



Bales better

User Manual

MC1000 Compactor



MC1000.UM.2A.EN

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orkel.no/qr/mc

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1 General

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1.1 INTRODUCTION

1.1.1 Foreword

The products from Orkel AS are well known for their high quality, reliability and strength. We will therefore congratulate you, choosing one of our products.

To fulfill our own goals, regarding quality and strength, Orkel AS has implemented a continuing product-developing process. All compactors undergo a thorough quality control before leaving the factory.

Read thoroughly, and familiarize yourself with our recommendations, regarding machine - safety, use and maintenance. Make daily maintenance a routine. By doing this, the machine will be safe to operate, and you will contribute to a longer machine lifespan and an effective utilization of the machine.

With regards

Orkel AS

1.1.2 Disclaimer

The original parts used in an Orkel® machine are designed and built to provide optimal fit, function, safety, and structural integrity. For this reason, Orkel® **DOES NOT** in any circumstance approve of the use of after-market, gray market, or imitation parts.

The information provided by Orkel® hereunder is provided "as is" and with all faults, and the entire risk associated with such information is entirely with the Buyer.

Orkel® does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information.

Information provided in this document is proprietary to Orkel®, and Orkel® reserves the right, at its sole discretion, to make any changes or modification to the information in this document or to any products and services at any time without notice.

Orkel® does not assume responsibility for any damages associated with the machine or failure caused by incorrect use of the machine. Neither do we assume responsibility for any changes to the product made after initial delivery.

1.1.3 Range of use

The MC1000 compactor is designed for compressing soft organic materials to bales wrapped in plastic film for storage or transport. The MC1000 compactor is capable of producing bales of various sizes, ranging from Ø500 mm to Ø850 mm. The compactor must only be used for this purpose.

| |
|---|
| NOTE: Other materials can also be compressed, but have to be confirmed by Orkel AS in each case. This due to |
|---|

warranty legislations.

1.2 CONTROL BEFORE DELIVERY

This machine is tested, controlled and has passed final inspection, before leaving the factory.

1.2.1 Preparation at customer location

Orkel AS will set-up the machine for the customer if requested/agreed. An introduction course, both in handling and operating the compactor will be held at site if requested/agreed. During commissioning and start-up period, we're offering our technical assistance and answering all questions regarding the compactor start-up.

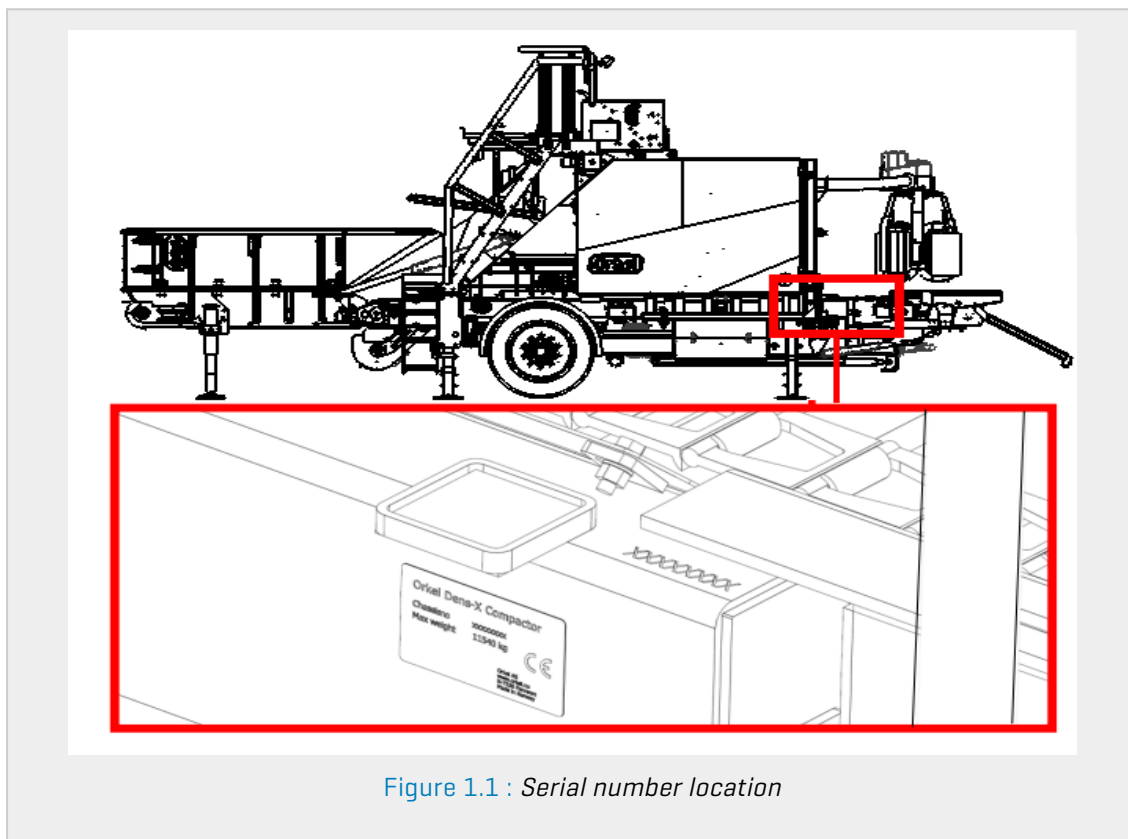
NOTE: Please see the delivery - warranty formula included with the user manual.

1.3 IDENTIFICATION OF THE MACHINE

A sticker describing the serial number is located on the right side of the machine. In addition, the number is also imprinted on top of the frame. See [Figure 1.1](#).

The serial number must always be provided when contacting your dealer, either it's for ordering parts or technical assistance.

The serial number is the safest way to identify your machine. Do not remove or change the serial number.



1.4 THE OPERATORS MANUAL

1.4.1 How to use this manual

This manual is organized after the «see—think—use»-principle. The content and explanations are arranged in smaller sequential operations, and the main chapters are arranged according to the normal use of the machine [Example: Setup → Operation → Maintenance].

Chapter overview:

1. **GENERAL** This chapter contains some of the formalities associated with a new compactor. Quality control, identification the machine, and copies of the delivery and warranty forms.
2. **SAFETY** This chapter consist of the general safety measures one have to consider at all times when dealing with the machinery. More specific safety measures and warnings are listed and explained when relevant.
3. **SETTINGS AND HYDRAULIC ADJUSTMENTS** An introduction to the functionality of the machine. Furthermore, it explains how and where one can adjust the hydraulics to achieve the wanted functionality. Topics organized and gathered for every machine module. Same order as in [chapter 7 "Maintenance and mechanical adjustments"](#).
4. **OPERATION** Describes the rig up process, what to consider prior to and during operation. It also specifies the running in period.
5. **TRANSPORT** States all the safety measures and preparations necessary for successful and safe transport of the compactor.
6. **CONTROL SYSTEM** Gives a detailed overview of the control system and its functions.
7. **MAINTENANCE AND MECHANICAL ADJUSTMENTS** A detailed overview of the necessary maintenance and procedures for mechanical adjustments. Topics organized and gathered for every machine module. Same order as in [chapter 3 "Settings and hydraulic adjustments"](#).
8. **LUBRICATION** Explains oil and grease lubrication functionality, settings, troubleshooting and shows detailed lubrication charts for manual lubrication.
9. **PRESERVATION** Washing, and other preparations prior to and during long time storage.
10. **ELECTRICS** Electric schematics.
11. **HYDRAULICS** Hydraulic diagrams.
12. **SPECIFICATIONS** An overview over the general machine capacities and performances.

1.5 WARRANTY

Orkel AS recommends that you study the document «Warranty conditions» for detailed information regarding warranty terms and conditions. This document can be found enclosed in the binder delivered with the compactor. You can also contact our after sales department.

1.6 DECLARATION OF CONFORMITY

EC DECLARATION OF CONFORMITY

Manufacturer:
ORKEL AS

Address:
Johan Gjønnnes Veg 25
N-7320 Fannrem Norway
Phone: + 47 72 48 80 00

Product description:
Agricultural/Industrial - multi compactor

Model: ORKEL DENS - X

Type: 204
From serial number: 20420001

Orkel AS hereby declare, that the identified product above is conform to the requirements of:
Directive on machinery – 2006/42/EC - Electromagnetic compatibility Directive -2004/108/EC and EN ISO 12100/EN ISO 4413/EN ISO 13850/EN 349+A1/EN ISO 13857

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Fannrem, 27 August 2015



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Per Helge Weiseth [sign]

Date of shipment:

2 Safety

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2.1 INTRODUCTION

This operator's safety manual is made to describe safe and good routines when operating the compactor. On the other hand, it is not possible to describe every operational and safety matters that may arise. Carefully consider all your actions, if it is posing a safety hazard to you, or others close to the compactor! · Accidents may kill you or make you disabled. · Accidents can be avoided.

2.2 SYMBOLS

This symbol means:



- **ATTENTION!**
- **BE CAUTIOUS!**
- **CONSERN FOR YOUR PERSONAL SAFETY!**

When you see this symbol in the operator's manual, be aware that violation of instructions given, can cause you or others in the working area of the machine, being injured or killed.

2.2.1 Warning, danger and caution

Each time you see the words and symbols as shown below, please note the different directions they symbolize. The pictograms are used in this manual or/and on the machine.



The symbol and the word **DANGER**, state a direct or immediate dangerous situation that will cause **DEATH OR SERIOUS INJURY** if not avoided.



The symbol and the word **WARNING**, indicates a potentially hazardous situation. If you fail to comply with instructions given it could result in personal injury or loss of life.



Do not start operating the machine until you have read and understood the safety precautions.



Ensure that there are no people between tractor and machine during connecting and disconnecting.



Danger rotating parts. Keep clear of moving/rotating parts in chamber.



Always use the hydraulic securing valves on the chamber door lifting cylinders, to ensure that the chamber door stays in open position during maintenance or repair.



All parking of the machine must be on a firm levelled ground, and secured with wheel chocks.



Danger. Film holder/cutter has a sharp knife and there is a risk of cutting/crushing injury. Always keep closed when the machine is not operating.



Noise zone. Use ear protection.



Always stop the tractor engine or external power unit before; lubricating, adjusting, maintaining or repairing the machine. Also, remove the ignition key to prevent accidental start.



Never allow children to stay near the machine during operation. Young children can do unpredictable things



Operator or others close to the machine must be aware when the bale is unloaded from the wrapper table. Bales dropped may roll more than 10 m, or even dropped prematurely.



The net or widefilm is cut with a sharp knife. Be careful when loading a new roller, or if any adjustment is done to the knife system.



Unauthorized personell are not allowed closer than 5 meters, when the machine is operating or when maneuvering.



Keep clear! Do not enter below bunker or frame when operating the compactor.



Stairway. Access only for operators or mechanics.



Make sure the transmission is running with the correct speed and direction. Wrong speed and/or direction can damage machinery and may cause great danger to persons nearby. The machine is designed for a PTO-speed of 850 rpm.



Stay clear, rotating machinery.



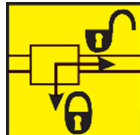
Strapping point.



Lifting point.



Jacking point.



Hydraulics securing valves, locking the tail-gate lifting cylinders.



Between the tractor and the machine, there is a rotating PTO-shaft. No one is allowed to stand between the tractor and the machine while the engine is running. Do not wear loose clothes, scarfs etc.



Warning signs, indicating danger or warning attached to the machine, must not be removed or painted over. Unreadable signs shall be replaced by new ones. These can be ordered from Orkel AS.

2.3 EMERGENCY STOP

The machine is equipped with 5 manual emergency stop buttons. Four are accessible from ground level and one on top of the machine as indicated on [Figure 2.1](#).



Figure 2.1 : Red circles indicates emergency stop locations. Two more buttons are located on the opposite side, ground level.

When an emergency stop button has been triggered, the emergency stop button has to be reset so that the machine can be started from the control panel.



Figure 2.2 : Mushroom head type emergency stop button. Twist the head to reset.

2.4 TO THE OPERATOR

2.4.1 Exercise of security

- As operator, it is your responsibility that you read and understand the safety instructions given in this operator's safety manual.
- These instructions must be followed without exception. The operator is the key to safety on this machine, not only for you, but also for others in the compactors working area.
- Follow the safety instructions, and you will experience the compactor as a safe and secure place to work.

2.4.2 Personal protection



The Compactor might generate a lot of dust and noise, depending on which material being compressed. For your own health, we recommend that operators use personal protective equipment, such as safety goggles, dust/filter mask, and ear-protection during operation.

2.4.3 Personal safety

Use all available protective and safety equipment. Provide good lighting in the area where the machine is positioned. All covers must remain intact and attached during operation. If pressing of flammable materials, a fire extinguisher must be in close proximity.

2.4.4 Safe operation



Persons under 16 years of age should under no circumstances operate this machine.




Personnel under influence of alcohol or other drugs must not operate this machine.

2.4.5 Important issues


Be aware of children and other unauthorized persons in close proximity to the machine. Never allow unqualified persons to operate this machine.

2.4.6 Danger zones



WARNING

Only operators and maintenance personnel are allowed "inside" the danger zone! All others must be turned away, due to their own safety!



WARNING

The entire left side of the compactor is a blind spot for the operator.



2.5 PRECAUTIONS

2.5.1 Know your machine

Know your machine. Learn all the functions and actuating mechanisms, and familiarize where the emergency stop switches are located. Learn the machine's capacity and limitations, to avoid unnecessary downtime and mechanical break-down.

IMPORTANT: If any dangerous situations occur, shut down the power take off (PTO) right away.

2.5.2 Equipment control

Before starting up, make sure that the machine and its equipment is in place and in good working order! See [chapter 7 "Maintenance and mechanical adjustments"](#).

2.5.3 Cleaning

A good cleaning of the machine increases durability and safety. Therefore, keep all surfaces clean, remove dirt, oil-spills and other remains.

2.5.4 Environmental protection

Hazardous waste, such as rubber, oil and other materials that could harm the environment, must be disposed at approved disposal centres.

2.6 BREAK-IN PERIOD

| Check | Check points |
|-------|--|
| | Do not run compactor at maximum capacity the first 25 hours of operation |
| | Be observant – monitor that functions are working correctly. |
| | Check for abnormal sounds from the machinery |
| | Fine tune the process to be carried out so that the compactor can reach maximum capacity, based on material being baled. |
| | All bearings have a visible grease collar. Figure 2.3 |
| | No visible grease on the relief valve on the grease pump. |

Precautions: A new compactor must go through a break-in period. It shouldn't be run at maximum capacity at the first 25 hours of operation. The operator must be observant, monitoring that all functions are working correctly, and being aware of abnormal sounds from the machinery. Fine tuning of the process must be carried out, until the compactor has reached its optimum capacity, based on the material being baled.



Figure 2.3 : Grease collar on bearings/bushings

NOTE: Slide bearing clearance is tight when the machine is new, and could lead to increased temperature in the bearings. The slide bearings must be checked frequently during the break-in period. If the temperature is rising in some of the bearings, activate the manual greaser from the control panel to increase the amount of grease supplied to bearings.

3 Settings and hydraulic adjustments

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3.1 MAIN PARTS



Figure 3.1 : The compactor main parts

3.1.1 Principle of operation

The material is loaded into the feed hopper using a wheel loader, or directly by a conveyor belt. The material is then transported by the elevator into the chamber. The amount and speed is controlled by an ultrasonic sensor as well as settings in the display unit. All functions and settings may be adjusted depending on the characteristics of the material being baled.

When the material has been shaped to a compact bale, several layers of net or film is laid on the bale by the net/film system. The net/film ensures that the bale maintains its shape during the transport to the wrapper. The chamber door is opened automatically and the bale is transported to the wrapper by the sub conveyor. The chamber door closes and the baling immediately resumes. If there is any spillage, this will be recycled back to the elevator by the sub conveyor.

The wrapping starts as soon as the bale is detected on the wrapping table. Parameters such as chamber pressure and the number of layers of film may be set on the display unit. During normal operation, the machine runs on the automatic sequence. The operator(s) main task is to ensure that there is a sufficient amount of material in the hopper and that the finished bales are moved away from the bale drop zone. The operator shall also check for leaks and listen for unusual sounds while performing tasks as refilling the plastic magazine.

3.2 HYDRAULICS



The compactors hydraulic system operates with high pressure. Check all hoses and connections for damage. Replace damaged parts immediately. When adjusting the machines hydraulic valves, being within the wrappers area of movement is not allowed. Take cautions when adjusting the valves, as the wrapper arms speed may change rapidly. Make yourself familiar with all the functions of the machine.

The default setting of the machine is done during the test run at the factory. Before performing any changes or testing on the machine, the hydraulic oil must have reached normal work temperature. This is because certain functions are affected by the oils viscosity and may respond differently if the oil is cold.

For recommended oil types to be used, see [section 8.6.1 "Hydraulics"](#) . In the description of how to adjust the machines hydraulic valves, the valves are referred to by valve numbers. See overview in [section 11.2 "Valve overview"](#).

3.2.1 Guidelines for hydraulic adjustments

Specific instructions regarding hydraulic settings are listed and explained for each individual component chapter.

NOTE: All references to valves found in this sub chapter can be found in the hydraulic schematic and valve overview in [chapter 11 "Hydraulics"](#)

IMPORTANT: All hydraulic adjustments: Start at low speed and increase the speed gradually. The oil must have reached operating temperature when the adjustment is performed.

RULE OF THUMB FOR K1, B1, P2, P3, P4 AND P5: Turning the valve clockwise decreases the speed. Turning the valve counterclockwise increases the speed.

RULE OF THUMB FOR P1 AND M1: Turning the valve clockwise increases the speed. Turning the valve counterclockwise decreases the speed.

3.2.2 Tank valves

MC1000 got four tank valves: T1, T2, T3 and T4.

3.3 FEED HOPPER

NOTE: All references to valves found in this sub chapter can be found in the hydraulic schematic and valve overview in [chapter 11 "Hydraulics"](#)

3.3.1 Control panels

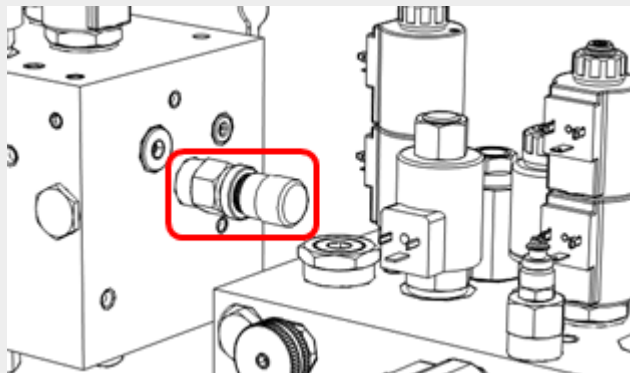
The levers are explained in detail in [section 4.2.2 "Lever/Controls overview"](#) and activate functions as described.

| No. | Description | Action/Movement |
|-----|--------------------------|-----------------|
| 1. | Left support leg, rear | Up / down |
| 2. | Right support leg, rear | Up / down |
| 3. | Left part of the hopper | In / out |
| 4. | Right part of the hopper | In / out |
| 5. | Left part of the hopper | Up / down |
| 6. | Right part of the hopper | Up / down |

3.3.2 Settings

Adjusting the feed hopper speed is done by turning the M1 valve ([Figure 3.2](#)). Clockwise increases the speed. Counterclockwise decreases the speed.

Default settings: Close the valve and then open two turns.



[Figure 3.2](#) : The red box indicates the M1 valve

3.4 ELEVATOR AND SUB CONVEYOR

3.4.1 Settings

The speed of the elevator belt and the sub conveyor may be changed from the display unit, on the machine settings page.

3.5 CHAMBER

The bale chamber can handle high loads, but the set chamber pressure and the resulting bale density must be considered and possibly limited according to type of material. When baling certain material, too high chamber pressures may reduce the bale chamber life time. See and [section 6.1.4 "Settings"](#) for how to set the chamber pressure.

NOTE: All references to valves found in this sub chapter can be found in the hydraulic schematic and valve overview in [chapter 11 "Hydraulics"](#)

3.5.1 Opening speed settings

Closing speed: Adjusting the bale chamber closing speed is done by turning the K1 valve. Clockwise decreases the speed. Counterclockwise increases the speed.

Default setting: Close the valve and then open 1/2 turn.

3.5.2 Chamber pressure settings

The chamber pressure settings is set on the display unit. When the baling starts, the elevator will run at its higher set speed. When the chamber pressure surpasses the elevator slow threshold, the speed is reduced in order to allow a higher bale density. The bale is done when set maximum chamber pressure is reached. The plastic tying unit will then start.

Parameters that may be set on the display unit are:

Chamber max pressure: 100 - 280 bar

Elevator slow threshold: 30 - 100% of set pressure

Example:

Material: Wood chips

Set chamber pressure: 180 bar

Chamber slow threshold: 75 %

When the chamber pressure sensor registers a pressure of 135 bar [75 % of 180 bar], the elevator speed is reduced. The elevator will maintain the low speed until a chamber pressure of 180 bar is reached. Then the plastic tying starts automatically.

IMPORTANT: The chamber pressure must never exceed 280 bar!

3.6 PLASTIC TYING UNIT

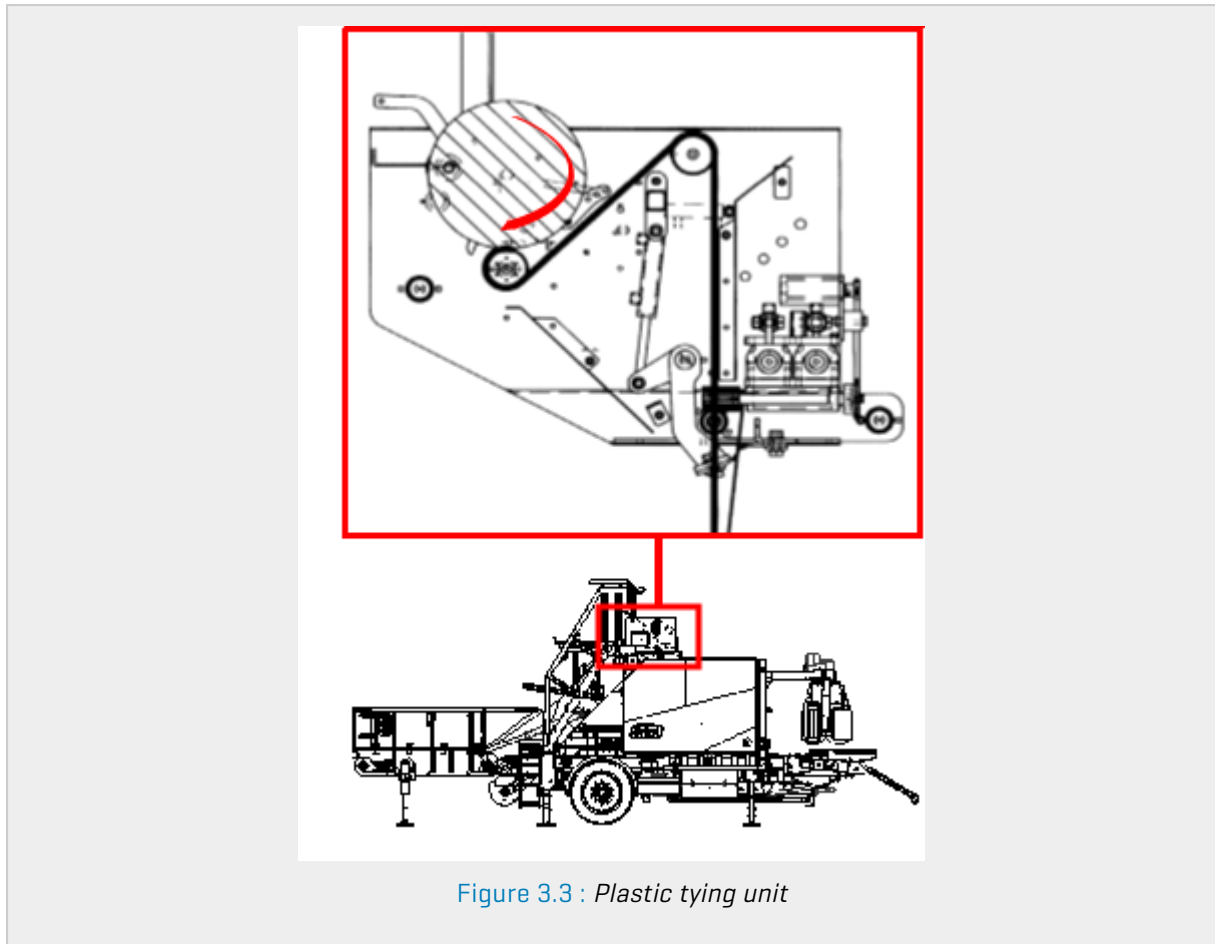
3.6.1 Principle of operation

Laying net or film on the bale in the chamber is done by the plastic tying unit on the top of the machine.

When set maximum chamber pressure is reached, a set amount of net/film is fed into the chamber by the feed rollers in the plastic tying unit. When the "tail" is long enough, it is grabbed by the bale and pulled. The feed rollers stop and open, so that the net/film spreads on the bale. The feed rollers allow the net/film to spread over the whole width of the bale. The brake engages and puts tension on the net/film. The bale is now laid with a predefined number of layers of net/film. Afterwards, the feed rollers close again and the net/film is cut by the knife. Finally, the chamber door opens and the bale is transported to the wrapper by the sub conveyor. The chamber closes again and the baling resumes while the wrapper starts.

When loading the system with a new roller of net/film, shut down the machine and thread the net/film as shown on the illustration below. In order to ease the handling of the net/film, the brake should be released.

The brake automatically disengages when opening the rollers. If this for some reason doesn't happen, this may be done from the display unit [] or the remote control [section 3.6.4 "Remote control"] on the platform.



3.6.2 Brake and feed speed

The speed should be set so that the net/film is fed at a slightly higher speed than the bale's peripheral speed. Depending on whether net or film is used, and what material is being baled, the brake force must be set accordingly. In general, it is desirable to keep the brake force as high as possible in order to maintain a high density bale. The brake force should be set when net/film is pulled during the automatic net/film sequence. The brake force is shown on the brake pressure gauge. The valve for the brake pressure is adjusted consecutively until the appropriate brake force is reached. Start the adjustment with a low brake force, and increase it. If the brake force is too high, this might damage or even rupture the net or film.

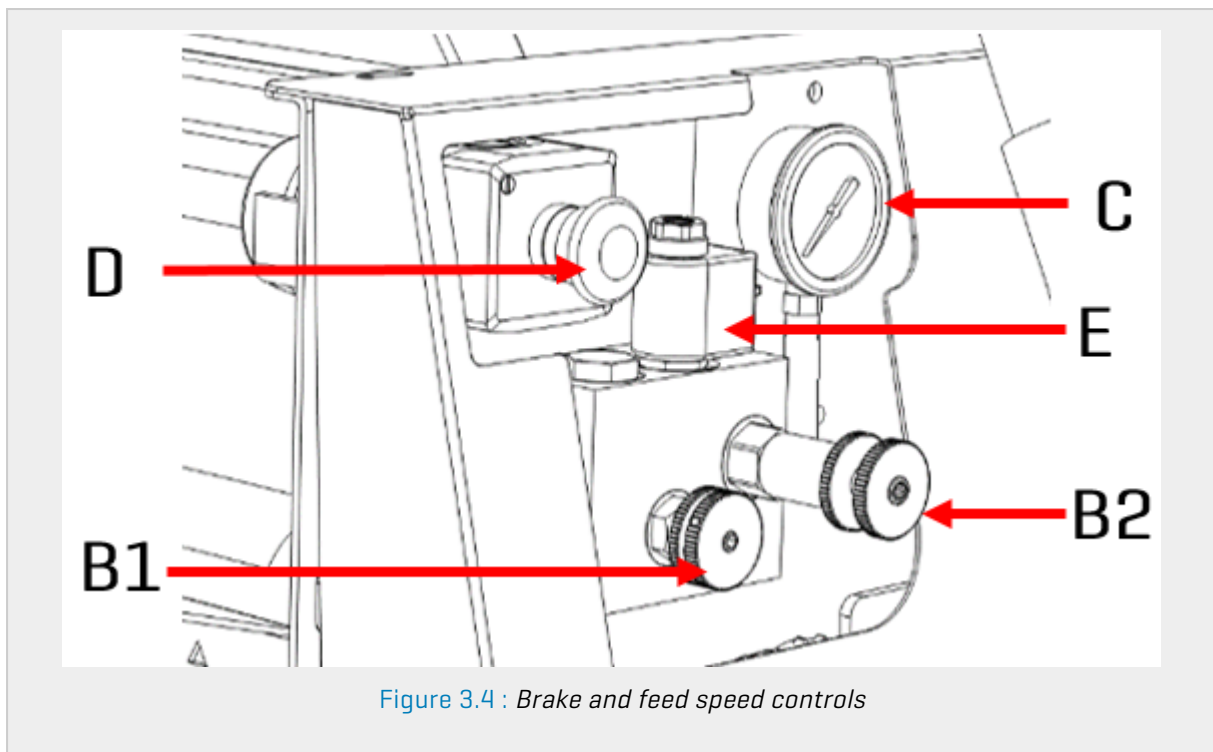


Figure 3.4 : Brake and feed speed controls

- B1 Valve for feed speed
- B2 Valve for brake force
- C Gauge
- D Emergency stop switch
- E Electrical valve for brake release/engagement

3.6.3 Settings

Feed speed: Adjusting the feed speed is done by turning the B1 valve. Clockwise decreases the speed. Counterclockwise increases the speed.

Default setting: Close the valve and then open 3/4 turn.

Brake force: In order to maintain tension, the film roller is slowed down when being laid on the bale. Adjusting this brake force is done by turning the B2 valve. Clockwise increases the brake force. Counterclockwise decreases the brake force.

Default setting: Increase the pressure and notice the pressure on the manometer when the film breaks. Then slightly decrease the pressure.

NOTE: When starting the machine cold, the brake pressure might be higher. Therefore, set the pressure by cold oil or readjust when the oil temperature has increased.

Brake release valve: The brake is controlled electrically from the display unit or from the remote control on the platform. See and [section 3.6.4 "Remote control"](#)

3.6.4 Remote control

The plastic tying unit may be operated from the platform using the remote control. Each button activates a programmed sequence, including several functions running in order:

- | | |
|-----------------------|--|
| Open film system: | Press and hold red and blue buttons until the sequence is finished [knife and feed rollers open]. |
| Close film system: | Press and hold red and yellow buttons until the sequence is finished [feed rollers and knife close]. |
| Start net/film system | Press and hold green button for at least 2 seconds until the net/film |

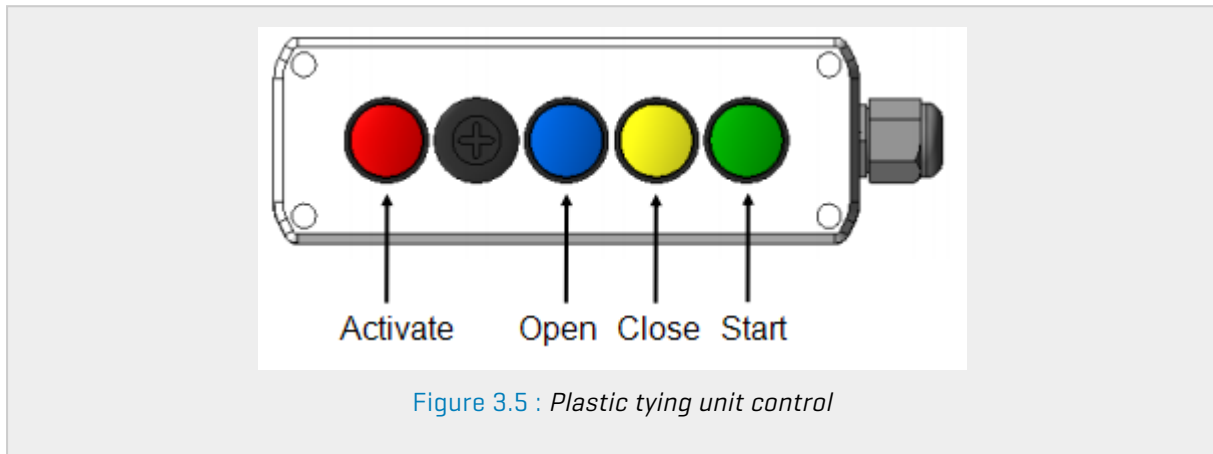
system starts

Release brake: Press and hold red button and shortly tap blue button.

Engage brake: Press and hold red button and shortly tap yellow button.

The brake will automatically release and engage when the opening and closing sequences are engaged.

NOTE: When the net/film system is started from the remote control, the machine will continue in auto mode when the sequence is completed.



3.7 WRAPPING TABLE

3.7.1 Principle of operation

The wrapping table rotates the bale so that the wrapping arms can wind even layers of plastic around the bale, thus sealing the material, and making the bale ready for storage. After the wrapping is complete, the wrapping table tilts forward, rolling the bale off so that it can be collected and stored.

3.7.2 Wrapping settings

Wrapping arms, high speed: Valve P1 regulates the oil flow to the wrapping arms. Turning it clockwise increases the speed. Counterclockwise decreases the speed. Recommended wrapping arms speed is 27-28 rpm.

