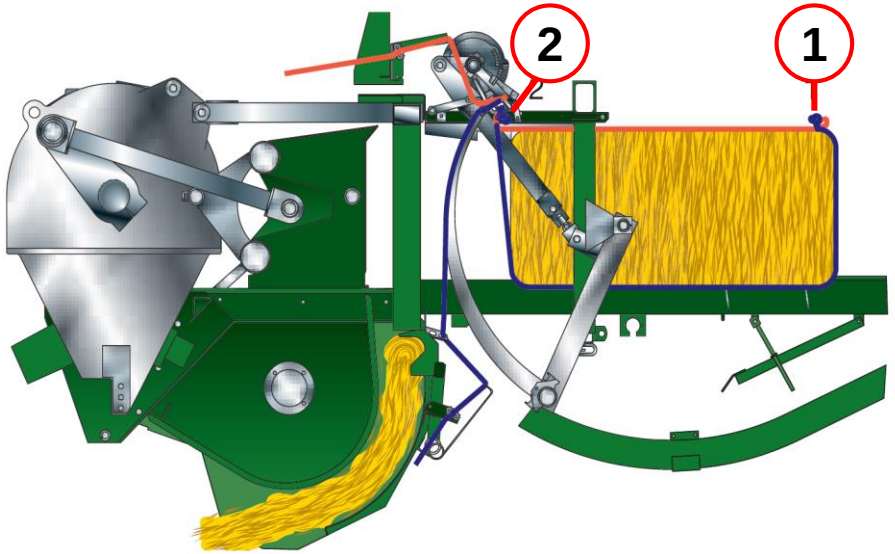


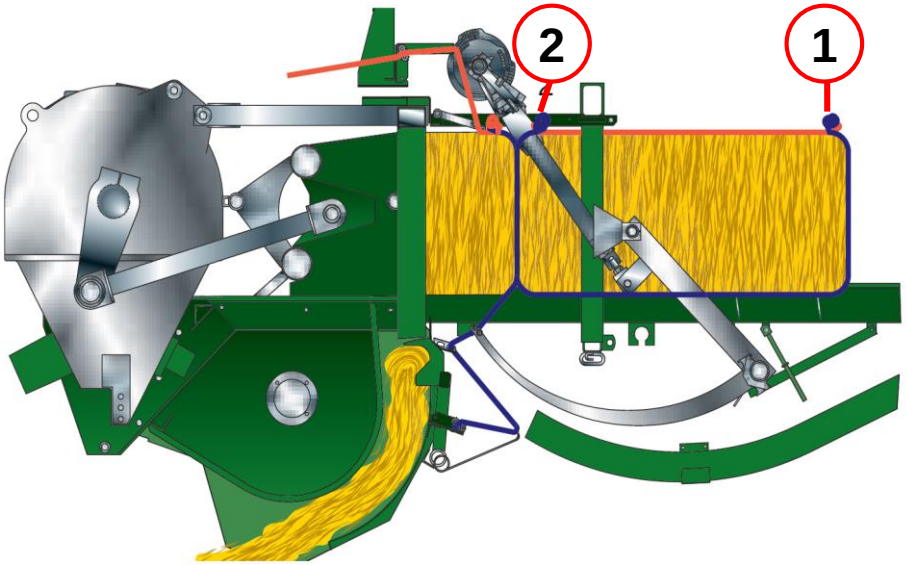


5. Tying

Tying: tying principle of double knotter

The twine is fed from the top (**red = upper twine**) and bottom (**blue = lower twine**). The upper and lower twines are connected with each other by the starting knot **(1)**. Both twines are drawn around the bale without tension. For tying the big bale, the upper and lower twine is routed by the knotter needles to the knotter. Two knots are tied in the knotter. First the end knot **(2)** closing the baled big bale is tied. Then the starting knot **(1)** for the new big bale is tied.

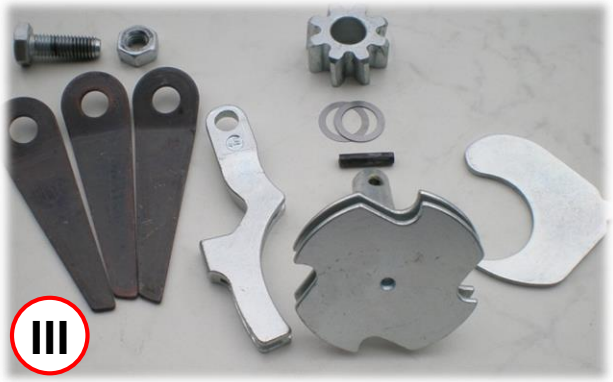




5. Tying

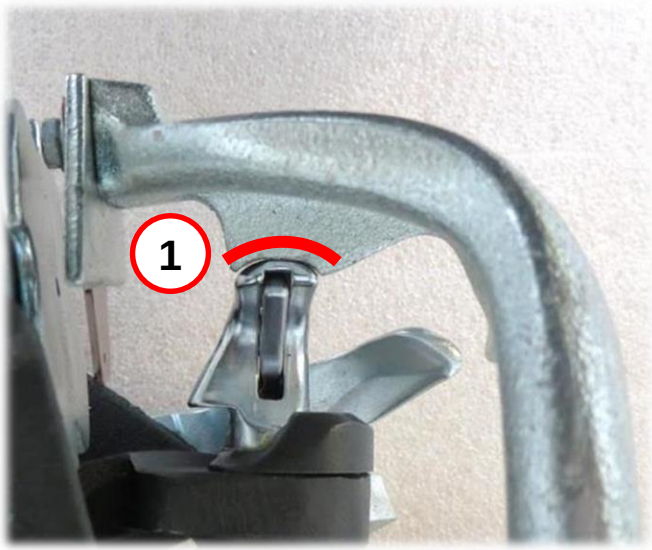
Raaspe double knotter BiG Pack 890, 1270 MultiBale, 1290, 4x4

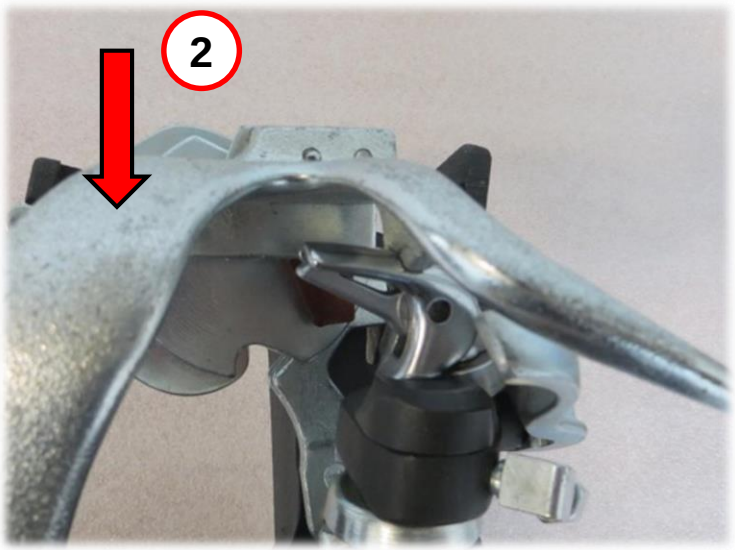
I. Knotter frame
II. Knotter disc
III. Twine retainer
IV. Drive of twine holder
V. Billhook
VI. Blade lever
VII. Twine pusher



5. Tying

Blade lever



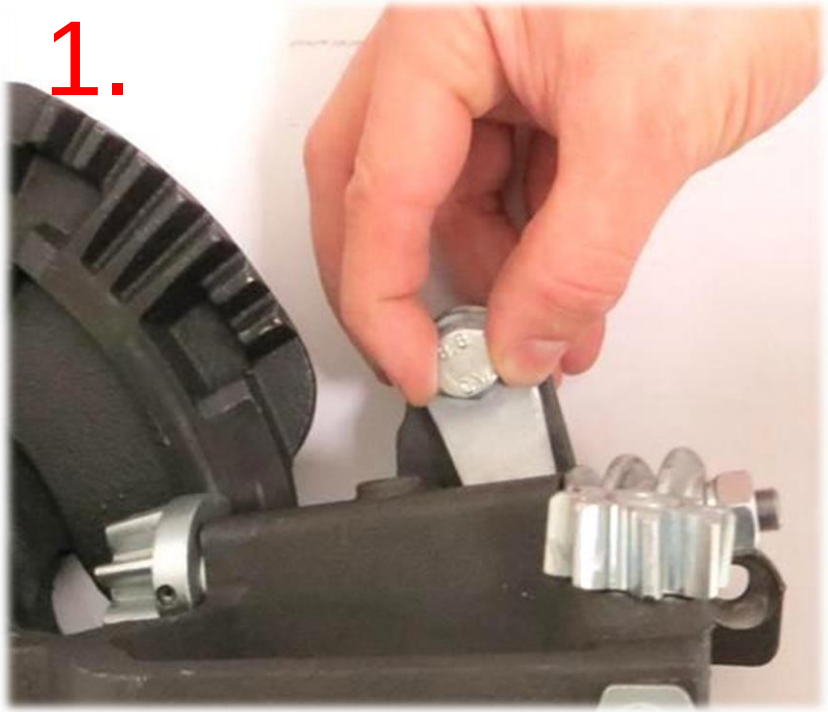


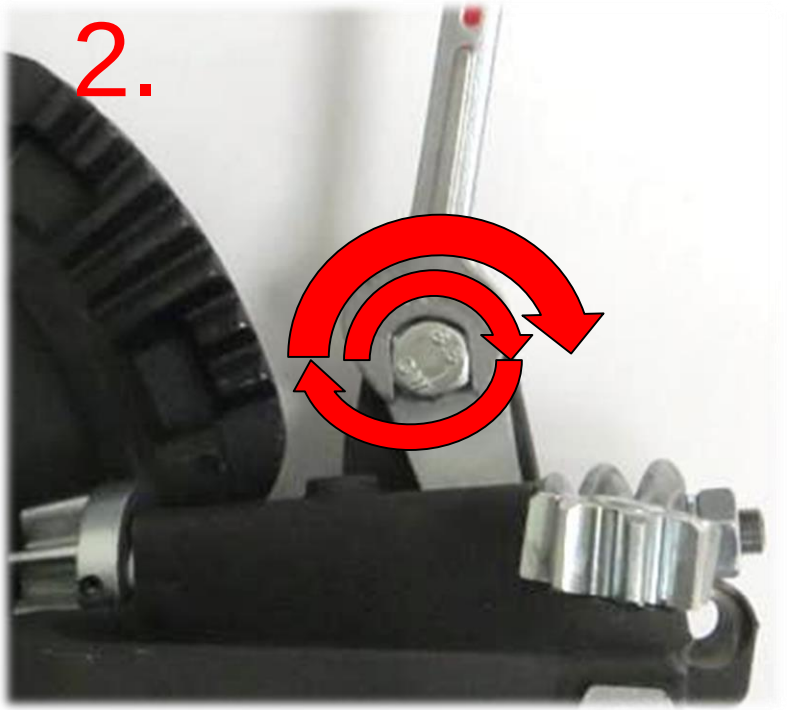
Setting the blade lever

- The blade lever has to make light rubbing contact with the billhook to be able to strip the knot reliably off the billhook.
- The blade lever curvature **(1)** must suit the curvature of the billhook.
- The blade lever is set with a hammer.
- The blade lever must be positioned such that it can slide over the billhook from both sides.
- If the blade lever is set to tight, the blade lever distance can be increased again in using the billhook as an anvil and striking on the blade lever from the side **(2)**.

5. Tying

Setting the twine retainer





It is important that **no** twine is in the twine driver while performing this setting!!!

Purpose of the twine retainer

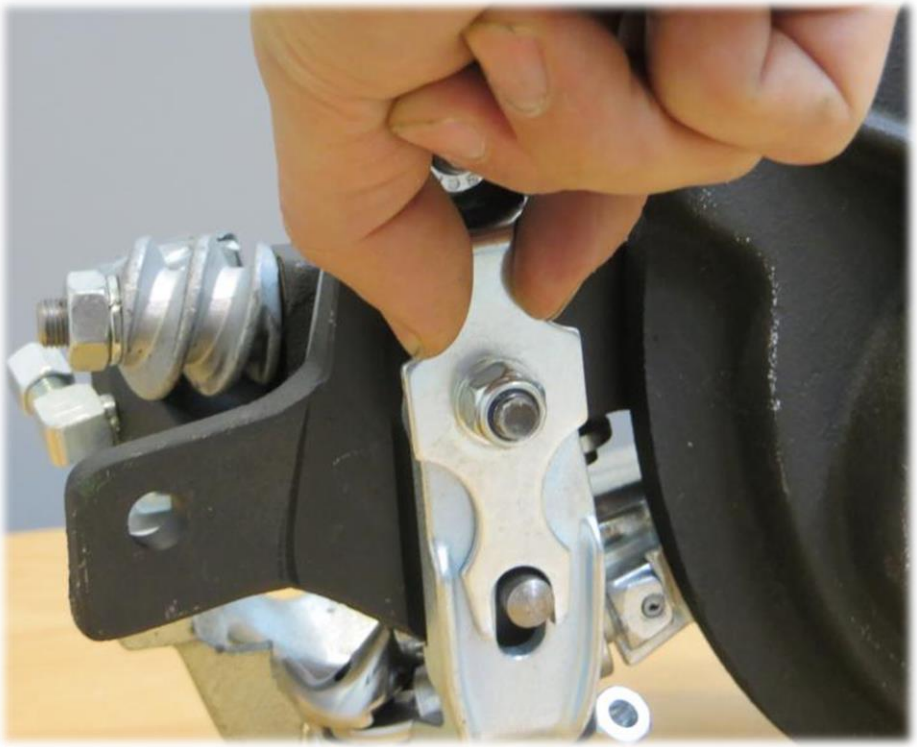
- Holding the upper and lower twine between the first knots (closing knot) and the second knot (starting knot) in the knotter frame
- Withdrawing the twine a bit from the twine retainer while producing the second knot
- Taking a decisive part in the determination of the twine end lengths at the second knot (starting knot)

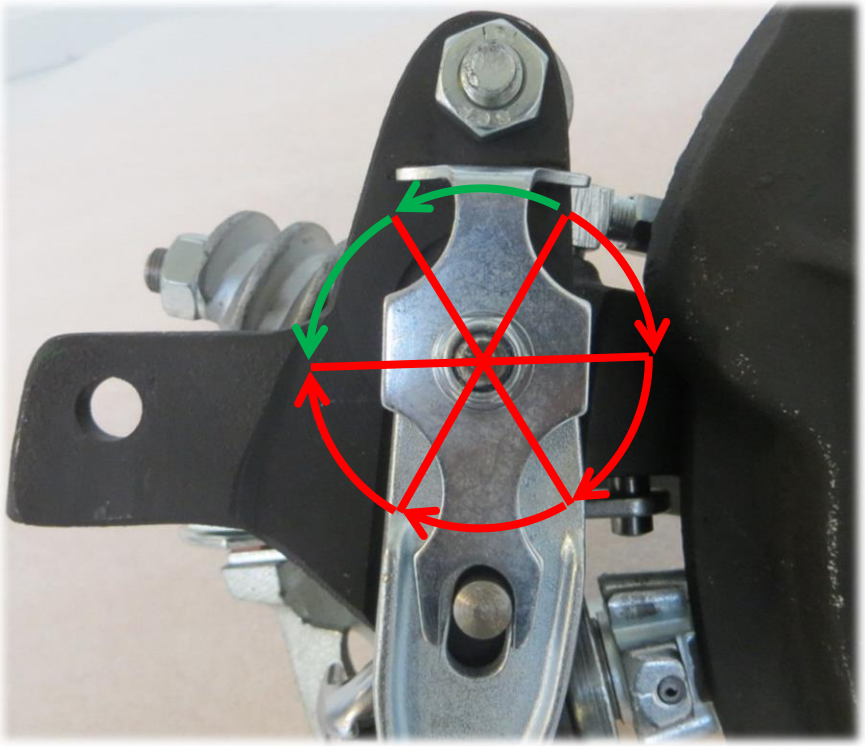
Setting the twine retainer spring force

- Tighten the screw only manually at first (without using tools!) to set the twine retainer spring force.
- Secondly, tighten the screw by 1.5 turns using a tool (observe the labelling).
- Then lock the screw with the counter nut.

5. Tying

Setting the billhook





Purpose of spring tension on billhook

The spring force can be adjusted to tighten the knot very early and thus receive sufficiently long twine ends on the finished knot.

Setting the spring force on the billhook tongue

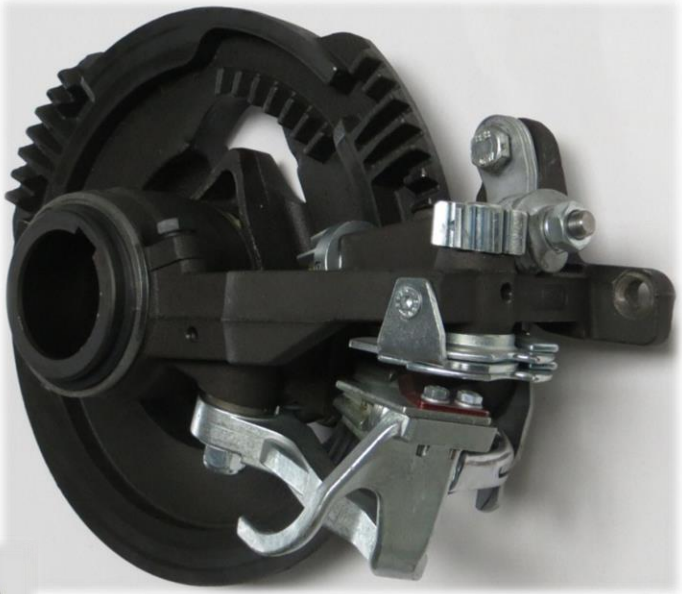
- In the course of basic setting the spring is adjusted this tight by the M8 nut that the spring can still be moved to and fro by the fingers using much force.
- The adjustment range of the nut is a full turn → adjust the nut in steps of 60°
- Starting from the basic setting, the nut can be tightened 4x60° (the spring is fully compressed then) and released by 2x60° (the spring is too loose then).