Perform adjustment as follows: Open valve P1 completely. Then close valve P1 gradually until the correct speed is achieved. Check and reset the settings on the display unit in order to maintain the appropriate wrapping belt rotation and hence wrap film overlap.

Wrapping arms, low speed: When the wrapping arms high speed is set, the low speed may be set using valve P2. The low speed may not exceed 10 rpm.

NOTE: The wrapping arms low speed needs to be set correctly in order to ensure the correct orientation to the film cutters. The wrapping arm speed may increase when the oil is warm. Therefore, closely monitor the wrapping arm slow speed and readjust if needed. The position of sensor S5 may also need to be readjusted.

3.7.3 Film cutter settings

The opening and closing speed of the film cutters must be set correctly. If their speed is too high, the wrapping film might be damaged instead of neatly cut when the wrapping arms stop. The film cutters speed, left [valve P4] and right [valve P5], may be reduced by turning the valve clockwise. Both cutters should be equally set. The cutters should move softly.

Default setting: Close the valve and then open 1/2 turn.

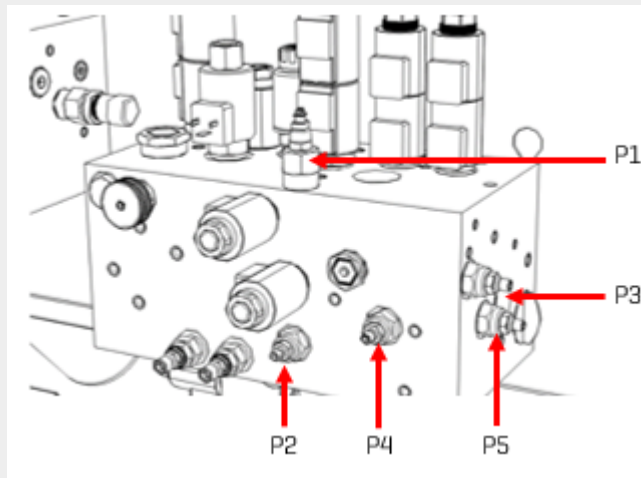


Figure 3.6 : Film cutter valves

Setting the speed: Turning the valve clockwise decreases the speed. Turning the valve counterclockwise increases the speed. Adjusting the height of the cutters is normally not necessary. The film should lay on the middle of the cutter when cut.

Film cutter rollers: Film cutter, upper position: Both rollers must roll freely. Film cutter, lower position: The outer roller should be kept locked. This is in order to hold the film so that it is cut, not ripped. Make sure that the knife is centred between the two rollers. Straighten the knife, if necessary. See [Figure 3.7](#)

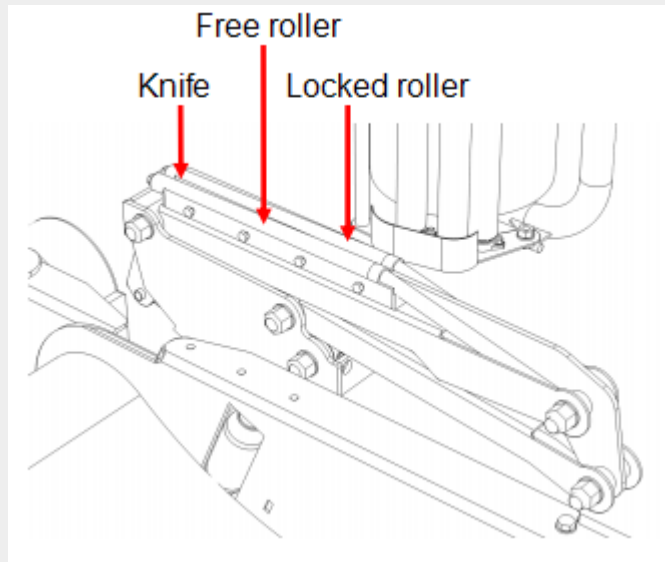


Figure 3.7 : Film cutter rollers

3.7.4 Wrapping table tilt speed

Adjusting the wrapping table tilt speed may affect the speed of the bale when rolling off the wrapping table during bale drop. Adjusting the wrapping table tilt speed is done by turning valve P3. Clockwise decreases the speed. Counterclockwise increases the speed. Default setting: Close the valve and then open 3/4 turn.

NOTE: Do not set the speed too high as this might cause the bale to roll off the table uncontrollably.



Bales dropped from the wrapping table may roll more than 10 m.

3.7.5 Wrapping table ultrasonic sensor

The wrapping table ultrasonic sensor detects the bale when transported from the chamber, so that the table accepts the bale by moving to the middle position.

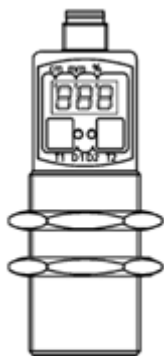
3.7.6 Microsonic sensor [S1]

This type shows the read distance on an LCD. The sensor detects bales on the table.

Resetting the trigger distance and mode:

1. Press both buttons simultaneously for at least three seconds until the text "Pro" is shown on the LCD.
2. Press both buttons once more. The current trigger distance setting is now shown.
3. Adjust to 70 cm. [distance below 1 m shown in mm, distance above 1 m shown in cm].
4. When the desired distance is set, press both buttons simultaneously two more times and make sure the output mode is set to "Normally closed" (symbol shown below). If not, press up or down to change.
5. Then press both buttons simultaneously one more time until the LCD blinks "End".
6. Press both buttons one last time.

The sensor shows its state in its right LED. If the sensor is OK and reads nothing the LED will shine green. If the sensor detects an object the LED will shine yellow.



3.8 DRAWBAR

3.8.1 Telescopic drawbar

To be able to extract the telescopic drawbar, pull and hold the transport safety lock pull cord while engaging the hydraulic cylinder (lever 6).

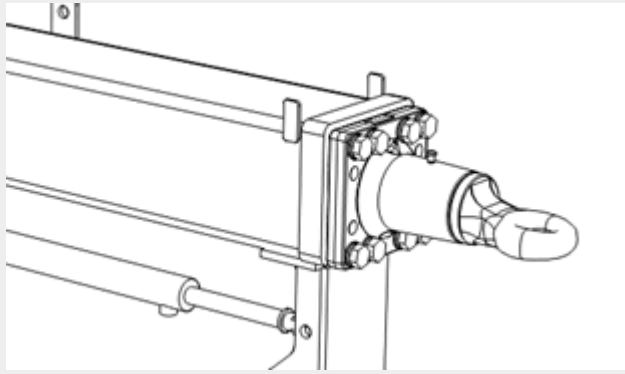


Figure 3.8 : *Telescopic drawbar*

The safety lock pull cord is located in close proximity to the hydraulic levers.

4 Operation

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4.1 SAFETY

IMPORTANT: If any dangerous situations occur, shut down the PTO right away.

4.1.1 Safe work routine

This machine must under no circumstances be used for any other purpose than the intended one. Operate in daylight conditions only. Install additional worksite lighting if necessary. If the operator have to leave the site, the tractor or any other power supply must be turned off and key removed to avoid unattended start. Do not use loose or baggy clothing, due to many rotating parts in the machine. Long hair must be tied up to avoid possible entanglement in rotating parts.

4.1.2 Operator safety

If you fail to comply with instructions given it could result in personal injury or loss of life.

- be cautious and extra observant during mounting new plastic film in the plastic tying unit.
- be cautious and stay focused on all danger zones during operation.
- be cautious when entering the stairs.
- check all danger zones before startup and during operation to avoid dangerous situations.
- pay attention to every potential danger caused by the machines automatic systems.
- carry out a test on emergency stop switches, and sensors on a regular basis, to ensure they are in good working order.
- shut down the machine before any work is done to the plastic tying unit, due to danger of getting fingers or hands cut/amputated.
- pay attention to fire hazard from overheated bearings, especially when pressing very dry materials.
- know the localization of the fire extinguisher. Keep it close!
- pay attention to the risk of unauthorised people entering the machine's stairway [risk of falling into feed hopper or elevator]. The stairway is for authorized personnel only.

Shut down the machine when loading the tying unit with a new net/film roller.

4.1.3 Other people's safety

The machine has multiple automatic functions, which start and stop without any warning. No unauthorized personnel must be located in the danger zone during operation. The danger zone should be marked with flags or fences if possible.

4.1.4 Assembly on site

The operator must be aware of hazards during alignment and when assembling the machine.

- Make a visual control of the complete machine to detect any transport damages.
- Ensure that the machine is standing on a firm surface before aligning and levelling. The support legs may sink into the ground during alignment or assembling the machine.

Take care when assembling/mounting the compactor. Squeezing of body parts and injuries from falling can occur when maneuvering the wrapping table.

Max. height in operation position: 3900 mm

4.1.5 Elements of hazard during operation

If you fail to comply with instructions given it could result in personal injury or loss of life.

Pay attention to the risk of:

- squeezing/crushing/cutting of fingers or hands near the knife for plastic tying unit.
- squeezing/crushing of fingers or hands between conveyor belts and sprockets.
- squeezing/crushing of fingers or hands between belt and roller, and under the wrapping table.
- squeezing/crushing of body and feet when bale is dropped from the wrapping table.


- squeezing/crushing of fingers or hands between wrapping arms and frame.
- impact from rotating wrapping arms.
- sensor on wrapping table might fail, causing a too early bale drop.
- a burst in a hydraulic line/hose with high pressure- and heated oil can cause severe injury to eyes and skin.

4.1.6 Danger zones during operation

The left side of the compactor is a blind spot. The operator must always be sure there's no one present in this area, before start up and during operation.


Maintain the boundaries of the danger zone as described in [section 2.4.6 "Danger zones"](#).

4.1.7 Risk of overturning



The operator must take precautions to avoid risk of overturning. Both during rigging, set-up and when operating the machine.

4.1.8 Leaving the machine



Before leaving the machine, the operator must turn off the engine [tractor] or any other power source. Remove key or secure the power source to avoid unattended start.

4.2 CONNECTION AND SETTING UP THE MACHINE

4.2.1 Rig up

IMPORTANT: Be aware of the danger of tipping when rigging up.

1. Park the compactor on an even and solid surface.
2. Disconnect cables for lighting, hoses for brakes and hydraulics, as well as the drawbar.
3. Move and park the tractor on the left side of the compactor, perpendicular to the compactor's longitudinal axis, and aligned with the input shaft on the hydraulic pump's gearbox.
4. Connect the hydraulic hoses to the tractor's hydraulic take outs.
5. Start levelling the machine with the hydraulic jack stands, left- and right rear [lever 1 and 2].
6. Continue levelling the machine with hydraulic jack stand, left- and right front [lever 4 and 6].
7. Fold down the wrapping table belt tensioner.
8. Pull and hold the transport safety lock pull cord while retracting the drawbar using lever 6.
9. Open the safety valves on the hopper lifting cylinders and lower the hopper to the appropriate height [lever 3] [see [chapter 4.2.2 "Lever/Controls overview"](#)].
10. Fold up the hopper side walls and assemble the covers between the hopper and the elevator.
11. Fold down the stairs [see [chapter 4.2.11 "Stairs"](#)]
12. Ensure that the tank valves are all open [T1-T4]. See
13. Connect the PTO drive shaft according to manufacturer directions. The PTO drive shaft protection shall be intact and secured in both ends. Read the safety guidelines enclosed with the PTO drive shaft.



Make sure that the compactors main power switch is on before running the PTO, as to avoid overloading and/or damaging the compactor's electrical system.

14. Start the tractors PTO.

IMPORTANT: Check the rotational direction of the PTO [see [chapter 4.2.6 "Power take off"](#)]

15. Run the PTO at about 300 RPM.

16. Maintain this speed until the oil has reached the appropriate operating temperature. See [chapter 4.2.10 "Oil temperature"](#).

17. Increase the PTO speed to 850 rpm.

18. Lower the wrapping table to its horizontal position using the display unit.

19. Fold down the bale bridge. Perform a function test of all the emergency stop switches before starting baling.



Perform a function test of all the emergency stop switches before starting baling.

4.2.2 Lever/Controls overview

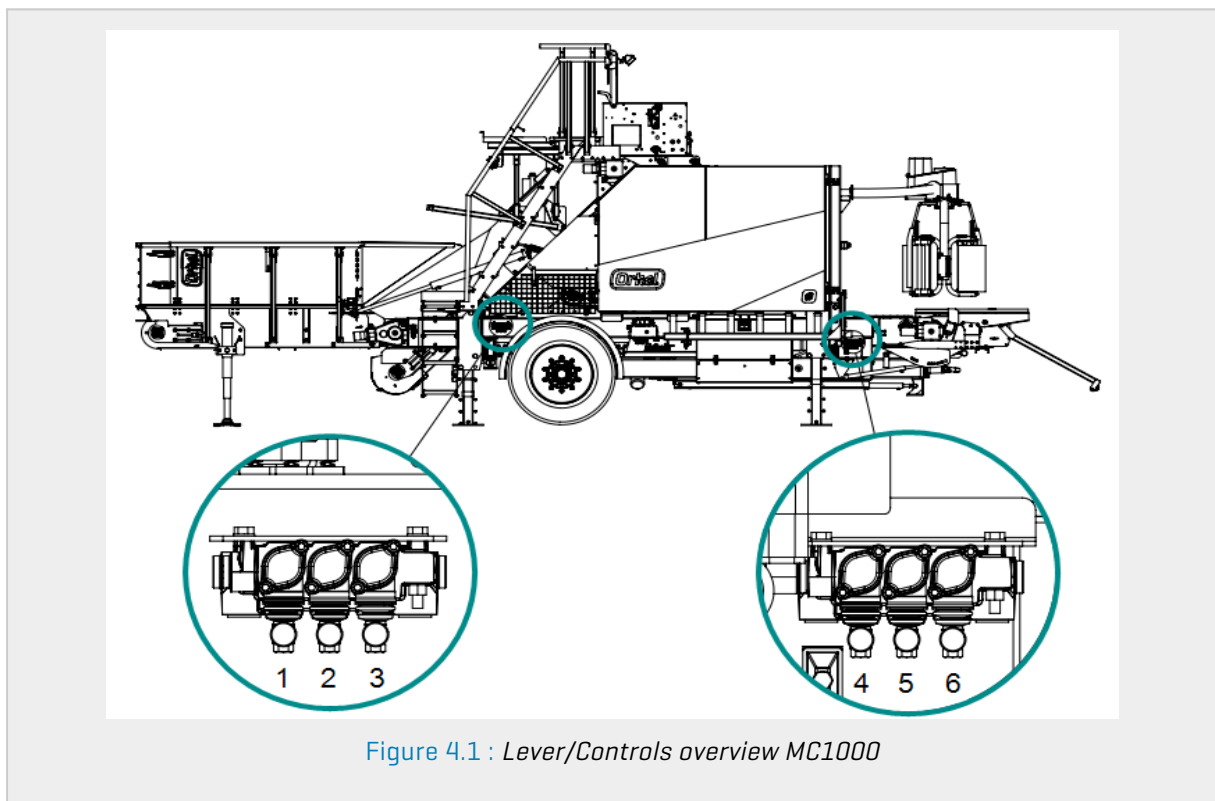


Figure 4.1 : Lever/Controls overview MC1000

See [section 3.3.1 "Control panels"](#) for descriptions of the levers/controls regarding the feed hopper.

4.2.3 Lever list

| Lever no: | | Valve function |
|-----------|------------------------|----------------|
| 1 | Left support leg, rear | Up / down |

| Lever no: | | Valve function |
|-----------|--------------------------|----------------|
| 2 | Right support leg, rear | Up / down |
| 3 | Feed hopper | Up / down |
| 4 | Left support leg, front | Up / down |
| 5 | Right support leg, front | Up / down |
| 6 | Drawbar | In / out |

4.2.4 Leveling the machine

1. Ensure that the feed hopper is raised clear of the ground when leveling the machine. The feed hopper may be lowered onto the ground only when the machine is properly leveled.
2. Operate the valves for the hydraulic jack stands until the machine is properly leveled [See [section 4.2.2 "Lever/Controls overview"](#)]
3. Use the "spirit levels" on the frame during the leveling.

NOTE: The leveling of the compactor may change during time if the surface is not entirely solid. Therefore, check the leveling regularly. Incorrect leveling may cause machine errors and uneven wear or damage to the chamber belts.

4.2.5 Placing the tractor with telescopic drawbar

The tractor should be placed on the left side of the machine when connecting the PTO drive shaft. The drive shaft should be horizontal and parallel to the input shaft on the gearbox. When disconnecting the drive shaft from the power supply/tractor, the drive shaft must be secured to the machine without disconnecting it from the input shaft. This is to avoid that the drive shaft falls off the machine during transport.

4.2.6 Power take off

The PTO drive shaft is delivered with its own user manual from the manufacturer. Assemble the shaft accordingly. Maintain and lubricate the PTO-shaft according to instructions given in the PTO-manual. Power requirement:

120hp / 90 kW [diesel engine]

90hp / 75 kW [electric motor]

IMPORTANT: If any dangerous situations occur, shut down the PTO right away.

4.2.7 PTO Speed

The machine is designed for a PTO speed of 850 rpm. Ensure that the PTO speed and rotational direction is correct [counter clockwise rotation when viewed from the tractor is correct].

NOTE: It is important for the machine performance [the hydraulic system] that the PTO speed is steady.

4.2.8 Electrical power source

The machine is equipped with a 24V electrical power system, and is self-supplied through an integrated generator and a battery pack. The main power switch separates the battery pack from the rest of the system, and must always be turned off whenever the machine is parked and during transportation.

4.2.9 Hydraulic connections

The machine has two separate hydraulic systems: The main system includes oil tank, pumps and valves, and is powered by the PTO drive shaft via the gearbox. This system powers all functions used during baling and are controlled either automatically or manually from the display unit.

The auxiliary system is connected to the tractors hydraulic system and is powered by this.

- Feed hopper lifting cylinders, feed hopper halves [IN/OUT], jack stands, film roller storage, and drawbar.
- Feed hopper lifting cylinders, jack stands, film roller storage, and drawbar.

All functions are operated through manual levers on the machine. See [section 4.2.2 "Lever/Controls overview"](#)

IMPORTANT: Check that all the valves between the oil tank and hydraulic pumps are opened before the PTO is started.

NOTE: For energy preservation flow rate from tractor should be set no higher than 30 l/min. Oil port should be turned off when not in use.

4.2.10 Oil temperature

The oil temperature is shown in the top left corner on the display unit main page. If the oil is too cold, run the PTO at maximum 300 rpm until the minimum start temperature is reached. See temperature values below.

IMPORTANT: Starting the PTO drive shaft with full speed at a too low temperature may harm the hydraulic system.

Heating the oil may take up to 25 minutes. A sticker on the oil tank indicates the applied oil type.

IMPORTANT: Run the PTO at 300 rpm until the minimum start temperature is reached.

Titan Utto WB: Minimum start temperature: 5°C / 50°F When the minimum start temperature is reached, increase the PTO speed to 850 rpm.

4.2.11 Stairs

Unfold: The compactor is equipped with foldable stairs. The stair may be unfolded to working position as follows:

1. Pull the lever towards you and pull the stairs out from the machine until the support is fully extended.
2. Push the lever away from yourself and carefully unfold the lower part of the stairs outwards and down.

Fold: The stair may be folded back into transport position as follows:

1. Carefully fold the lower part of the stairs upwards and in. Ensure that the lock engages.
2. Hold the upper stair segment and fold the middle of the support upwards and in. Ensure that the lock engages.

Ensure that the stairs are properly locked before transporting the machine.

4.3 DAILY CHECKLIST

4.3.1 Daily checklist prior to startup

| No | Checkpoint prior to startup |
|----|--|
| 1 | Ensure that the drawbar is set in operational position. |
| 2 | Check that all main valves are open. |
| 3 | Check chain oil and grease level. |
| 4 | Check if grease comes out from the pressure relief valve on the grease pump unit [indicates blocking of pipe]. |
| 5 | Check the tension of chains, carrier belts, and chamber belts. |

| No | Checkpoint prior to startup |
|----|--|
| 6 | Check wrapping table sensors and table movement. |
| 7 | Leave the wrapping table in its middle position. |
| 8 | Look for oil leaks. |
| 9 | Check the oil temperature. |
| 10 | Check the levelling of the machine. |

4.3.2 Checkpoints while baling

| No | Checkpoint prior to baling |
|----|--|
| 1 | Continuously observe all moving parts and functions. |
| 2 | Check the tracking of both chamber belts (leveling will affect the tracking). |
| 3 | Check the greasing pump function. |
| 4 | Check the chain lubrication system (Dry chains?). |
| 5 | Check the condition and cleaning of chamber rollers. Too much material on the rollers will affect the tracking of the chamber belts. |
| 6 | Avoid overfilling of the space between the elevator and sub conveyor. (Easily avoided by controlling the material amount fed into the elevator). |

4.4 BREAK-IN PERIOD

The first 50 hours of operation are considered to be the break-in period.

NOTE: Before the compactor is shipped from the factory, Orkel has performed a thorough quality control and made a test run. The test run is done without any material. The need of some adjustments during first start up is to be expected, depending on the material being baled.

4.4.1 Precautions during the break-in period

When the compactor is brand new, there are a couple of things that need special attention from the operator. The tensioning of the elevator chain must be checked and, if necessary, readjusted during the first three hours of operation. Also remember to check wheel nut tightness after 10 km of road transport, and retighten if necessary.

4.4.2 After the first 50 hours of operation

Change the oil, and all oil filters.

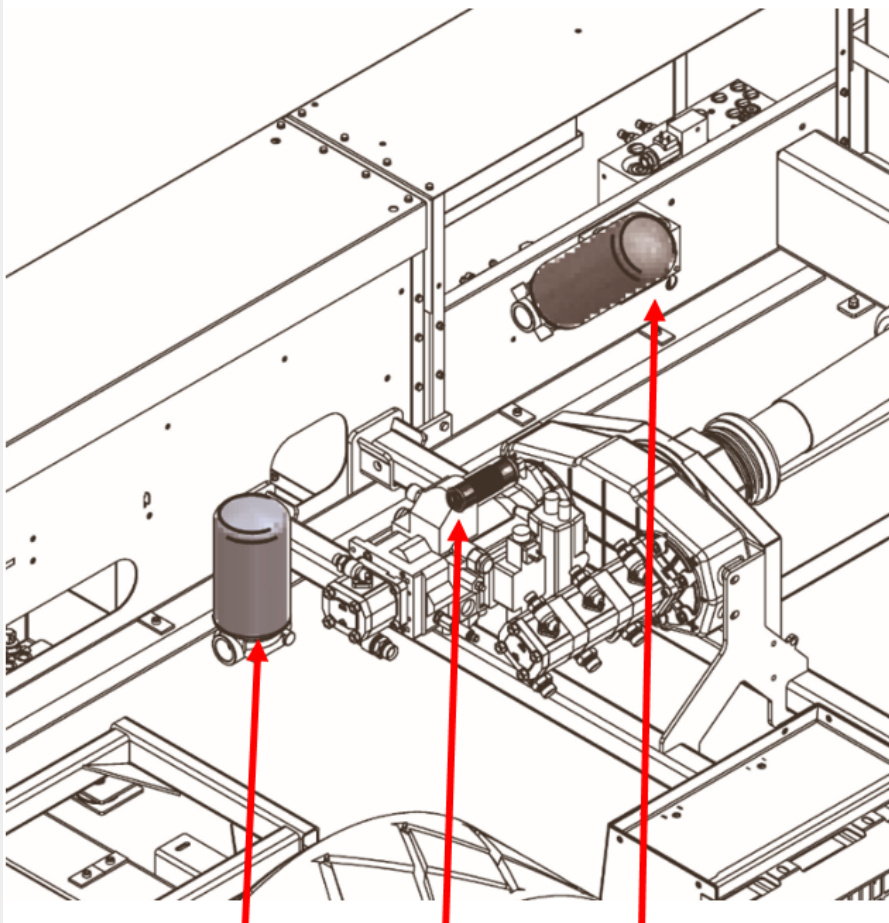


Figure 4.2 : Filters

IMPORTANT:

Orkel recommends that the operator regularly performs visual controls of the compactor as well as active listening for abnormal noises. Perform adjustments as soon as there is a need. A problem that is not immediately rectified may cause further problems, and in worst case lead to mechanical breakdown.

| No | Checkpoints during and after break-in period |
|----|---|
| 1 | Grease collar. Check that all bearings have grease collar. |
| 2 | Perform visual control of the compactor – before, during and after use. |
| 3 | Grease pump. Check pressure relief valve, no visible grease shall be present. |
| 4 | Elevator chain. Check tension after 1-3 hours of operation |
| 5 | Check and adjust elevator and sensor. |
| 6 | Replace filters after the first 50 hours of operation. |
| 7 | Change hydraulic oil after 50 hours of operation. |
| 8 | Listen for abnormal noises. |

4.5 AUTOMATIC OPERATION

IMPORTANT: If the tank valves are closed when the PTO is started, there is a high risk of damaging the hydraulic system. Before starting, please make sure that all tank valves are open. See [section 11.2 "Valve overview"](#)

When pressing the start icon on the display unit, the following will happen:

The chamber starts, the elevator starts, the sub conveyor and hopper start. Material is fed into the bale chamber. The feed amount is controlled by the ultrasonic sensor S29.

When set chamber pressure is reached (elevator slow threshold) the elevator slows down in order to reduce the material flow into the chamber until the bale is finished.

Then, the net/film knife opens and the feed rollers start feeding the net/film into the chamber. A predefined number of layers of net/film is laid on the bale, and the knife cuts the net/film.

The chamber opens and the bale is transported to the wrapper by the sub conveyor. The ultrasonic sensor above the wrapping table detects the bale. Then the wrapping table receives the bale and tilts to its middle position. The chamber door closes.

When the chamber door is closed, a new baling cycle starts. At the same time, the wrapping starts on the wrapping table; the wrapping arms start and the film cutters release the film. The wrapping arms lay film on the bale until a predefined number of revolutions is reached, before the film cutters cut the film.

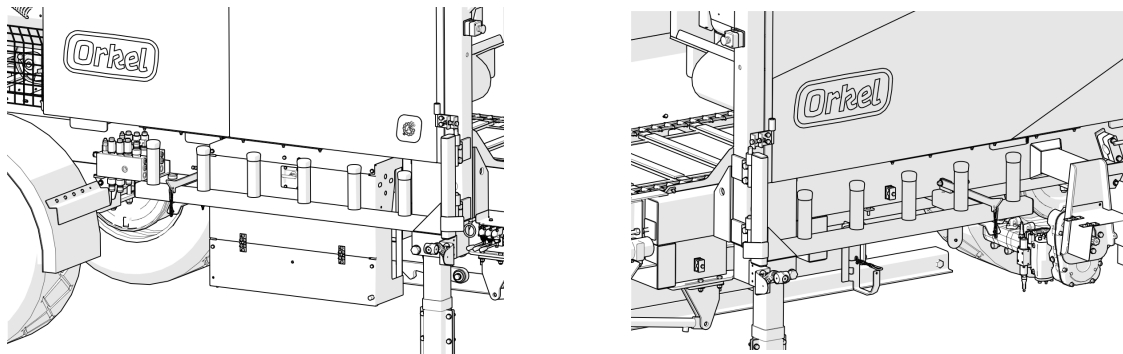
The finished bale is then dropped from the wrapping table, either manually from the display unit, or automatically if the automatic bale drop is activated.

There are several conditions that determine the desirable number of layers with wrapping film; type of material, type of film and storage conditions and duration are especially important. Please read the manual enclosed with the film.

NOTE: 14 turns/laps of the wrapping arm equals approximately 6 layers of film on the bale.

4.6 FILM ROLLER STORAGE

A storage magazine with a combined capacity of 11 rollers, is mounted on both sides of the compactor.



NOTE: 14 turns/laps of the wrapping arm equals approximately 6 layers of film on the bale.

4.7 WRAPPING ARMS

4.7.1 Wrapping arm emergency stop

The compactors wrapping arms are equipped with safety guards that stop the wrappers movement if obstructed while wrapping. If the safety guards are triggered, there will be a popup message on the display unit. The safety guards must be manually cleared from any obstruction. The machine will not start until activated by a new command from the display unit.

4.7.2 Installing a new film roller in the wrapper

1. Grab the tensioner on the stretcher and pull it to the right.
2. Open the lock lever, lift the centering cone and lock it in its upper position.
3. Replace the empty film roller.
4. Align the film roller with the centering cone, drop and lock the cone.
5. Thread the film as shown on [Figure 4.5](#) and swing back the tensioner onto the film roller.
6. Fasten the film on the bale or the film cutter. Wrapping may now continue.

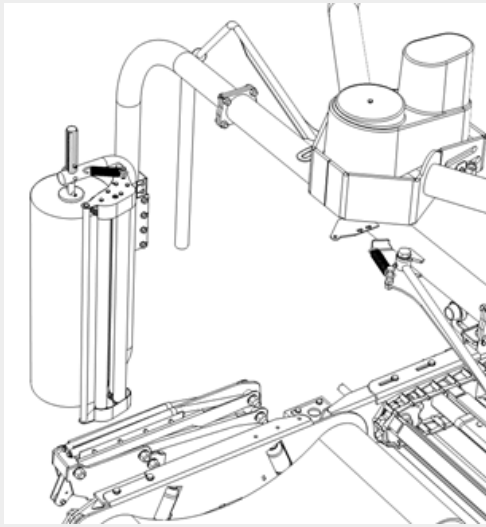


Figure 4.3 : Film stretcher with tensioner

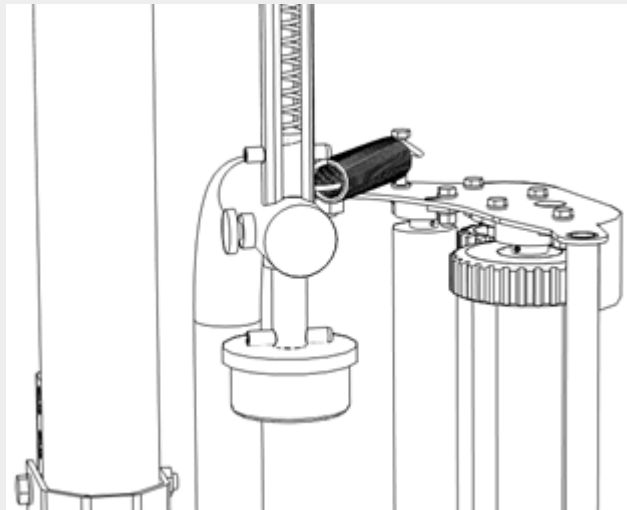


Figure 4.4 : Empty film stretcher

Threading of the film shall be done as illustrated in the principle drawing

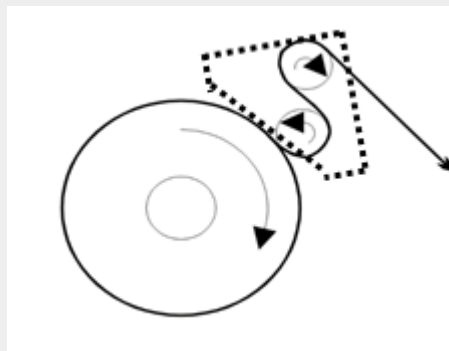


Figure 4.5 : Film in the film stretcher seen from above.

User resources for installing new film rollers may be found at www.orkel.com/qr

4.8 PARKING BRAKE

The parking brake is located near the right side wheel [Figure 4.6]. Rotate clockwise to engage, and counter clockwise to disengage.

IMPORTANT: Apply the included pad lock when the park brake is activated, as to prevent unauthorized use of the compactor or disengagement of the parking brake.

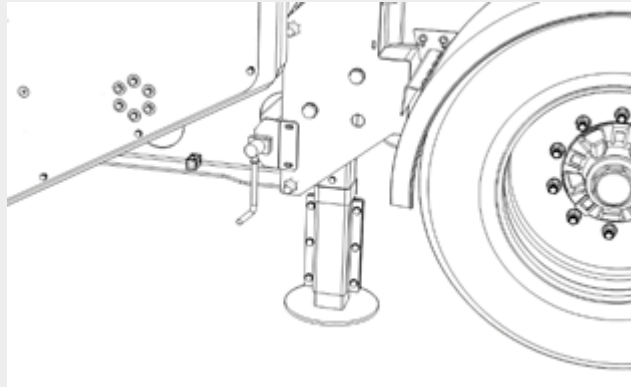


Figure 4.6 : Parking brake

NOTE: Always make sure the parking brake is disengaged before moving the compactor.

4.9 OPERATORS PLATFORM

The operator's platform is a safe station for the operator when changing net/film rollers in the tying unit. It keeps the operator away from all moving parts and makes the process safer. It also contains extra room for additional net/film rollers.