5. Tying

BiG Pack 870 HDP HS & HDP 2 double knotter

Knotter disc

Twine driver drive



Twine driver & twine retainer

Billhook

Knotter frame

Blade lever

5. Tying

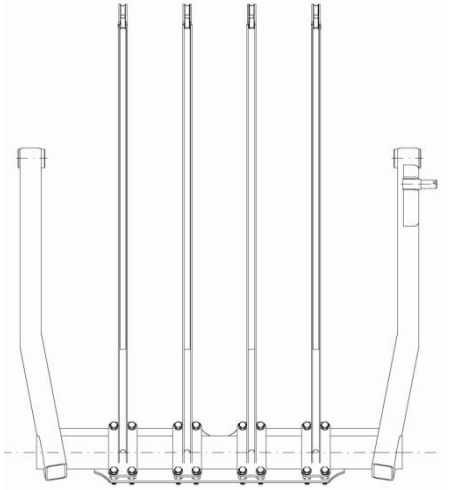
Differences from Raaspe double knotter BiG Pack 890, 1270 MultiBale, 1290, 4x4

- The BiG Pack 870 HDP HS & HDP 2 double knotter has 5 parts which are different from the double knotter of the 890 to 4x4 machines.
- The scraper disc **(A)** can be mounted much easier
- A new closing element **(B)** had been designed for tightening the billhook tongue
- The blade lever **(C)** also is of much more slim design
- In addition, the cast constructions of the twine knotter disc **(D)** and the knotter frame **(E)** differ from the double knotter of the 890 to 4x4 machines.
- The distance of the individual knotters is shortened to 130 mm due to the clearly slimmer design of the knotter.
- Rasspe always uses shim rings 0.2 mm and 0.5 mm. This enables setting all knotter distances over 0.4 mm.

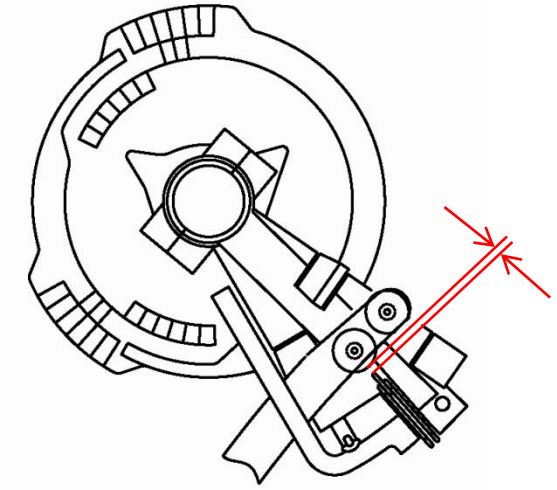
5. Tying

Basic settings of the needles

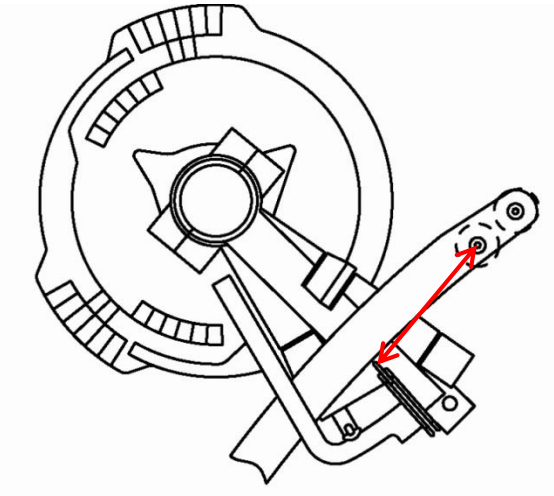
Lateral adjustment of the needles

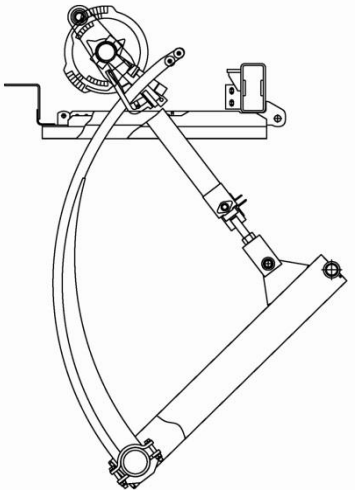


Height of the needles on the knotter



Upper dead point of the needles





Basic setting of the twine pusher

Overreach of the twine pushers

Twine pusher relative to the channel slot

The basic settings of the needles and the twine pushers differ in the individual BiG Pack models (see operating instructions).

Possible setting errors and how to remedy them

5. Tying

Spring tension on twine retainer too low

Purpose of the twine retainer

- Holding the upper and lower twine between the first knots (closing knot) and the second knot (starting knot) in the knotter frame
- Withdrawing the twine a bit from the twine retainer while producing the second knot
- Taking a decisive part in the determination of the twine end lengths at the second knot (starting knot)

Fault diagnosis

The too low spring tension on the twine retainer causes that too much twine is drawn out of the twine retainer thus causing:

- Long twine ends on the knot
- In some cases the billhook is unable to draw the twine through the knot
- The blade lever has difficulties stripping off the finished knot thus causing that the knot gets stuck on the billhook
- Knots are existing on the lower twine strand only (no knot in the upper twine strand) → in this case the upper twine had been drawn out of the twine retainer completely (the upper twine is always drawn out first)

Broken spring/low spring tension of the twine retainer

5. Tying

Spring tension on twine retainer too high

Purpose of the twine retainer

- Holding the upper and lower twine between the first knots (closing knot) and the second knot (starting knot) in the knotter frame
- Withdrawing the twine a bit from the twine retainer while producing the second knot
- Taking a decisive part in the determination of the twine end lengths at the second knot (starting knot)

Fault diagnosis

The too strong spring tension on the twine retainer causes that it is difficult to draw the twine out of the twine retainer. The twine is stretched, thus causing:

- short twine ends on the knot → the twine contracts again after having been cut off
- Particularly long twine fragments can be noticed
- The wear rate on the cam track for the billhook and the twine retainer increases

5. Tying

Spring tension on billhook too low

Purpose of spring tension on billhook

The spring force can be adjusted to tighten the knot very early and thus receive sufficiently long twine ends on the finished knot.

Fault diagnosis

When the spring tension on the billhook is too low, it may become difficult for the knotter jaw to grip the twine ends and pull them through the knot. This has the following consequences:

- Incomplete knots particularly on the second knot
- The knot is not sufficiently tightened immediately after the knotting process (one short loop with short ends)
- The knot is drawn open more and more by the plunger strokes while the bale grows. The knot may spring open when the bale now leaves the bale channel.

5. Tying

Spring tension on billhook too strong

Purpose of spring tension on billhook

The spring force can be adjusted to tighten the knot very early and thus receive sufficiently long twine ends on the finished knot.

Fault diagnosis

When the spring tension on the billhook is too strong it may happen more and more frequently that the knot remains on the billhook. This has the following consequences:

- The blade lever is unable to strip off the knot
- The knot ends are held by the knotter jaw
- Very long frayed knot ends
- Higher load for the blade lever and billhook

5. Tying

Twine pusher misses the upper twine

Purpose of twine pusher

The twine pusher pushes the tying twine against the billhook.

Fault diagnosis

If the twine pusher fails to catch the tying twine, the billhook cannot receive the tying twine.

- The first knot (closing knot) it tied
- On the second knot (starting knot) the lower twine is tied but not the upper twine
- The knotter loses the upper twine (see reflectors or electronic knotter monitoring)

5. Tying

Lower needle misses the upper twine in the direction of travel on the left

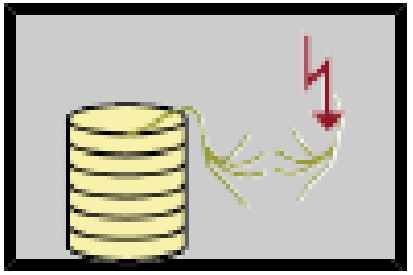
Purpose of lower needle

The lower needle places the lower and upper twines in the twine driver on the first knot (closing knot).

Fault diagnosis

It may happen that the lower needles do not catch the upper twine during startup if the needles are not aligned properly. If the upper twine passes the needle on the left side in the direction of travel, the following symptoms are caused:

- The lower needle places only the lower twine in the twine driver
- It is knotted twice
- In this case the knotter would lose the lower twine (see error message)
- The upper twine passes from one bale to the next



5. Tying

Lower needle misses the upper twine in the direction of travel on the right side

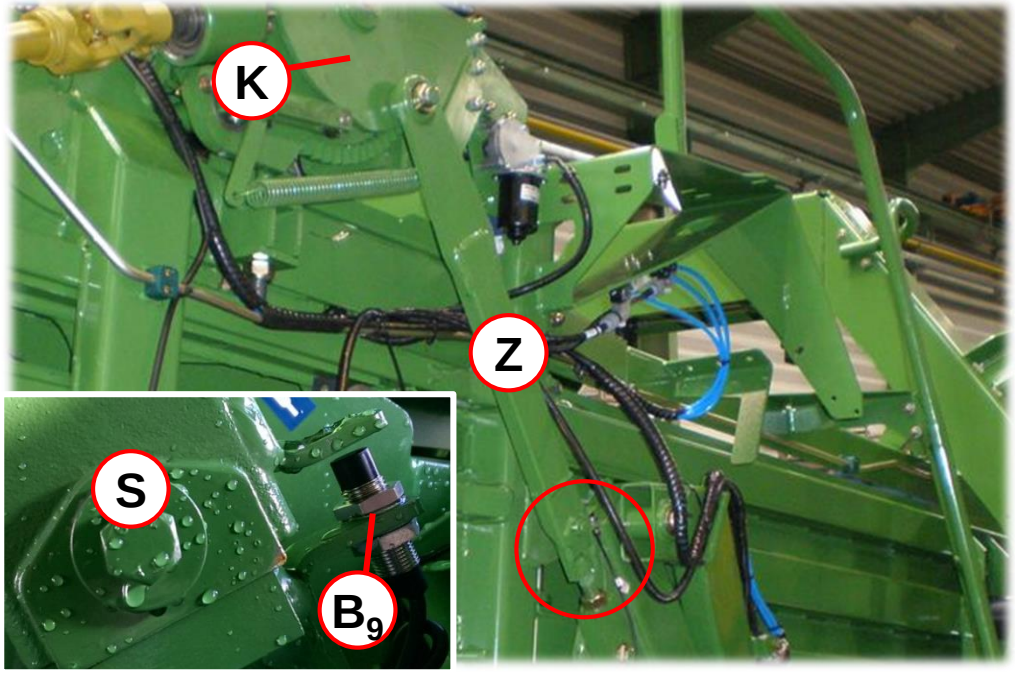
Purpose of lower needle
The lower needle places the lower and upper twines in the twine driver on the first knot (closing knot).

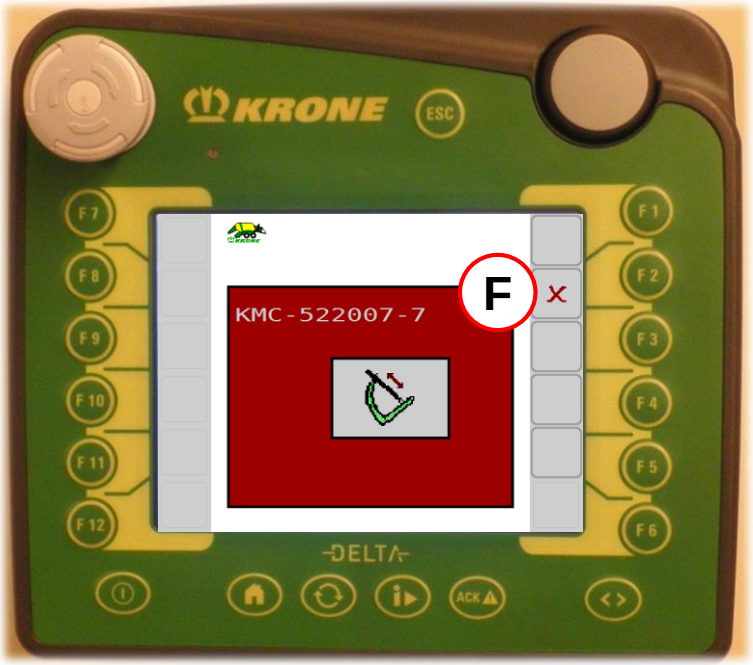
Fault diagnosis
It may happen that the lower needles do not catch the upper twine during startup if the needles are not aligned properly. If the upper twine passes the needle on the right side in the direction of travel, the following symptoms are caused:
– Both twines would wrap around the billhook

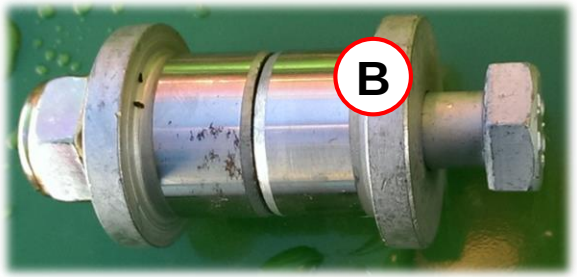
5. Tying

Needle protection

When the tying cycle has been tripped, the needle connecting rod **(Z)** is driven by the cam disc **(K)**. Thus the needle yoke is drawn up and the needles are routed through the bale channel protected by the plunger to the knotters. If the resistance to be too big for this movement for any reason, the shear bolt **(S)** shears off and the needles stop. The inductive proximity switch (NAMUR) **(B_9)** is no longer energised and the error message **(F)** is shown on the display. The knotter shaft rotates by a full turn and the connecting rod **(Z)** pushes the needle yoke and the needles down in the initial position. The needle is thus protected from damage. If the shear bolt **(S)** has been sheared off, the machine must be checked to find the cause.







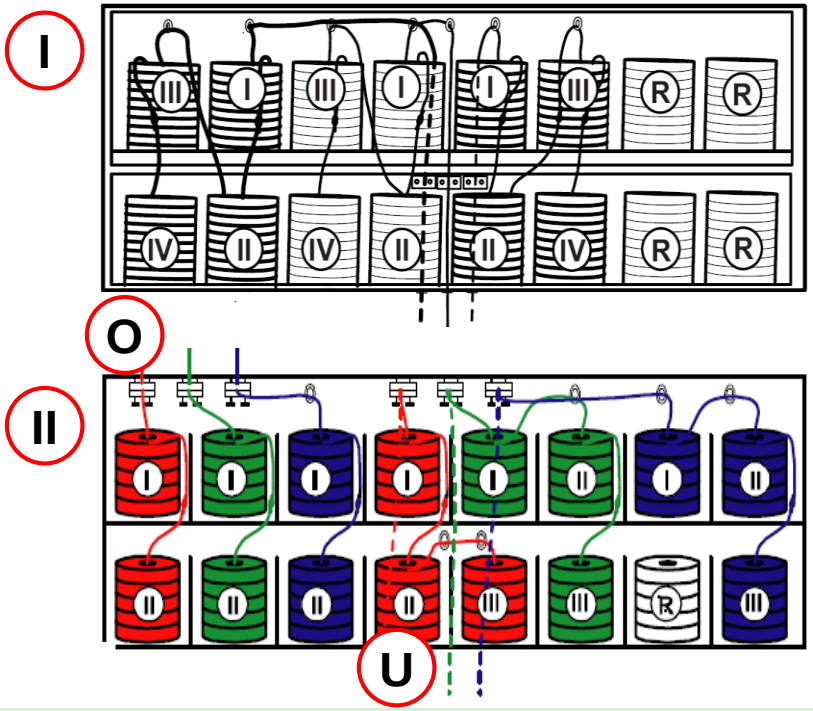
Repair:
- Hexagon head screw M10x60 12.9
- Shear bushings **(B)**
- Locknut M10

5. Tying

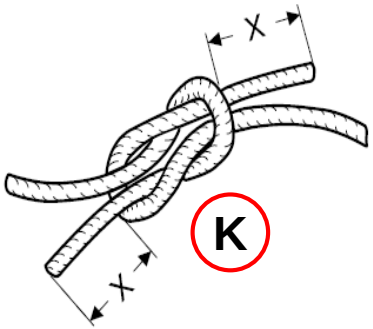
Twine box

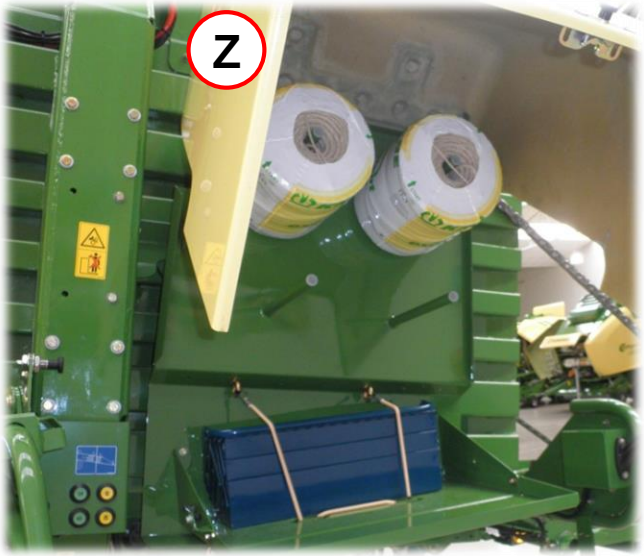
The twine boxes on the left and right on the machine can accommodate 2 x 16 spools of twine. The boxes are closed dustproof by an all-around seal. The twine boxes can be easily swung up for service or cleaning work. That way all functional components are accessible directly. The twine boxes are supported in opening by a shock absorber **(D)** and can be locked in open condition. The flow of twine in the twine box is designed such that 3 rolls (4 rolls BP 890) can be connected respectively for the lower twine and 2 rolls for the upper twine.

B172: An additional twine box **(Z)** is available as an option for all models as an accessories kit. The left additional twine box offers much space for four spools of twine and a tool box. The twine box on the right side can accommodate six spools of twine.



I – single knotter
II – double knotter
O – upper twine
U – lower twine





The spools of twine must be connected by a reef knot **(K)**. Shorten the ends of the knot to **X = 15 - 20 mm**.