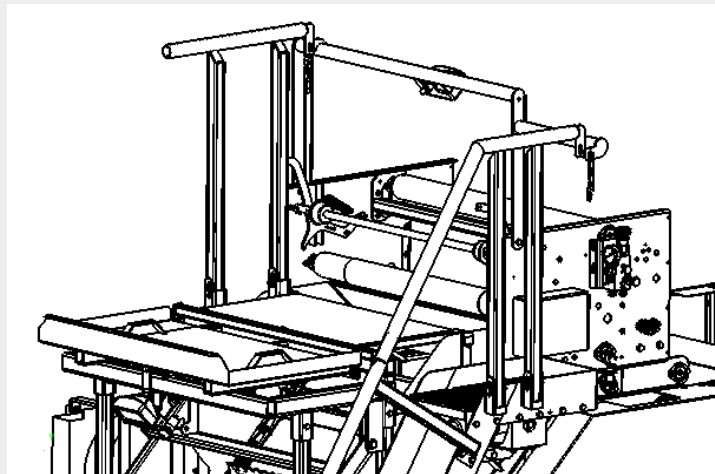


Figure 4.7 : Operator's platform

Standing on the platform may give a better overview of the work site and danger zones.

5 Transport

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5.1 TRANSPORT SAFETY

Be aware of the danger of tipping when driving off road.

5.1.1 Speed limit



Km/h



mph

5.1.2 On road preparation

This machine is designed for being towed by the drawbar only. Ensure the tractor is equipped with a drag unit with sufficient strength.

NOTE: Weight on draw bar: 1800 Kg - 3970 Lb.

IMPORTANT: Be aware of the height of the machine during transport!

Height: 3900 mm

Before set-up and mounting of machine [after transportation]. Always carry out a visual control of the machine, to reveal any transport damages.



Be aware of danger of overturning during transport. Do not exceed recommended speed limits!

5.1.3 Lifting points

Net weight of the machine is 7120 kg. - 15700 Lb.

All lifting of machine must be performed as shown in the illustrations.

Front: Use a nylon strap to make a loop around the front crossbeam [Beam Dim: 100 x 100mm].

Rear: Use lifting points on the hydraulic jack stands

NOTE: Use only certified lifting gear with sufficient lifting capacity.

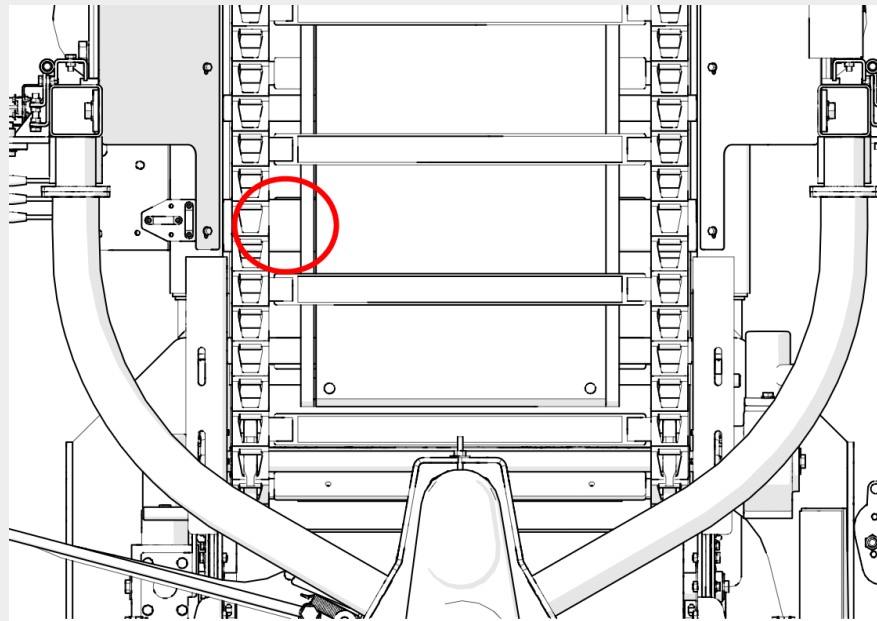


Figure 5.1 : Lifting- and strapping points front

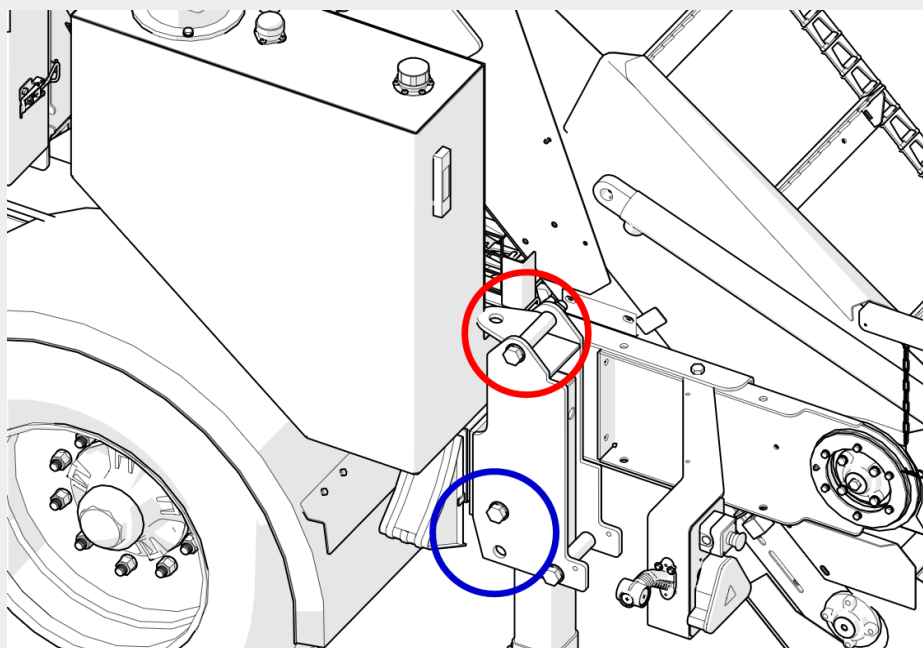


Figure 5.2 : Lifting- [red] and strapping [blue] points rear

5.1.4 Strapping and tie down

Secure the machine from moving if transported by lorry, train or boat. Only use approved securing straps or chains, designed for this purpose. There are four points designed for strapping. One on each hydraulic jack stand.

5.1.5 Dismantling the machine



General safety precautions must be taken when stripping down the machine. Center of gravity might change during dismantling. Secure large parts to reduce the risk of injury. Be aware of overturning.

Hazardous waste like: Oil, plastic and so on, must be stored in an environmentally safe way, or delivered at a certified waste-disposal plant.



Be aware of overhanging power lines.

Max height in transport position: 3900 mm

5.2 HIGHWAY USE

The compactor is designed for a maximum speed of 40 km/h. Exceeding this speed is considered dangerous. Furthermore, the speed must be limited according to national speed limits. Before using the machine the operator must ensure that all covers and hatches are closed and secured.

Be aware of overhanging power lines. Max. height in transport position: 3900 mm.

5.2.1 Transport preparation

The levers referred to in this chapter can be found in [section 4.2.2 "Lever/Controls overview"](#) and [section 4.2.3 "Lever list"](#).

1. Lift the bale bridge and fold it over the wrapping table.
2. Raise the wrapping table (done from display unit,) to its upper position in order to ensure free passage when extending the drawbar.
3. Extend the drawbar (lever 6) until the transport safety lock engages (see [section 3.8.1 "Telescopic drawbar"](#)).
4. Fold back the wrapping table belt tensioner.
5. Disconnect the PTO drive shaft and secure it in transport position.
6. Disassemble the covers between the hopper and the elevator.
7. Fold in the hopper side covers, and secure them.
8. Fold the stairs into transport position, according to instructions given in [section 4.2.11 "Stairs"](#)
9. Raise the feed hopper (lever 3).
10. Secure the hopper in its upper position by closing the valves M2 and M3 on each side (see).
11. Retract all four hydraulic jack stands to their upper position (levers 1, 2, 4 and 5).
12. Disconnect hydraulic hoses.
13. Disengage the main power switch.
14. Rotate the wrapping arms to their transport position. See illustration in [section 12.6.4 "Dimensional sketch, transport mode"](#).
15. Move the tractor in front of the machine.
16. Connect the tractor to the draw bar.
17. Connect the el-cable and hoses for hydraulic/pneumatic brakes.
18. Check the road lights and brakes before driving.
19. Ensure that film roller storages, covers and hatches are all closed and secured.

6 Control system

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6.1 USER INTERFACE

This section provides a brief introduction to the user interface, so that you quickly can get started using the machine.

NOTE: Software reviewed by this chapter is MP2000 5.0 G. Variations from the illustrations may occur.

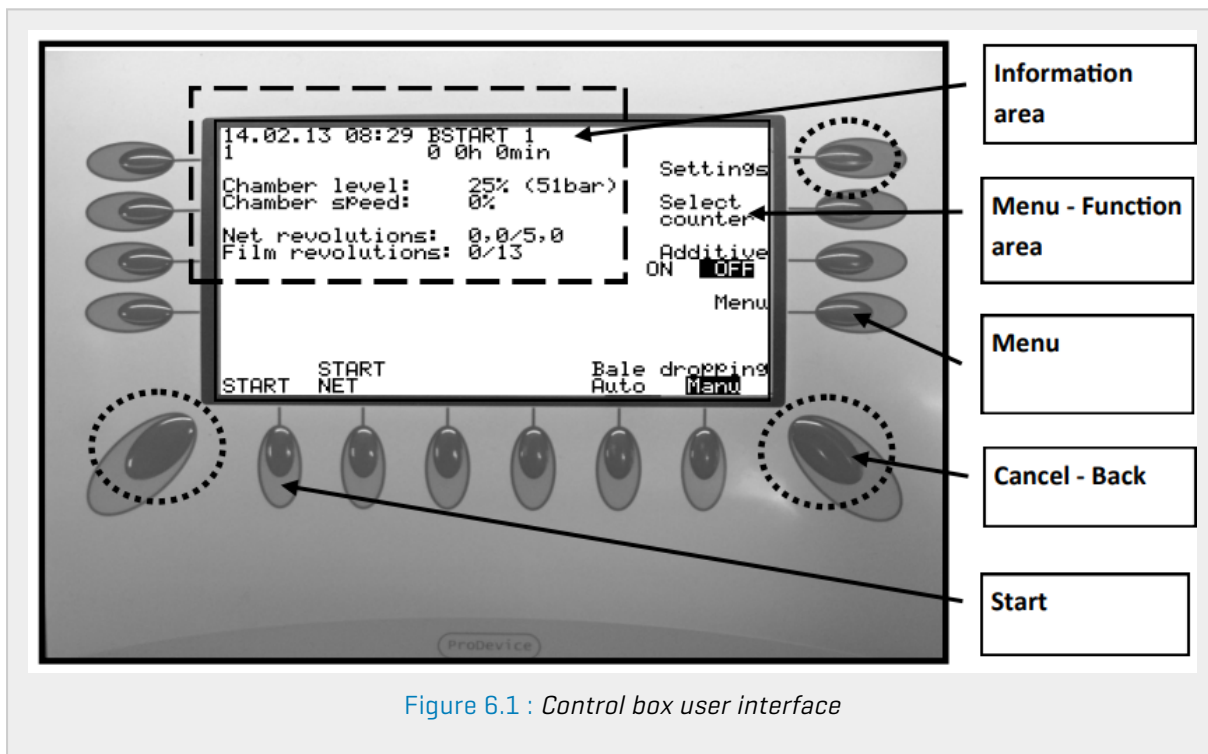


Figure 6.1 : Control box user interface

Information area:

Display information about status in different menus. Also time, date and counters

Menu - Function area:

Display machine information, on each function in chosen menu.

Buttons:

By pressing button near/under desired function, the function is activated.

Menu button:

Used for switching between main menus

Cancel - Back button:

Use to cancel a on-going process, leave a menu or go back to start menu.

Re-start of program:

If the programme stop by any reason [e.g. overload], you might complete the interrupted cycle manually to unload the bale. To get started in "AUTO" again, the control box must be restarted.

By pressing the tree buttons, marked with a ring [picture above] at the same time, the box is reset. No data is lost during this operation.

6.1.1 Choose menu language

When connecting the box for the first time, picture to the right appear on screen. Press immediately the button under/side of the language you want. For later start-up, the control box will remember the language you have chosen

Available languages: EN-English, DE-German FR-French, NL-Dutch TR-Turkey, PL- Polish, CS-Czech, SK-Slovak, HU-Hungarian

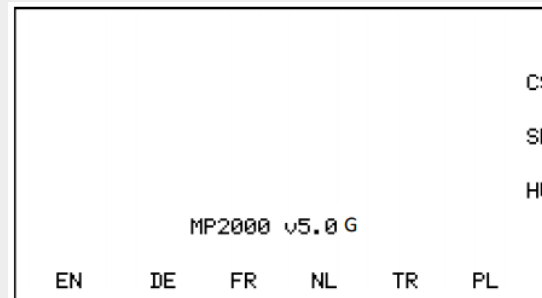


Figure 6.2 : Start up screen language

6.1.2 Main menu - start screen

In this screen you get information of:

Ratio of charge and chamber pressure

Chamber speed

Number of turns of widefilm/net

Number of turns of plastic film [wrapper]

Possible selections:

Start, machine

Start Net Widefilm/net in chamber

Bale dropping Manual or Auto Wrapping table

Additive On or Off [Silage additive]

Start wrap [only if a bale is on the table]

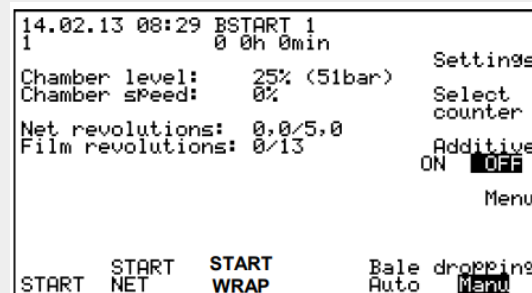


Figure 6.3 : Start screen

6.1.3 Program menus - basic functions

Press menu button to enter menu: **Baler 1**

Possible selections:

Chamber speed [Tailgate opening speed]

Chamber greaser Manual greasing in progress as long as the button is pressed down

Chamber, open close [Tailgate]

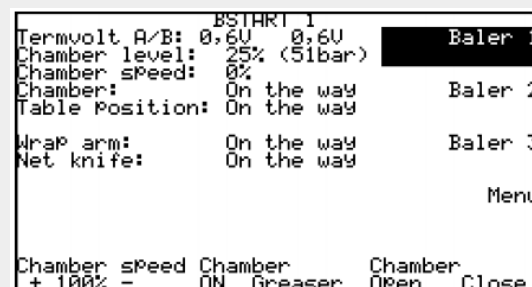


Figure 6.4 : Screen menu, Baler 1

Press baler 2 to enter menu Baler 2

Possible selections:

Net knife, open - close

Net feed, on

Belt under, Fast - slow speed

```

BSTART 1
Termvolt A/B: 0,6V 0,6V Baler 1
Chamber level: 25% (51bar)
Chamber speed: 0%
Chamber: On the way Baler 2
Table Position: On the way
Wrap arm: On the way Baler 3
Net knife: On the way
Menu

Net knife Net feed Belt under
Open Close ON Fast Slow
    
```

Figure 6.5 : Screen menu, Baler 2

Press baler 3 to enter menu Baler 3

Possible selections:

Feed table, on - off

Elevator, fast - slow speed

Run table, on - off. Wrapper table

Net revolutions, Set the number of layers of wide-film/net added to the bale in chamber

```

BSTART 1
Termvolt A/B: 0,6V 0,6V Baler 1
Chamber level: 25% (51bar)
Chamber speed: 0%
Chamber: On the way Baler 2
Table Position: On the way
Wrap arm: On the way Baler 3
Net knife: On the way
Menu

Feed table Elevator Run table Net
ON Fast Slow ON revolutions
+ 5,0 -
    
```

Figure 6.6 : Screen menu, Baler 3

Press menu to enter menu Wrapper 1

Possible selections:

Film revolutions Set the number of layers of plastic film added to the bale on wrapper table

Table, up - down. [Wrapper table]

Chamber, open - close [Tailgate]

```

BSTART 1
Termvolt A/B: 0,6V 0,6V Wrapper 1
Chamber level: 25% (51bar)
Chamber speed: 0%
Chamber: On the way Wrapper 2
Table Position: On the way
Wrap arm: On the way
Net knife: On the way
Menu

Film revolutions Table Chamber
+ 13 - UP Down Open Close
    
```

Figure 6.7 : Screen menu, Wrapper 1

Press wrapper 2 to enter menu Wrapper 2

Possible selections:

Home Wrapper arm back to start-position

Slow - Fast Wrapper arm speed

Auto Automatic wrapping cycle of bale when it's loaded on table

Film cutter open - close

```

BSTART 1
Termvolt A/B: 0,6V 0,6V Wrapper 1
Chamber level: 25% (51bar)
Chamber speed: 0%
Chamber: On the way Wrapper 2
Table Position: On the way
Wrap arm: On the way
Net knife: On the way
Menu

Home Slow Fast Auto Film cutter
Open Close
    
```

Figure 6.8 : Screen menu, Wrapper 2

6.1.4 Settings

NOTE: Write down old settings as a back-up before you start changing values.

In menu settings you can set/change up to 30 parameters [See screen pictures 1,2 og 3]

By pressing button under the arrow in the display you can switch between parameters and screens pages.

By pressing button under + or - of the chosen parameter, the value is changed.

Yes, On or Increase a parameter, press +

No, Off or Decrease a parameter, press -

| Setting | Value |
|------------------------|--------|
| Chamber max speed | 100% |
| Chamber feed speed | 100% |
| Chamber net speed | 100% |
| Chamber bale out speed | 33% |
| Chamber full level | 60% |
| Chamber max Pressure | 198bar |
| Elevator stop delay | 0s |
| Feed delay | 0s |
| Net feed time | 0s |
| Film feed time | 0s |

Figure 6.9 : Settings page 1

See recommended settings in "Values and settings in menu" on page 51

| Setting | Value |
|------------------------|-------|
| Film feed time | 5s |
| Net revolutions | 5,0 |
| Feed roll closed delay | 1s |
| Knife delay | 0,5s |
| Chamber open delay | 6 |
| Bale on table delay | 1s |
| Film revolutions | 13 |
| First film release | 1 |
| Second film release | 4 |
| Third film release | 6 |

Figure 6.10 : Settings page 2

Press **cancel - back** button to return to menu **settings - counters**

Press button to the right for counters in display to enter menu **counters**.

| |
|----------|
| Settings |
| Counters |
| Menu |

Figure 6.11 : Settings and counters

Counters

This menu can store information for up to 50 different customers or jobs.

When entering the menu, the first 7 counters is shown in display.

| N | Name | Sales | Work-time |
|----|-------------|-------|-----------|
| 1* | ABCDEFGHIJK | 0 | 0h 0min |

| | | |
|-------------|---|---------|
| List total: | 0 | 0h 0min |
| Total: | 0 | 0h 0min |

Figure 6.12 : Counter page 1

View stored information

Switch between counters by pressing buttons under arrows in display.

Press select button to choose a counter to look into.

The chosen line should now be marked with a * behind the counter number in display.

Then press details button to view stored information registered on the customer. [Number of bales and time spent]



Figure 6.13 : Counter page 2

Change text, or add a new customer/job

Choose the counter to be changed, Press details button, then modify button.

ABC - Skip through alphabet from the start and backwards and then numbers.

ZYX- Skip through numbers and alphabet from the end and forwards.



Figure 6.14 : Counter page 3

Change or write letters and numbers:

Press **ABC** or **ZYX** button until requested letter is in cursor.

Then press **arrow button** to move to next letter or make a space.

Erase a letter, press **clear button**

Confirm changes, press **OK button**



Figure 6.15 : Counter page 3

Reset: Counter

NOTE: Make sure the correct counter you'd like to reset, is chosen. [Picture, counter 2]

Press **reset counter**. Confirm or invalidate by pressing: **Yes** or **No**

Erase counter: customer or job:

Press **delete**. Then confirm or invalidate by pressing **Yes** or **No**.



Figure 6.16 : Counter page 4

Time

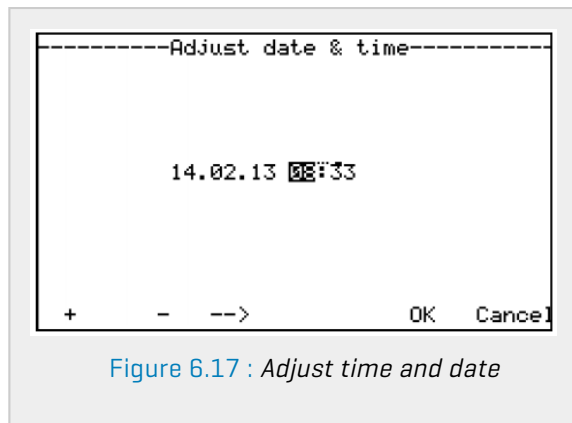
Enter menu screen; user settings.

Select **Clock** on the right side of screen to enter menu; **Adjust date & time**

Move cursor along the line by pressing button under the arrow shown in display. Move the cursor to the value you'd like to change

Increase/Decrease value, press + or -

Confirm new time by pressing **OK**



Press cancel - back button to return to menu; Settings and counters

Press menu button to get new main menu. Press user settings button to enter menu; User settings.

6.1.5 User settings

Control unit: Information line showing which program and edition. MP 2000 v5.0 G

Changing brightness in display

By pressing buttons below Brightness in display, you can adjust to requested intensity with + or -

Changing contrast in display

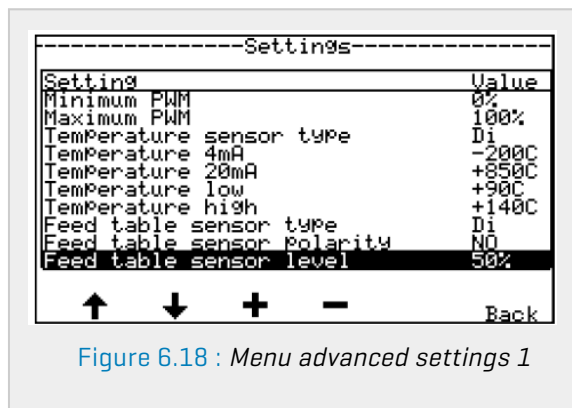
By pressing buttons below Contrast in display, you can adjust to requested intensity with + or -

Changing background

Choose between bright letters on dark background, or dark letters on bright background. By pressing buttons under polarity, you can change background with POS or NEG.

Calibration:

To calibrate scale for bale on table, if installed. Choose Scale button. [Not in use]



6.1.6 Advanced settings

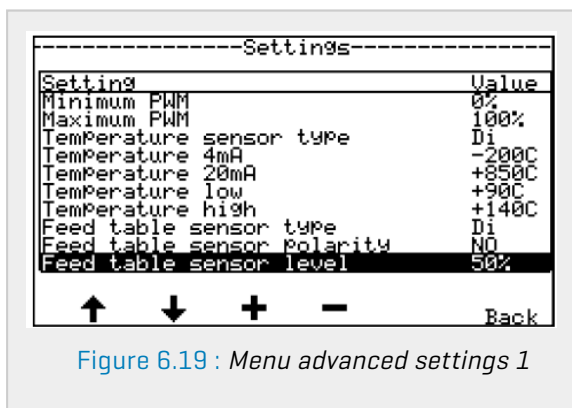
NOTE: These settings must be performed by trained personnel only.

To get access to more parameters in menu settings:

Enter menu Settings as shown in picture 1 on previous side.

Press upper and lower buttons on left side simultaneously. New parameters will now appear in display.

See picture 1 and 2 to the right, to see advanced parameters to be changed.



NOTE: Chamber speed regulation: MC 850 /1000

Chamber speed regulation must be set to YES, after all settings have been done.

NOTE: PTO ratio MC 850 /1000

PTO ratio must be set to 1,13

| Setting | Value |
|----------------------------|-------|
| Minimum PWM | 0% |
| Maximum PWM | 100% |
| Temperature sensor type | Di |
| Temperature 4mA | -200C |
| Temperature 20mA | +850C |
| Temperature low | +90C |
| Temperature high | +140C |
| Feed table sensor type | Di |
| Feed table sensor Polarity | NO |
| Feed table sensor level | 50% |

Navigation: ↑ ↓ + - Back

Figure 6.20 : Menu advanced settings 1



These advanced settings is only to be set by qualified personnel. Do not change settings if you are not sure.

6.1.7 Sensor test

Enter main menu, User settings

Press button to enter menu; Sensor test.

A list of all sensors and their current status is shown in display.

| Sensor test | | | |
|-------------|---------|---------|-----------|
| S1 OFF | S9 OFF | S17 OFF | S25 OFF |
| S2 OFF | S10 OFF | S18 OFF | S26 ON |
| S3 OFF | S11 OFF | S19 OFF | S27 ON |
| S4 OFF | S12 OFF | S20 OFF | S28 OFF |
| S5 OFF | S13 OFF | S21 OFF | S29 |
| S6 OFF | S14 OFF | S22 OFF | S30 5,3mA |
| S7 ON | S15 | S23 ON | S31 ON |
| S8 ON | S16 | S24 OFF | S32 ON |

Back

Figure 6.21 : Menu advanced settings 1

Sensor Test, procedure:

Hold a piece of metal [steel] in front of the sensor, watch at the same time the current sensor status in display. The sensor status should now change between ON and OFF while moving the metal-piece in and out of the sensor front. In that case, the sensor is OK.

If there's no change in status of the particular sensor, there is a failure in sensor or a cable break-down. See sensor's overview and their numbers in //REF

Press **Cancel - Back** button twice to return to startup screen.

6.1.8 Error messages memory

Press **fault memory** in main menu, user settings to enter menu; fault memory. In this menu, the last 30 errors is stored continuously.

To browse faults in memory, press button under arrows up or down in display

NOTE: Use this menu as a reference if you are about to contact your local dealer or Orkel Compaction Ltd, if a problem has occurred.

| N | Description | Code | Date |
|---|---------------------------|------|------|
| 1 | Chamber not closed | 180 | 14.2 |
| 2 | Chamber Pressure sensor 1 | | 14.2 |

Navigation: ↑ ↓ Details Back

Figure 6.22 : Menu advanced settings 1

To look closer at a failure, press button under **Details** shown in display.

Example: Failure code:180

This indicate there is a error in sensor S18. See [section 6.1.10 "Error messages on display"](#)

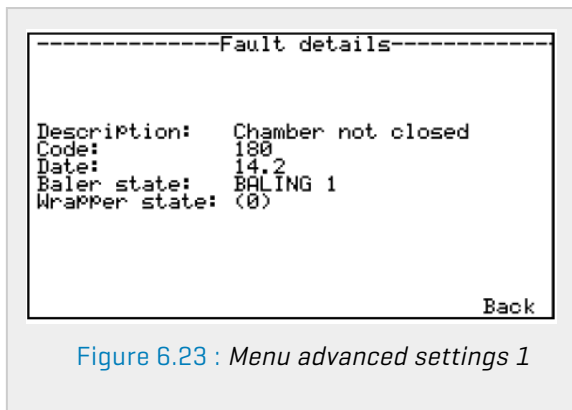


Figure 6.23 : Menu advanced settings 1

6.1.9 Values and settings in menu

| Text: | Description of parameter setting | Recommended settings/values |
|------------------------|--|-----------------------------|
| Chamber max speed | Speed of the chamber when filling up with material | 80 - 100% |
| Chamber feed speed | Chamber speed during net feeding and cutting | 40 - 50% |
| Chamber net speed | Net wrapping speed | 80 - 100% |
| Chamber bale out speed | Speed of the chamber when bale is ejected out of the chamber | 40 - 50% |
| Chamber full level | Level of chamber filling when elevator slows down | 60 - 80% |
| Chamber max pressure | Setting of a maximum pressure inside the chamber at a point when elevator stops and net/film starts. | 180 - 220 bar |
| Elevator stop delay | Delay of elevator stop after chamber is full | 0 s |
| Feed delay | Delay of net feed | 0 s |
| Net feed time | Time necessary during net feeding to get it anchored (hooked) between chamber and bale surfaces - regards MP's with only net wrapping system | 4 - 6 s |
| Film feed time | Time necessary during net (film) feeding to get it anchored (hooked) between chamber and bale surfaces - regards machine with alternative film or net wrapping | 4 - 6 s |
| Net revolutions | Number of net/film wraps on bale in the chamber | 3 - 6 r |
| Feed roll closed delay | Continue to press the feed rollers together in mid position | 1 |
| Knife delay | Delay on net/film knife before cutting | 0.5 |
| Chamber open delay | Delay of opening the chamber after net (film) wrapping completed | 0 |
| Bale on table delay | To allow the bale to go all the way to the table. | 1 s |
| Film revolutions | Revolutions of film laid on the bale on wrapper table | 14 [=6 layers] |
| First film release | First opening of the film cutter | 1 |
| Second film release | Second opening of the film cutter | 4 |
| Third film release | Third opening of the film cutter | 6 [or 4] |
| Film cutter open time | Operating time from closed to open. | 0.5 s |
| Film cutter close time | The time from starting to close the film cutter to finish. | 1 - 2 s |
| Net control | Programme setting for machines with net only in the tying unit. [Stops the machine if net is broken or the roll is empty]. | ON |
| Film control | Programme setting for machines with net or film in the tying unit. [Stops the machine if film/net is broken or the roll is empty] | ON |

| Text: | Description of parameter setting | Recommended settings/values |
|---------------------|--|-----------------------------|
| Net type | Type of the net/film wrapping unit - for net only [net] or net/film model [plastic]. | PLASTIC |
| Measure weight | Not in use. | |
| Table down delay | Delay of the table from dropping position until it starts to go up again. | 1 - 2 s |
| Bale rotation delay | Extra wrap before rotation starts. [for stabilizing] | 0 - 4 |
| Bale rotation time | Makes the bale rotate on the table while dropping | 0 - 5 |
| Rotate feed-rollers | Feed-rollers rotate while opening rollers | Yes/no |
| Bale transport | Gives extra oil to the belt under when moving to the table | Fast/Normal |

6.1.10 Error messages on display

| Message | ID | Sensor | State |
|---|-----|----------|---|
| Bale on the table | 10 | S1 | [not used] |
| Bale did not move to the table | 11 | S1 | LOAD1 |
| Table not in middle position | 30 | S3 | LOAD3, LOAD4, WRAPRAMP, LOAD5, WRAP1, WRAPSTART, WRAP2, WRAP3, WRAP4, WRAP5, WRAP6, WRAP7, BALEREADY1 |
| Table did not move to middle position | 31 | S3 | LOAD2, DROP3 |
| Wrapper arms not in start position | 50 | S5 | OPEN1, OPEN2, OPEN3, LOAD1, LOAD2, LOAD3, LOAD5, WRAP1, WRAP6, WRAP7, BALEREADY1, DROP1, DROP2, DROP3, READY1 |
| No wrap pulse | 51 | S5 | WRAPSTART, WRAP2, WRAP3, WRAP4 |
| Wrapper arm speed to high | 52 | S5 | WRAP3, WRAP4 |
| Wrapper arm obstructed | 80 | S8 | [all states where V9 or V10 driven] |
| Table did not move to the down position | 90 | S9 | DROP1 |
| Table did not move to the up position | 100 | S10 | OPEN1, DROP3 |
| Film broken or roll empty | 110 | S11 | WRAP3, WRAP4 |
| Film broken or roll empty | 120 | S12 | WRAP3, WRAP4 |
| Both films broken or rolls empty | 111 | S11, S12 | WRAP3, WRAP4 |
| Bale chamber not open | 170 | S17 | LOAD1 |
| Bale chamber did not open | 171 | S17 | OPEN2 |
| Chamber not closed | 180 | S18 | BALING1, BALEFULL1, NETFEED1, FEEDDELAY1, NETFEED2, NETFEED3, NET1, PLASTIC0, PLASTIC1, PLASTIC2, PLASTIC3, PLASTIC4, PLASTIC5, OPENDELAY1, LOAD4, WRAPRAMP, WRAP1, WRAPSTART, WRAP2, WRAP3, WRAP4, WRAP5, WRAP6, WRAP7 |
| Bale chamber did not close | 181 | S18 | LOAD3 |
| Netknife did not open | 190 | S19 | NETFFED1, NETFEED2, NETFEED3 |
| Feed roll did not open | 191 | S19 | PLASTIC2 |
| Netknife did not close | 201 | S20 | NET1 |
| Feed roll did not open | 204 | S20 | PLASTIC4 |

| Message | ID | Sensor | State |
|--------------------------------|-----|--------------|--|
| Net did not break | 202 | S20 | BSTART01, BSTART05, BSTART10, BSTART15, BALING1, BALEFULL1 |
| Net tying failure | 203 | S20 | NETFEED3, PLASTIC3 |
| Film cutter did not close | 220 | S22 | PLASTIC5 |
| Emergency STOP | 70 | S7 | [all] |
| Emergency STOP | 230 | S23 | [all] |
| Chamber pressure sensor broken | 1 | S30 | [when baling] |
| Chamber overpressure | 2 | S30 | [when baling] |
| Under-voltage at control unit | 3 | Control unit | [all] |
| Under-voltage at control unit | 4 | Control unit | [all] |
| Under-voltage at control unit | 5 | terminal | [all] |
| Under-voltage at control unit | 6 | terminal | [all] |
| Malfunction at control cable | 7 | Control unit | [all] Also malfunction in control box or circuit |
| Malfunction at control cable | 8 | Control unit | [all] Board error in the electric cabinet |

7 Maintenance and mechanical adjustments

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7.1 SAFETY

7.1.1 Before maintenance

Before any maintenance or adjustments are performed on the machine, we recommend you to make a conference call to your local dealer or Orkel AS. All repair work shall be carried out by a skilled mechanic.

7.1.2 Safety precautions during maintenance and mechanical adjustments

NOTE: Due to your own safety, Orkel AS recommends that all repair- and maintenance work on the machine is done in daylight conditions or equivalent.



If you fail to comply with instructions given it could result in personal injury or loss of life.

- The PTO/Tractor must be stopped before any repair work or maintenance is carried out.
- The hydraulic safety valves on the chamber door lifting cylinders [K2 and K3], must be closed before anyone enters the chamber.
- Be cautious when cleaning belts and rollers to avoid crushing or squeezing of body parts.
- Use proper shoes and work wear to avoid slipping and other injuries when working on the machine.

7.1.3 Elements of hazard during maintenance



If you fail to comply with instructions given it could result in personal injury or loss of life

- Squeezing/crushing of fingers and hands near chains and sprockets
- Squeezing/crushing of finger and hands during cleaning of conveyor belts and rollers.
- Getting entangled into PTO axle. Do not stay in PTO area.

- Slipping and falling while entering the stairs or when working on the machine.
- Getting moderate burns. The oil is approximately 70°C - 158°F.

IMPORTANT: Safeguard can only be dismantled when the machine is stopped.

7.1.4 Control after repair or maintenance

Check that all tools are stowed away and that all covers are mounted correctly and in place.



Shut down the machine and disconnect the PTO-shaft prior to every machine inspection.



Be extra careful when performing function control on running machinery.

IMPORTANT: Inspections, simple repairs and adjustments mentioned in this manual may be performed by operators who have undergone training in the use and maintenance of this machine. More advanced repairs must be performed by skilled technicians.

NOTE: Maintenance should begin with a thorough cleaning in order to avoid dirt penetrating unwanted areas/-components.

7.2 ELECTRICS

- Visually, check the cables for damages and proper placement.
- Check all cable connections
- Check the road lights and work lights
- Check the emergency buttons for malfunction.

7.3 WHEELS

Check the condition of the tires, they should have sufficient pattern depth and be without excessive wear. Control the tire inflation and wheel nut torque before transport to a new location. See [section 12.5 "Wheels and tyres"](#)

7.4 CHAINS

The chamber chains, and chain tensioner A, B and C, must be controlled for sufficient lubrication and correct tension. Look for abnormal wear and tear on sprockets and chains. Replace worn out parts if needed.

Contact your local supplier or Orkel AS directly if you have any doubts about parts that must be replaced.

7.4.1 Chain tensioner A

Basic setting:

Adjust the chamber drive chain tensioner bolt until the chain play is approximately 3 mm.

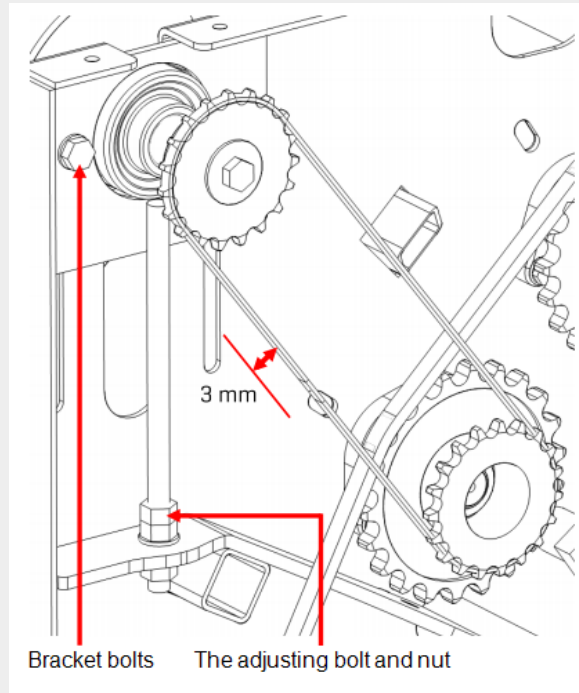


Figure 7.1 : Chain tensioner A

Implications during adjustment:

When adjusting either the left side [drive chain tension] or the right side [belt tracking] of this roller, these adjustments influence each other. Hence, you have to adjust both sides multiple times, until you achieve the ultimate chain tension and belt tracking combination.

Adjustment:

1. Untighten the two bolts holding the adjustable bracket.
2. Adjust the chain tension by turning the nut on the bolt.
3. Tighten the bolts holding the adjustable bracket when the chain-tension is OK.
4. Readjust the right side to find the optimal lining of the belt.
5. Repeat if necessary.

NOTE: Right side adjustment [belt tracking] is done by following the same general steps as described above.

IMPORTANT: Check the chain tension after adjusting the belt tracking.

7.4.2 Chain tensioner B and C

Control:

The length of the spring should be between 130 - 140mm.

Adjustment:

Increase the chain tension by tightening the nut on the bolt.

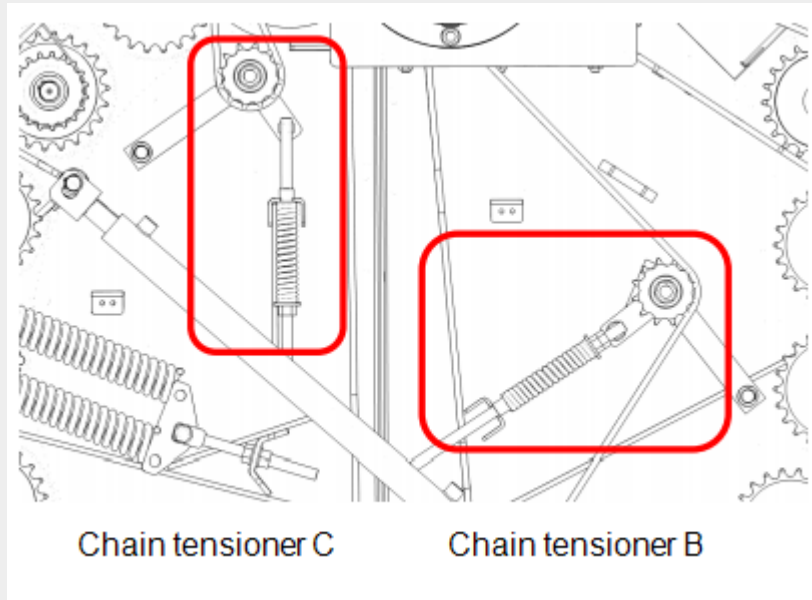


Figure 7.2 : Chain tensioner B and C

7.5 FEED HOPPER

7.5.1 Tightening the feed hopper belts

This belt are of chain type with welded carriers. Check the belt tensioning and look for uneven wear.

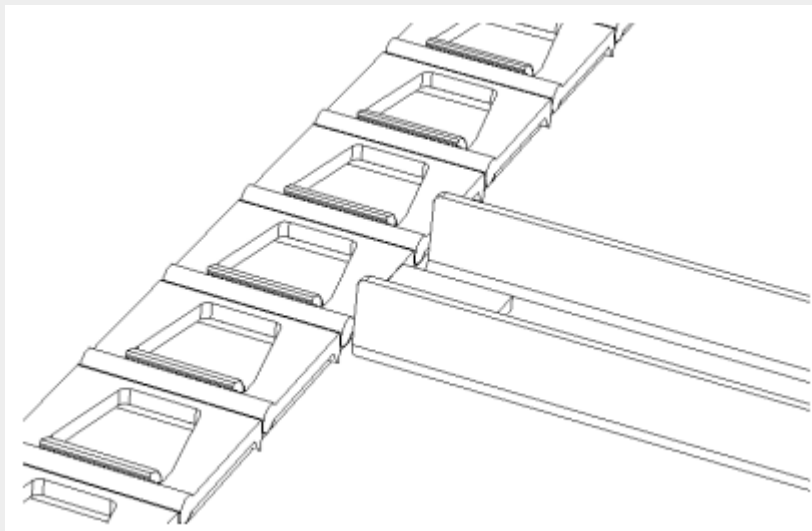


Figure 7.3 : Feed hopper conveyor

Procedure:

- Loosen the four bolts holding the bracket.
- Untighten the counter nut and tighten the bolt on the chain tensioner until correct belt tension is achieved.
- Adjust both sides equally.
- Tighten the counter nut and the attaching bolts on the bracket.

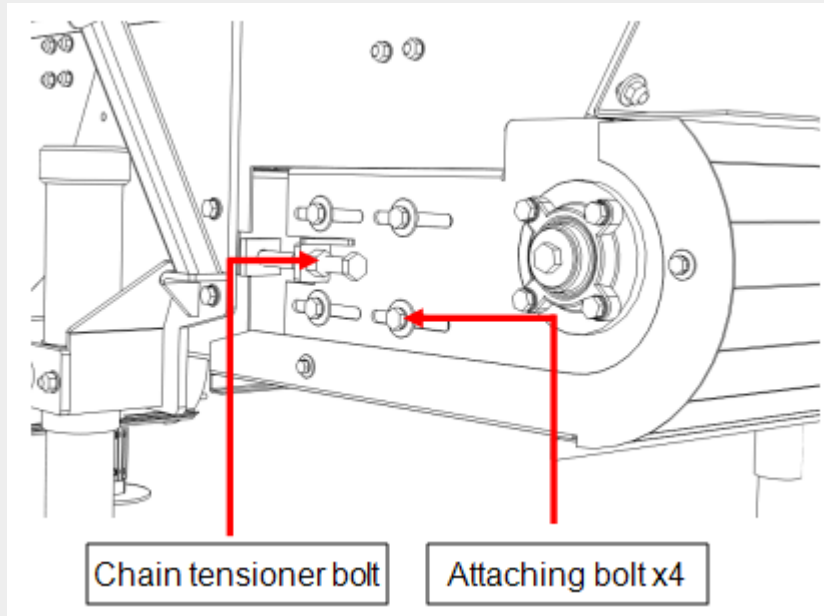


Figure 7.4 : Chain tensioner, feed hopper

7.5.2 Ball bearings

The rollers in the feed hopper should be without deformations and cracks. Check the bearing clearances without belt tension. Replace worn bearings.

7.6 ELEVATOR AND SUB CONVEYOR

7.6.1 Conveyor belts and feeder carrier

Sub conveyor and elevator.

The sub conveyor and elevator are of chain type with welded carriers. Check the chain tensioning and look for uneven wear.

7.6.2 Adjusting the conveyor chains

Same procedure on both chains. Tighten the chain tensioner, until all play is gone. Adjust equally on both sides, and check that the tracking of the chain is centered. If the wear in the chain links is too large to achieve proper chain tension, one link can be removed.



Figure 7.5 : Elevator conveyor chain

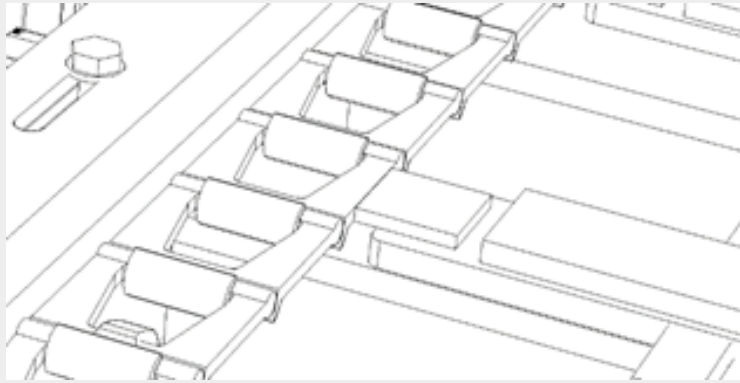


Figure 7.6 : Sub conveyor

Procedure

- Loosen the four bolts holding the bracket.
- Untighten the counter nut and tighten the bolt on the chain tensioner until correct chain-tension is achieved.
- Adjust both sides equally.
- Tighten the counter nut and the attaching bolts on bracket.

7.6.3 Chain tensioner, sub conveyor

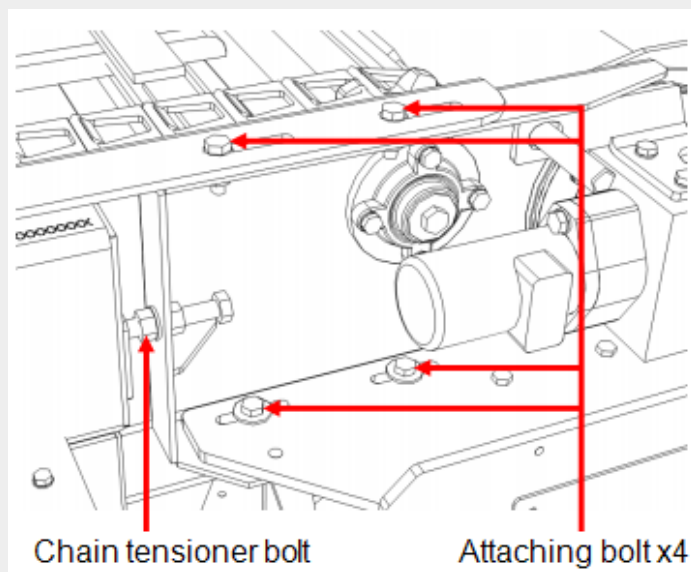
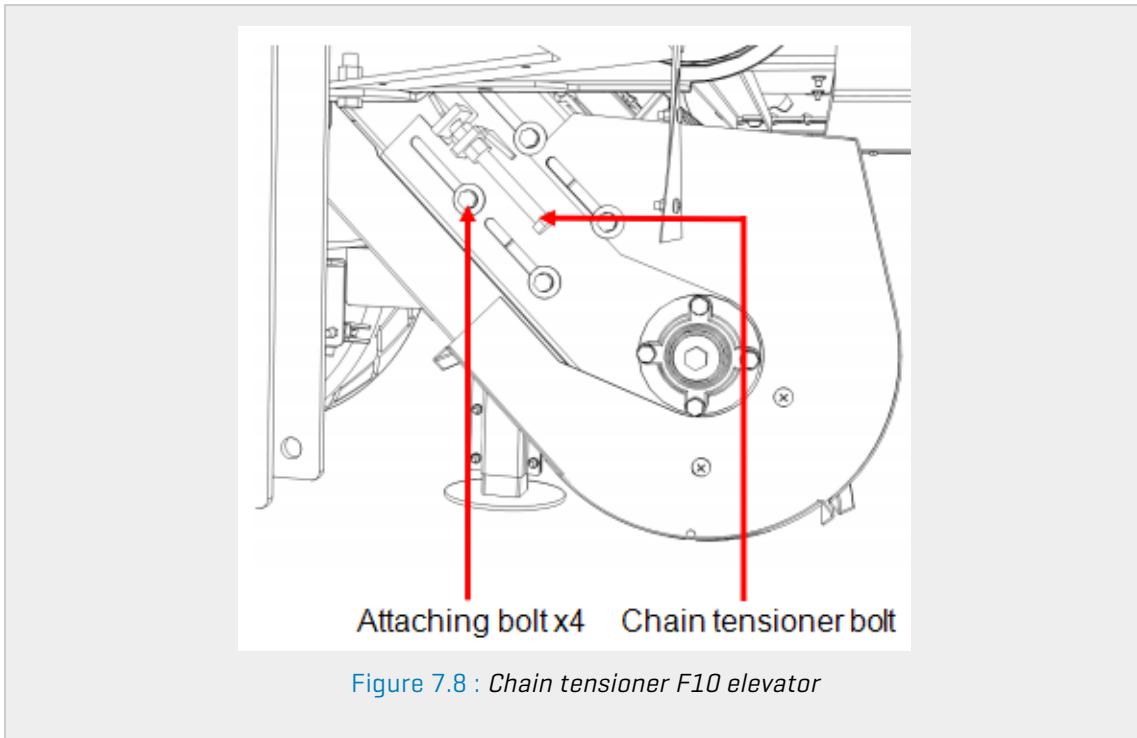


Figure 7.7 : Chain tensioner sub conveyor

7.6.4 Chain tensioner, elevator



7.6.5 Ball bearings elevator

The rollers in the elevator and belt under should be without deformations and cracks. Check the bearing clearances without belt tension. Replace worn bearings.

7.7 BALING CHAMBER



All repair and maintenance work inside the chamber is associated with great danger. Secure the chamber door lifting cylinders, by closing the securing valves on both sides. The machine must be stopped and PTO disconnected.

7.7.1 Inspection

Chamber - rollers - bearings - belts

The bale chamber must be checked frequently. Before performing a control, the chamber must be properly cleaned, preferable using a high pressure washer. Check the tracking of the chamber belts and adjust if needed.

Look for wear on the chamber sidewalls and check the condition of the rollers and rubber belts. The grade of wear and tear are varying, depending on which material being baled.

Replace damaged rollers and belts if excessively worn. If there is excessive wear on the chamber sidewalls, Hardox wear plates can be retrofitted on the chamber walls. Contact Orkel AS if relevant.

NOTE: The play in the slide bearings is at the smallest when the compactor is brand new. This may result in increased temperature in the bearings. The bearings should therefore be checked as they might require additional lubrication.



During control and manual greasing of bearings and bushings the tractor/motor shall not be running.

NOTE: In extreme cases of heating, a special filler nipple may be used [force lubricate] after removing the hose from the bearing. Please contact Orkel if this is necessary.

7.7.2 Adjusting the front chamber belt

All adjustment of the belt tracking is done on the right side of the chamber [upper front roller]. See [Figure 7.10](#). The belt tracking should not touch the chamber side walls.

If the belt is tracking towards **B** [[Figure 7.9](#)], the distance **C** [[Figure 7.10](#)] must be increased. If the belt is tracking against **A** [[Figure 7.9](#)] the distance **C** [[Figure 7.10](#)] must be reduced.

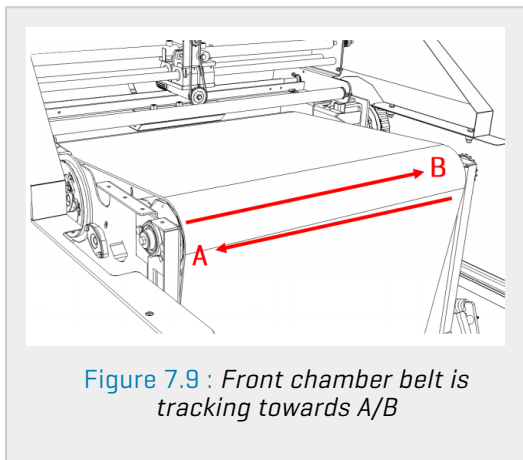


Figure 7.9 : Front chamber belt is tracking towards A/B

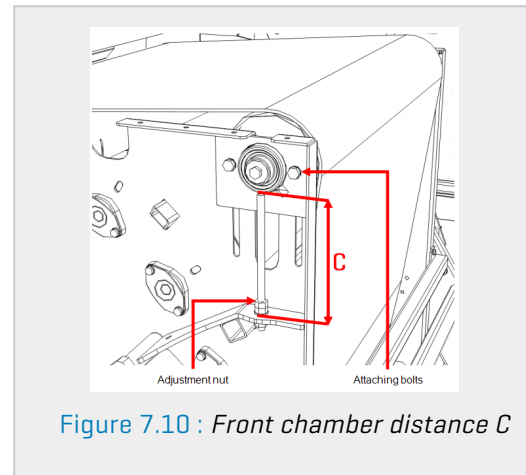


Figure 7.10 : Front chamber distance C

Loosen the attaching bolts, to allow a movement of the bracket. Loosen the counter nut and adjust the distance **C** by turning on the adjustment nut.

Tighten the counter nut and the attaching bolts of the bracket when the belt has a correct tracking.

7.7.3 Adjusting the rear chamber belt

The adjustments of the rear chamber belt is done preferably from the right side of the machine. Dismount the cover and safety net [[Figure 7.11](#)] to get access to the adjusting bracket and bolts seen in [Figure 7.14](#).

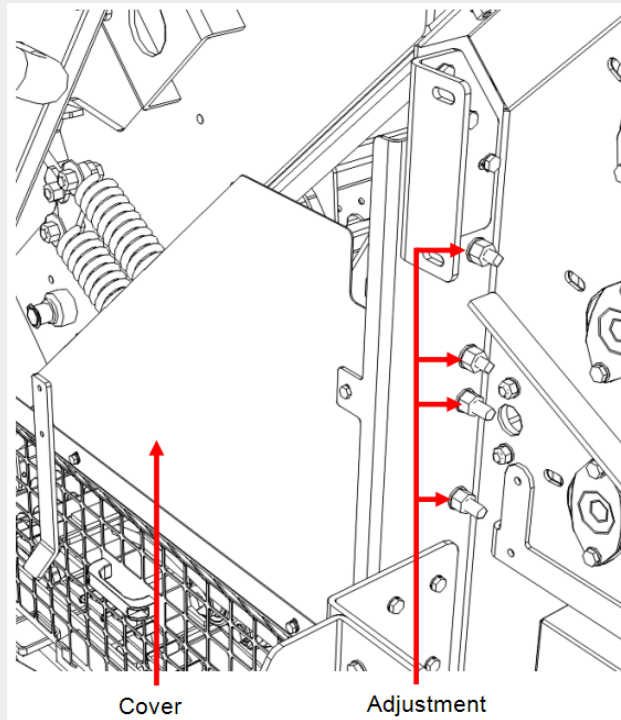


Figure 7.11 : Rear chamber adjustments

Rear tension roller

Adjusting the belt tracking is done by changing the distance C on the rollers bearing point D [Figure 7.13]

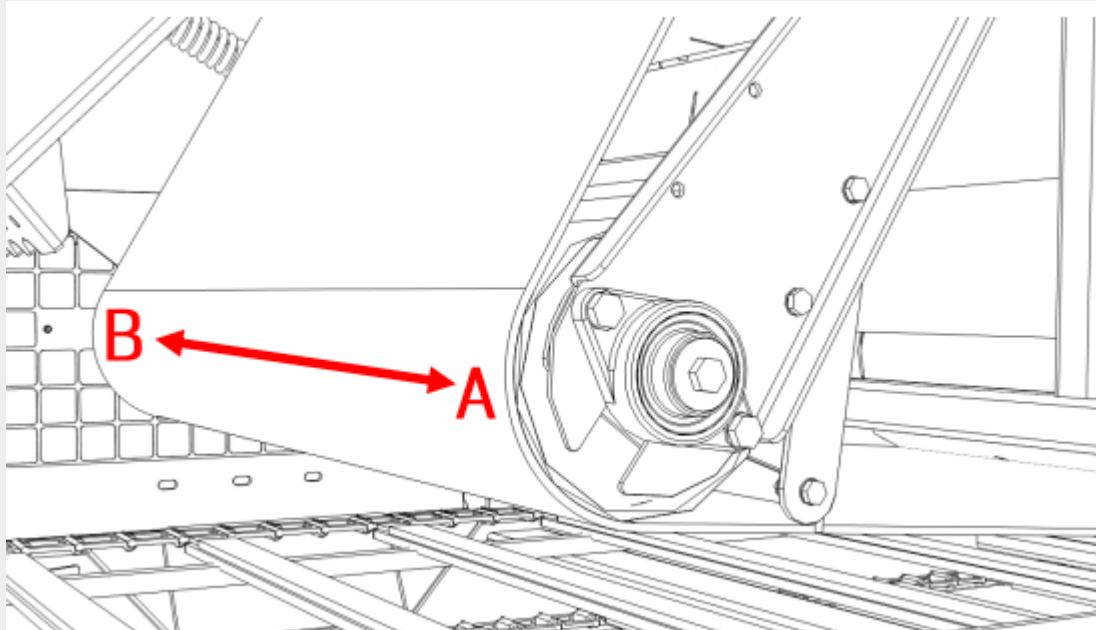


Figure 7.12 : Tension roller

By increasing the distance C, the belt tracking will go towards B [Figure 7.12]. When decreasing the distance C, the belt tracking will go towards A.

If the belt still goes towards one of the sides, this operation must be carried out on the left side bearings, but in reverse order. If reducing the distance C, the belt tracking will enter towards B.

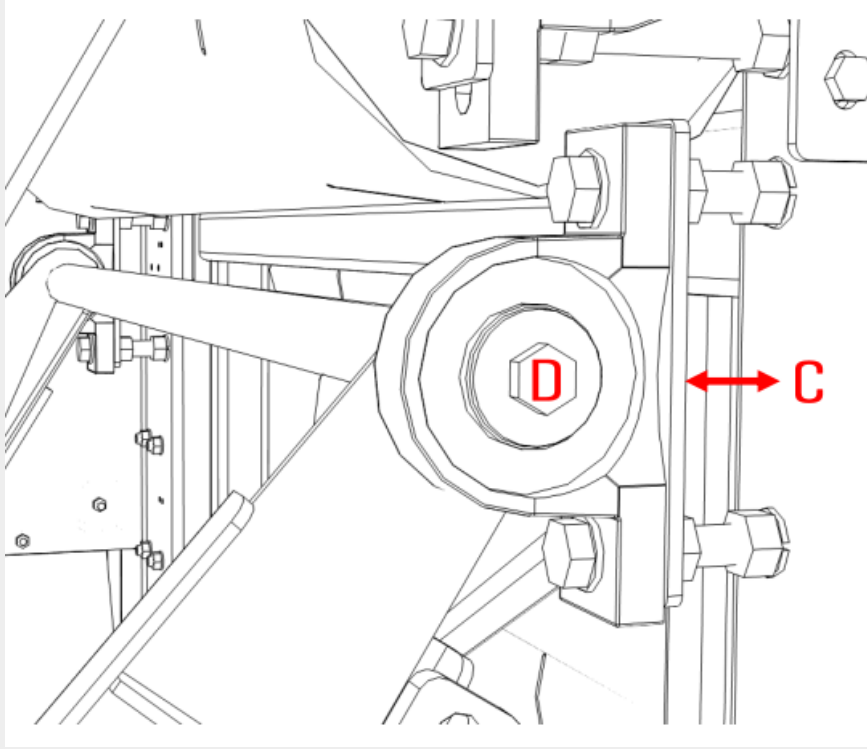


Figure 7.13 : Bearing point [D], tension roller

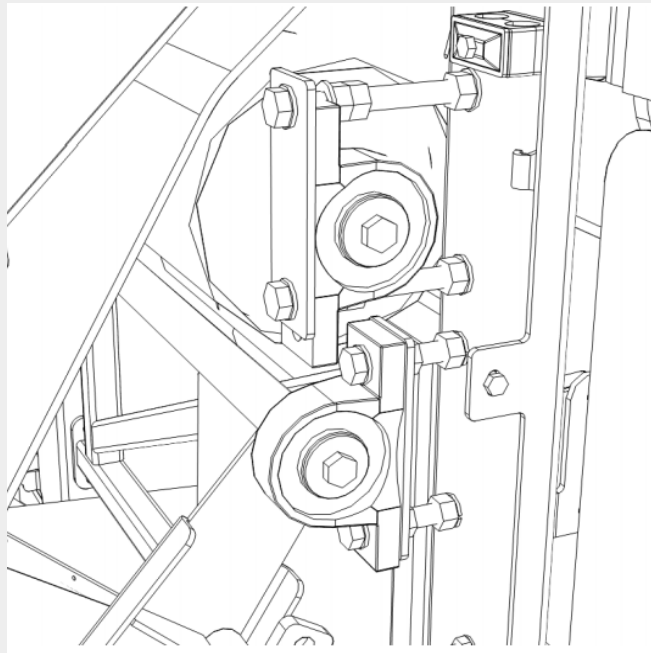
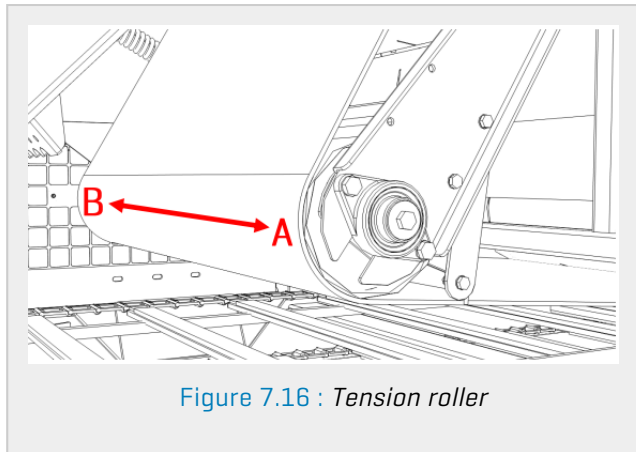
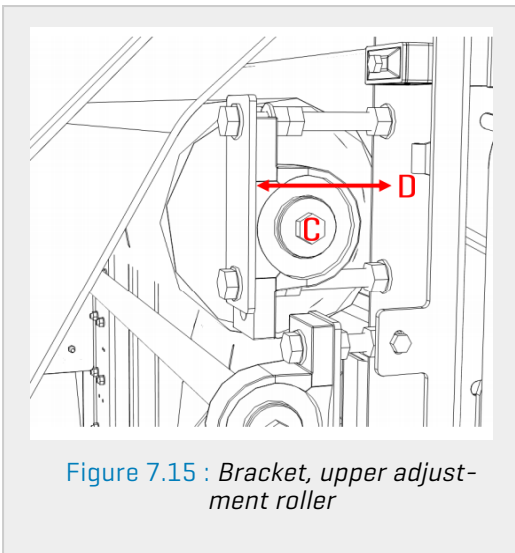


Figure 7.14 : Adjusting brackets, rear chamber belt

Upper adjustment roller C

Prior to this adjustment it's very important to ensure that the machine is levelled.

Adjusting the belt tracking is performed by changing the distance D on the roller C (Figure 7.15). Preferably on the right side bracket.



By increasing the distance **D**, the belt will go towards **A** (Figure 7.16) in the chamber. If decreasing the distance the belt will go towards **B** (Figure 7.16) in the chamber.

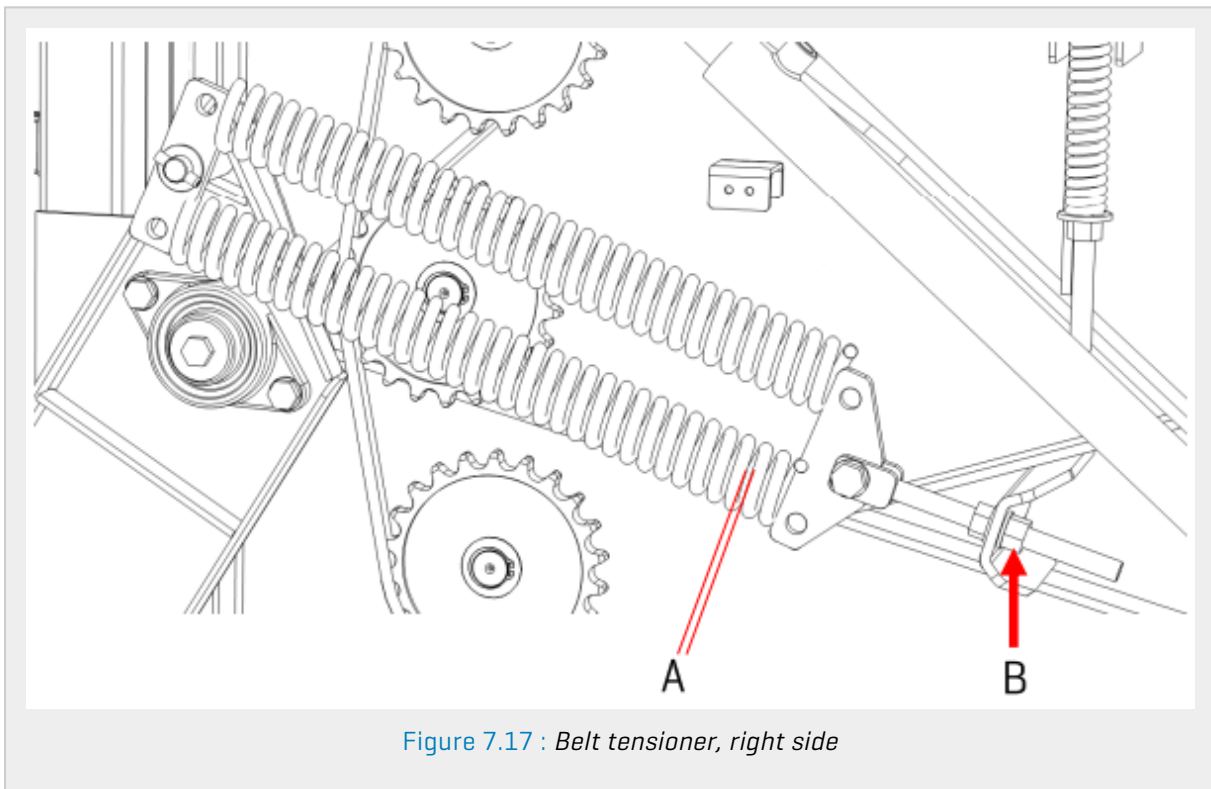
If the tracking of the belt still goes towards one of the sides, this operation must be carried out on the left side, but in reverse order.

If increasing the distance **D** (Figure 7.15), the belt tracking will enter towards **B** (Figure 7.16).