5. Tying

Thread in the lower twine

I. Single knotter

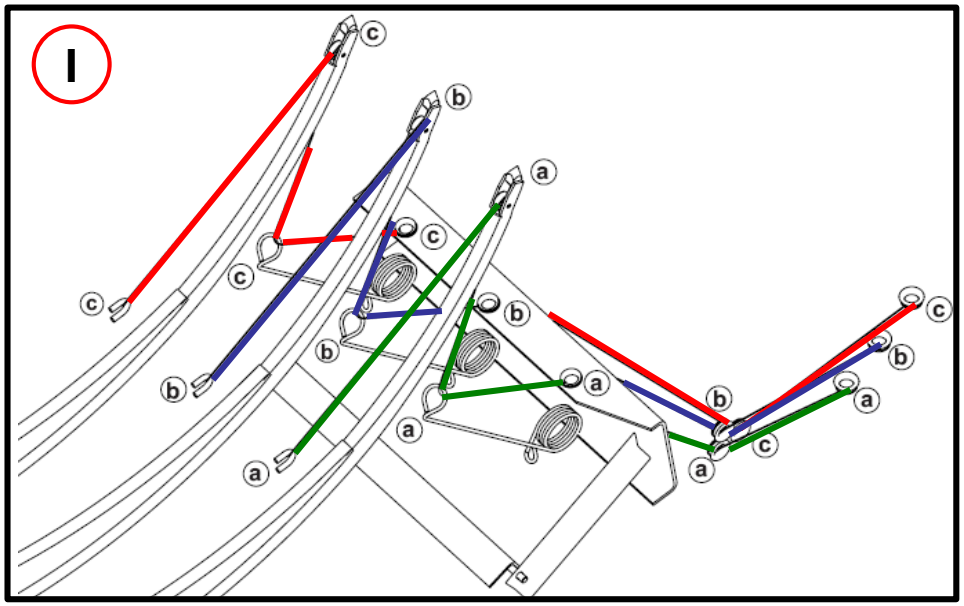
Thread the tying twine arriving through the bottom twine guide eyes of the twine box via the outer twine guide in the eyes. Thread it from hear via the twine tension springs in the tying needles and fix it by a knot on the respective eyes on the frame.

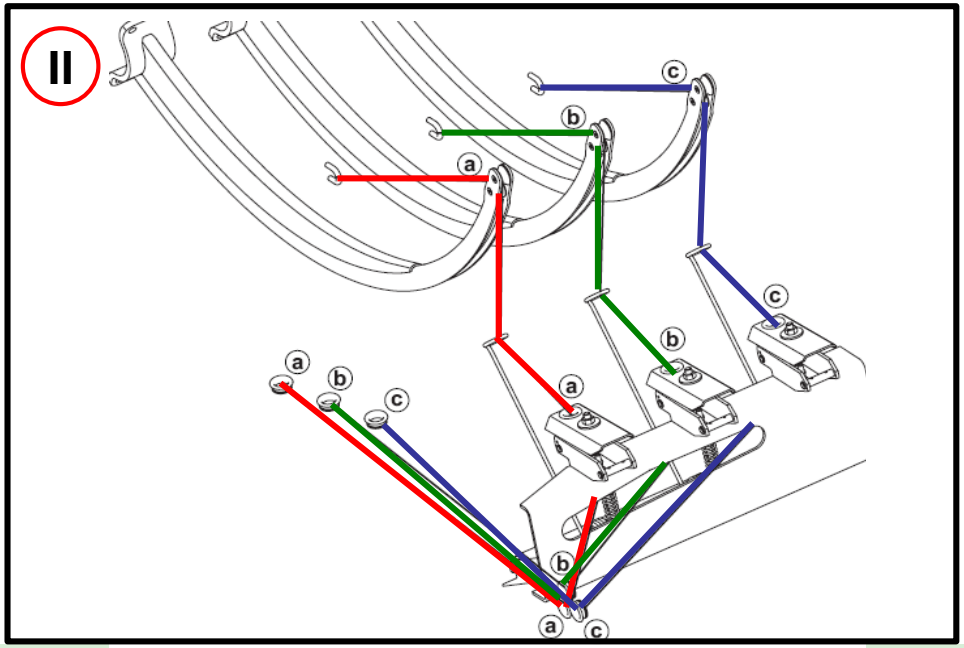
II – Double knotter lower twine strand

Thread the tying twine arriving through the bottom twine guide eyes of the twine box via the outer twine guide in the brakes. Thread it from here via the twine tension springs in the tying needles and fix it by a knot on the respective eyes on the frame.

Always make sure that the twine strands do not cross.

Before inserting new twine, the tractor must be switched off and the knotter shaft secured so that the needle yoke can not move.





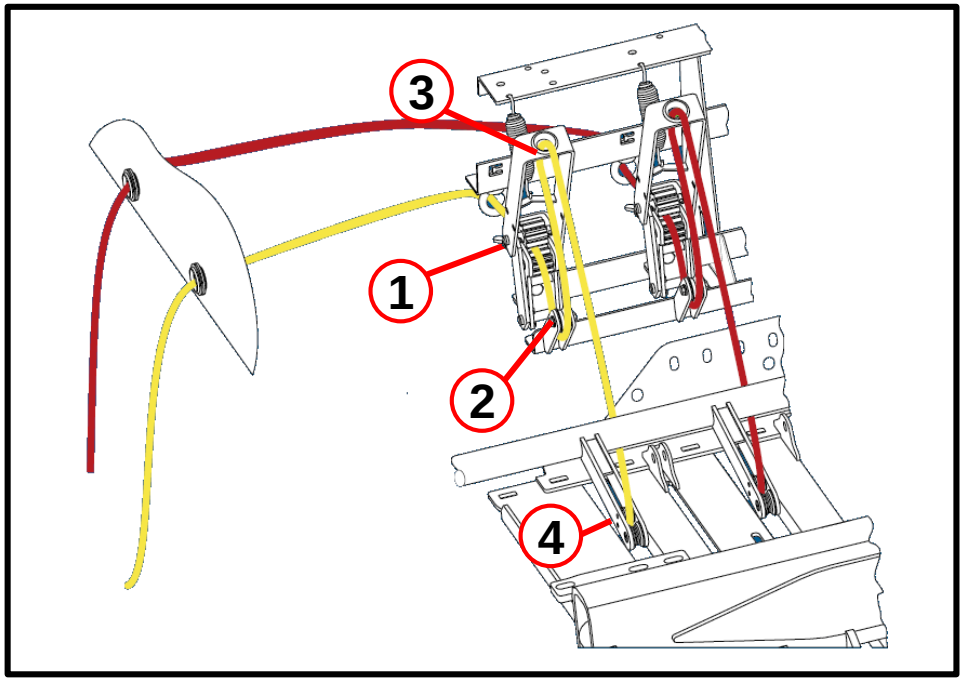
5. Tying

Thread in the top twine

Pass the twine through the twine guides to the twine brake **(1)**. From there, pass through the lower twine guide **(2)** to the eye of the twine tension springs **(3)**. Through the eye of the twine tension spring, the twine must be guided through the rollers of the upper needle **(4)**.

When the square baler is empty, the upper and lower twines can be knotted together in the press channel.
If the press channel is filled, you can alternatively press the loose twine end of the upper twine in the bale. To do this, thread the twine through the rollers of the top needle and let about 50 cm of twine down into the press channel. During further pressing, the twine will be clamp through the flags and thereby pulls down the twine tension springs.

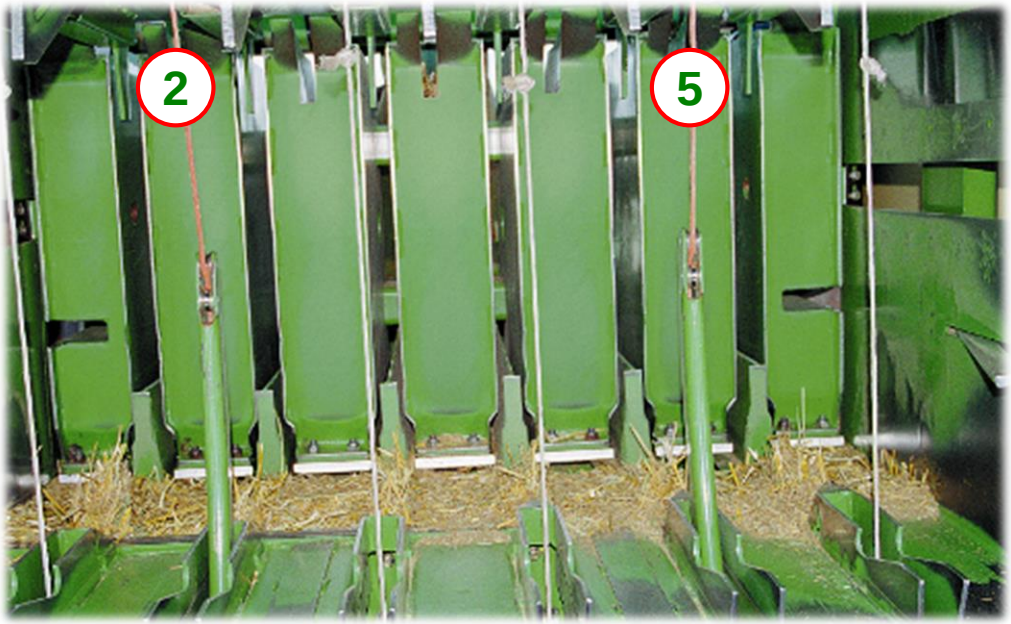
It is important that the twine tension springs are tensioned shortly before the binding process is triggered.

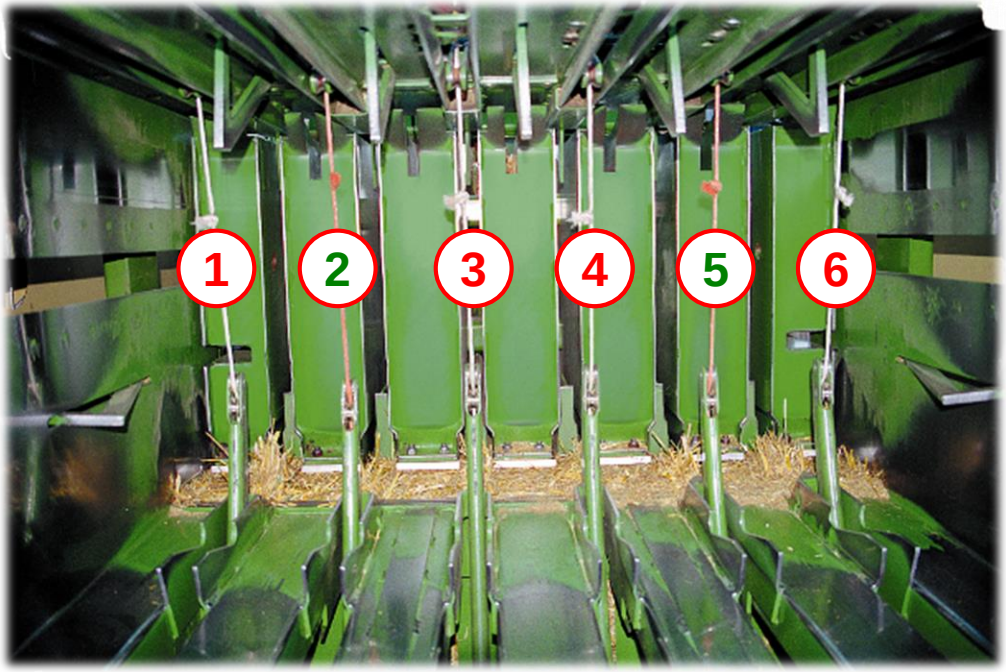


5. Tying

Mode of operation

Only knotter needles 2 and 5 are guided to the respective knotter for tying the MultiBale bales to form big bales. This separate tying system is possible with the two-part needle yoke and the double knotter technique only.





Six knotter needles are guided to the knotter via the automatically controlled ratchet mechanism to tie the big bale and the last MultiBale bale. Knotter needles 1, 3, 4, and 6 tie the big bale. Knotter needles 2 and 5 tie the last MultiBale bale of the big bale.

6. Operation

Operation units

B412
KRONE operation terminal DS 500

B413
ISOBUS operating terminal CCI 800

B308
ISOBUS operating terminal CCI 1200

External terminal variant

6. Operation

ISOBUS operation terminal: DS 500

- ISOBUS based => KRONE exklusiv
- Display 5,7“
- Touch capable + Hardkey
- Expandable with ISOBUS AUX-Joystick
- ON / OFF **(1)**
- Setting Brightness **(2)**
- ESC-Button **(3)**
- ACK-Button **(4)**
- APP Switch **(5)**
- HOME – Button **(6)**
- Scroll wheel **(7)**
- In-Cab connection **(8)**
- 12 function keys **(9)**

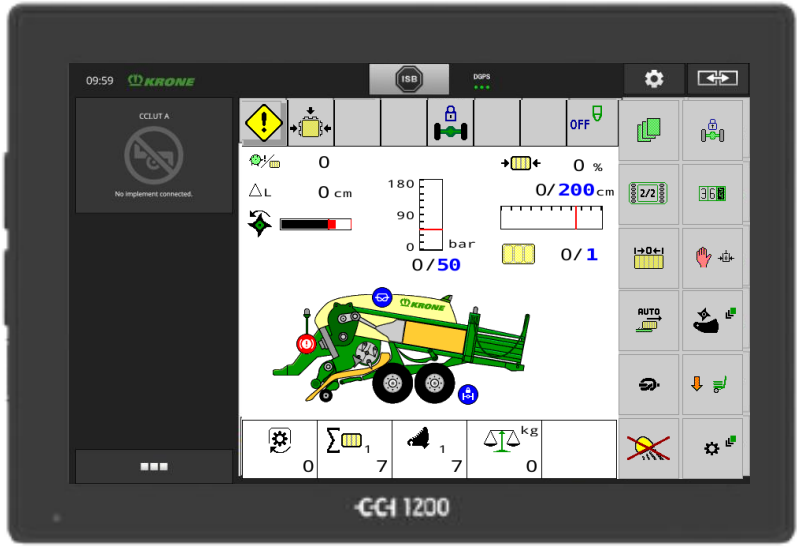
Comfort control unit: CCI 800 operating terminal

- CCI ISOBUS product – Manufacturer-independent use
- Display 8”
- Identical software like CCI 1200
- One main VTs + Live info menus
- Touch capable
- SectionControl
- Camera connection possible
- AUX connection possible

6. Operation

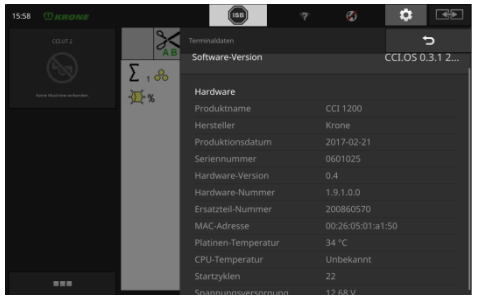
Comfort control unit: CCI 1200 operating terminal

- CCI ISOBUS product – Manufacturer-independent use
- Display 12,1"
- Identical software like CCI 800
- Touch capable
- Two main VTs + Live info menus
- Section Control
- Camera connection possible
- AUX connection possible



6. Operation

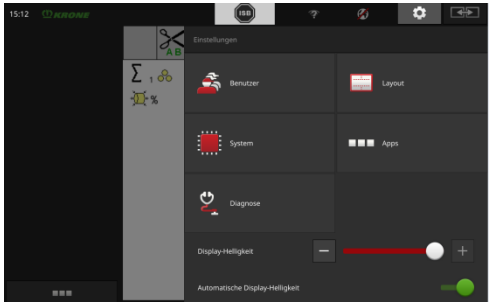
Comfort control unit: CCI 800 / 1200 operating terminal functions



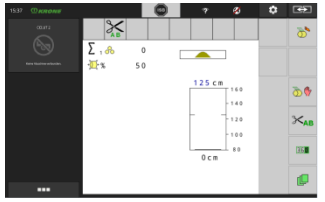
Software Info 2 sec
(opens settings)

ISB

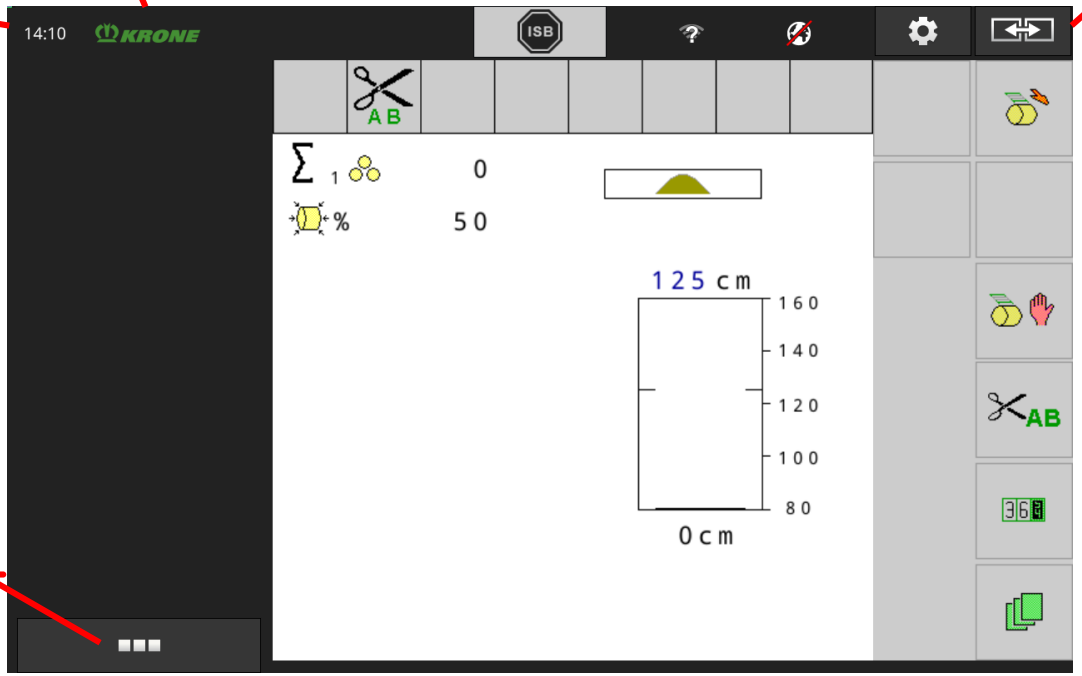
Settings



Layout Switch 2 sec
(Standard <-> Maxi)

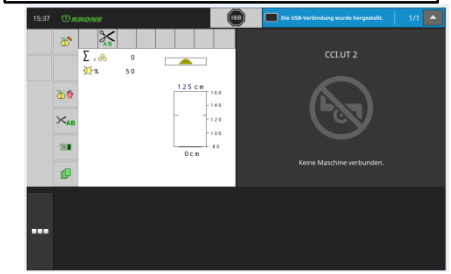


Screenshot 2 sec
(save on USB flash drive)



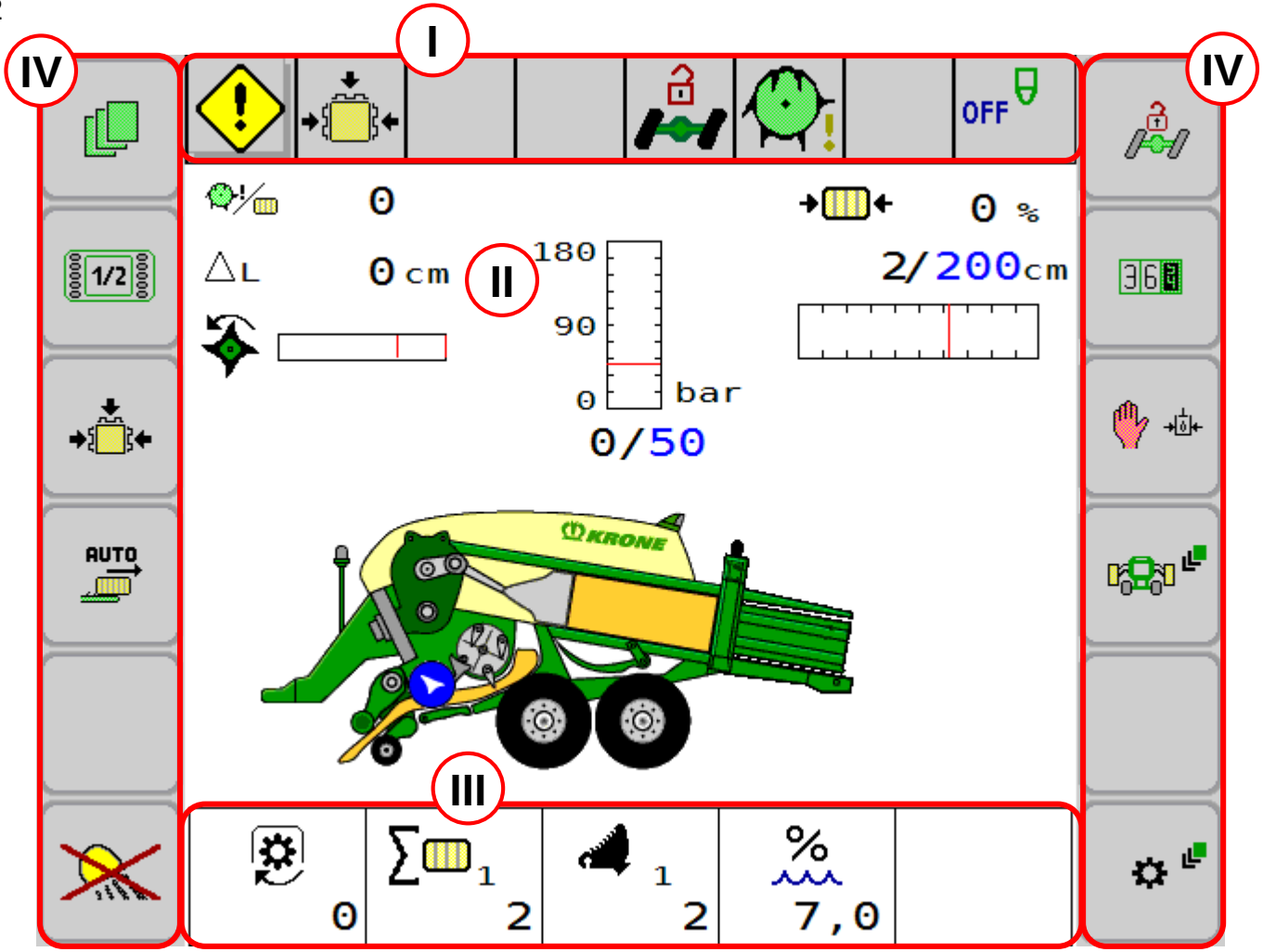
App menu

View Switch (right <-> left)
(Nur CCI 1200)

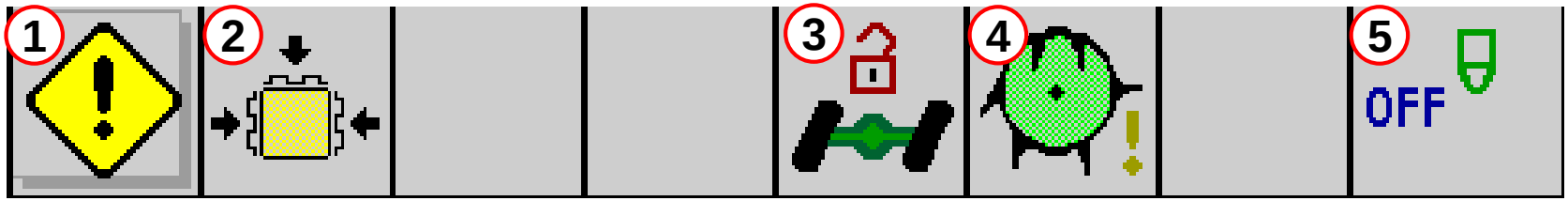


Working screen

I – Status line
II – Area of the main window with non-adjustable displays and setting options
III – Area of the main window with individually selectable displays
IV – Function keys 1-12



Status line



Current states of the machine (depending on equipment) are shown in the top line of the display:

1. **Error message**
   If an error message is pending, it is shown as a warning icon. The icon is touch-capable.

2. **Baling pressure at the bale channel**
   Icon indicates whether baling pressure is built up or released. If the Chamber flaps are open, the symbol flashes.

3. **Status of steering axle lock or bale ejector position**
   Display for the steering axle lock
   Axle locked/axle released

4. **Packer utilisation**
   If the utilization of the packer is optimal, the symbol is displayed inverted / black. In this case, the feeder rack push each piston stroke crop in the main chamber.
   If the utilisation is lower, the symbol will be flashing. Increase the driving speed until the symbol goes to black permanently.

5. **Silage additives unit**
   The icon indicates whether the silage additives unit is switched on or off.

Main window

Working screens

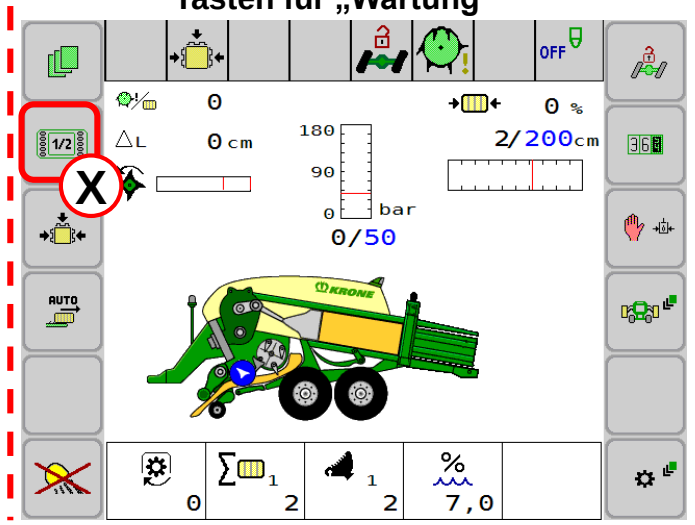
There are three different working screens depending on the operating state of the baler. Each working screen shows the functions required for the current application. The machine switches automatically between the working screens. The driver can also user the key **(X)** to switch manually between the working screens "Maintenance" and "Work".

Automatic switch to…

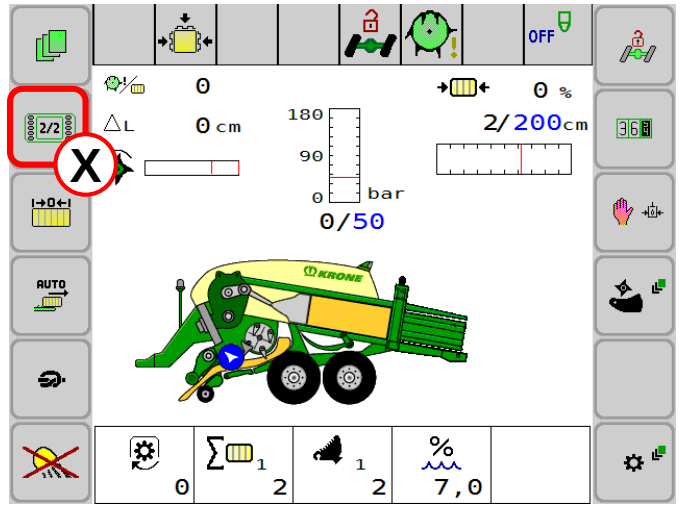
- "Road mode" → PTO shaft off, chute up, pick-up raised, wait time (1 minute)
- "Maintenance" → e.g. chute down, PTO shaft off
- "Work" → PTO shaft is accelerated to working rotational speed

Tasten für „Straßenfahrt“

Tasten für „Wartung“



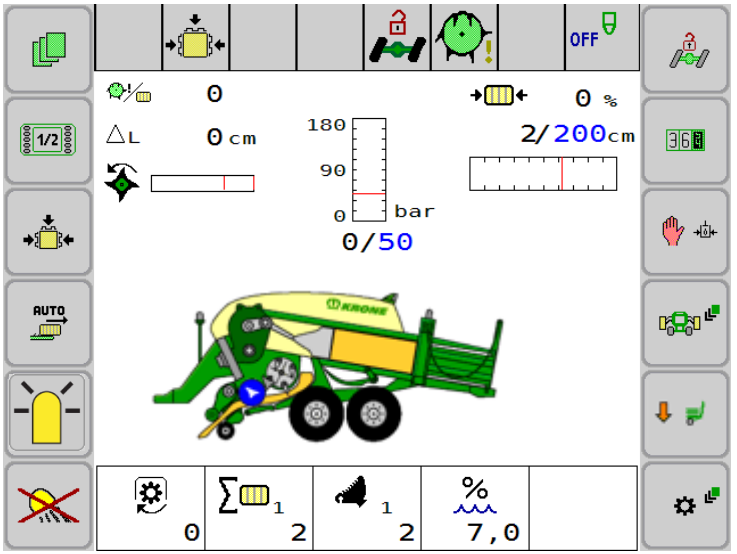
Tasten für „Arbeit“



Main window

Function keys

Page 1/2 - Maintenance



Call up menu level of the machine

Go to page 2/2 – Work

Close / loosen / fast closing baling flaps

Automatic bale ejection

Warning beacon on/off

Working light on/off

Lock/loosen self-steering axle

Setting the customer counter

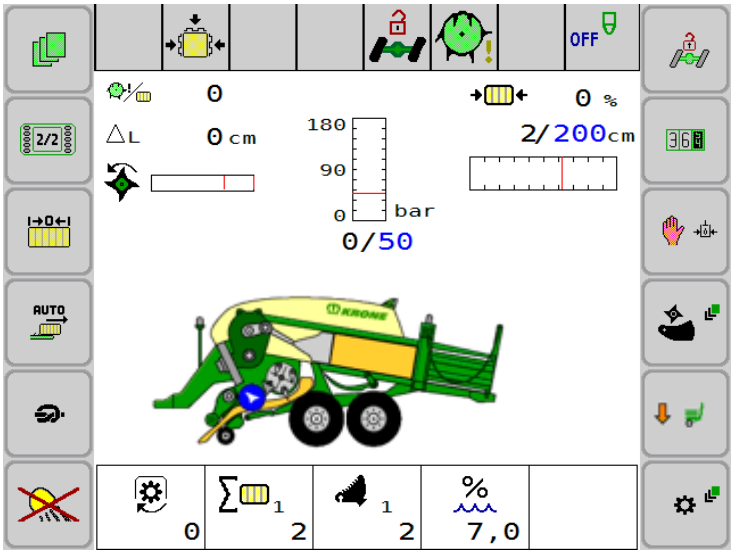
Select manual mode/automatic mode

Release twine boxes

Lower bale chute

Release Starter aid / Intake

Page 2/2 - Work



Call up menu level of the machine

Go to page 1/2 – Maintenance

Reset current bale length to zero

Automatic bale ejection

Trigger knotter

Working light on/off

Lock/loosen self-steering axle

Setting the customer counter

Manual/automatic mode

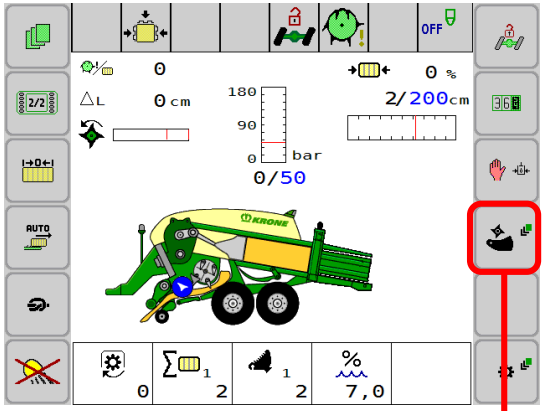
Release blade cassette

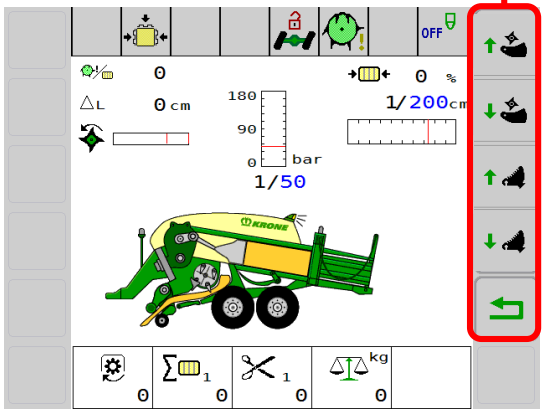
Lower bale chute

Release Starter aid / Intake

Main window
Function keys

Release blade cassette





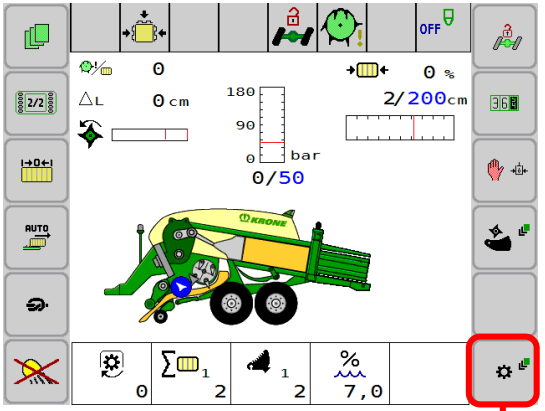
Lift blade cassette

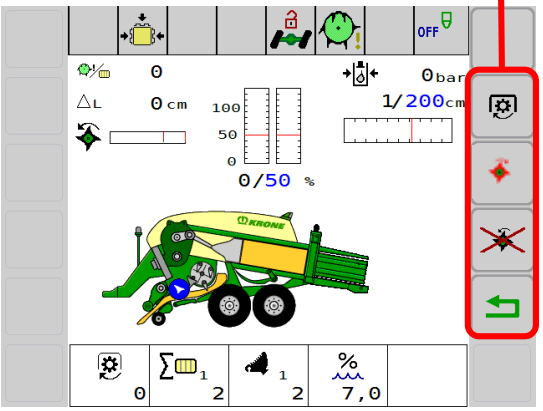
Lower blade cassette

Activate Blades (VC)

Deactivate Blades (VC)

Release Starter aid / Intake





Starter aid start / stop

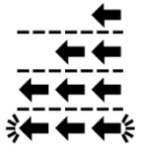
Reverse intake → stay press button

Intake start / stop

Area of the main window with non-adjustable displays and setting options

1. Direction display

The arrows **(R)** on the left/right indicate to the driver the side to which and by how much he/she must correct his/her direction when driving over the swath to ensure uniform filling of the bale chamber.
Up to three arrows are displayed.



2. Baling density display and setting manual mode: baling pressure

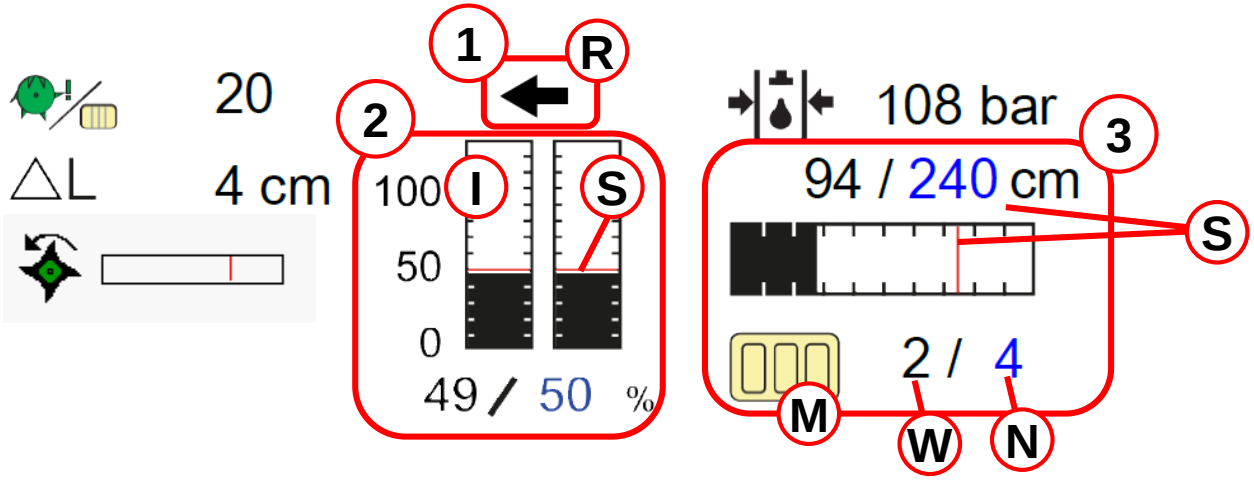
The left number below the bargraphs and the height of the bars **(I)** show the current actual baling pressure value in bar. The right number below the bargraphs and the lines in the bargraphs **(S)** indicate the setpoint value entered for the baling pressure in bar.

Automatic mode: baling force

The number below the bargraphs and the height of the bars **(I)** indicate the current actual baling force value in %. The right number (highlighted in blue) below the bargraph and the lines in the bargraphs **(S)** indicate the setpoint value entered for the baling force in %.

3. Bale length display and setting

The display for the MultiBale icon option **(M)** is shown here. The first value **(W)** above the bar shows the current pressed MultiBale. The second value **(N)** shows the target number of MultiBales per entire bale. After each MultiBale, a horn sounds briefly. If the bale is finished, a longer and louder horn sounds. The first value under the bargraph and the length of the bar indicate the actual status of the bale length. The second value and the red line **(S)** indicate the set target bale length.