The belt must run freely between the chamber walls.

7.7.4 Adjusting the chamber belt tensioner

The tension of the belts is under the influence of the force from the twin springs on both sides of the chamber.




Basic settings:

Turn the nut **B**, until there's a clearance **A** of 1 mm between the coils (Figure 7.17).

NOTE: When pressing very light and dry materials, such as hay and wooden chips, the material might have some problems to start rotating. If such problem occurs, the clearance must be reduced. $A = 0 - 1\text{mm}$.

7.7.5 Replacing chamber belt

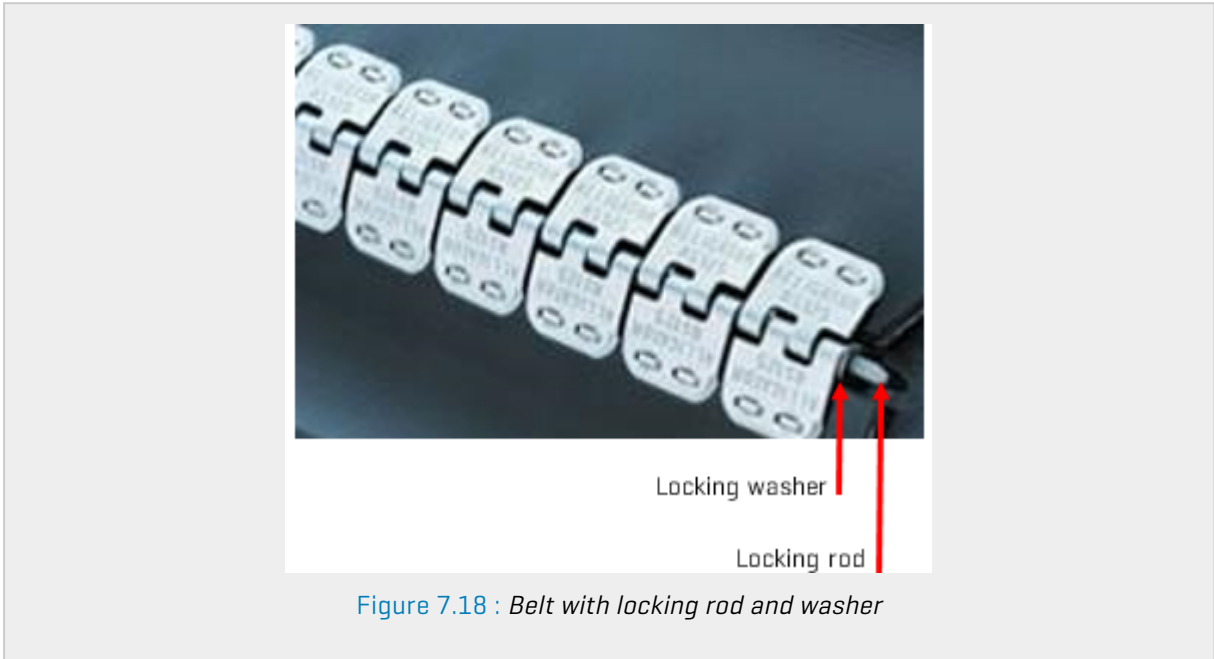
Clean the chamber. Use a high pressure washer.



WARNING

Remember to secure the chamber door lifting cylinders before entering the chamber

Remove the damaged belt using a knife and cut the belt crosswise. Be observant of the rotation direction. Hook the new belt to the old one and use the chamber motor to pull the belt into place. Use caution when using the chamber motor. De-tension the belt before replacing belts. Fit the new belt and insert the locking rod as shown. Secure the locking rod by mounting the two washers, one on each side [Figure 7.18].



7.8 PLASTIC TYING UNIT

The tying unit, containing wide film or net is located on top of the chamber.

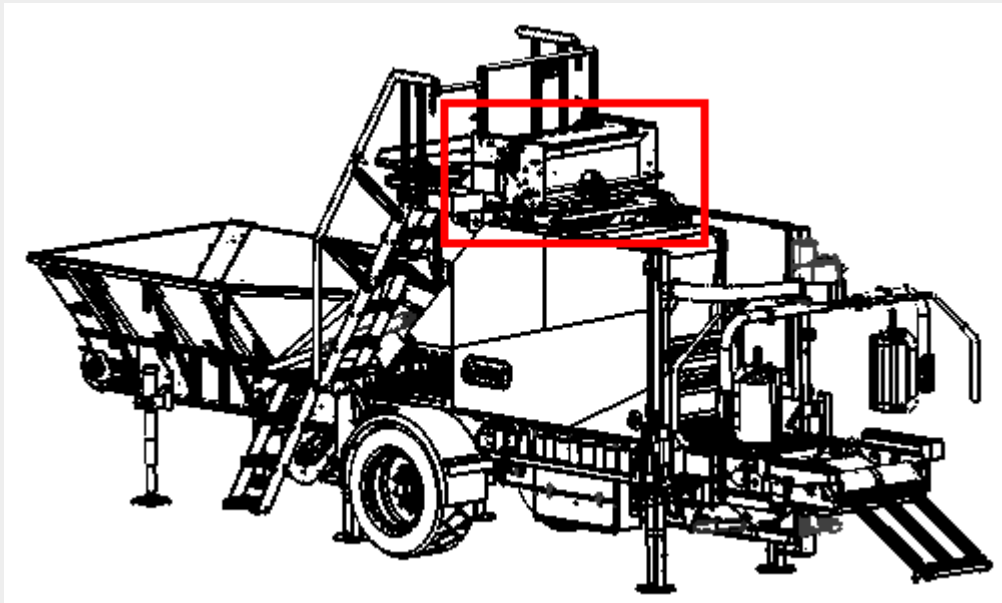


Figure 7.19 : Plastic tying unit, location

7.8.1 Control and maintenance

1. Clean and lubricate the slides for feed rollers.
2. Check the chain tension and the chain condition.[SeeFigure 7.20] Adjust the tension by loosening the bolt and turn the nylon eccentric to add more tension to the chain. Then retighten the bolt.
3. Check all movable parts and bearings in the tying unit.
4. Check the condition of the hydraulic hoses and couplings. Examine the unit for any leakages.
5. Control the free wheel function [feed rollers].

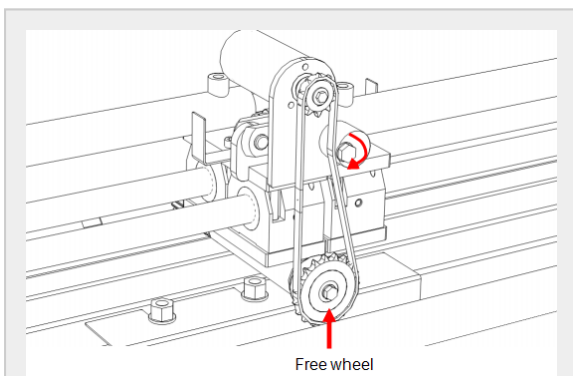


Figure 7.20 : Free wheel, seen from wrapping table

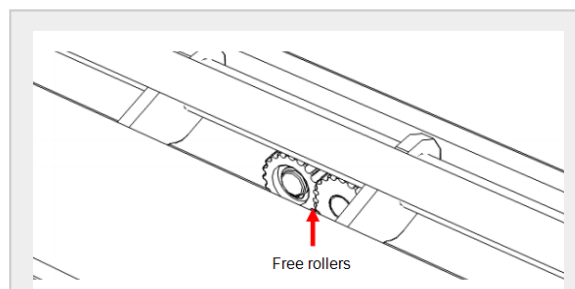


Figure 7.21 : Feed rollers, seen from operator's platform

7.9 WRAPPING TABLE

7.9.1 Inspection

Check the function of both emergency stop handles. Tighten the hinge bolts so that the handles barely returns to the start position. If the hinge bolts are too loose, the emergency stop handles may be triggered unnecessary. Also check that the wrapping film crosses the film cutter in the center of the knife bed. See Figure 7.23.

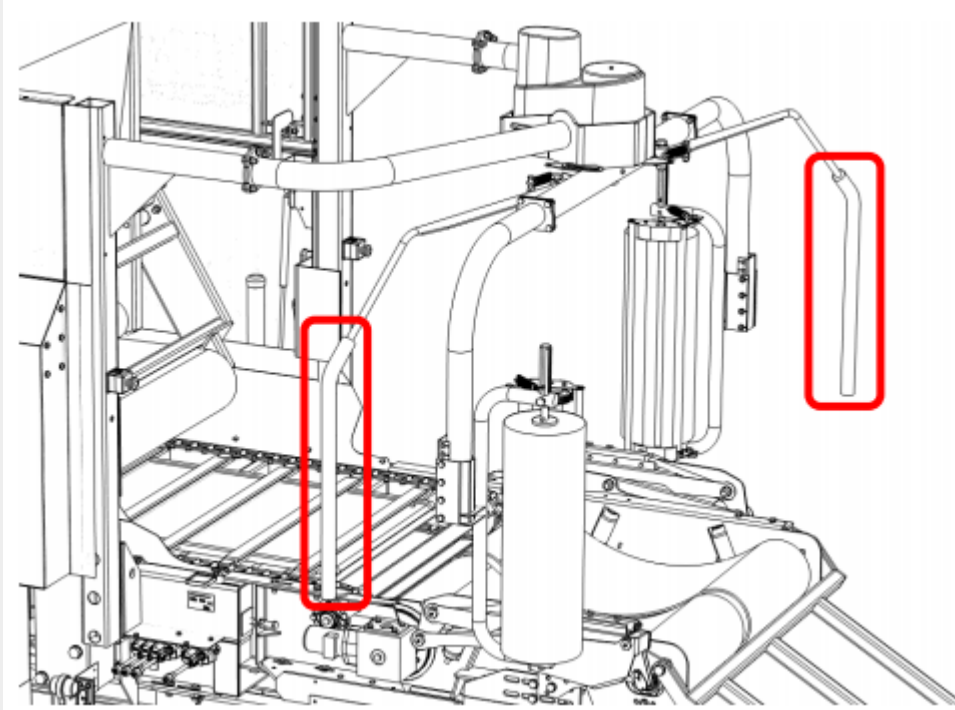


Figure 7.22 : Wrapping table, emergency stop handles

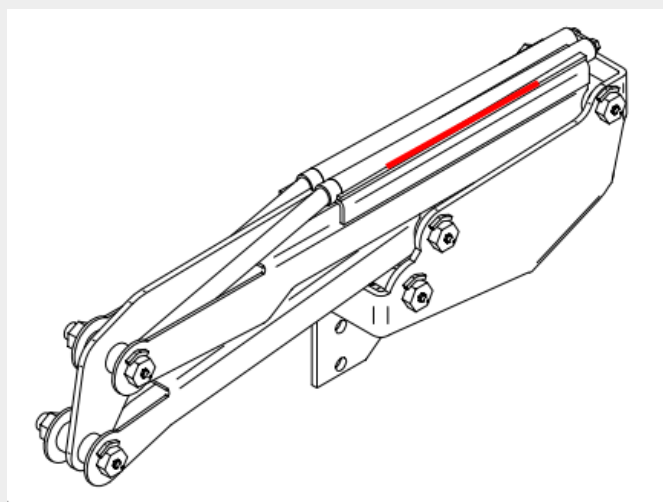


Figure 7.23 : Knife bed

7.9.2 Adjusting the wrapping table belt

The tension of the wrapping table belt must be adjusted as shown in [Figure 7.24](#).

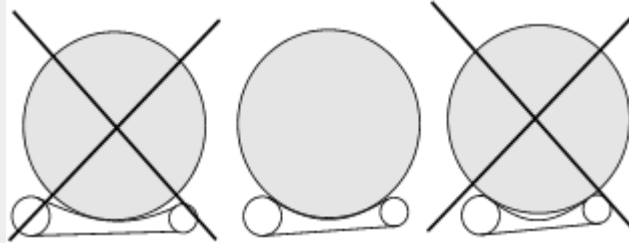


Figure 7.24 : Correct belt tension, wrapping table

The belt tension can be changed by relocating the roller. There are six alternative holes to mount the roller support [Figure 7.25]

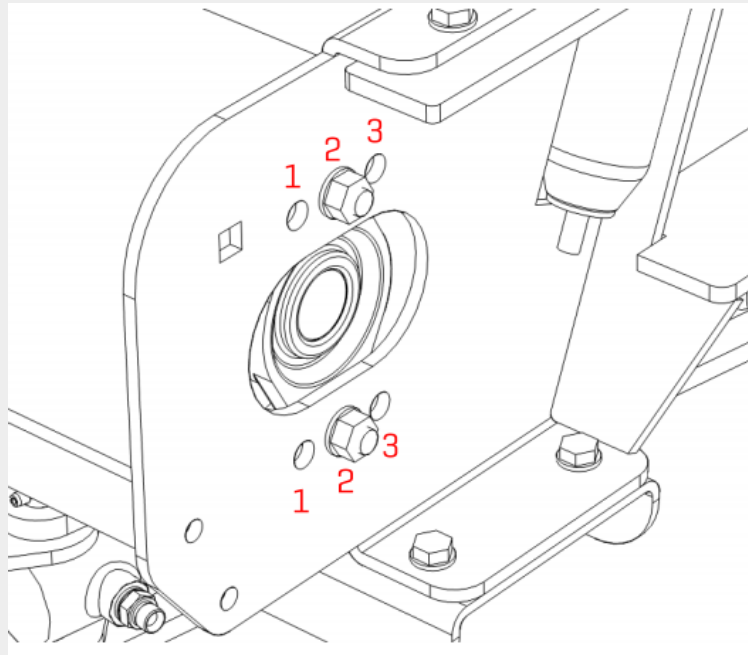


Figure 7.25 : Holes for roller support

Loosen the upper bolt to allow some movement on the bearing housing. Dismount the lower bolt and pull the roller to a suitable position. Insert the bolt in a suitable hole. Both sides must be equally mounted.

If the belt tracking is incorrect, try to change location [side] of the belts.

7.10 FRAME, DRAWBAR, ATTACHMENTS

7.10.1 Frame

IMPORTANT: Check the welding for cracks or deformations once a month.

7.10.2 Main components, fastening points

Check all major bolt connections and re-tighten if necessary.

- Drawbar—frame
- Drawbar—eye
- Chamber—frame
- Feed hopper—frame
- Elevator—frame

Pay extra attention to the bolts fixing the draw bar and eye. [574 Nm]

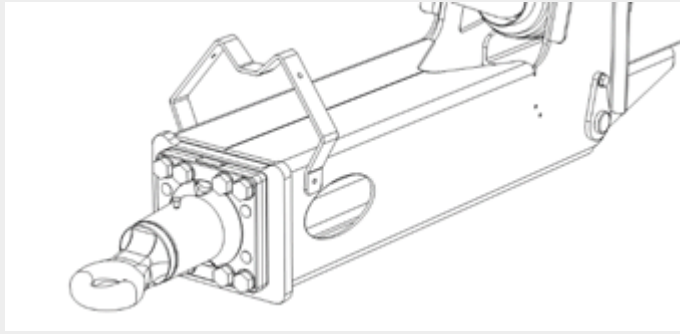


Figure 7.26 : Fixing bolts for drawbar eye

7.11 CHAMBER ROLLER BUSHINGS

IMPORTANT: The bushings must be controlled every 5000 bales produced, or when 1000 hours of operation are reached. Whatever comes first.

IMPORTANT: The distributed load to the bearings will not be even, and therefore the wear is not evenly distributed inside the bearing.

7.11.1 Wear inspection

A quick control of the degree of wear [clearance] might be done with a crowbar and a dial gauge. If no excessive wear is found, there's no need for further dismantling of the bushings.



Figure 7.27 : Check for play in the bushings. Red markings indicate areas on the bushings.

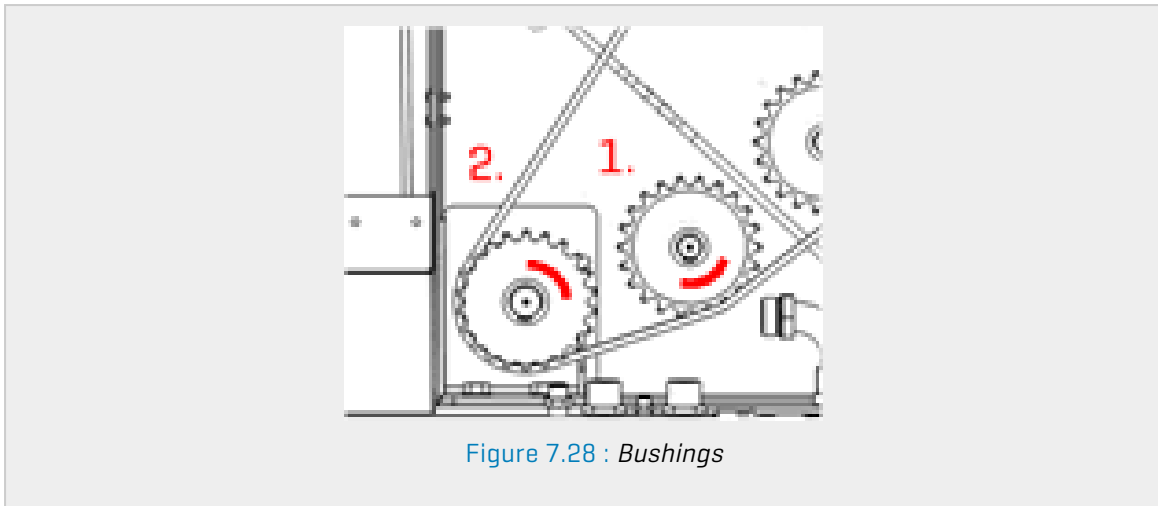
There are two typical conditions of a worn out bushing, depending on where the bushing is located on the machine. Read the description and see [Figure 7.27](#).

1. Bale pressure

This is the most typical condition. These bushings are worn the most when the chamber is «full», and the bale pressure forces the rollers outwards. Thus the most wear on the bushings will be on the outer side.

2. Drive chain

This condition occurs on the bushings that are affected by the drive chain direction. A turning point is shown in Figure 7.28. The wear is also influenced by the chamber pressure. But not as excessive as for condition 1. Thus the most wear in these conditions are located on the opposite side of the chain contact side.



Inspection

Use a crowbar and inspect each bushing from multiple angles. The worn out areas might be located at different positions according to how the machine has been used, and which material has been baled.

7.11.2 Permissible wear

Small type, 40 mm

New bearing: 40 mm inside diameter, 44mm outside diameter.

Defect bearing: $\geq 42,2$ mm inside diameter.

Measure the diameter several places to get the correct impression of the bearing ovality.

Large type, 50 mm

New bearing: 50 mm inside diameter, 55 mm outside diameter

Defect bearing: $\geq 52,7$ mm inside diameter.

Measure the diameter several places to get the correct impression of the bearing ovality. The material thickness in bearings must under no circumstances be $\leq 0,2$ mm. **If so, the bearing is defect and must be replaced immediately.** The reason is to avoid serious damage to the rollers axle, and potential mechanical breakdown.



NOTE: Good practice is to change the bearings before reaching the maximum degree of wear.

7.11.3 Remove sprockets

The sprockets are fastened to the axle with an eccentric connection. Follow this procedure to loosen the sprockets.

1. Make an indication mark across both the sprocket and axle (red line) that indicates movement between the axle and the sprocket.
2. Set a solid steel bar on one of the sprocket teeth, and hit it with a hammer [opposite of the sprocket working direction].
3. Remove the sprocket, when the indication mark has shifted.

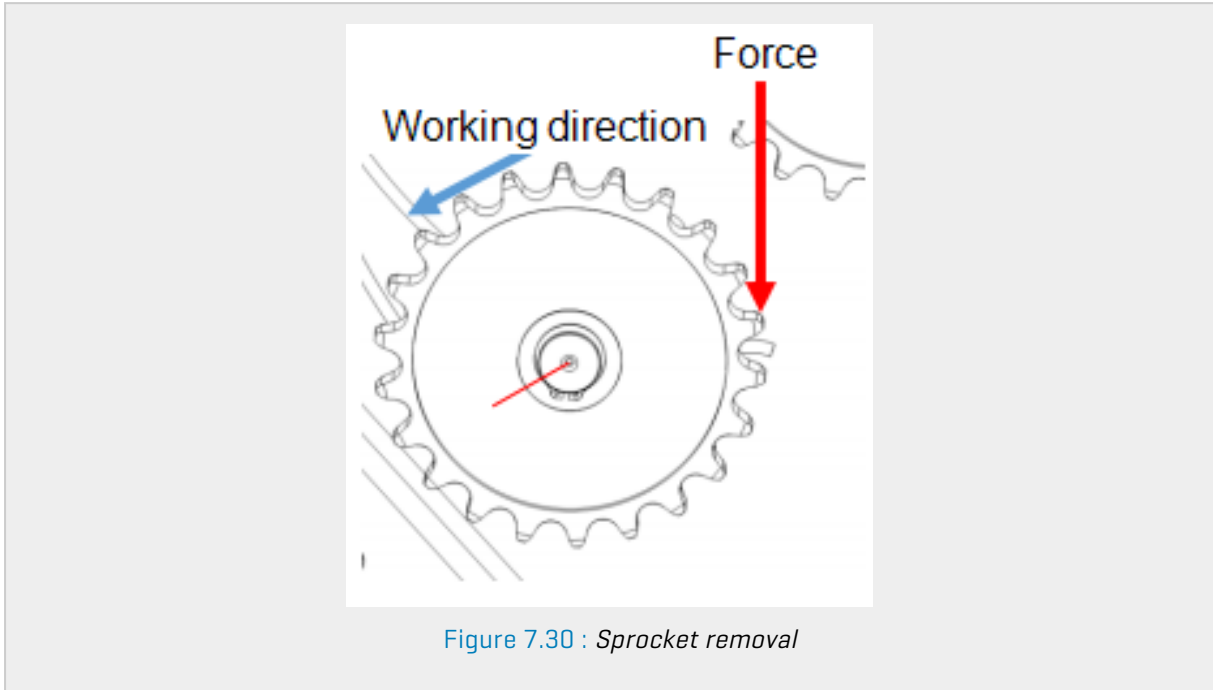


Figure 7.30 : Sprocket removal

7.12 HYDRAULICS

7.12.1 Hydraulics oil

The oil level is monitored by the control unit. An alarm stating “oil level - low” is displayed in the control unit. Top up if necessary. The oil level can also be visually checked through an oil glass placed in/on the oil tank.

Check the oil-condition: Minimum once a year.

Change oil: Minimum every third year. See specifications in [section 8.6.1 "Hydraulics"](#)

Oil-filter: 3 pcs, must be changed minimum once a year and after the first 50 hours of operation (break-in period).

7.12.2 Hoses and connections

Check the hydraulic system for any leakages, and that no hoses are rubbing against sharp edges on the machine.

NOTE: The hydraulic hoses have a limited life time. We recommend to change the hydraulic hoses every six years.

7.12.3 Hydraulic pump, gearbox

Check the input shaft and its splines. Check the bolts holding the gearbox, and retighten if necessary. Check the oil level in gearbox, with the dipstick.



Figure 7.31 : Dipstick with max and min level indicators

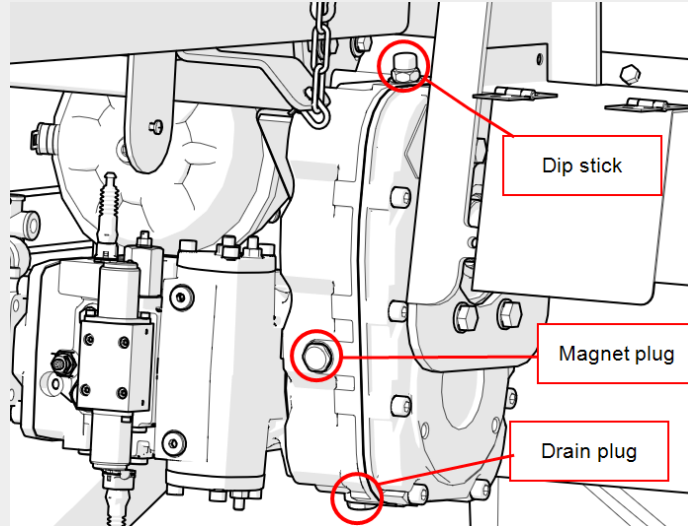


Figure 7.32 : Gear box and hydraulic pump

The oil level must be between max and min on the level indicator. Top up if necessary.

The gear oil must be changed minimum once a year, or when needed. See approved lubricants in [section 8.6.4 "Gearbox and gears for hydraulic motors"](#)

NOTE: When changing gear oil, the magnet plug must be cleaned. Inspect the amount of metal shavings on the magnetic plug. If there's a lot of shavings present, it's indicating excessive wear in the gear box.

7.12.4 Heat exchanger

Perform daily inspections of the cooling element on the heat exchanger. Look for dirt and other unwanted contamination. Clean if necessary.

7.13 OIL CHANGE AND OIL FILTER



Hydraulic oil is injurious to your health. Avoid contaminating bare skin. Avoid inhaling oil mist or vapor. Take environmental considerations, collect the old oil and recycle.



Oils can be hot.



Some pressure can remain in the hydraulic system/hoses/pipes, even though the machine is shut down.

IMPORTANT: Always change filters when changing the hydraulic oil!

7.13.1 Changing oil and filter

Hydraulic oil

1. Heat the oil up to about 30°C.
2. Slightly tilt the compactor towards the drain plug. The plug is placed on the underside of the tank.
3. Shut down the machine and disconnect the PTO.
4. Place an empty container beneath the drain hole.
5. Remove the drain plug.
6. Drain until empty. Approximately 130 L of oil.
7. Clean up the oil spill.
8. Reinsert the drain plug [replace sealing if necessary].
9. Change the oil filter according to the "Filter"-procedure below.
10. Drain the oil and remove the oil filter on the collector according to the "Collector and cooler"-procedure.
11. Refill. A sticker on the oil tank indicates the applied oil type.
12. Check the oil level.
13. Run the compactor for a while, top up if necessary.
14. Dispose with the old oil according to environmental regulations.

Collector and cooler

1. Place an empty container beneath the drain hole.
2. Remove the drain plug.
3. Drain until empty. Approximately 10 L of oil.
4. Clean up the oil spill.
5. Reinsert the drain plug [replace sealing if necessary].
6. Change the oil filter according to the "Filter"-procedure.

Changing filter

1. Locate the desired filter to be replaced.
2. Place an empty container beneath the filter insert.
3. Remove the filter.
4. Drain until empty.
5. Clean the oil spill.
6. Mount the new filter.
7. Dispose with the old filter according to environmental regulations.

IMPORTANT: Always use original parts when changing filter.

Changing gear oil

For main gear, feed hopper, elevator and wrapping table:

1. Place an empty container beneath the drain hole.
2. Remove the drain plug.
3. Drain until empty.
4. Clean the plug.
5. Clean up the oil spill.
6. Reinsert the plug [replace sealing if necessary].
7. Refill with Shell Omala S2 220.
8. Check the oil level.

Sub-conveyor gear

1. Remove the gear from the compactor.
2. Rotate [drain plug down].
3. Place an empty container beneath the drain hole.
4. Remove the drain plug.
5. Drain until empty.
6. Clean the magnetic plug.
7. Mount the gear in its original position.
8. Refill with Shell Omala S2 220.
9. Reinsert the plug.

7.14 WELDING AND GRINDING

DISCLAIMER: Changes made to the frame may invalidate warranty and homologation standards. By doing so you may forfeit warranty claims. Any changes to the frame or machine should be avoided if possible.

All welding, drilling and other work done on the frame, must be carried out with great caution.

7.14.1 Precautions when welding

IMPORTANT: The control unit must be disconnected before welding.

Place the ground connector as close to the welding point as possible. Observe excessive temperatures.

NOTE: After grinding/cutting/welding, repaint the areas in order to avoid corrosion.



Always use goggles, gloves, and suitable working clothes.



Always keep a fire extinguisher available.

7.15 SERVICE HISTORY

We recommend to fill in all service/maintenance work in this table

| Date/year | Service/maintenance/major repair | Performed by; Name/company |
|-----------|----------------------------------|----------------------------|
| | | |

| Date/year | Service/maintenance/major repair | Performed by; Name/company |
|-----------|----------------------------------|----------------------------|
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8 Lubrication

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8.1 LUBRICATION SYSTEM, BEKA MAX EP 1

The compactor is equipped with a fully automatic lubrication system. It lubricates the chamber roller bushings [grease] and the chains [oil].

8.1.1 Oil lubrication, mode of operation

A single piston pump driven by the hydraulic pressure, supplies oil to the chains through brushes which are mounted on strategic locations. Each time the chamber door opens, the piston is activated and supplies a fixed amount of oil to the chains.

8.1.2 Grease lubrication, mode of operation

An electrical motor runs an eccentric disc. The eccentric disc drives two single working pistons which push a fixed amount of grease through a pressure relief valve, and further on to a main distributor. The main distributor supplies grease to sub-distributors, which deliver the correct amount of grease to each bearing.

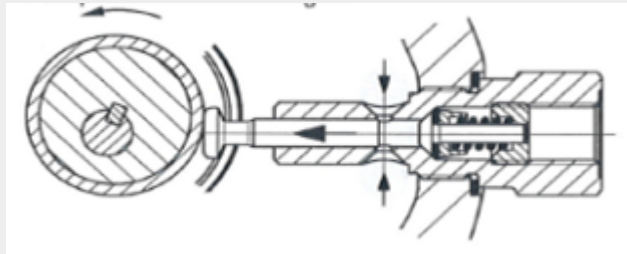


Figure 8.1 : Pump element, suction phase

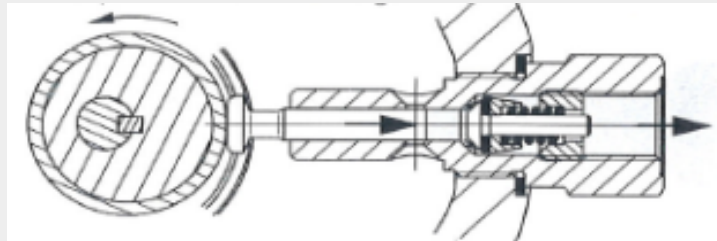


Figure 8.2 : Pump element, pressure phase

The grease lubrication system is a progressive system. It operates all types of grease of NLGI kl. 2 type. See recommended lubricants in [section 8.6.3 "Greasing"](#).

A progressive lubrication system, means that all the bearings are lubricated one by one. This progressive system makes the lubrication system easily monitored through a high pressure relief valve (nr.9, [section 8.1.3 "Beka max grease lubrication system"](#)). If a lubrication line to a bearing is clogged, the pressure will increase [**280 bar**] and visible grease appears on the relief valve.

Please check the pressure relief valve on a regular basis. If visual grease is present, a line or a distributor is clogged. Another malfunction could be that a line is broken, but then there's no visual grease on the relief valve.

NOTE: New machine: In the first weeks of operation, the system must be checked frequently. Check that there's a visual grease collar on all lubrication points. This indicates all the bearings are being lubricated. Keep track of the grease consumption. Be aware if the daily grease consumption changes. This might indicate that something is wrong.

8.1.3 Beka max grease lubrication system

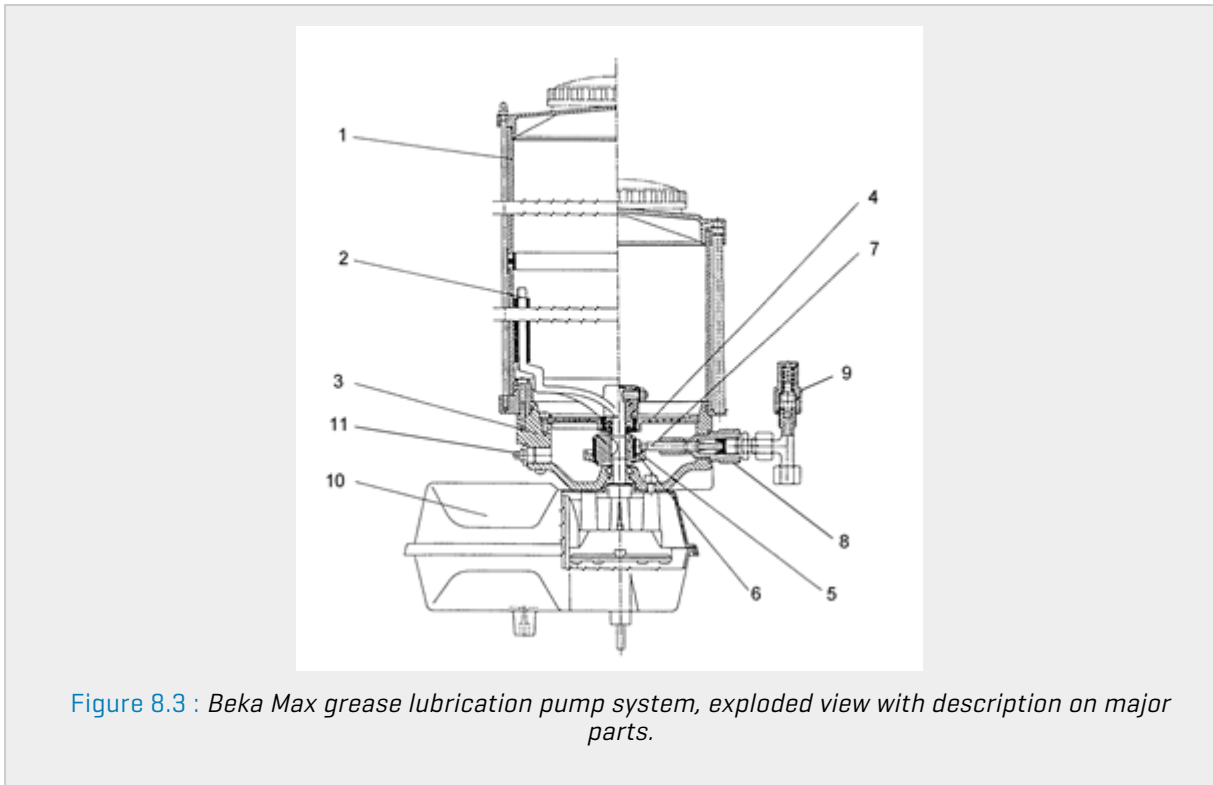


Figure 8.3 : Beka Max grease lubrication pump system, exploded view with description on major parts.