6. Operation

Area of the main window with non-adjustable displays and setting options

4. Knotting process
Appears briefly after the knotting process. Falls activated, an acoustic signal sounds for approx. 1 second.

5. Bale layers
Shows the current number of layers of the last bale pressed.

6. Layer thickness
Shows the current layer thickness in cm. During pressing, this display can serve as orientation of the machine utilisation.

7. Slip display
On the VariCut, the pick-up and the cutting rotor are powered by a belt. This display represents the slip of the belt and the red bar is the maximum slip that should be achieved.

8. Current baling flap pressure
Displays the current baling flap pressure in bar in automatic mode.

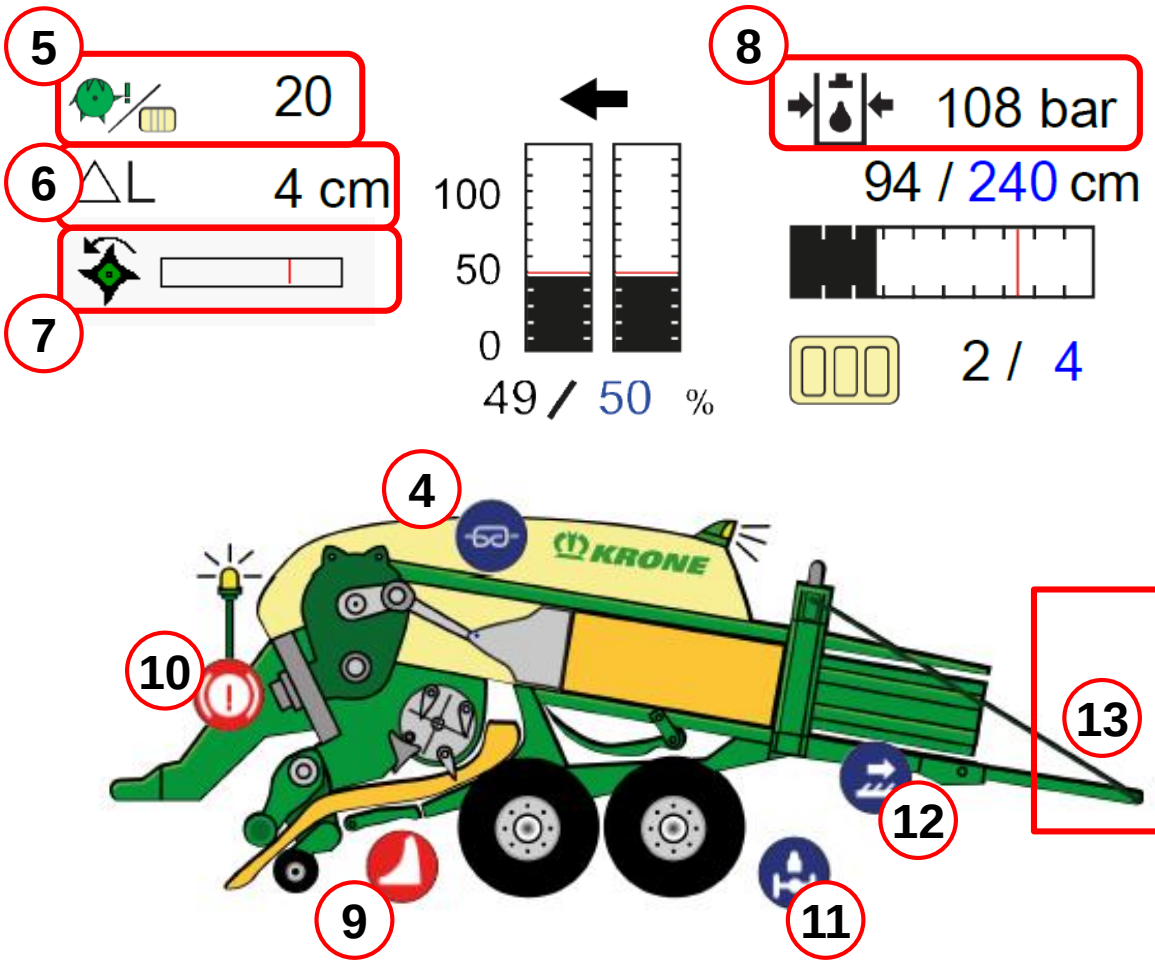
9. Blade cassette not up

10. Flywheel brake applied

11. Self-steering axle locked

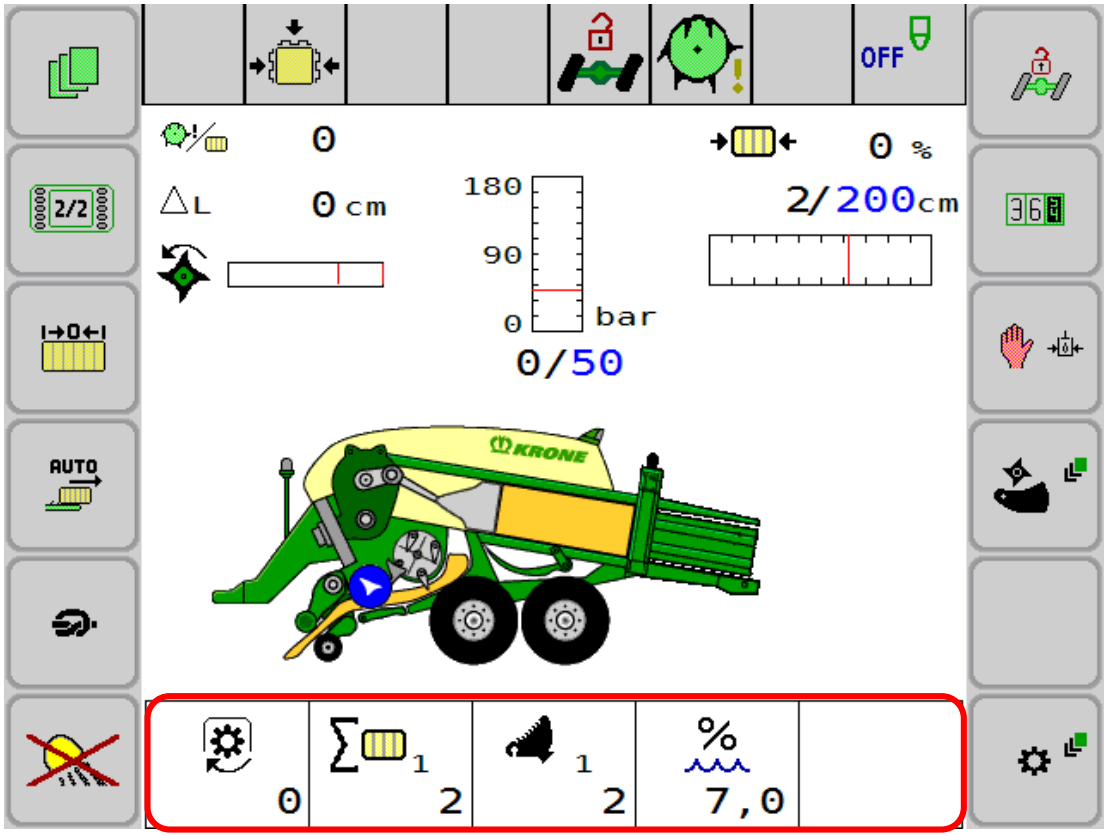
12. Bale ejector active

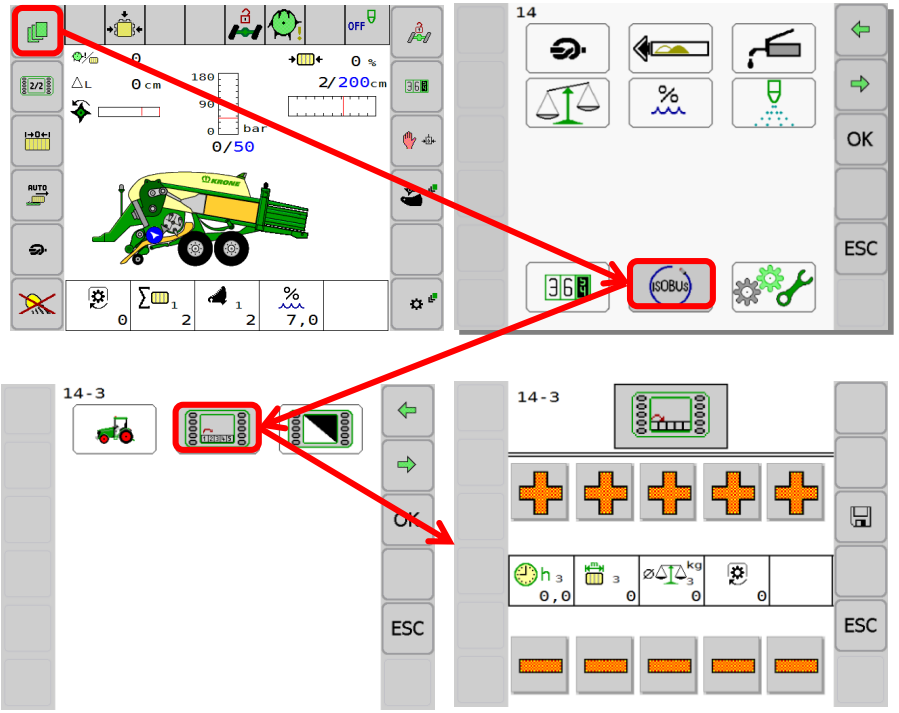
13. Bale chute down



Area of the main window with individually selectable displays

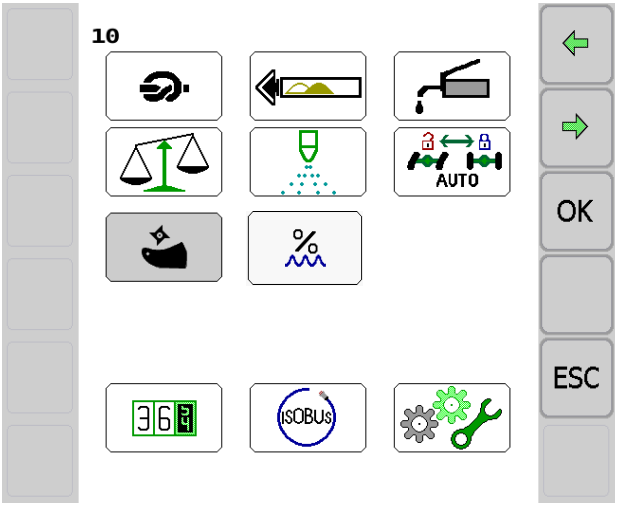
Menu **14-3** is used to determine which displays are to be shown in the main window. Up to 5 display elements can be displayed simultaneously in the main window. The number of display elements depends on the machine equipment.





6. Operation

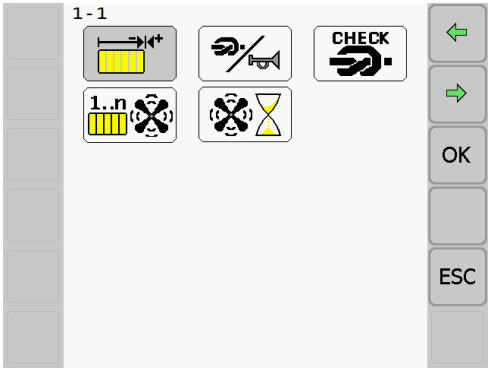
Menu structure

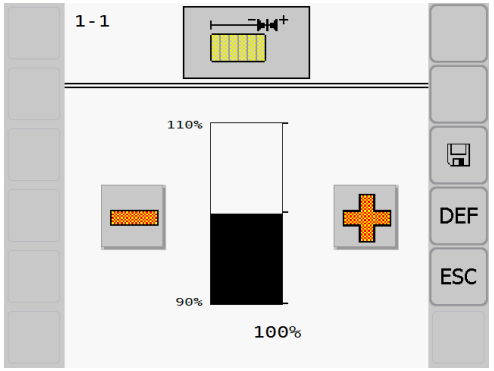


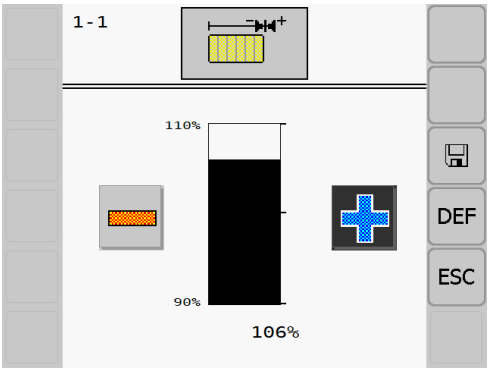
- 1 Knotter
  - 1-1 Bale length correction
  - 1-2 Knotter signal
  - 1-3 Knotter monitoring
  - 1-4 Blowing interval
  - 1-5 Blowing time
  - 1-6 MultiBale correction
- 2 Sensitivity of direction display
- 3 Central lubrication
- 4 Bale scale
- 5 Moisture measurement
  - 5-1 Error message for moisture measurement
  - 5-2 Correction value for moisture measurement
- 6 Silage additives unit
- 8 Steering axle
- 10 Cutting unit
  - 10-1 Blowing interval cutting unit cleaning
  - 10-2 Cutting unit calibration
  - 10-3 Cutting unit mounted/dismounted
  - 10-4 Manual cutting unit cleaning
  - 10-5 Cutting unit automatically lower&lift activated/deactivated
- 13 Counter
  - 13-1 Customer counter
  - 13-2 Total counter
- 14 ISOBUS
  - 14-2 Diagnostics of speed/direction of travel
  - 14-3 Configure main window
  - 14-4 Setting background colour
  - 14-5 SmartConnect
  - 14-9 Changing over between terminals
- 15 Diagnostics
  - 15-1 Sensor test
  - 15-2 Actuator test
  - 15-3 Software info
  - 15-4 Error list

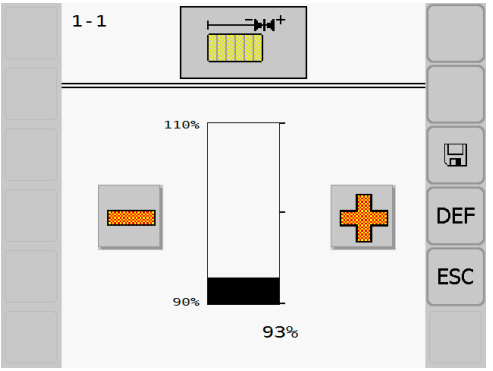
1-1 Bale length correction value

Different material characteristics, e.g. of straw or grass, may cause the actual bale length to deviate from the specified setpoint value. The correction value can be used to correct the deviation. If a correction value of for example 110% is set, the bale will be 10% longer.



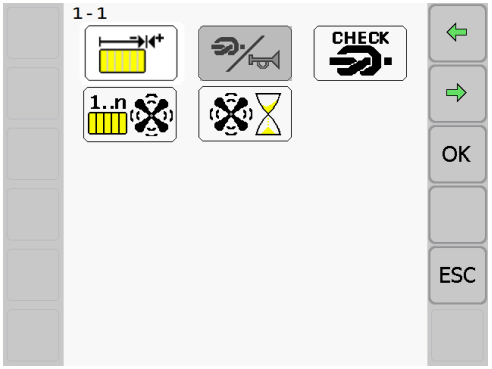


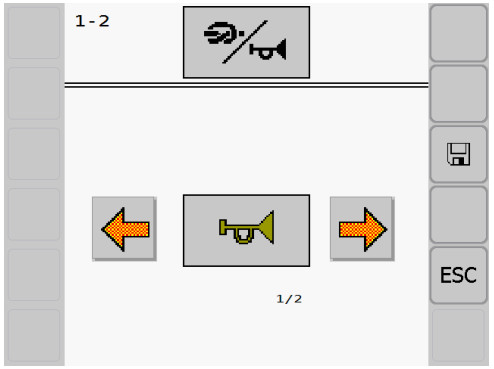


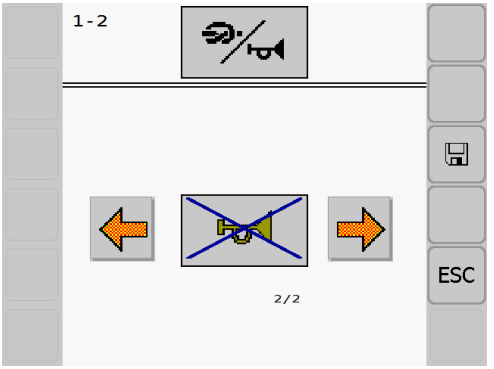


1-2 Knotter signal

Here, you can specify whether an acoustic signal should sound after every completed knotting process.

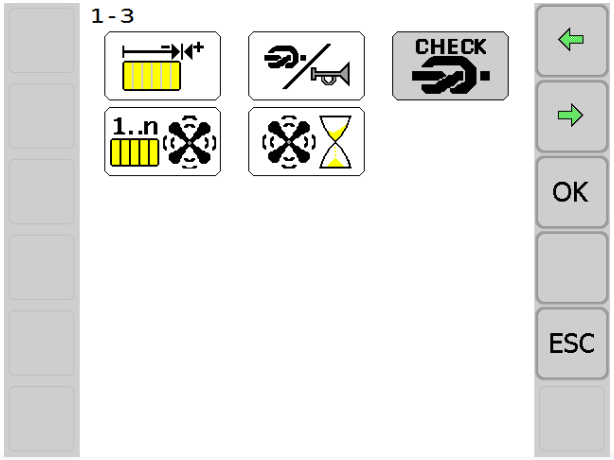


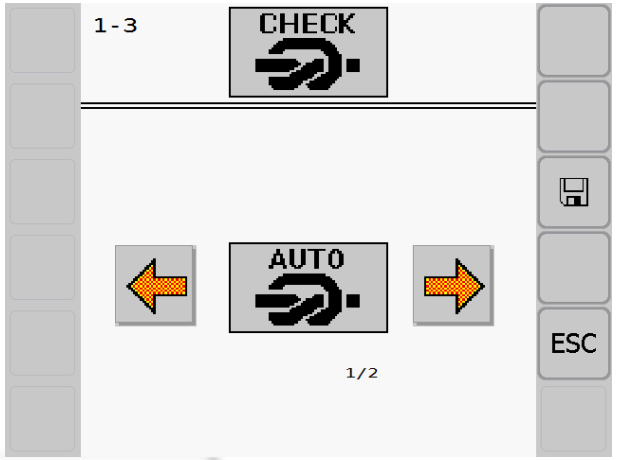


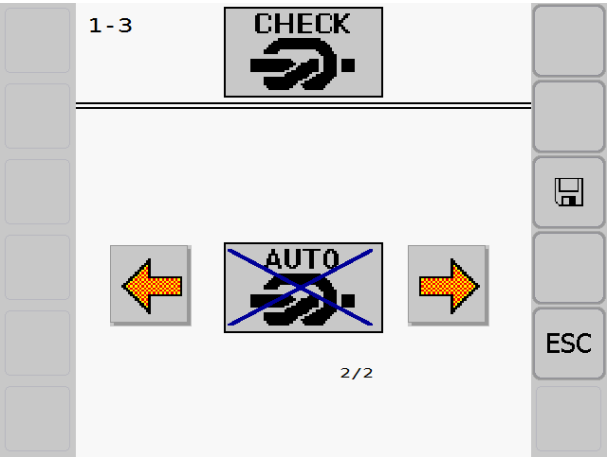


1-3 Knotter monitoring

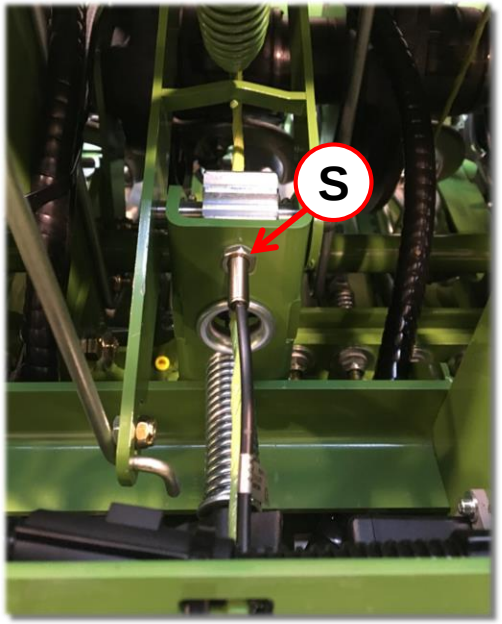
This electronic monitoring system can be switched off under menu **1-3** "Setting/Knotter monitoring".





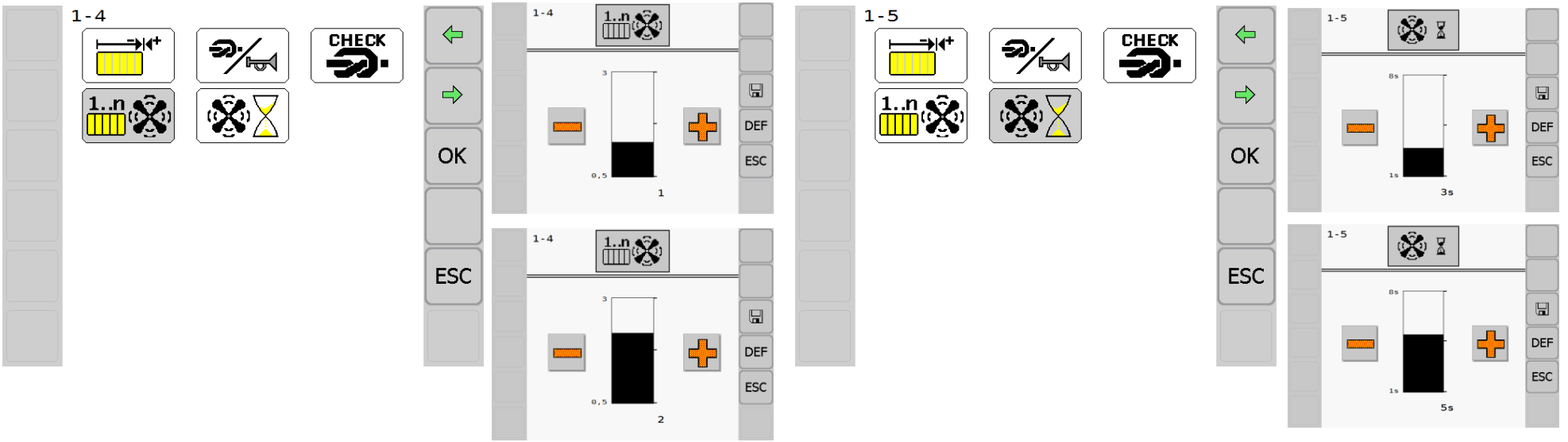


If a sensor **(S)** malfunctions while the machine is in operation, for example, you can deactivate knotter monitoring to stop the error message being continuously displayed.



1-4 Knotter cleaning & 1-5 Cleaning time

Knotter cleaning is performed as standard using compressed air. Every knotter is equipped with two blowing lines.

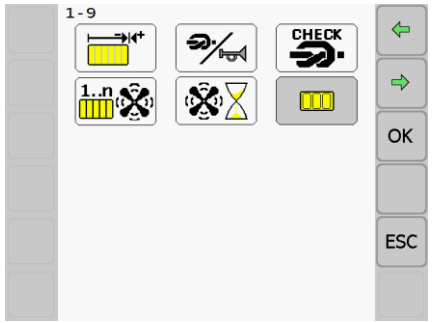


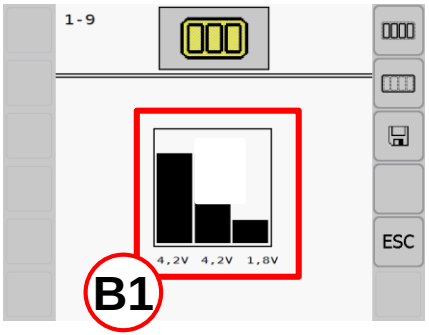
Knotter cleaning is performed shortly before the tying cycle. Depending on the operation conditions, the cleaning intervals can be set using the terminal in the menu "Settings/Knotter settings/Bale blowing" **1-4** between **0.5 all the way to every 3 bales**.
In the menu "Settings/Blowing time" **1-5**, you can set the **blowing time from 1 to 8 seconds**. The factory setting is **1,5s**.
Not in all countries are tractors equipped with compressor units. To enable perfect cleaning in this case, these machines are equipped with an on-board compressor **(K)**.

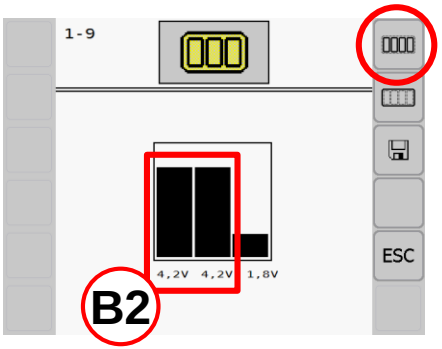
Knotter cleaning is only released at a pto speed in excess of 600 rpm.

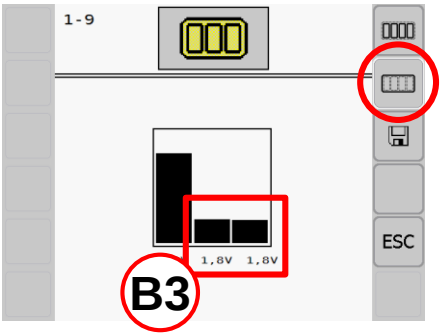
1-9 Calibrating the MultiBale

After repair work or heavy loads, it may be necessary to calibrate the MultiBale lock, if the middle bar is bigger or smaller than the outer two bars **(B1)**.

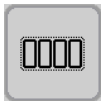




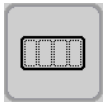


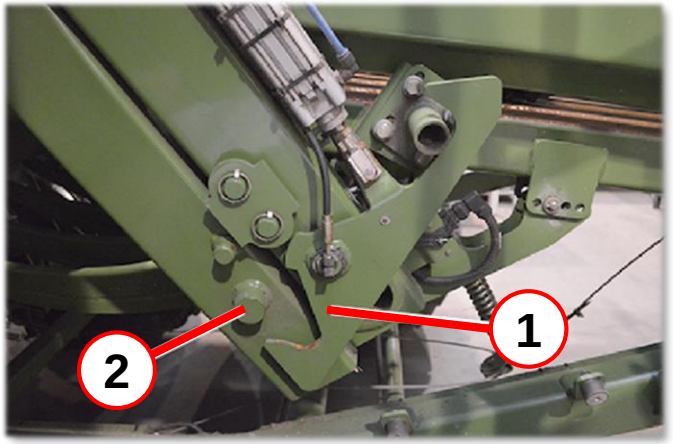


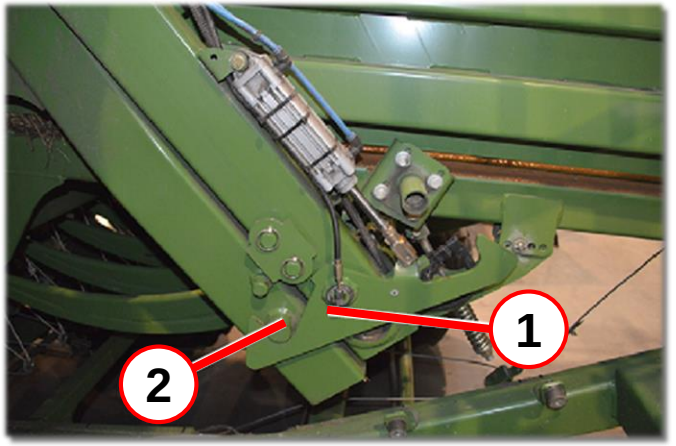
Move lock to "MultiBale" position

1.  Press and hold until the middle and left bar are the same height **(B2)**.
2. The lock **(1)** is fully unlocked if the lock is below the journal **(2)**.

Move lock to "Entire bale" position

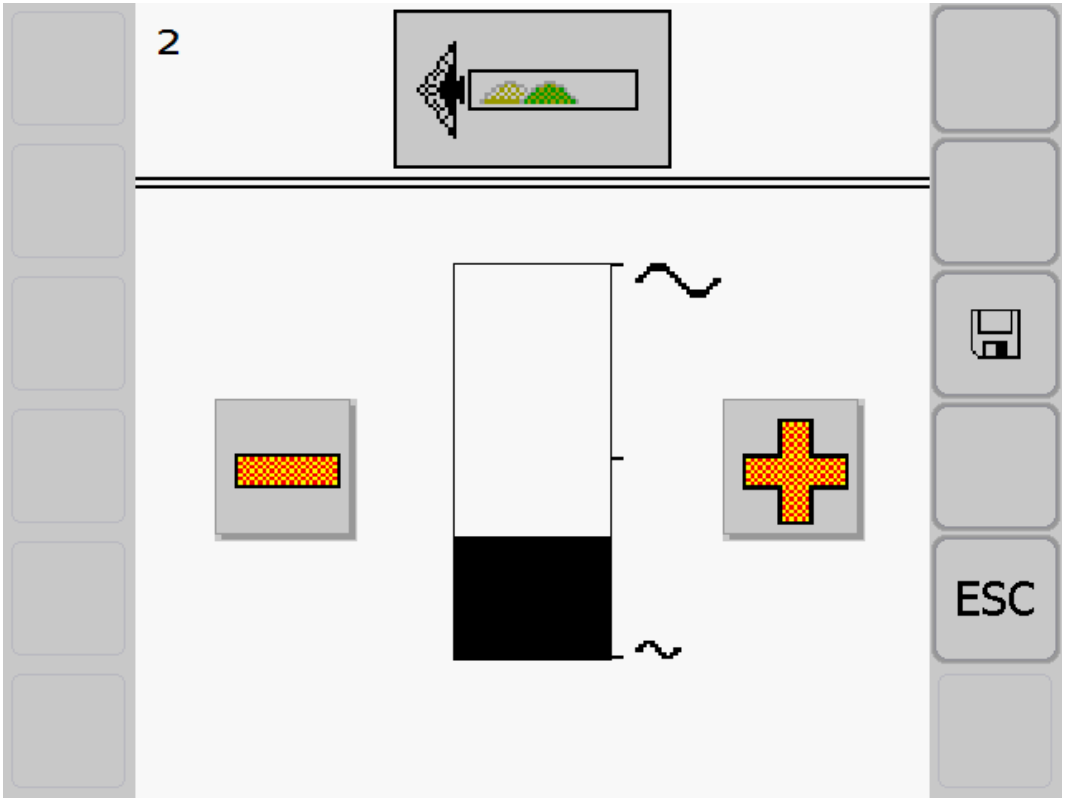
1.  Press and hold until the middle and right bars are the same height **(B3)**.
2. The lock **(1)** enclose the journal **(2)** and rest on it.

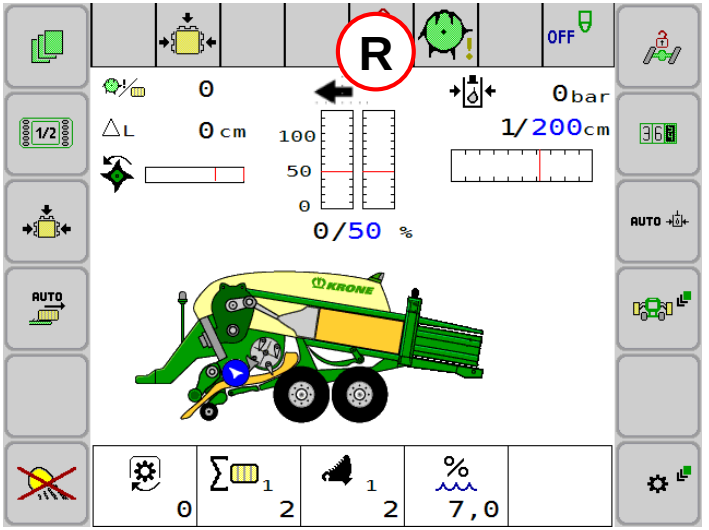


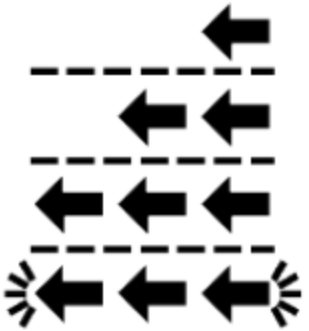


2 Setting the direction display sensitivity

The baling force is recorded by two sensors on the connecting rods. The signals are also used in the operation unit for the direction display **(R)**. The greater the difference between the measured forces of the left and right sensor, the stronger the direction of travel instructions. In menu **2**, the sensitivity of the direction display can be adjusted.

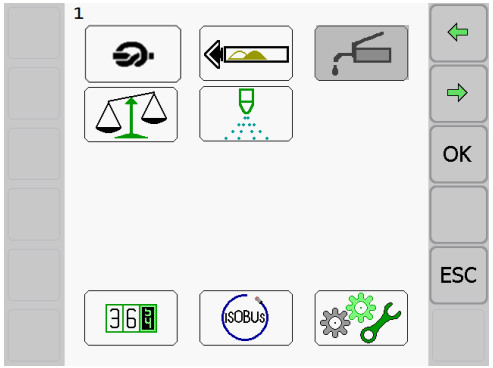


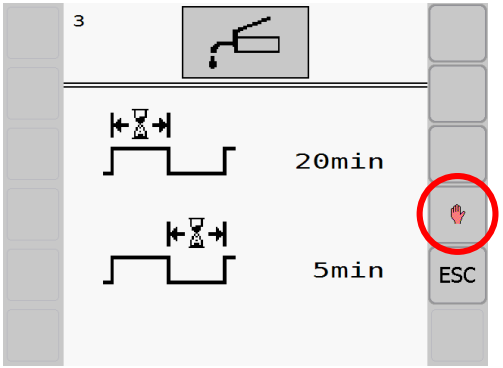




3 Central lubrication

You can trigger interim lubrication here manually. The lubrication periods are not adjustable.

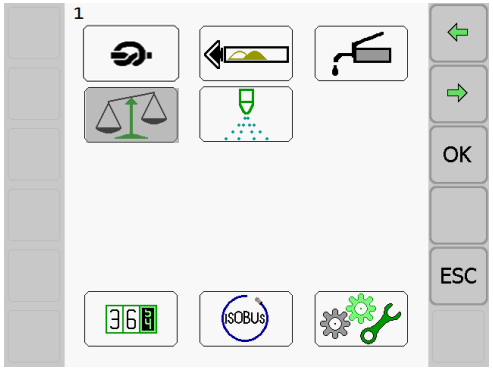


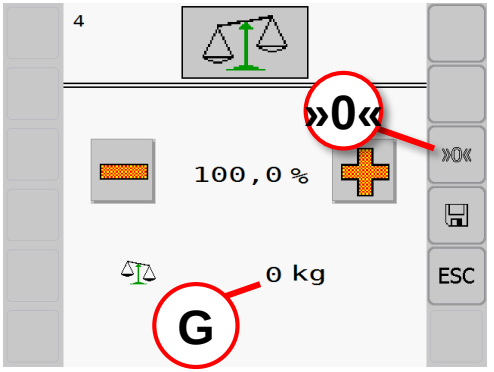


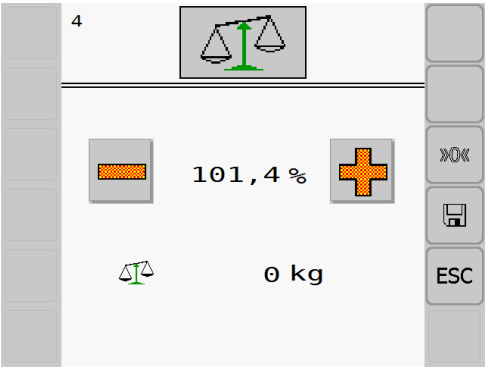
4 Bale scale adjustment

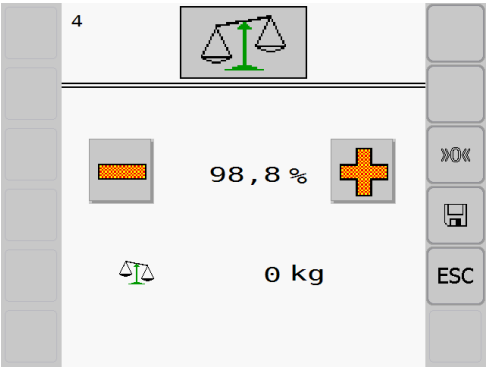
The bale scale can be readjusted in the limit range from 95 % to 105 %. To make the adjustment, open menu **4 "Setting/Bale scale"**. With the machine at a standstill, place a calibrated test weight (250 to 300 kg) onto the empty bale scale. If the value **(G)** in the display deviates from the test weight, use the plus and minus buttons to readjust the displayed value until the value **(G)** matches the weight of the test weight. Use the **(OK)** button to save the set value.