- | | |
|---------------------------|--------------------------------|
| 1. Reservoir, transparent | 7. Delivery piston |
| 2. Stirrer scrape | 8. Non return valve |
| 3. Suction area, pump | 9. Pressure relief valve |
| 4. Screen | 10. Motor [24V DC] |
| 5. Eccentric cam | 11. Refill nipple, male sleeve |
| 6. Pressure ring | |

NOTE: The plain bearings on chamber rollers are under huge stress and force during operation. It is of great importance that the lubrication system is in good working order.

IMPORTANT: Do not operate the compactor without a proper functioning lubrication system.

NOTE: This lubrication system has a grease level monitor that shut down the machine if the grease level is too low.

8.2 REFILLING LUBRICANTS

Make sure the level of lubricants is always between maximum and minimum in the reservoir (oil and grease). Check the level on a daily basis, before start-up.

8.2.1 Refilling the oil reservoir

The grease lubrication system is sensitive to the influence of external contamination, such as dust and dirt. Keep the cap on and refill through the male sleeve nipple (no. 11, [section 8.1.3 "Beka max grease lubrication system"](#)) when refilling grease.

NOTE: Always keep the reservoir, male sleeve nipple and pump clean.

NOTE: We recommend that you purchase grease in larger containers. Pails of 20 litres/16kg's in combination with air or electrical operated tools for refilling. Standard grease gun with 0,5 litres cartridges might also be used.

A grease gun for cartridges, with special nipple might be ordered as an option. Part number: 58086

8.2.2 Adjusting the amount of grease

The grease lubrication system is set to a maximum delivery of 0,29cm³/rev. However one of the pumps is adjustable [PE120V].

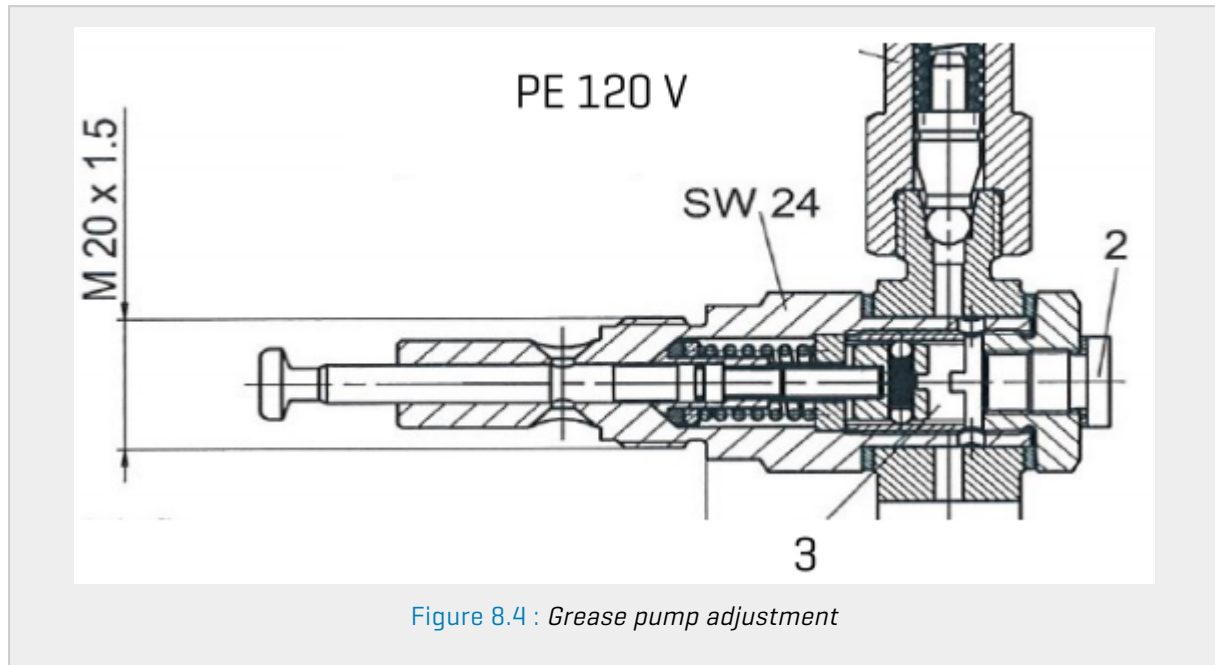


Figure 8.4 : Grease pump adjustment

Remove plug [item 2, Figure 8.4] to get access to adjusting screw [3]. By turning the screw clockwise, the amount is reduced. 1/2 turn on the adjusting screw reduces the grease added by 0,013cm³. Please contact Orkel Compaction if you have any questions.

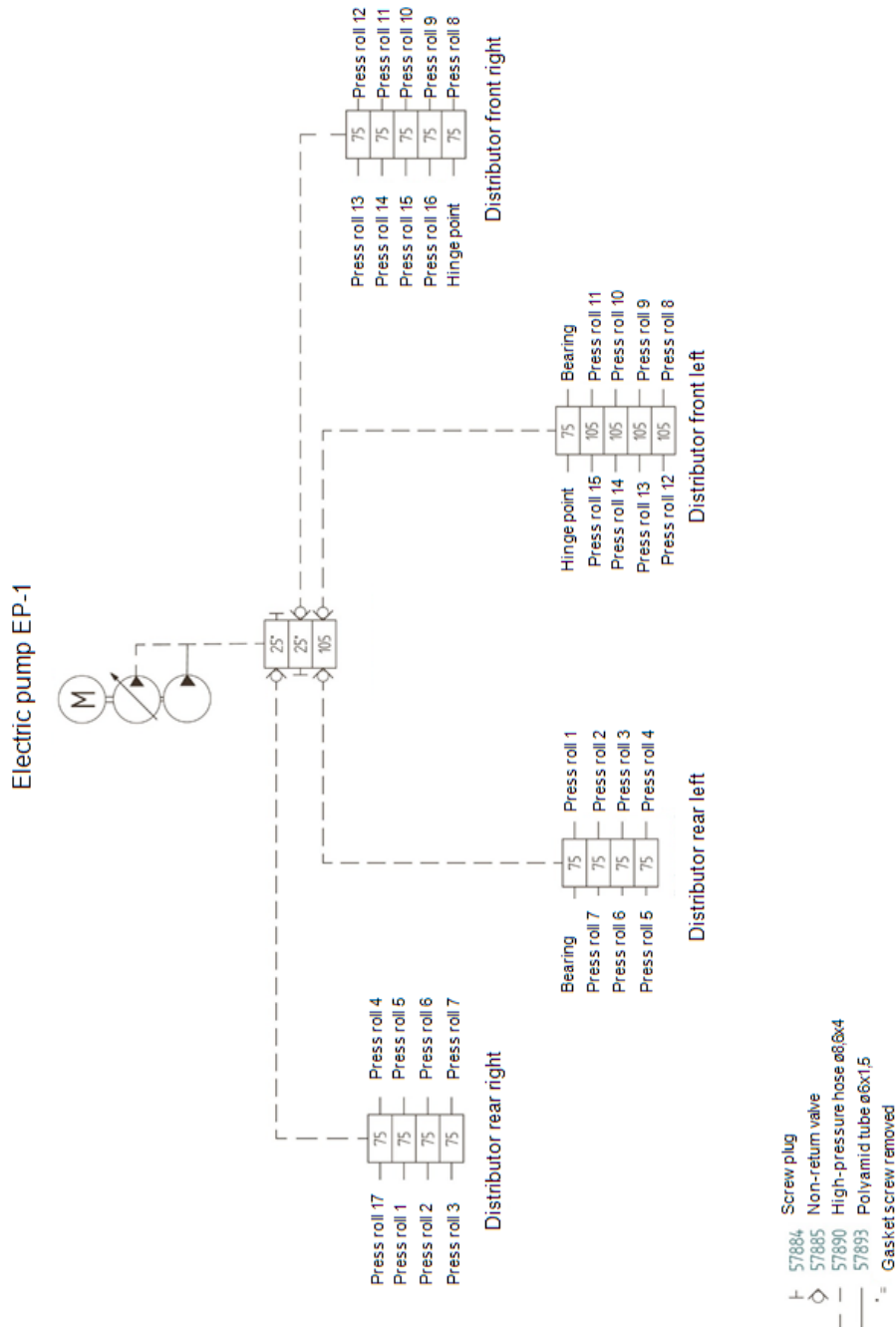
It is also possible to regulate the grease amount for the control unit. Adjustable from 100% down to 40%.

8.2.3 Bleeding the grease system

If the level in the reservoir is too low, it can be necessary to bleed the system after refilling.

1. Disconnect the plastic tube, mounted under the pressure relief valve on the pump.
2. Activate the function greaser in the control box, until there is a smooth and constant flow from the outlet.
3. Reconnect the plastic tube to its original position.
4. Activate the function greaser from the control box once more [the pump will run as long as the button on the control box is activated].
5. Disconnect the tube from the first distributor block and activate the pump until you have a constant flow from this outlet.

8.3 ELECTRIC PUMP AND MAIN DISTRIBUTOR



8.4 TROUBLESHOOTING FOR BEKA MAX

| Problems | Cause | Remedy |
|---|--|---|
| Pump does not work | Fuse defective Problem with the power supply Problem with pump motor | Replace fuse Replace electrical cable Replace pump motor NOTE: Correct motor mounting |
| Pump is working but does not supply grease | Air pocket in pump Level in reservoir is too low Pump element not building up pressure (no air pocket) | Bleed the pump Refill the reservoir Replace the pump element |
| No grease collar at all points of lubrication | Pump does not work Clogging somewhere in the system | Refer to pump not working above. See if grease is present on pressure relief valve |

| Problems | Cause | Remedy |
|---------------------------------------|---|---|
| No grease collar on multiple bearings | A primary hose between main distributor and sub distributor is broken Leakage in fittings | Replace hoses Retighten fittings or replace |
| No grease collar on one bearing | The hose serving the bearing is defective Leakage in the fitting | Replace hose Retighten fittings or replace |
| Reduced pump speed | High pressure in the system Low ambient temperature | Conduct a complete system check Run greaser manually for one minute (1 or 2 times) to lubricate the system. Then restart machine and verify that the greasing system operates as intended. |
| Grease on pressure relief valve | System pressure too high Main distributor clogged or system clogged Valve relief spring defective | Check the system Replace the distributor Repair clogged bearing (housing) Replace valve |

8.5 OIL TEMPERATURE

ISO-VG system [International Standardization Organization - Viscosity Grade]

ISO standard 3448 splits industrial lubricants in ISO-VG classes. The standard tells which viscosity is good for different temperatures. Lowest ISO-class equals thinnest oil.

NOTE: The temperature limitations is depending on the applied oil type.

8.6 APPROVED LUBRICANTS

8.6.1 Hydraulics

Recommended:

Titan Utto WB

8.6.2 Chain lubrication

Chain lubrication: Titan Utto WB

8.6.3 Greasing

Greasing: Use grease grade NLGI 2 with high pressure additives EP [Extreme pressure]
Shell GADUS S3 V220C 2

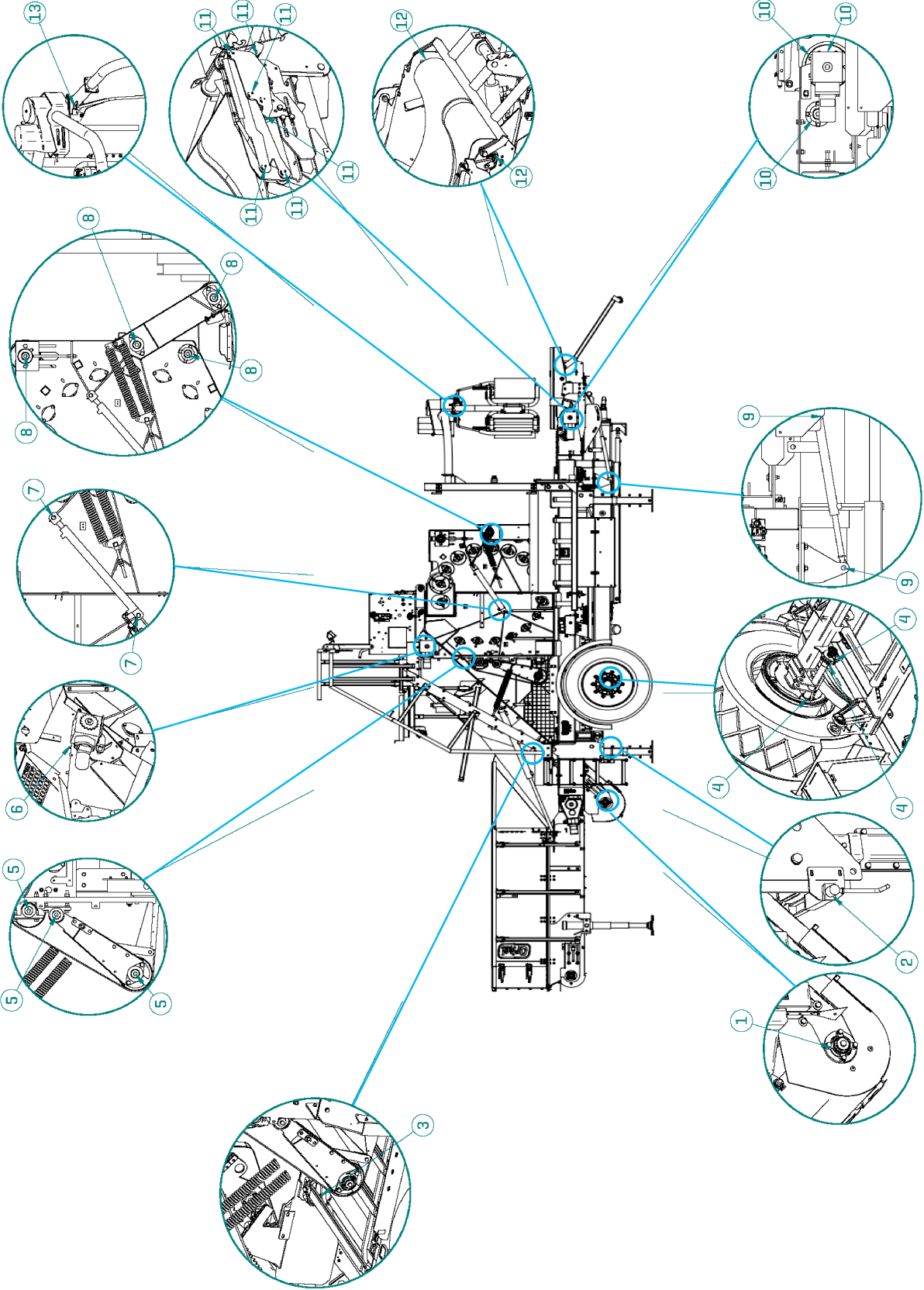
Recommended grease: Statoil seaway CAH 92
UNO X Multifak EP 2

8.6.4 Gearbox and gears for hydraulic motors

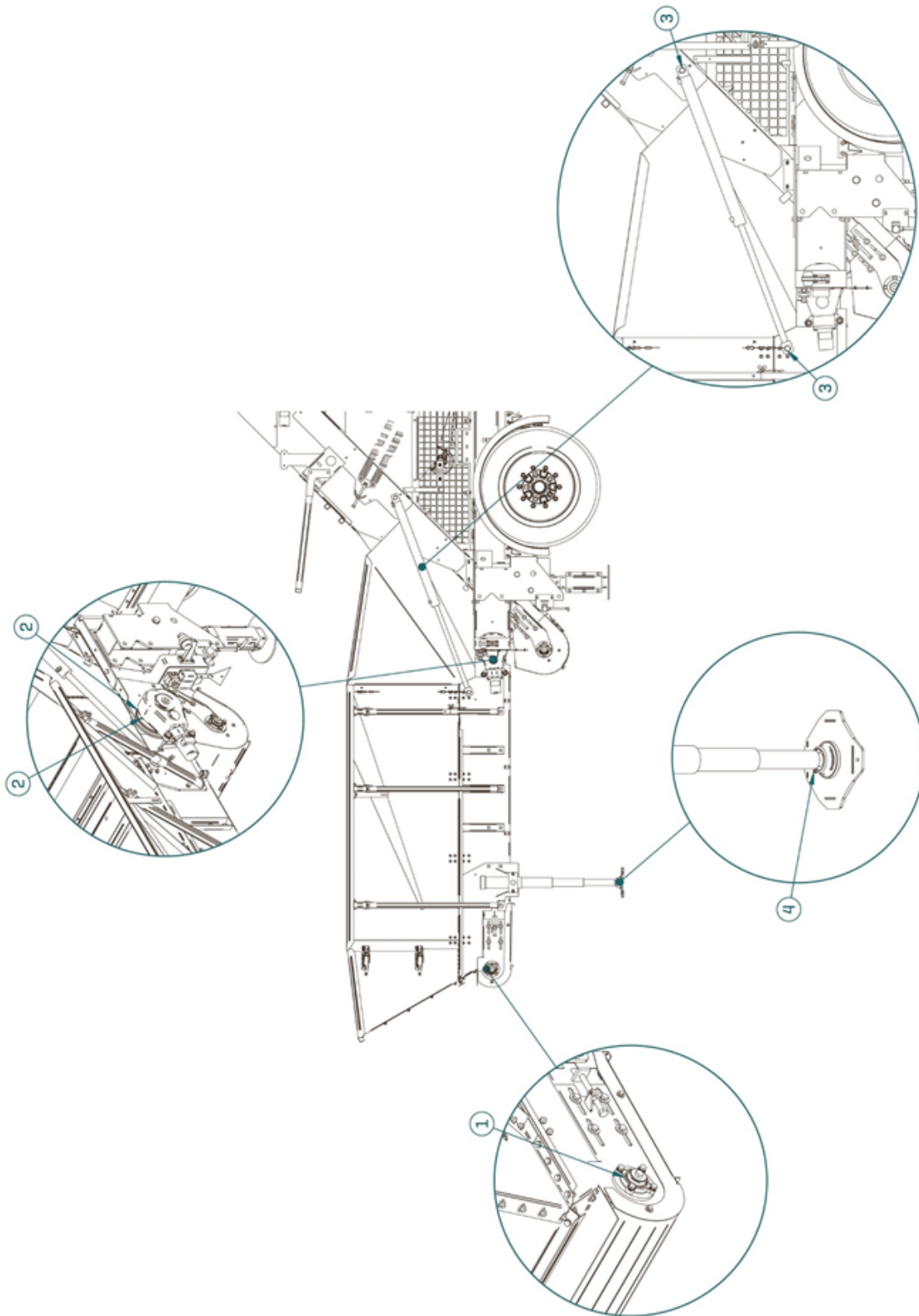
Gear oil: Renolin unisyn CLP 220N

8.7 MANUAL LUBRICATION CHARTS

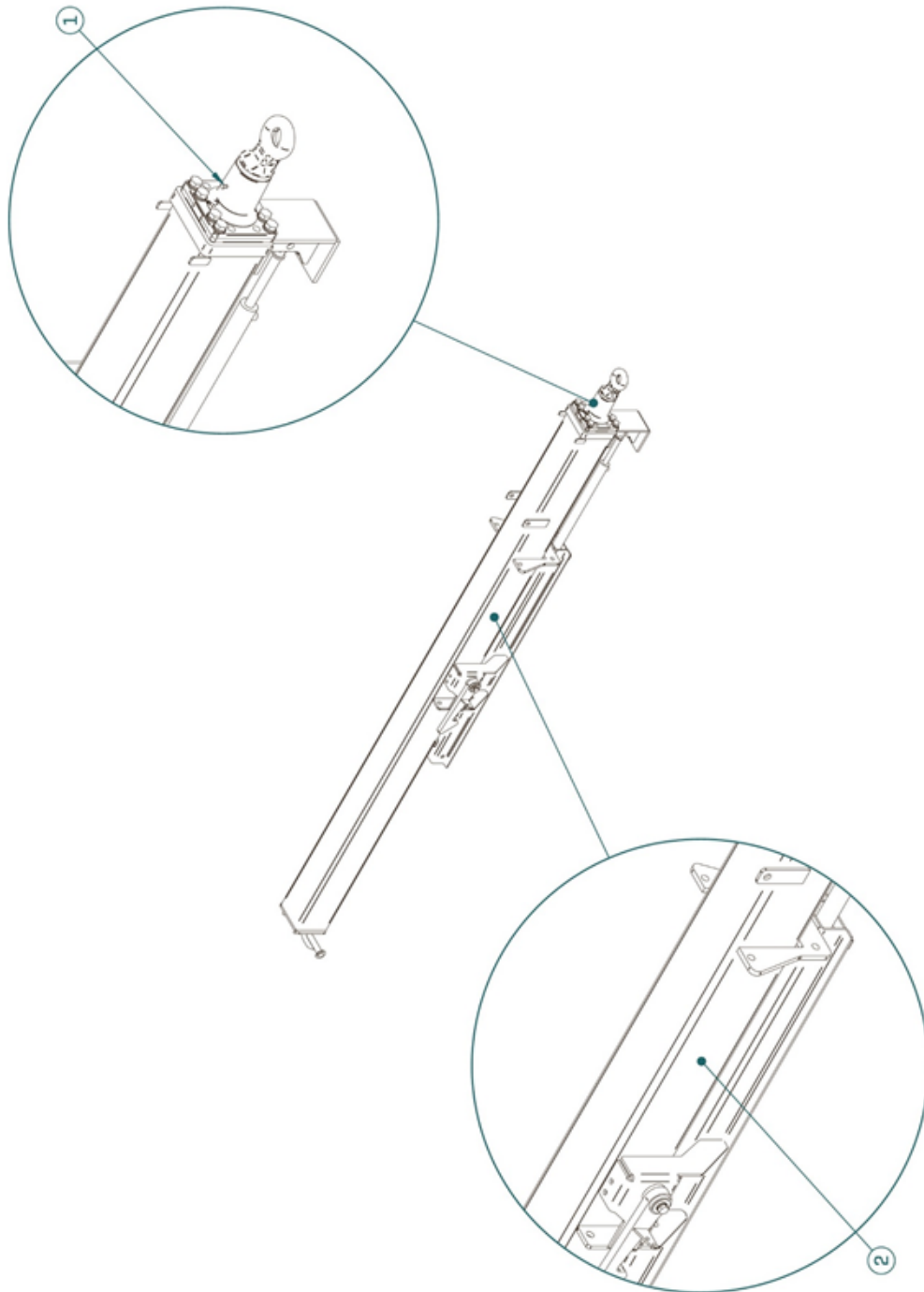
8.7.1 The compactor



8.7.2 Feed hopper



8.7.3 Telescopic drawbar



8.8 LUBRICATION LIST - MANUAL GREASING POINTS

MC1000:

| No: | Description: | Qty on each side: | Location: | Total | Intervall |
|-----|-------------------------------------|-------------------|----------------|-------|-----------|
| 1 | Elevator, lower | 1 | Left and right | 2 | D |
| 2 | Handbrake | 1 | Right | 1 | M |
| 3 | Sub conveyor, elevator side | 1 | Left and right | 2 | W |
| 4 | Brake shaft, support | 3 | Left and right | 6 | M |
| 5 | Under elevator, bearings on rollers | 3 | Left and right | 6 | W |
| 6 | Elevator, upper | 1 | Left and right | 2 | W |
| 7 | Chamber cylinder | 2 | Left and right | 4 | W |
| 8 | Chamber and bearings on rollers | 4 | Left and right | 8 | W |
| 9 | Cylinder, wrapping table | 2 | Left and right | 4 | W |
| 10 | Wrapping table | 3 | Left and right | 6 | W |
| 11 | Knife arms, wrapping table | 6 | Left and right | 12 | W |
| 12 | Wrapping table, support roller | 1 | Left and right | 2 | W |
| 13 | Emergency stop arm, wrapper | 1 | Left and right | 2 | M |

Feed hopper:

| No: | Description: | Qty on each side: | Location: | Total | Intervall |
|-----|------------------------|-------------------|------------------------|-------|-----------|
| 1 | Cylinder | 2 | Left and right | 2 | M |
| 2 | Bearing | 1 | Left and right | 4 | W |
| 3 | Hinge point right side | 1 | Right | 4 | M |
| 4 | Telescopic leg | 2 | Left, right and middle | 2 | M |

Telescopic drawbar:

| No: | Description: | Qty on each side: | Location: | Total | Intervall |
|-----|--------------|-------------------|----------------|-------|-----------|
| 1 | Cylinder | 1 | | 1 | W |
| 2 | Bearing | 1 | Left and right | 2 | W |

9 Preservation

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9.1 CLEANING

9.1.1 Using high pressure washer

The compactor can be cleaned with a high pressure washer. Avoid directing the beam towards any electrical connections and components.

| |
|---|
| IMPORTANT: Use hearing protection when cleaning the compactor with a high pressure washer. |
|---|

9.2 STORAGE

A thorough cleaning and a complete lubrication is recommended prior to long term storage. The control unit must be kept warm and dry to ensure functionality. The control unit may be detached from the compactor and stored inside during the storage period. Touch-up paint is recommended to avoid corrosion.

9.2.1 Long time storage

If you're using grease of NLGI class 2 with EP additives [extreme pressure] there's no need for special precautions to be made regarding long time or winter storage. Perform a complete lubrication service on the machine before storage. If you're using a grease type according to lubrication standards, but not having the anti-corrosion effect, the system must be filled up with anti-corrosive oil. Regular motor oil is sufficient.

9.2.2 Oil filling in the grease lubrication storage

This operation is easily done with an empty grease gun filled up with motor oil. Remove the piston and the coil spring in the gun. Insert an empty grease cartridge and fill the grease gun while holding it vertically. Attach the gun at the inlet on the main distributor and empty the gun into the system [1/2 litre].

10 Electrics

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10.1 INPUTS AND OUTPUTS SORTED BY TYPE

10.1.1 Inductive sensors

| Inductive sensors | | | | | | |
|-------------------|----------------------------|--------|-------|--------|--------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| S03 | Table middle position | KR3-3 | | KR1-3 | KR5-3 | |
| S05 | Wrapping arm home position | KR3-4 | | KR1-4 | KR5-5 | |
| S09 | Wrapping arm stop | KR3-9 | | KR1-9 | KR5-9 | |
| S10 | Table lower position | KR3-10 | | KR1-10 | KR5-10 | |
| S11 | Table upper position | KR3-4 | | KR1-4 | KR5-11 | |
| S12 | Film sensor 1 | KR3-4 | | KR1-4 | KR5-12 | |
| S15 | Film sensor 2 | KR3-15 | | KR1-15 | KR5-15 | |
| S17 | Chamber dampening | KR4-17 | | KR2-17 | KR6-17 | |
| S18 | Chamber opened | KR4-18 | | KR2-18 | KR6-18 | |
| S19 | Chamber closed | KR4-19 | | KR2-19 | KR6-19 | |
| S20 | Feed rollers opened | KR4-20 | | KR2-20 | KR6-20 | |
| S22 | Feed rollers closed | KR4-22 | | KR2-22 | KR6-22 | |
| S31 | Net knife closed | KR4-31 | | KR2-31 | KR6-31 | |
| S32 | Chamber speed | KR4-32 | | KR2-32 | KR6-32 | |

10.1.2 Ultrasonic Digital sensors

| Ultrasonic Digital sensors | | | | | | |
|----------------------------|---------------|--------|-------|--------|--------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| S01 | Bale on table | KR3-4 | | KR1-4 | KR5-1 | |
| S21 | Feedhopper | KR4-21 | | KR2-21 | KR6-21 | |

10.1.3 Pressure sensors

| Pressure sensors | | | | | | |
|------------------|------------------|--------|--------|-------|-------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| S30 | Chamber pressure | KR4-30 | KR6-30 | | | |

10.1.4 Level and high temp/switch

| Level and high temp/switch combined in housing | | | | | | |
|--|-------------------------|--------|--------|--------|--------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| S26 | High temperature switch | | | KR4-25 | KR6-26 | |
| S27 | Low level switch | KR4-25 | KR6-27 | | | |

10.1.5 Emergency stop switches

| Emergency stop switches | | | | | | |
|-------------------------|--------------------------------|--------|--------|-------|-------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| S7,S23 | 5 switches connected in series | KR17-1 | KR4-29 | | | |

10.1.6 Simulate bale on table switch

| Simulate bale on table switch | | | | | | |
|-------------------------------|----------------------|-------|-------|-------|-------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| Bosch switch | Momentary switch, NO | KR3-2 | KR5-1 | | | |

10.1.7 Safety switch

| Safety switch | | | | | | |
|---------------|--------------------------|-------|-------|-------|-------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| S08 | 2 switches in series. NC | | | | KR3-4 | KR5-8 |

10.1.8 Grease pump

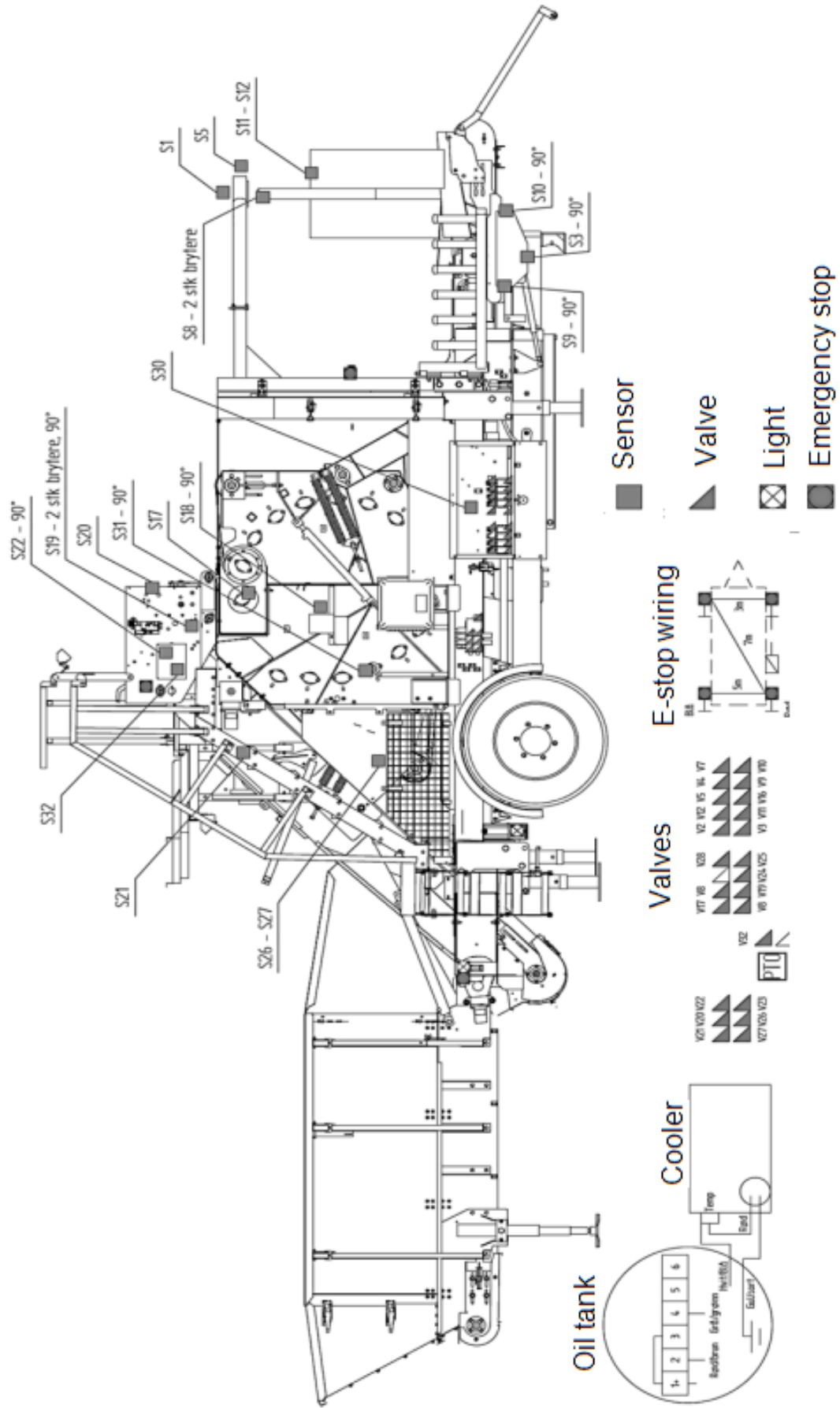
| Electrical grease pump | | | | | | |
|------------------------|------------------------|--------|--------|-------|-------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| G1 | Electrical grease pump | KR18-2 | KR23-6 | | | |

10.1.9 Valves

| Directional valves, globe valves, proportional valves | | | | | | |
|---|--------------------|--------|--------|-------|-------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| V02 | Chamber open | KR13-2 | KR15-2 | | | |
| V03 | Chamber close | KR13-3 | KR15-3 | | | |
| V04 | Wrapper bypass off | KR13-4 | KR15-4 | | | |

| Directional valves, globe valves, proportional valves | | | | | | |
|---|------------------------|---------|---------|-------|-------|-------|
| ID | Description | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| V05 | Table UP | KR13-5 | KR15-5 | | | |
| V06 | Table DOWN | KR13-6 | KR15-6 | | | |
| V07 | Run wrapping table | KR13-7 | KR15-7 | | | |
| V08 | Net knife | KR13-8 | KR15-8 | | | |
| V09 | Wrapping arm slow | KR13-9 | KR15-9 | | | |
| V10 | Wrapping arm fast | KR13-10 | KR15-10 | | | |
| V11 | Film knife open | KR13-11 | KR15-11 | | | |
| V12 | Film knife close | KR13-12 | KR15-12 | | | |
| V17 | Net feed rollers open | KR14-17 | KR16-17 | | | |
| V18 | Net feed rollers close | KR14-18 | KR16-18 | | | |
| V19 | Net feed motor | KR14-19 | KR16-19 | | | |
| V20 | Elevator high speed | KR14-20 | KR16-20 | | | |
| V21 | Elevator low speed | KR14-21 | KR16-21 | | | |
| V22 | Elevator ON | KR14-22 | KR16-22 | | | |
| V23 | Free circulation 2 OFF | KR14-23 | KR16-23 | | | |
| V24 | Belt under ON | KR14-24 | KR16-24 | | | |
| V25 | Feed table ON | KR14-25 | KR16-25 | | | |
| V26 | Belt under low speed | KR14-26 | KR16-26 | | | |
| V27 | Belt under high speed | KR14-27 | KR16-27 | | | |
| V28 | Net tying boost | KR14-28 | KR16-28 | | | |
| V32 | Chamber ON | KR28-7 | KR28-8 | | | |
| V41 | Wrap arm STOP | GND | RL6-87 | | | |

10.2 SENSOR OVERVIEW



10.3 SENSOR LIST AND FUNCTION

| Inputs on controllers for standard system | | | | | |
|---|-------------------------------|-------------------------|---------------------------------|-----------------------|------------------------------------|
| No. | Description | Type | Brand & type | Range | Comment |
| S1 | Bale on table ultra-sound | Digital ultra-sound | Microsonic mic+130/D/TC | 100...2000 mm | Default 70 cm |
| S3 | Table in middle position | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S5 | Wrapping arm in home position | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S7 | E-stop redundancy input | Switch NC | | | |
| S8 | Wrapping arm collision stop | Switch NC | | | |
| S9 | Table in low position | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S10 | Table in high position | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S11 | Wrapper film roller 1 | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S12 | Wrapper film roller 2 | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S17 | Chamber open position | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S18 | Chamber closed position | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S19 | Feed rollers open position | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | 2 sensors in series |
| S20 | Feed rollers closed position | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S21 | Feed table ultrasound sensor | Digital ultra-sound | Microsonic mic+130/D/TC | 100...2000mm | Default 130 cm, NC normally closed |
| S22 | net knife in closed position | Inductive PNP | Pepperl&Fuchs NBB8-18GM50-E2-V1 | 3...8 mm | |
| S26 | High temperature switch | Bi-metal switch | Hemomatik type | | Combined with S27 |
| S27 | Low level switch | Mechanical level switch | HE0300T080 | | Combined with S26 |
| S30 | Chamber pressure | Analogue pressure | | 4 - 20mA, 0...600 bar | |
| S31 | Chamber speed | Inductive PNP [pulse] | | 3...8 mm | |
| S32 | Net/film failure detection | Inductive PNP [pulse] | | 3...8 mm | Optional, but recommended |

10.4 FUSES

A master fuse [40 A] is located on the supply cable from the tractor/power pack. A fuse for lights [15 A] is located in a rubber fuse holder, inside the electrical cabinet.