Press the button **(»0«)** to reset the display value to zero. **At the same time, the neutral position of the sensors of the bale scale are calibrated.** This procedure must be performed if the display value indicates a weight when the bale scale is in the unladen state.





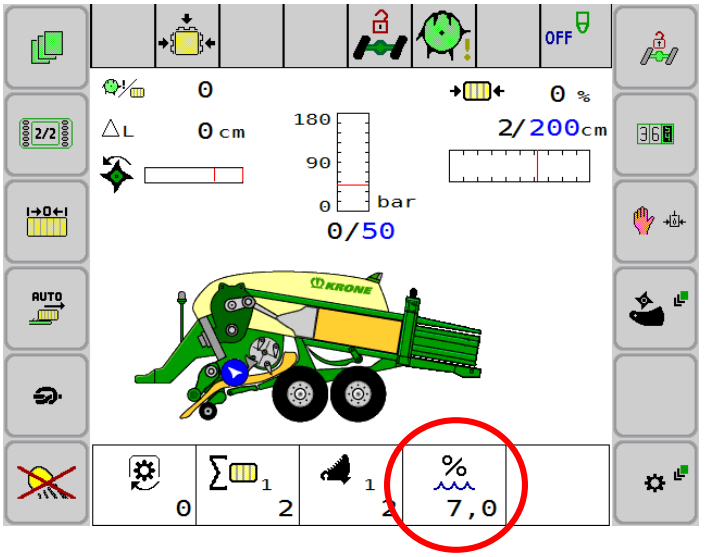


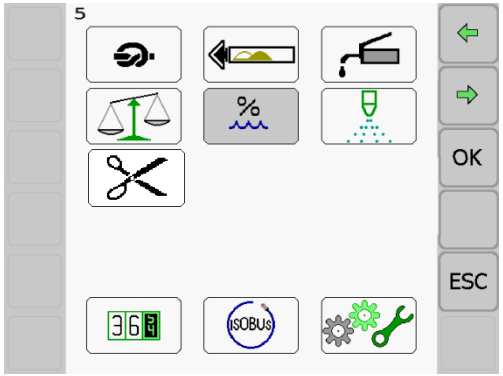


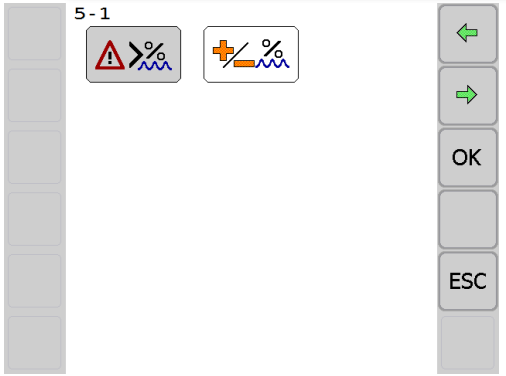
5 Bale humidity measurement

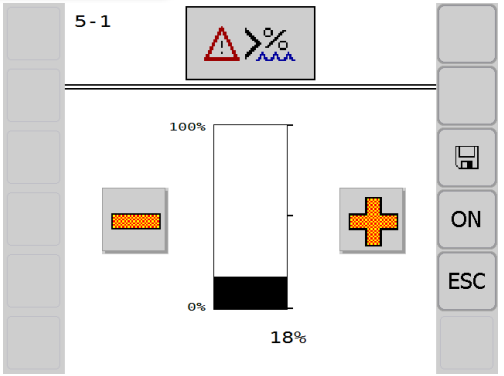
The measurement result is continuously shown on the display.
In menu **5-1 "Settings/Degree of moisture"**, the moisture limit in % is defined. If the measured value exceeds the set value during operation, a warning messages appears.

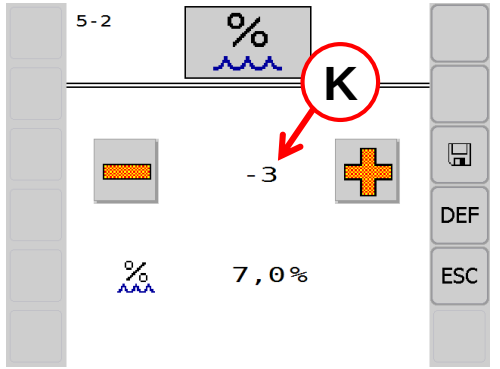
The value shown in the display can deviate due to different measuring procedures. In menu **5-2 "Settings/Setting correction value for moisture measurement"**, the deviation can be corrected using the correction value **(K)**. A correction value for the moisture measurement from +10 to -10 can be entered.
The moisture measurement is of informative nature and has no influence on the operating functions of the baler.



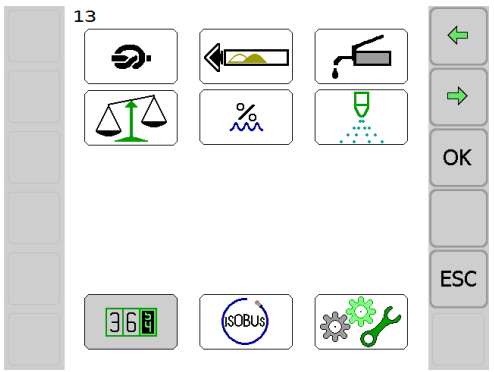


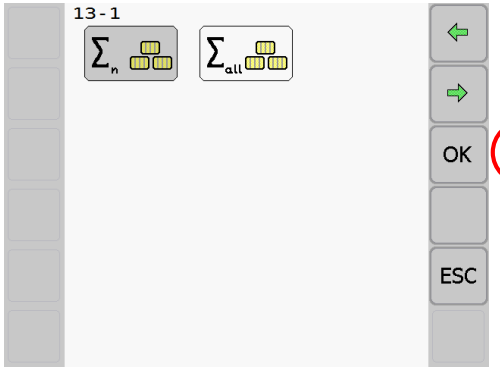


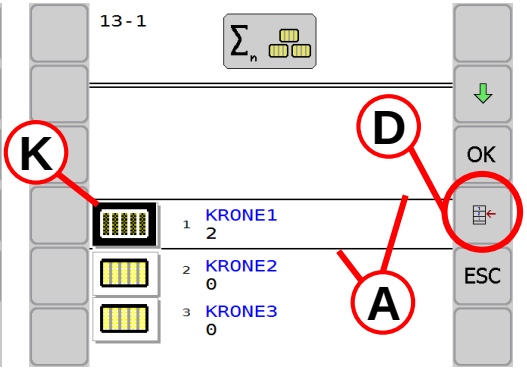


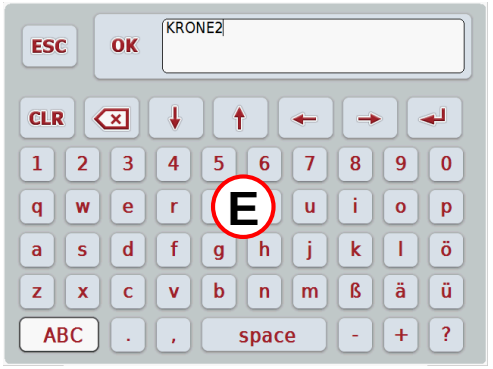


13-1 Customer counter

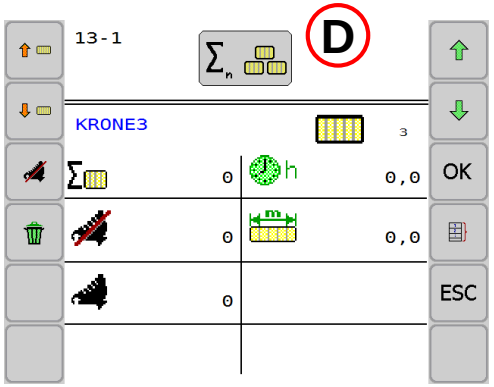








Up to 20 can be created. The **(K)** highlighted in black is the currently **activated** customer. The customer counter between the two lines **(A)** is currently the selected customer counter. However, the selected customer is not necessarily activated. To activate the selected customer, you must press the **"OK"** button. To change the name of the customer, simply tap it to open an input field **(E)**. To display additional detailed information about the selected customer, press button **(D)**.

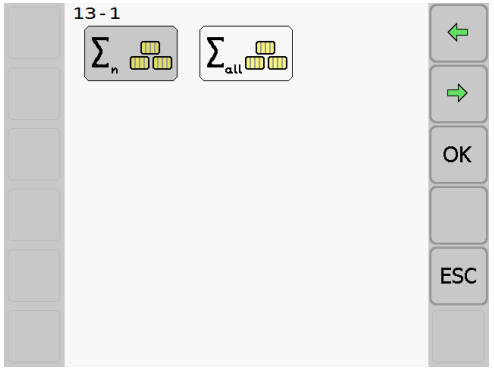


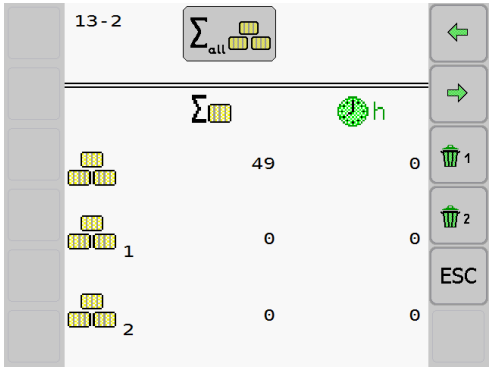
- Number of all bales
- Counter "uncut" bales
- Counter "cut" bales
- Counter "total weight"
- Counter "average weight"
- Operating hours counter (PTO shaft)
- Counter "total length of all bales"
- Knotter counter (for MultiBale)

Press to reset the selected customer counter to zero.

To increase or reduce the counter for "uncut" or "cut" bales, select or and then use or to correct the counter. The values from the day counter, season counter, "total length" counter, knotting counter as well as the total and average weight are automatically adjusted.

13-2 Total bale counter



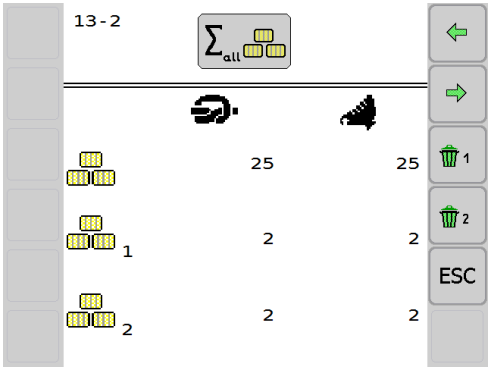


Total bale counter (cannot be deleted)

Season counter 1, 2 (deletable)

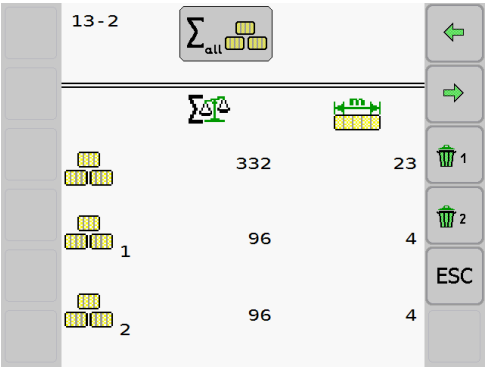
Operating hours

Press  or  to reset season counter 1 or season counter 2.



Counter "cut bale"

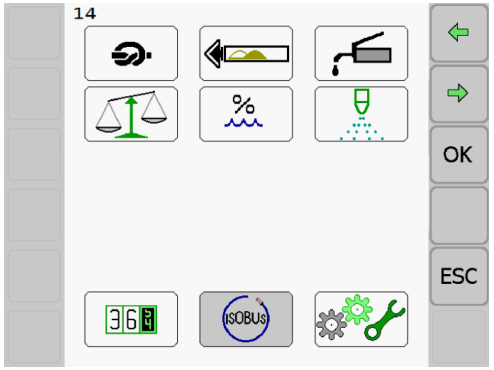
Counter "uncut bale"

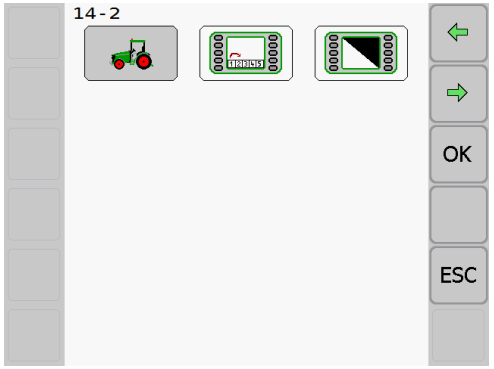


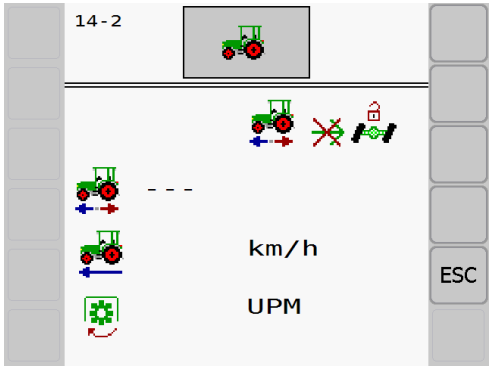
Counter "total; length of all bales"

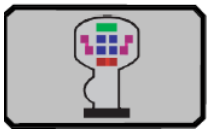
Counter "total weight"

14 ISOBUS menu

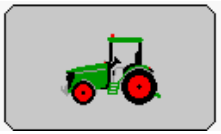




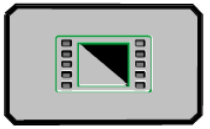




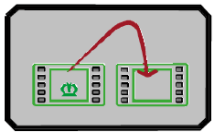
"Auxiliary diagnostics"
If functions are operated using a joystick, the terminal lists the function icons here.



"Diagnostics driving speed display/direction display"
The diagnostics display the direction of travel and speed of the tractor. The prerequisite is that the information is stored on the tractor bus system. Both pieces of information are use to automatically lock the steering axle. In addition, the PTO speed (if provided by the CAN bus on the tractor) is displayed here.



"Setting background colour"
You can choose between 3 modes here. The white background is recommended for daytime use and the black background for nights. In automatic mode, the terminal switches between daytime and night-time mode via the parking light on the tractor.

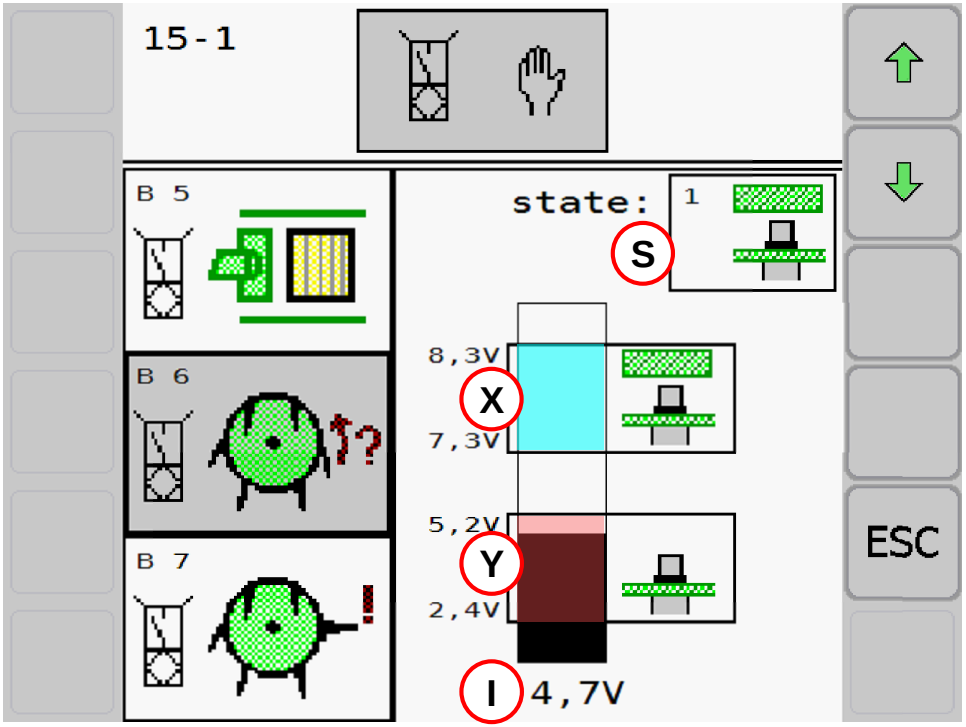


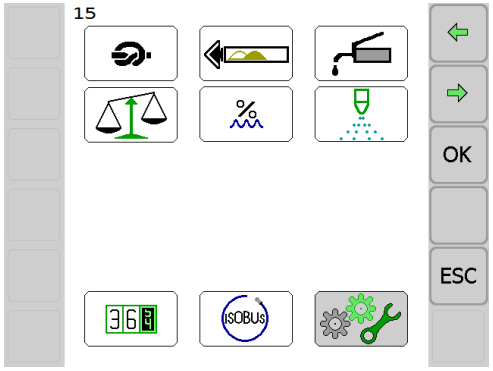
"Switching between terminals"
This menu is only available if multiple ISOBUS terminals are connected.

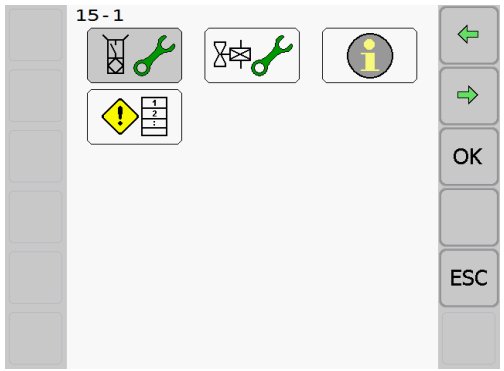
15-1 Diagnostics of inductive proximity switch (NAMUR)

In menu **(15-1)** "Manual sensor test", the sensors fitted to the machine are checked for errors. In addition, the sensors can be correctly set in the manual sensor test. Only after the sensors are set is the machine guaranteed to operate correctly.

The upper area **(X)** of the bargraph displays the minimum and maximum evaluated voltage with an attenuated sensor (metal in front of the sensor). The current value **(I)** is displayed below the bargraph. The distance between sensor and metal must be set so that the bar is in the upper area **(X)** in the attenuated state. Then check whether the bar is in the lower area **(Y)** in the unattenuated state.
The sensor status is displayed in the section **(S)**.