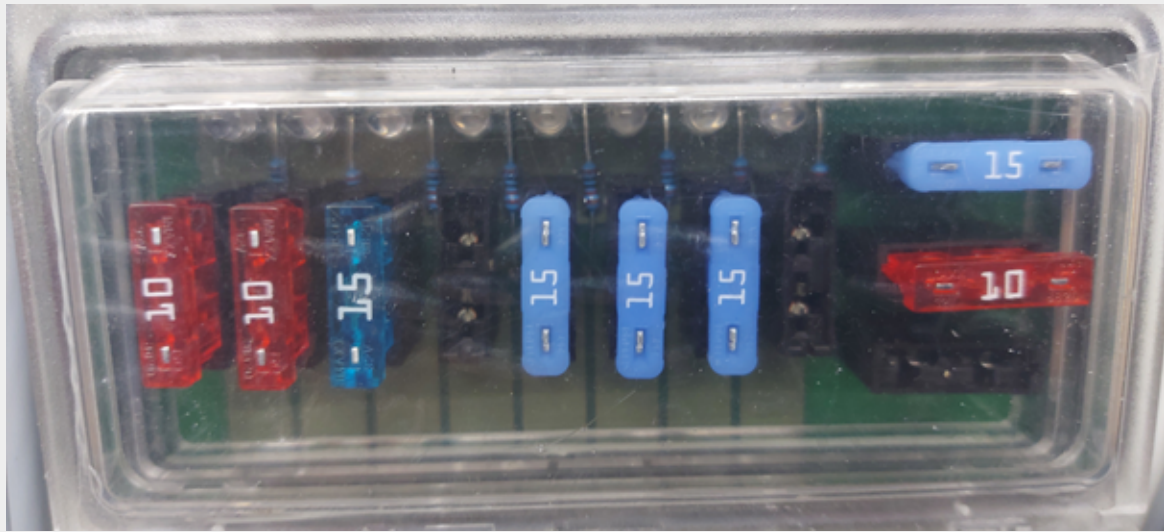


Figure 10.1 : Fuse box

| | | | | | | | | |
|-----|-----|-----|------|-----|-----|-----|------|-------------|
| 1 | 2 | 3 | Free | 5 | 6 | 7 | Free | 9 Spare |
| 10A | 10A | 15A | | 15A | 15A | 15A | | 10 Spare |
| | | | | | | | | 11 Spare |

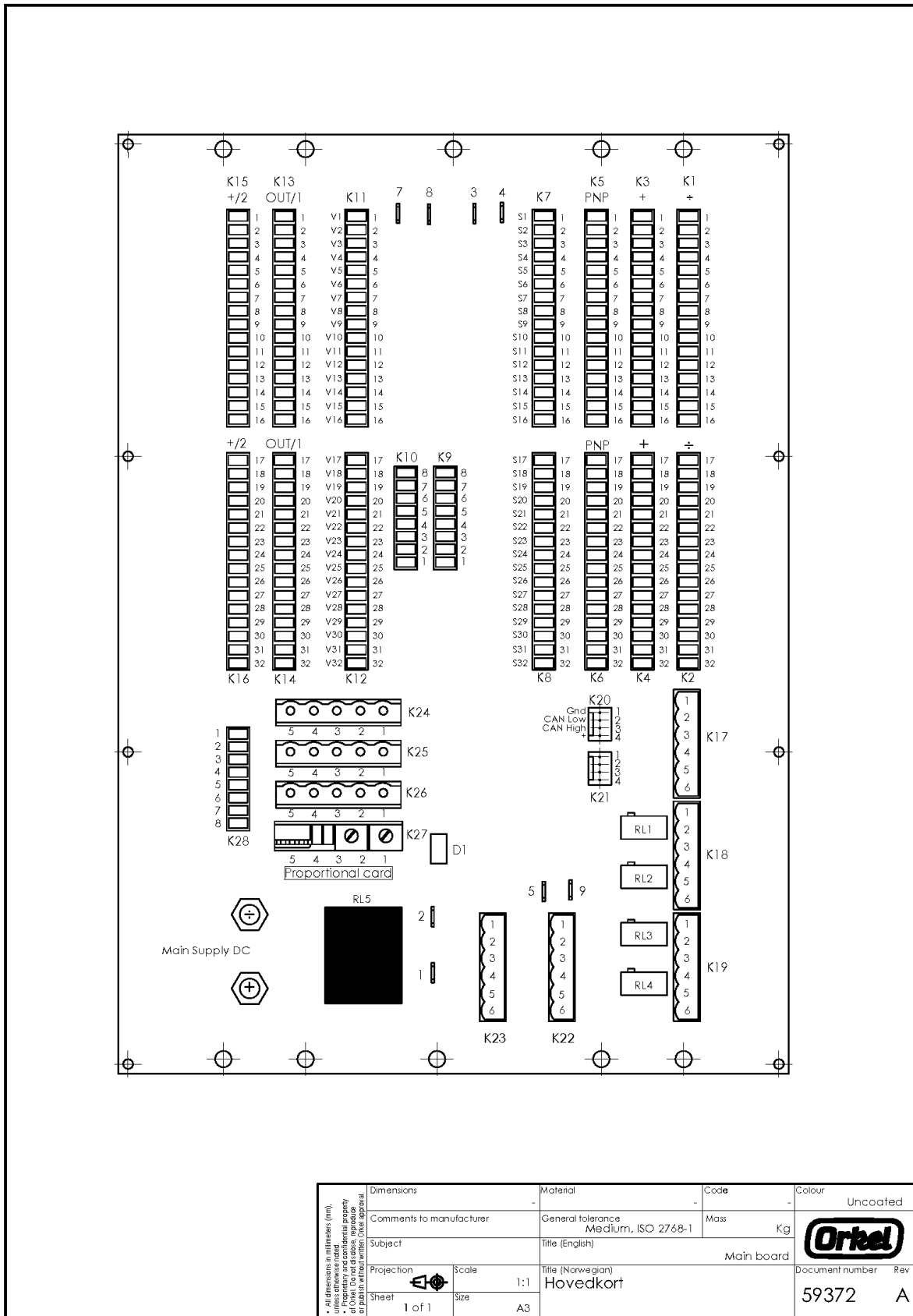
1. Terminal A og B [printed circuit board] 10A
2. Sensors 10A
3. Lubrication system 15A
4. Free 5A [Spare]
5. Hydraulic control V1 - V16 15A
6. Hydraulic control V17 - V32 15A
7. 15A
8. Free

9, 10 and 11. 10A, 15A og 20A [Spare]

10.5 SCHEMATICS

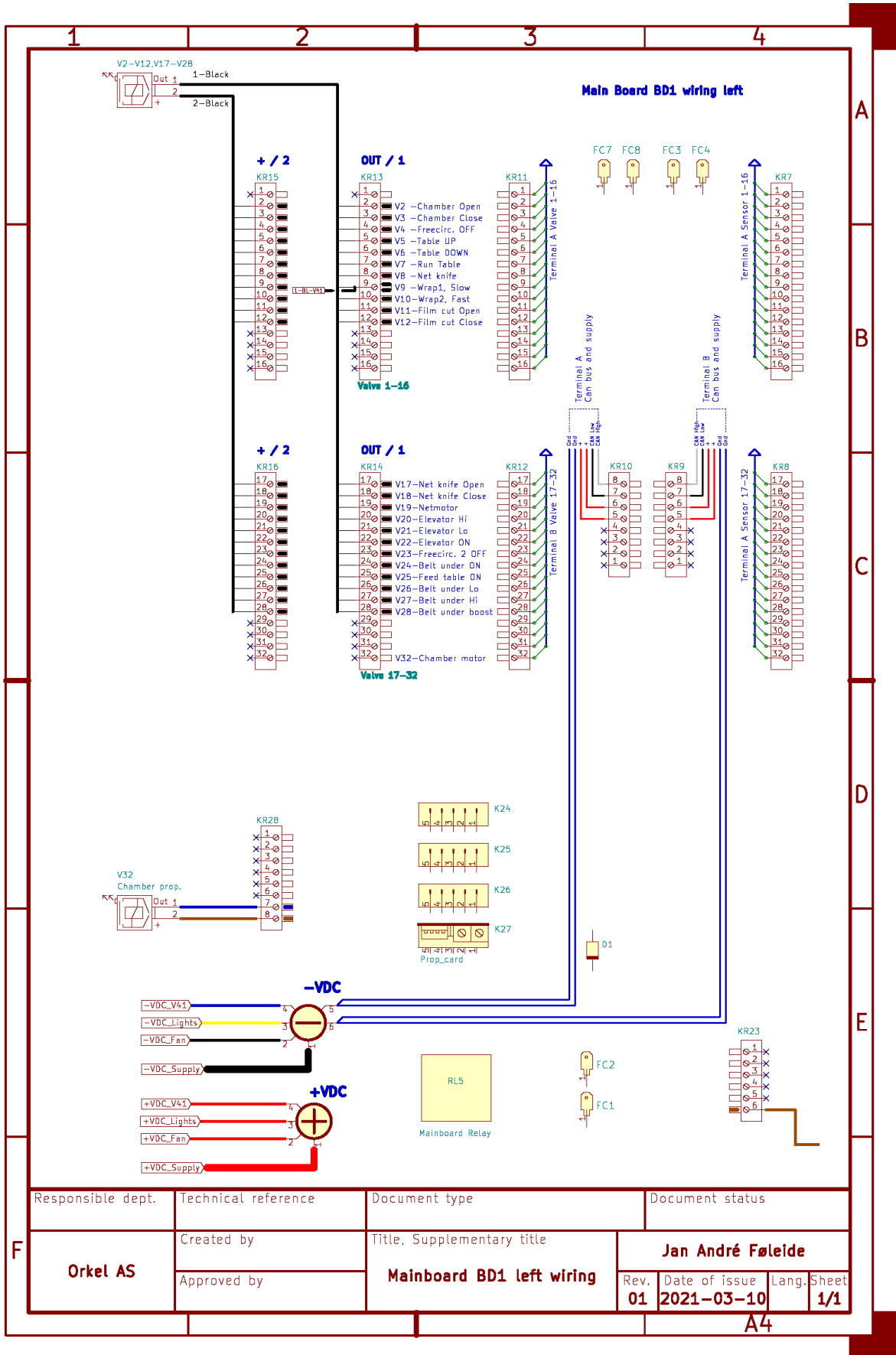
All schematics can be found online at www.orkel.com/qf for higher resolution.

10.5.1 Main board



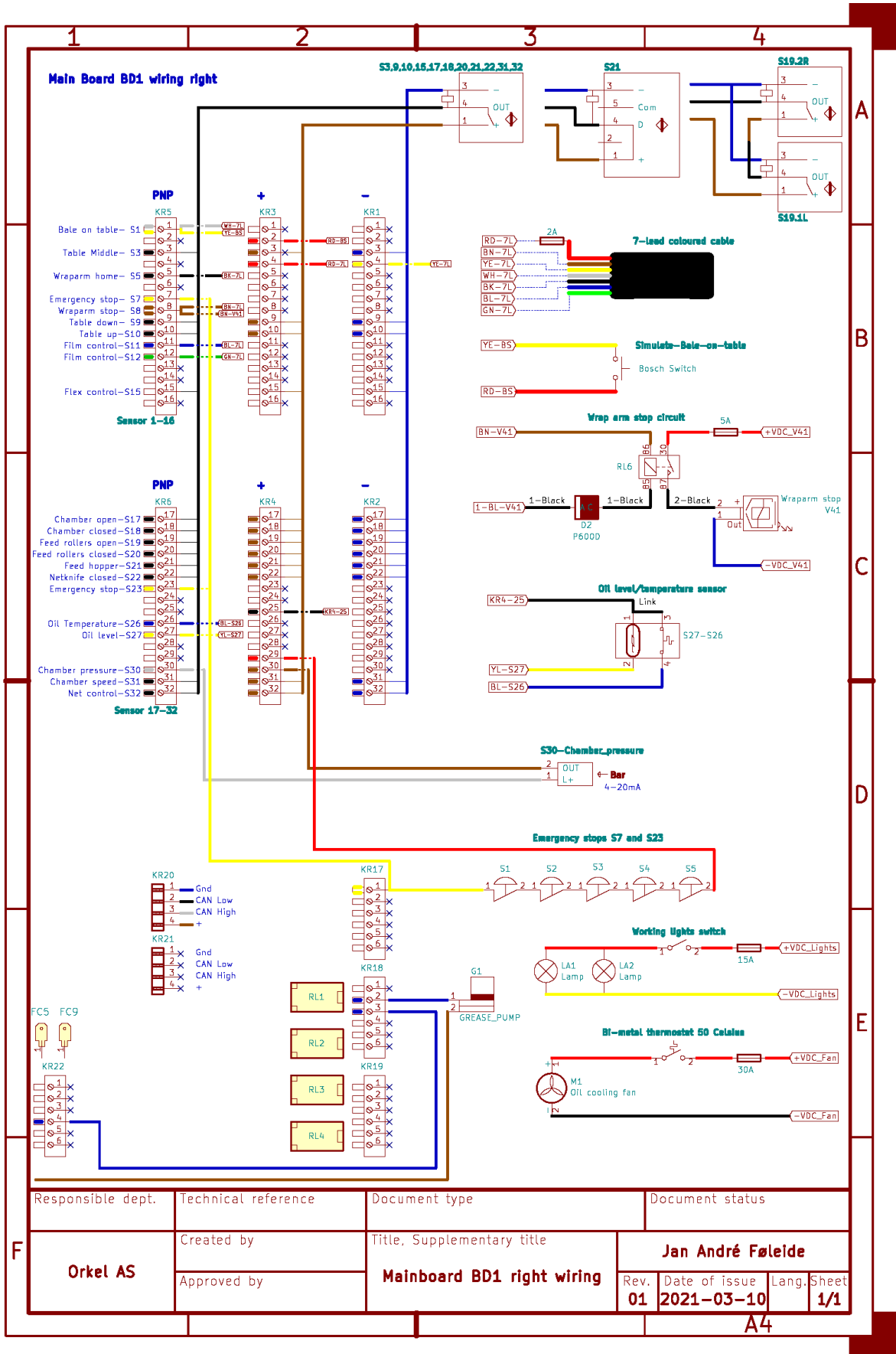
| | | | | | | | | |
|--|--------------------------|--------------------|-----------------|---|-------------------|----|-----------------|----------|
| <small> * All dimensions in millimetres (mm). * Property and confidential property of Orkel. Do not disclose, reproduce or pass on without Orkel's approval. </small> | Dimensions | - | Material | - | Code | - | Colour | Uncoated |
| | Comments to manufacturer | General tolerance | | | Mass | Kg | | |
| | Subject | Medium, ISO 2768-1 | | | | | | |
| | Projection | Scale | Title (English) | | | | | |
| Sheet | 1 of 1 | Size | 1:1 | | Title (Norwegian) | | Document number | Rev |
| | | | A3 | | Hovedkort | | 59372 | A |

10.5.2 Main board BD1 Left



| | | | |
|-------------------|---------------------|---------------------------|--|
| Responsible dept. | Technical reference | Document type | Document status |
| Orkel AS | Created by | Mainboard BD1 left wiring | Jan André Føleide |
| | Approved by | | Rev. 01 Date of issue 2021-03-10 Lang. Sheet 1/1 |

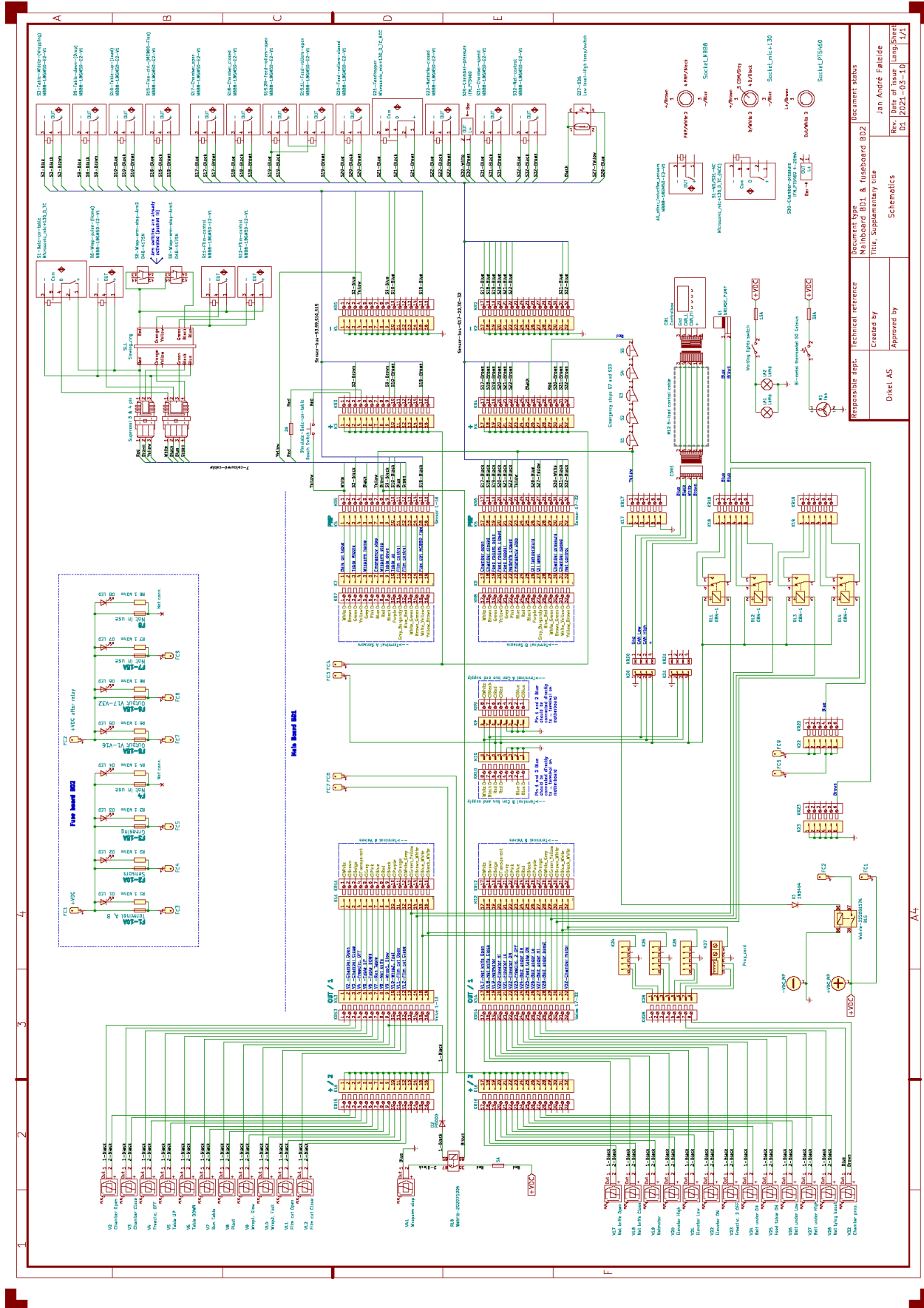
10.5.3 Main board BD1 Right



| Responsible dept. | Technical reference | Document type | Document status |
|-------------------|---------------------|----------------------------|--|
| Orkel AS | Created by | Title, Supplementary title | |
| | Approved by | Mainboard BD1 right wiring | |
| | | | Jan André Føleide Rev. 01 Date of issue 2021-03-10 Lang. Sheet 1/1 |

A4

10.5.4 Complete electrical schematics



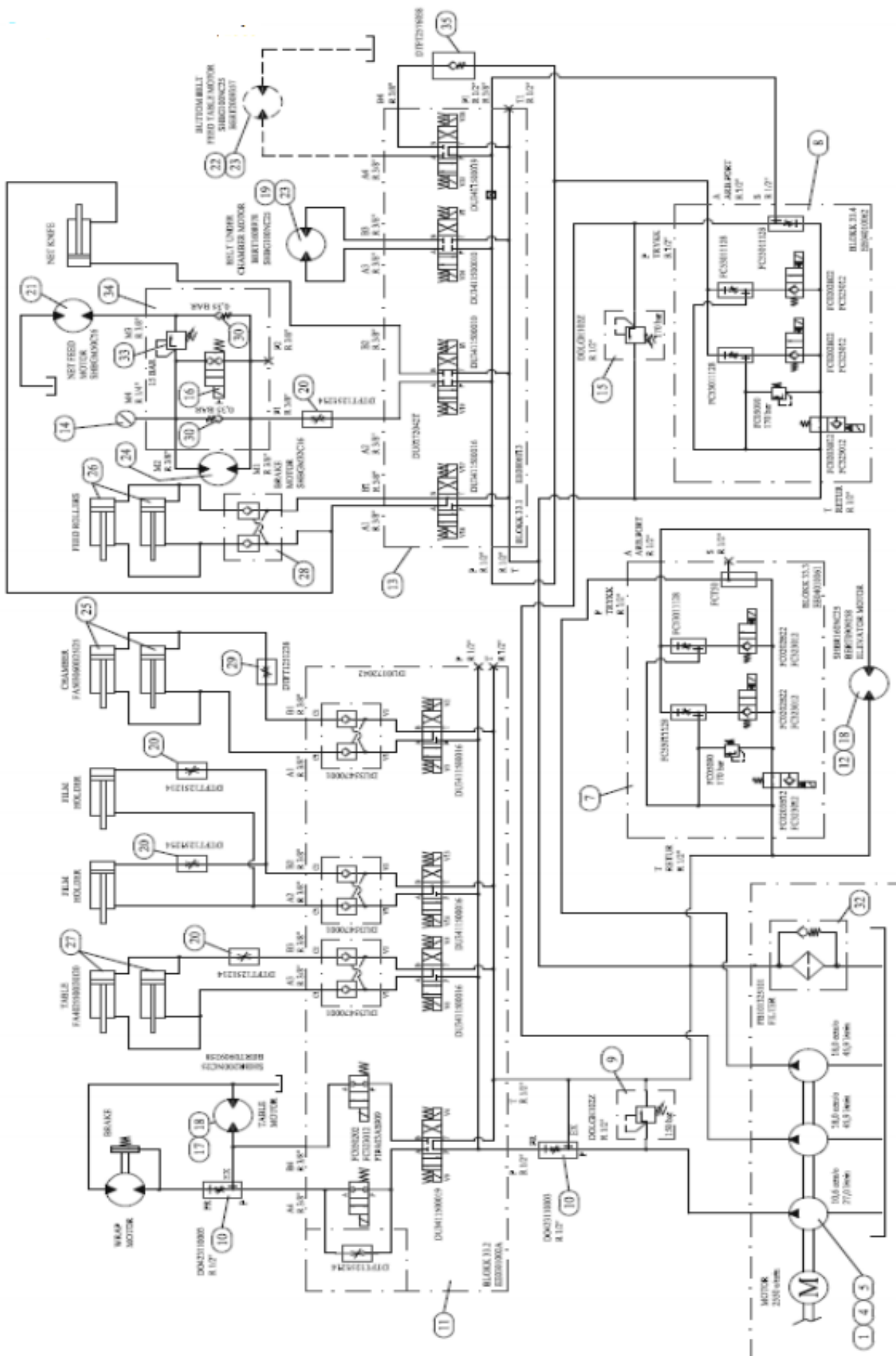
11 Hydraulics

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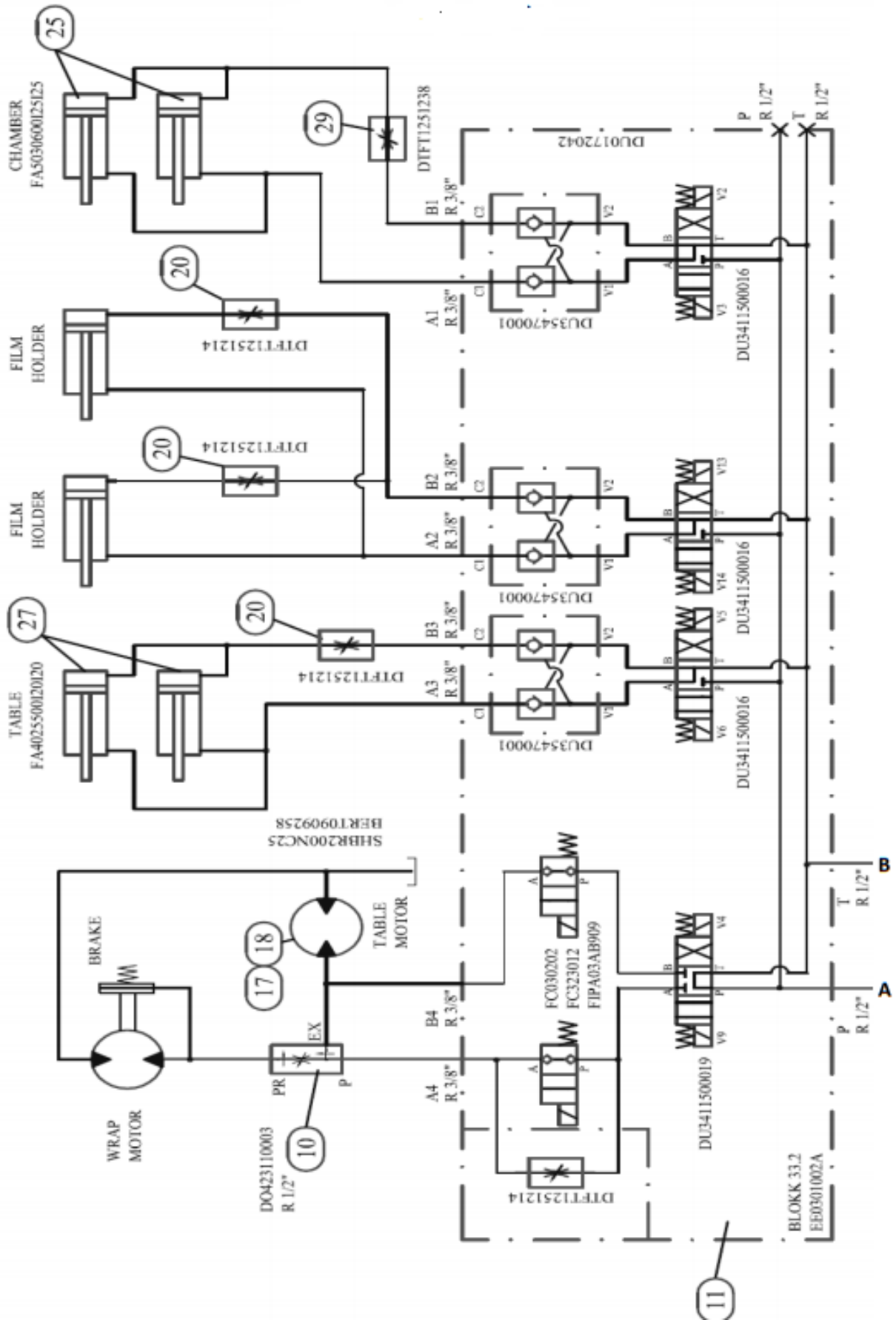
11.1 HYDRAULIC DIAGRAM

Please refer to [section 11.1.1 "Complete diagram"](#) and [section 11.1.6 "Hydraulic diagram list"](#) for the Hydraulic diagram list with components.