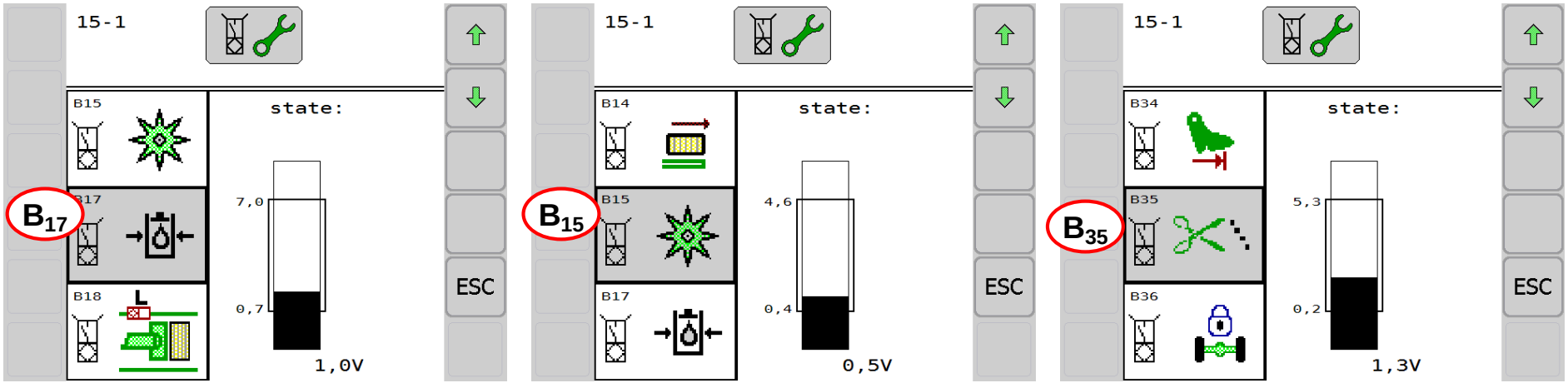
	(S) - Sensor status (state)
	Alive (metal detected)
	Not alive (metal not detected)
	Cable break
	Short circuit
p>100bar	Steering axle locked
p<100bar	Steering axle opened
	Button pressed
	Button not pressed

15-1 Analogue sensor diagnostics

Diagnostics for other sensors are also carried out in the same way.

Example:

B_{17} – Sensor baling pressure: at 0 bar baling pressure, the bar must be in the lower marked area
B_{15} - rotate star wheel: The bar must always be in the marked area after one rotation.
B_{35} – Position blade cassette VC-machine: Signal voltage to monitor the different positions.



	Sensor status (state)
	Sensor operable
	Cable break oder short curcuit
Error	Sensor fault

15-2 Actuator test

The actuator test under menu **15-2** is used to test the actuators installed on the machine. An actuator can only be tested if it is energised. The "manual actuator test" therefore requires that the actuator is briefly actuated manually in order to detect any errors in the actuators.

During the actuator test, the PTO shaft must not rotate and the tractor hydraulics must be deactivated. During the actuator test, actuators are activated and this may result in unpredictable actions on the machine. For this reason, this test must be performed from a safe position outside the area of action of machine parts moved by the actuators.

Diagnostics for digital actuators

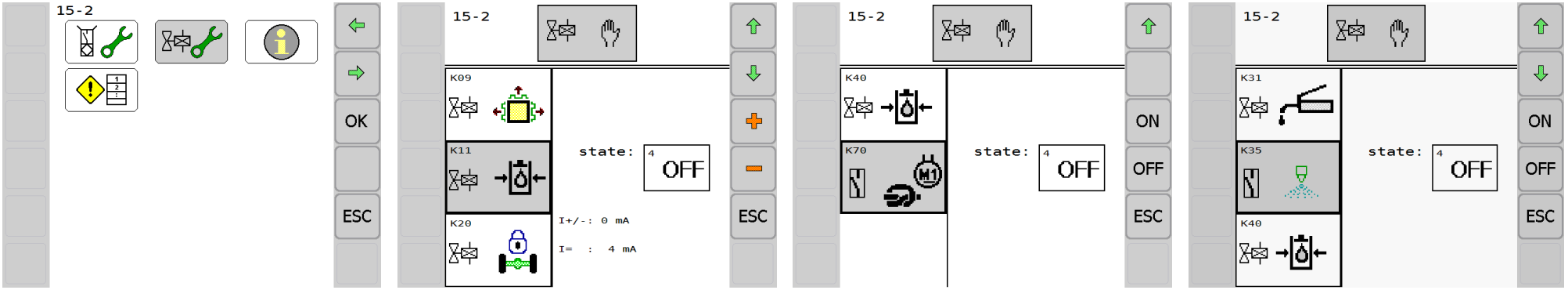
Errors are only displayed if the actuator is switched on and capable of being tested. If necessary, the LED in the plug can also be checked directly on the actuator.

	Actuator status (state)
ON	Actuator on
OFF	Actuator off
-/	General actuator error
FUSE	No supply voltage

Diagnostics for analogue actuators (pressure limiting valve)

The PWM value (per thousand) can be used to set a current (in mA). At the value PWM = 500, the current should be between 1000 mA and 3000 mA (depending on the valve used and the operating temperature)

- Press key (+), PWM is increased.
- Press key (-), PWM is reduced.



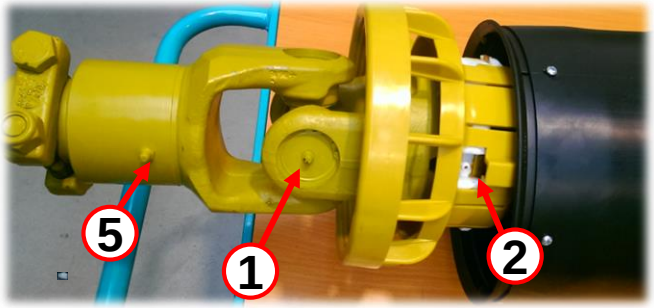
11. Maintenance

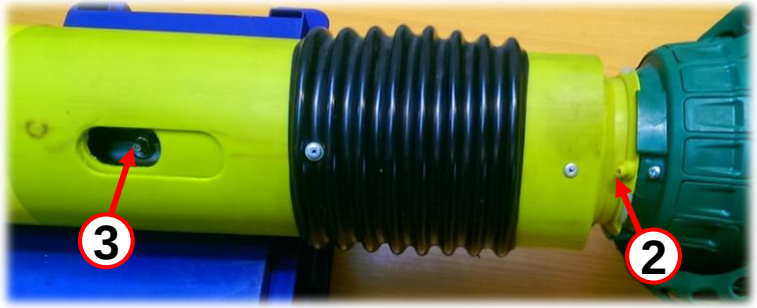
Maintenance

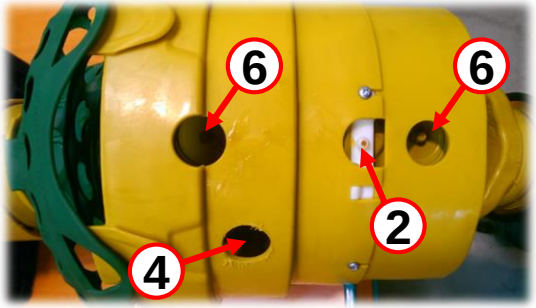
During all lubrication and maintenance work, it is essential to proceed according to the operating instructions, chapter 16 "Maintenance".

11. Maintenance

Overview of lubrication intervals and quantities for the universal shafts







	Universal joint Standart joint (1)	Slide rings of the guard tube (2)	Section tubes (3)	Wide-angle joint (80°) (4)	Freewheel clutch (5)	Universal joint Wide-angle joint (6)
Main universal shaft	15 g - 40 h	6 g - 40 h	15 g - 40 h (both sides)	70 g - 40 h	15 g - 250 h	30 g - 40 h
Flywheel universal shaft	15 g - 40 h	6 g - 40 h	- - -	- - -	- - -	- - -

11. Maintenance

Overview of lubrication intervals and quantities for the universal shafts

It is recommended that the grease is pumped into the universal joints until it leaks out between the seal and the double-halved joint.

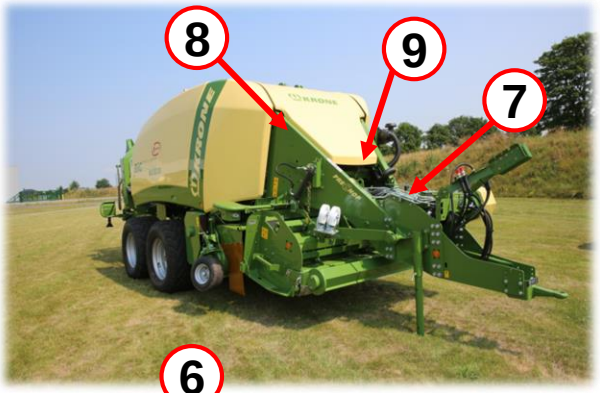
		Universal joints (C)	Slide rings of the guard tube (S)	Section tubes (T)	Wide-angle joint (80°) (W)	Overload clutch LN 4 (K)
Main universal shaft	Size S9 BP 870/890/1270/1290	26 g 50	6 g 50	32 g 50	100 g 50	- - -
	Size SH BP 1290HDP/4x4	28 g 50	6 g 50	32 g 50	120 g 20	- - -
Flywheel universal shaft	Size S8 BP 870/890/1270/1290	22 g 50	6 g 50	- - -	- - -	- - -
	Size S9 BP 1290HDP/4x4	26 g 50	6 g 50	- - -	- - -	- - -
Knotter drive	S4 All BiG Pack HS	10 g 50	- - -	20 g 50	- - -	- - -
Pick-up drive Without XC	S4 All BiG Pack HS	10 g 50	- - -	- - -	- - -	4-7 g 50
Pick-up drive with XC	S4 All BiG Pack HS	10 g 50	- - -	- - -	- - -	- - -

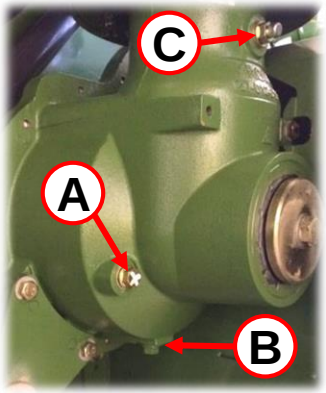
11. Maintenance

Overview of maintenance of gearbox/on-board hydraulic system/compressor

Item	Name
1	Main gearbox
2	Transfer gearbox for packer/knotter
3	Packer gearbox
4	Pick-up gearbox above/below Cutting unit gearbox XC above/below Cutting unit gearbox VC above/below
5	Starter aid
6	High-performance knotter cleaning gearbox
7	PreChop manual gearbox
8	On-board hydraulic system
9	Compressor

Maintenance intervals
Before the start of the season:
Check oil level
Once after 50 hours:
Change oil
Every 200 hours:
Change oil





- Every gearbox is fitted with an oil level inspection screw **(A)**, a drain plug **(B)** and an oil filler plug **(C)**. The oil filler plugs also act as bleed screws. During an oil change or when checking the oil level, the oil is filled up to the oil level inspection screw.
- The oil tank for the on-board hydraulic system and the compressor both have an oil dipstick. The oil is filled up to the marking. When changing the hydraulic oil, you must also replace the two high-pressure filters.

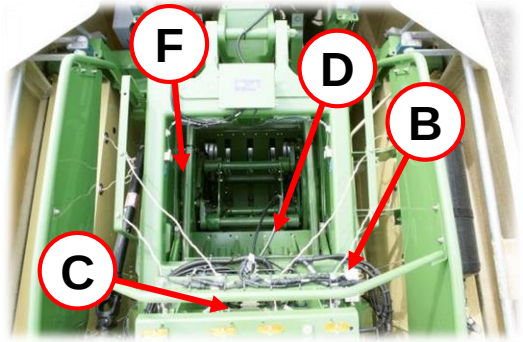
Some gearboxes that have several installation positions are fitted with two inspection screws. Use the screw that points closer to the ground to carry out your inspections.

11. Maintenance

Overview of central lubrication

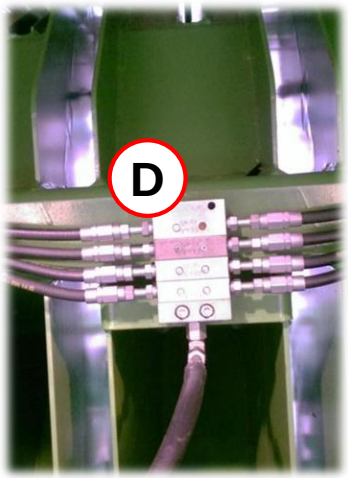
In the automatic central lubrication system, the system is monitored by the sensor **B_3**, which records the plunger movement during the lubrication process and sends the pulses to the job computer. If less than 3 pulses are delivered after the central lubrication has run continuously for 8 minutes, an error message appears in the display on the terminal.

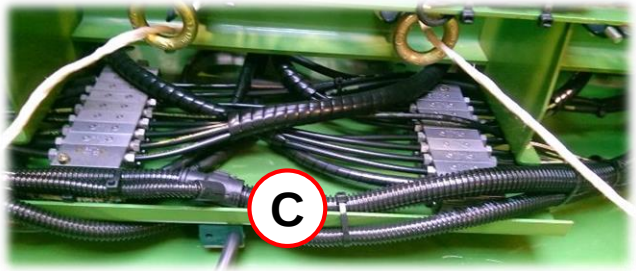
The central lubrication system is only released at a drive speed in excess of 600 rpm.

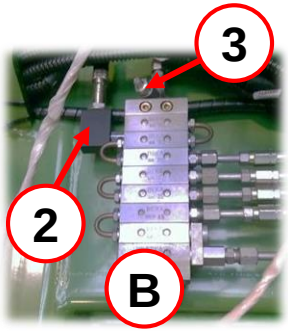


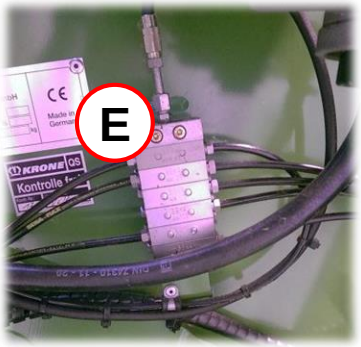
Item	Name
A	Pump unit with reservoir
B	Main distributor
C	Distributor blocks for the knotter unit
D	Plunger distributor
E	Pick-up distributor
F	Distributor packer
1	Pressure limiting valve 280 bar
2	B_3 – Sensor monitoring
3	Manual lubrication point

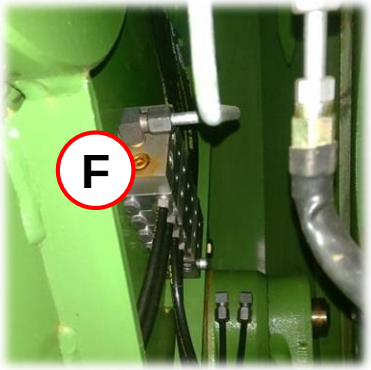
Use only one NLGI class 2 multi-purpose grease!











11. Maintenance

- New KRONE twine generation → called Square „²“
- Now 11 kg / rolls 22 kg / pack
- The twines have up to 25% more run length with consistent (Multibale² & HDP Smart²) and improved (HDP Strong² & HDP X-treme²) properties.
- The twine „MultiBale Smart“ will stay addtional to the new generation twines.

Product	Roll	Knot strength max., kgf	Tear strength max., kgf
MultiBale²	11 kg	245	380
MultiBale Smart²			
HDP Smart²		280	460
HDP STRONG²		315	510
HDP X-treme²		335	550

11. Maintenance

The kit includes sufficient numbers of all necessary wear and spare parts. All materials are individually identified with material numbers and unit numbers. This means that the chest can easily topped up again at any time.

BiG Pack 890 / 1270 / 1290 / 4x4
Order-no: 28 700 169 0

BiG Pack 870 / HDP Ⅱ
Order-no: 28 700 392 0

ID.-Nr.	Stück-zahl	Bezeichnung
313 55	1	Zugfeder, 147 lg.
180 641 3	2	Zugfeder 3 x 23 x 133
281 753 3	1	Feder 2,8x17,2x71,3
282 361 1	1	Feder 2,8x17,2x91
286 183 1	1	Zugfeder 3,5x22,5x170
301 554 0	1	Relais Wechsler 30A
910 803 0	3	Scheibe 12x18x1
910 804 0	10	Passscheibe 15X21X0,3
910 805 0	10	Passscheibe 15X21X0,5
910 806 1	5	Passscheibe 15X21X1,0
911 512 0	2	Sicherungsring A 14X1,0 471
911 513 0	2	Sicherungsring A 15X1,0
911 517 0	2	Sicherungsring A 19X1,2 471
912 411 0	10	Spiral Spannstift 5 X 22
912 557 0	10	Spiral Spannstift 5X30
913 100 0	1	Kerbstift 9X26
920 905 0	2	Überwurfmutter L 6
920 916 0	3	2-Schneidring LL6
920 921 1	2	L-Einschraub-Verschraubung
921 049 1	1	Gerade Verschraubung L 6
954 505 0	1	Rolle
954 506 0	6	Scheibe 20X25X0,2
954 507 0	6	Scheibe 20X25X0,5

ID.-Nr.	Stück-zahl	Bezeichnung
954 509 0	2	Feder für Schliesser
954 511 0	1	Schneckenrad
954 513 0	1	Schneckenwelle
954 514 0	2	Reiniger
954 538 0	2	Messerhebel kpl.
954 539 0	1	Garnmesser
954 541 1	2	Schliesser
954 542 0	1	Mitnehmer Doppelknoter
954 543 1	6	Kegelrad für Mitnehmerantrieb
954 544 0	6	Garnhalter
954 547 1	2	Knüpferhaken kpl.
954 549 0	10	Zylinderstift
954 592 0	6	Flachfeder
20 070 610 3	2	Garnriegel kpl.
20 073 181 0	1	Ablaufkurve
20 073 182 0	1	Zugfeder 4 x 31,5 x 220
20 076 353 0	1	Zugfeder 2x14,5x84
27 000 061 0	2	Nadelrolle
27 000 523 1	1	Zugfeder 192lg
27 001 318 0	6	Knüpferzunge kpl.
90 000 142 0	2	Gelenkkopf 12x16 M12
90 002 519 0	1	Stift 6x12

Thank you for your attention!!!