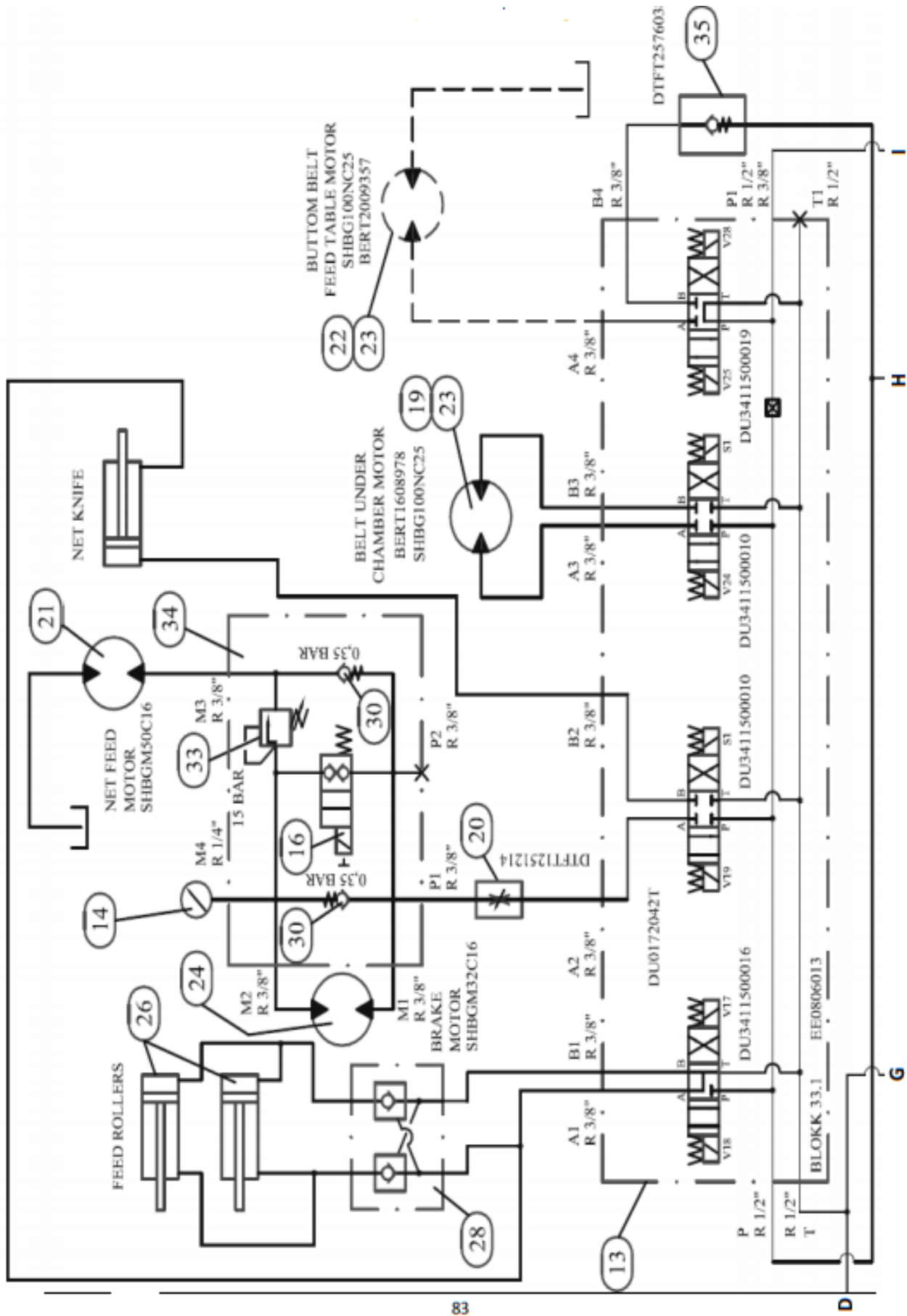
11.1.1 Complete diagram



11.1.2 Hydraulics 2

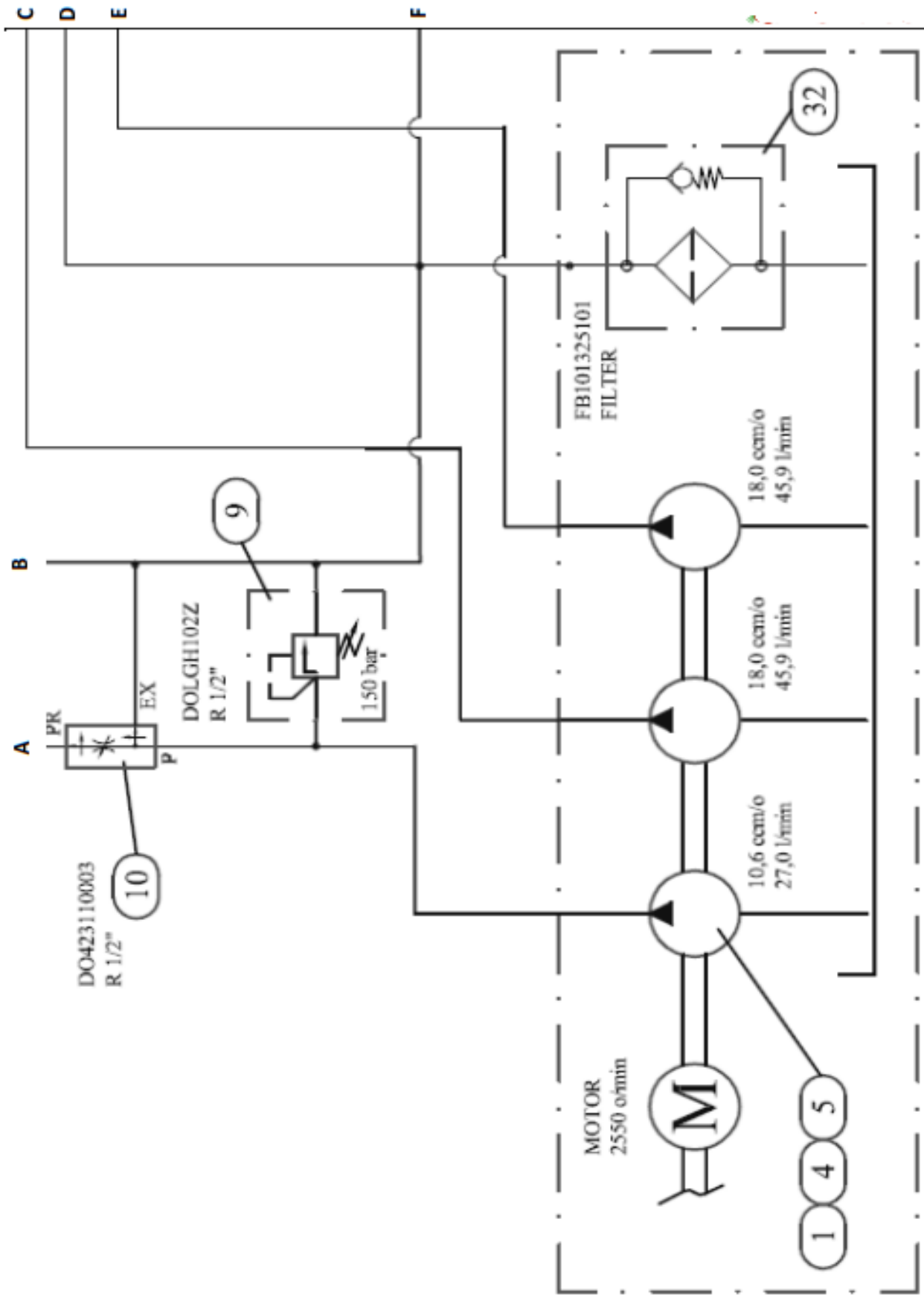


11.1.3 Hydraulics 3



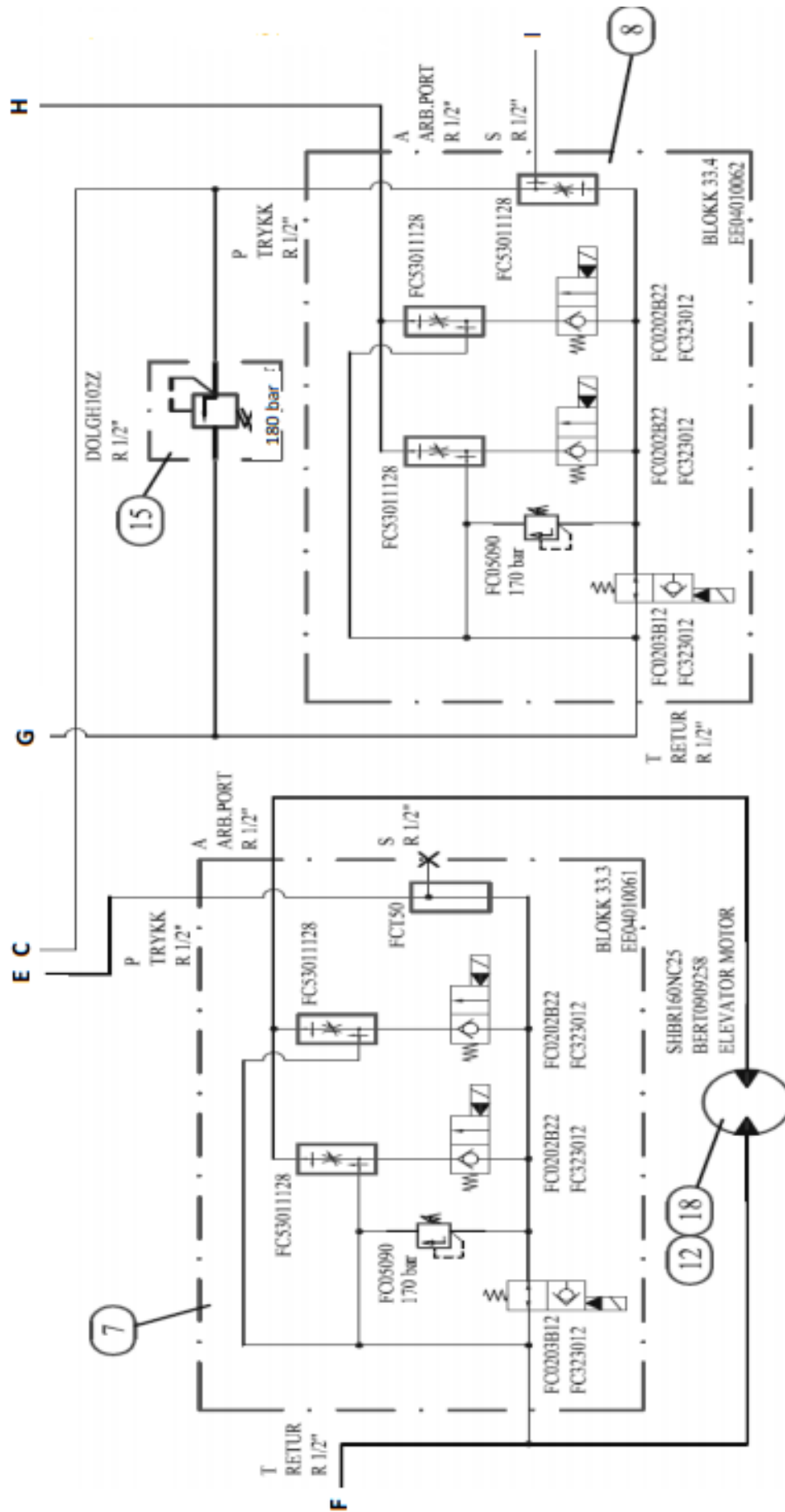
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11.1.4 Hydraulics 4



Hydraulic scheme MC 850/1000

11.1.5 Hydraulics 5



11.1.6 Hydraulic diagram list

| Outputs on controllers for standard system | | | | |
|--|-------------------|-----------------------|------------------------|--------------------|
| No. | Type | Brand & type | Current drawn at 12VDC | Resistance in Ohms |
| V1 | Directional valve | Duplomatic DS3-S1/10N | 2,72A | 4,4 |
| V2 | Directional valve | Duplomatic DS3-S3/10N | 2,72A | 4,4 |
| V3 | Directional valve | Duplomatic DS3-S3/10N | 2,72A | 4,4 |
| V4 | Directional valve | Duplomatic DS3-S4/10N | 2,72A | 4,4 |
| V5 | Directional valve | Duplomatic DS3-S3/10N | 2,72A | 4,4 |
| V6 | Directional valve | Duplomatic DS3-S3/10N | 2,72A | 4,4 |
| V7 | Globe valve | Flucom NC ECD 30/2202 | 2,37A | 5,0 |
| V8 | Directional valve | Duplomatic DS3-S1/10N | 2,72A | 4,4 |
| V9 | Directional valve | Duplomatic DS3-S4/10N | 2,72A | 4,4 |
| V10 | Globe valve | Flucom NC ECD 30/2202 | 2,37A | 5,0 |
| V11 | Directional valve | Duplomatic DS3-S3/10N | 2,72A | 4,4 |
| V12 | Directional valve | Duplomatic DS3-S3/10N | 2,72A | 4,4 |
| V17 | Directional valve | Duplomatic DS3-S3/10N | 2,72A | 4,4 |
| V18 | Directional valve | Duplomatic DS3-S3/10N | 2,72A | 4,4 |
| V19 | Directional valve | Duplomatic DS3-S1/10N | 2,72A | 5,0 |
| V20 | Globe valve | Flucom NC EPP 30/22B2 | 2,37A | 5,0 |
| V21 | Globe valve | Flucom NC EPP 30/22B2 | 2,37A | 5,0 |
| V22 | Globe valve | Flucom NC EPP 50/22B1 | 2,37A | 5,0 |
| V23 | Globe valve | Flucom NC EPP 50/22B1 | 2,37A | 5,0 |
| V24 | Directional valve | Duplomatic DS3-S1/10N | 2,72A | 4,4 |
| V25 | Directional valve | Duplomatic DS3-S4/10N | 2,72A | 4,4 |
| V26 | Globe valve | Flucom NC EPP 30/22B2 | 2,37A | 5,0 |
| V27 | Globe valve | Flucom NC EPP 30/22B2 | 2,37A | 5,0 |
| V28 | Directional valve | Duplomatic DS3-S4/10N | 2,72A | 4,4 |
| V32 | Solenoid | Duplomatic DS3-S1/10N | 1,71A | 7,0 |

11.1.7 Hydraulic overview name and position

| Pos. no | Name | Pos. no | Name |
|---------|--|---------|-----------------------------|
| 1 | Triple pump | 18 | Hydraulic gear 3.1 : 1 |
| 4 | Gate flange 90° 1/2" x 30 | 19 | Hydraulic gear 8.4 : 1 |
| 5 | Gate flange straight 3/4" x 40 | 20 | Throttle valve 1/4" |
| 7 | Block 33.3 | 21 | G. Rotor |
| 8 | Block 33.4 | 22 | Hydraulic gear 16.4 : 1 |
| 9 | High pressure relief valve. 1/2" 150 bar | 23 | G. Rotor |
| 10 | Flow Div. | 24 | G. Rotor |
| 11 | Block 33.2 | 25 | Cylinder 50 x 30 x 600 |
| 12 | G. Roller Br | 26 | Cylinder 32 x 20 x 150 |
| 13 | Block 33.1 | 27 | Cylinder 40 x 25 x 500 |
| 14 | Manometer 0 - 100 bar R1/4" | 28 | Check valve 3/8" |
| 15 | High pressure relief valve. 1/2" 180 bar | 29 | Throttle valve |
| 16 | Solenoid valve | 30 | Check valve 60 l/h 0,35 bar |

| Pos. no | Name | Pos. no | Name |
|---------|-----------------|---------|---------------------------------------|
| 16A | Coil 12V | 32 | Return filter |
| 16B | DIN Plug 12/24V | 33 | Pressure relief valve 50 l/min 70 bar |
| 17 | G. Rotor | 34 | Block |
| | | 35 | Check valve 3/8" 40 l/min 0,35 bar |

11.2 VALVE OVERVIEW

11.2.1 Valve list

| Valve number | Description | Location |
|--------------|---|--------------------------------------|
| 50 | Main distributor valve | In cabinet |
| 51 | Wrapper arm, fast speed | In cabinet |
| 52 | Wrapping table tilting speed | Outside cabinet, front |
| 53 | Wrapper film knife, right side, speed | Outside cabinet, front |
| 54 | Wrapper film knife, left side, speed | Outside cabinet, front |
| 55 | Chamber tailgate, opening speed | In cabinet |
| 56 | Feed hopper, speed | Manifold bloc, outside cabinet, rear |
| 57 | Belt under, fast speed | Manifold bloc, outside cabinet, rear |
| 58 | Belt under, slow speed | Manifold bloc, outside cabinet, rear |
| 59 | Elevator, slow speed | Manifold bloc, outside cabinet, rear |
| 60 | Elevator, fast speed | Manifold bloc, outside cabinet, rear |
| 61 | Net brake | Top, on HiT unit |
| 62 | Net feeder, speed | Top, on HiT unit |
| 63 | Net brake, deactivation | Top, on HiT unit |
| 64 | Main valve | Under frame, right side |
| 65 | Main valve | Under frame, right side |
| 66 | Main valve | Under frame, right side |
| 57 | Feeder table, transport safety valve | Cylinder, right side |
| 68 | Feeder table, transport safety valve | Cylinder, left side |
| 69 | Wrapper arm, slow speed | In cabinet, on valve block |
| 70 | Main valve | Under frame, near wheel right side |
| 71 | Safety valve, tailgate lifting cylinder | On cylinder, right side |
| 72 | Safety valve, tailgate lifting cylinder | On cylinder, left side |

See pictures below for placement of valves inside the cabinet. In general all the adjustment valves will have yellow stickers next to them that describes their function.

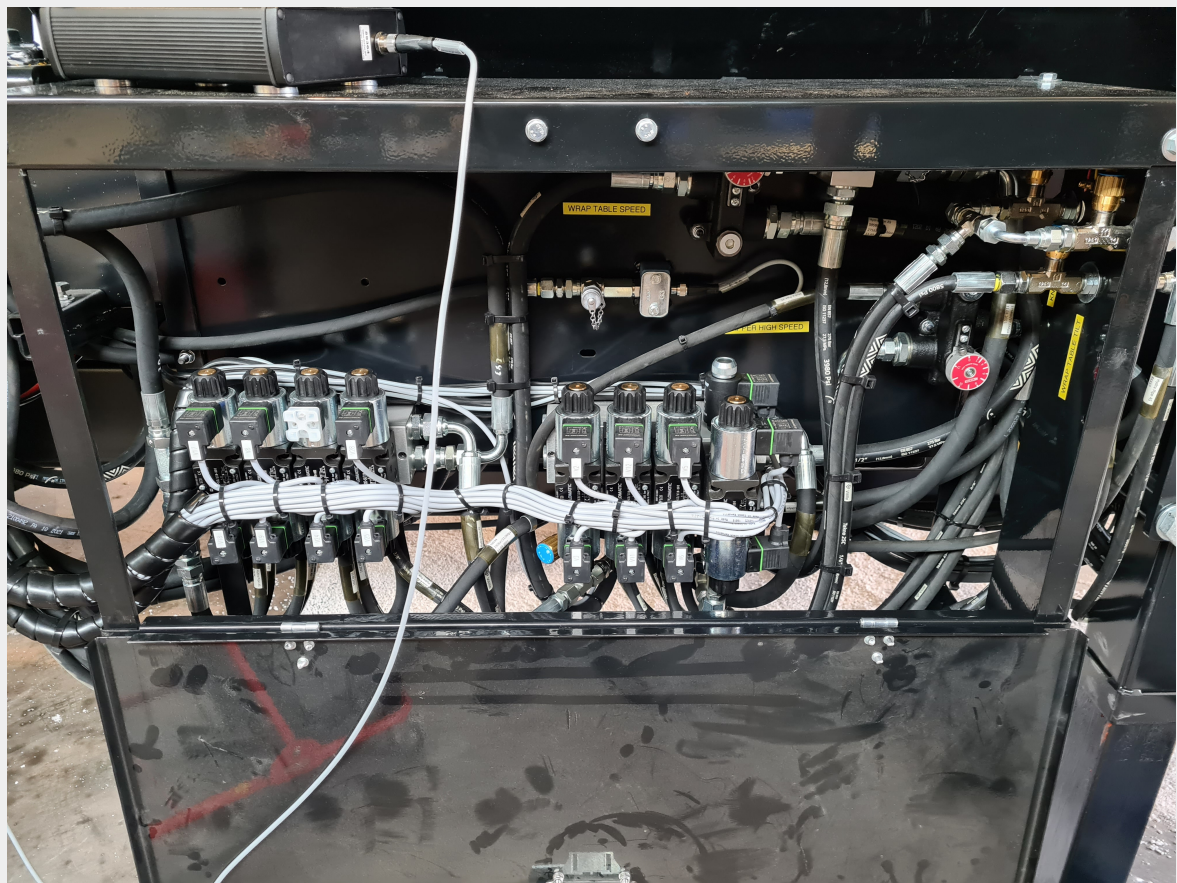


Figure 11.1 : Cabinet

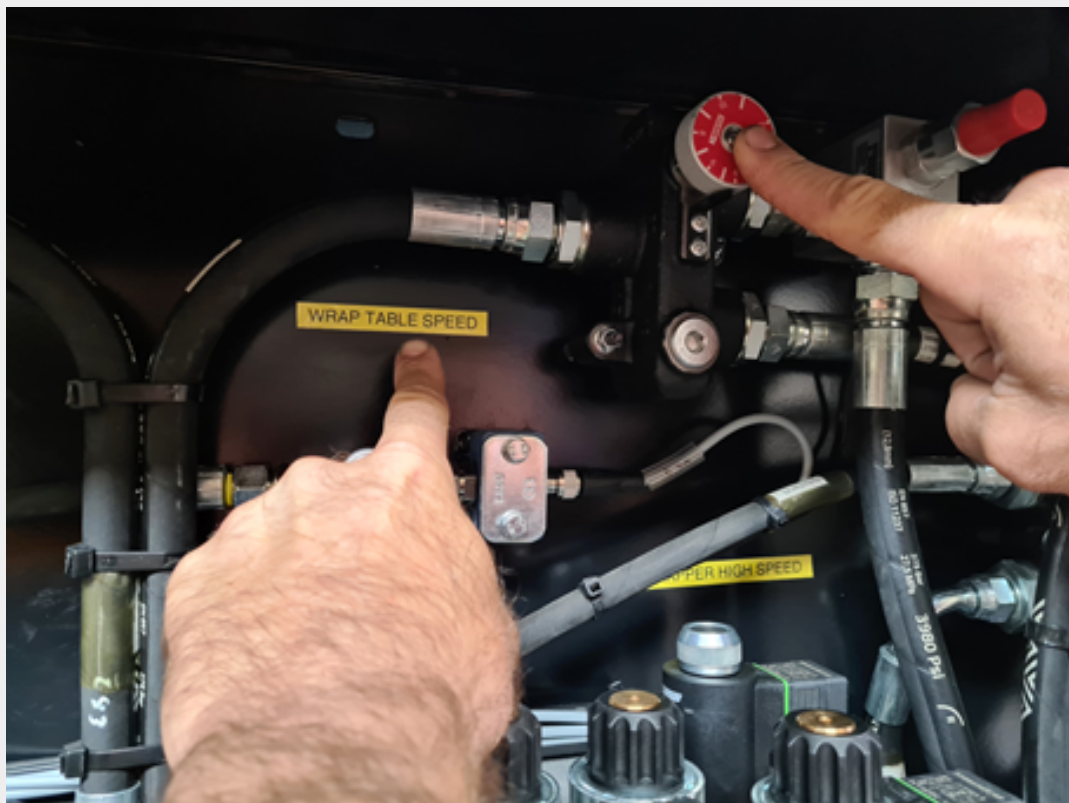


Figure 11.2 : Wrapping table speed



Figure 11.3 : V9



Figure 11.4 : V51, wrapper speed

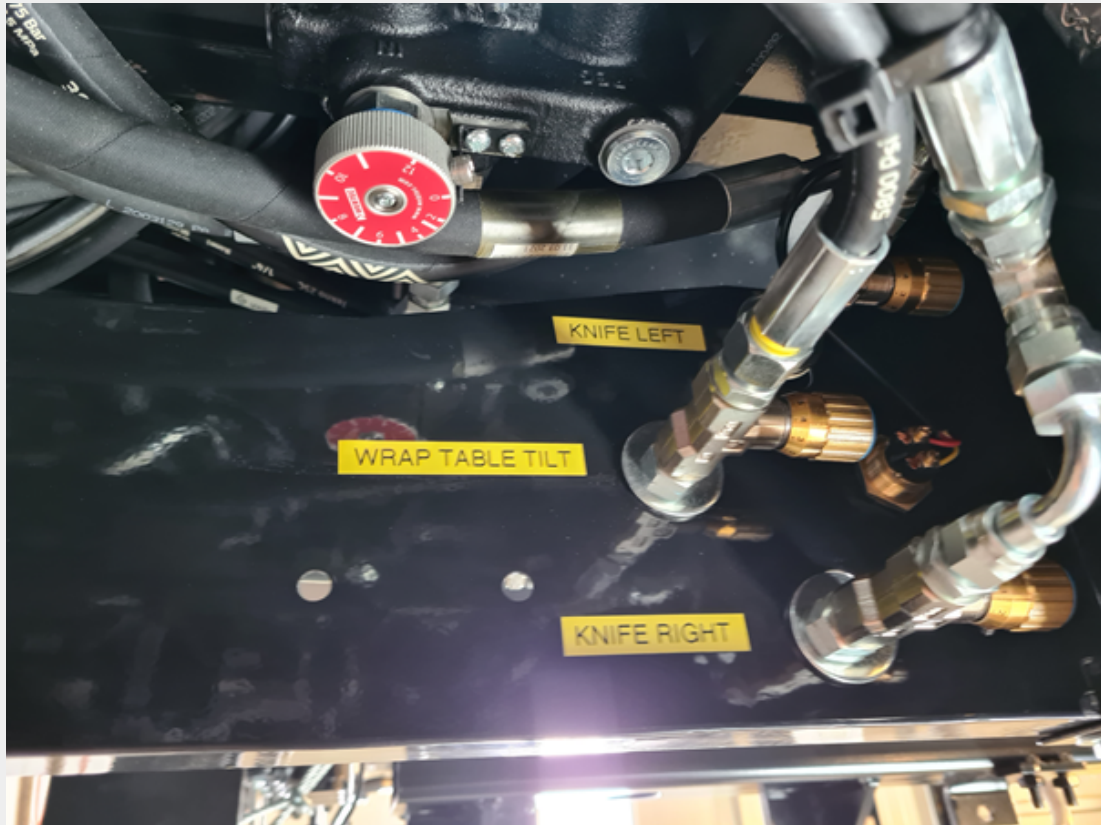


Figure 11.5 : V52, V53 and V54, Wrapping table tilt and knives



Figure 11.6 : V55, Chamber opening speed

11.3 VALVE ADJUSTMENTS

IMPORTANT: General rule all hydraulic adjustments: Always start adjustment by closing the valve. Open gradually until wanted speed is achieved. The oil must also have correct operational temperature.

Basic adjustments: By turning the valve clockwise, the flow is reduced and therefore the speed. The opposite occurs when turning the valve counter clockwise. The exception is; Feeder table speed, [valve 56]. By turning this valve clockwise, the speed will increase.

11.3.1 Adjusting wrapping table and arms

Valve 50 is controlling the total flow to the wrapper. If the valve is turned clockwise, the total oil volume will decrease and all the movements in wrapper unit will be slower. Valve 51 is controlling the amount of oil to the wrapper arm. If the valve is turned clockwise the arm speed is reduced.



Wrapper arm, maximum allowable rotation speed is 25 RPM.

HOW TO ADJUST WRAPPER: Close the valve 50, then open 3/4 turn [basic setting]. Close valve 51 completely, then open gradually until correct speed on the arm is achieved. Maximum 25 RPM. Adjust the speed on the belt with valve 50, to correspond, the rotation of arm and overlap of film layers.

Wrapper arm , slow speed adjustment

After the fast speed is correctly adjusted, the slow speed must be set. By turning valve no. 69 adjust and set the slow speed to maximum 10 RPM.

NOTE: The slow speed must be correctly adjusted to ensure the film cutter is working properly. The speed will increase when the oil is warm. Observe the wrapper arm carefully and adjust the slow speed once again if necessary.

Knife arm, settings

The rise and lowering speed of the arms must be correctly set. If the speed is too high, the film is torn instead of a controlled cut. The speed of knife arms is adjusted by turning valve 53 [right arm], and valve 54 [left arm] The speed is reduced by turning clockwise.

NOTE: : Both sides need to be adjusted equally, so that the arms have a smooth motion.

Basic setting: Close the valve, then open 1/2 turn.

Wrapper table tilt speed By adjusting the wrapper tilt speed, we can change the bale drop speed. By turning valve 52 clock wise, the drop speed will decrease. To avoid the risk of uncontrolled unloading of bale, the drop speed shouldn't be set to fast.

Basic setting: Close valve, then open 3/4 turn.

11.3.2 Adjusting chamber speed

By adjusting valve 55, the speed could be changed. The speed is to be set as fast as possible, without slamming the tailgate.

Basic setting: Close valve 55, then 1/2 turn, counter clockwise.

11.3.3 Adjusting conveyor belt speed

Feed hopper, chain belt

By adjusting valve 56, the belt speed on the feeder table is set.

NOTE: By turning the valve clock wise the speed is increasing. This is opposite of the other valves!

Basic setting: Close valve 56 by turning it counter clockwise. Then turn 1/8 - 1/4 clock wise.

Belt under, chain belt

Belt under speed is set by adjusting valve 57 [fast] and 58 [slow].

Basic setting: Close valve 57 then 2 turns counter clockwise. Open valve 58, then 1 turn clockwise.

Elevator, belt

The conveyor belt speed, in the elevator is adjusted by turning on valve 59 [fast] and 60 [slow]

Basic setting: Close valve 59 by turning it clock wise, then 1 turn counter clock wise. Close valve 60 by turning it clock wise, then 1 turn counter clock wise.

11.3.4 Adjusting plastic film or net brake

Plastic film, net brake

There must be some pre tension added to the film before it's added on to the bale. Adjust the brake by turning valve 61. By turning the knob clock wise, the tension is increased.

Basic setting: Increase the pressure, while reading the manometer. When the film is torn, reduce the pressure by 10%.

NOTE: : If the oil is cold, the pressure might be higher than the adjustment was made. The film might be torn. Adjust the net brake when oil is cold if the problem occurs.

Plastic film or net feeder, speed

Adjust the feeder speed by turning valve 62. the speed is reduced when turning the valve clock wise.

Basic setting: Close valve 62 by turning it clock wise., then 3/4 turn counter clock wise.

Plastic film or net, brake release

By closing valve 63, the net brake can be disengaged. This operation is performed when loading a new film or net roller in HIT unit.

Basic setting: Close valve 63.

11.3.5 Main valves

The machine is equipped with four main valves. Valve number: 64, 65, 66 and 70.

IMPORTANT: These valves must be closed only when repair work is done on the system or if any leakages has occurred. Keep the valves always open. Major harm on hydraulic motors can happen if the valves remain closed during start up.

11.3.6 Chamber pressure settings

Setting of the chamber pressure value is done in the control box. During start-up the elevator belt runs at fast speed. When chamber full level [pre set value] is achieved, the speed on elevator is reduced to obtain a higher density on the bale. When the value of chamber pressure is reached, the bale is ready for film or net binding.

Parameters to be set in control box is:

Fully pressed bale: 100 - 240bar

Start slow speed, elevator belt: 0 - 100% by pre set pressure

Example:

Material: Wood chips

Chamber pressure: 200bar

Chamber full-level: 80%

When the sensor register a chamber pressure of 160bar [80% of 200bar], the elevator belt speed is reduced to "slow speed". The belt speed will remain slow until chamber pressure reaches 200 bar.

IMPORTANT: Chamber pressure must never exceed 240 bar!

12 Specifications

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12.1 ELECTRICAL SYSTEM

Power supply:

24 Vdc with alternator located by the pump unit and dual 12 V 55 Ah lead acid batteries in series.

Sensors:

| | | |
|--------------------|----------------------------------|---------------------------------------|
| Position detected | Inductive | Pepperl+Fuchs NBB8-18GM50-E2-V1 |
| Feed hopper: | Ultrasonic, analogue | Pepperl+Fuchs UC2000-30GM70-IE2R2-V15 |
| Wrapping table: | Ultrasonic, digital [70 cm def.] | Microsonic mic+130/D/TC |
| Oil temperature: | PT1000 | FuehlerSysteme EF5/E-20/5 |
| Oil level: | Photoelectric lever | Carlo Gavazzi VP04EP |
| Chamber pressure: | Pressure, 0-600 bar | IFM PT5460 |
| Elevator pressure: | Pressure 0-250 bar | IFM PT5401 |

12.2 POWER TAKE OFF

| | |
|-----------------|---------|
| Maximum torque: | 2300 Nm |
| Speed: | 850 RPM |
| Type: | Cat 6 |

12.3 LUBRICATION SYSTEM BEKA-MAX

Grease system:

| | |
|-------------------------------|---|
| Voltage | 24 Vdc |
| Maximum current | 1,1 A |
| Pump capacity each revolution | Pump 1 [fixed amount] 0,17 cm ³ Pump 2 [adjustable] 0,04 - 0,12 cm ³ |
| Pump capacity each minute | 4,3 cm ³ /minute |
| Maximum pressure | 280 bar |
| Grease type | EP 2 NLGI-2 |
| Volume reservoir | 4,0 l |

Chain lubrication:

| | |
|------------------|--|
| Oil type | Motor oil SAE 10W - 30, 15W - 40 |
| Oil consumption | 6ml each bale on the table. 0.3 l/h [@ 50 bales/h] |
| Volume container | 4,2 l |

12.4 HYDRAULIC SYSTEM

| | |
|--|-------------------------------|
| Chamber drive: | 280/340 bar [SW/relief valve] |
| Sub-conveyer, feed hopper and film system: | 180 bar |
| Elevator and chamber door: | 170 bar |
| Wrapper | 150 bar |

12.5 WHEELS AND TYRES

| | |
|--|---|
| Tyre dimension: | 385/65 R 22,5 |
| Rim dimension: | 11,75 x 22,5, 10-bolt |
| Inflation pressure: 8,0 bar / 800 kPa / 116 psi [lb/in ²] Wheel nuts torque: | 8,0 bar / 800 kPa / 116 psi [lb/in ²] |
| Wheel nuts torque: | 450 Nm |

12.6 DIMENSIONS AND WEIGHT

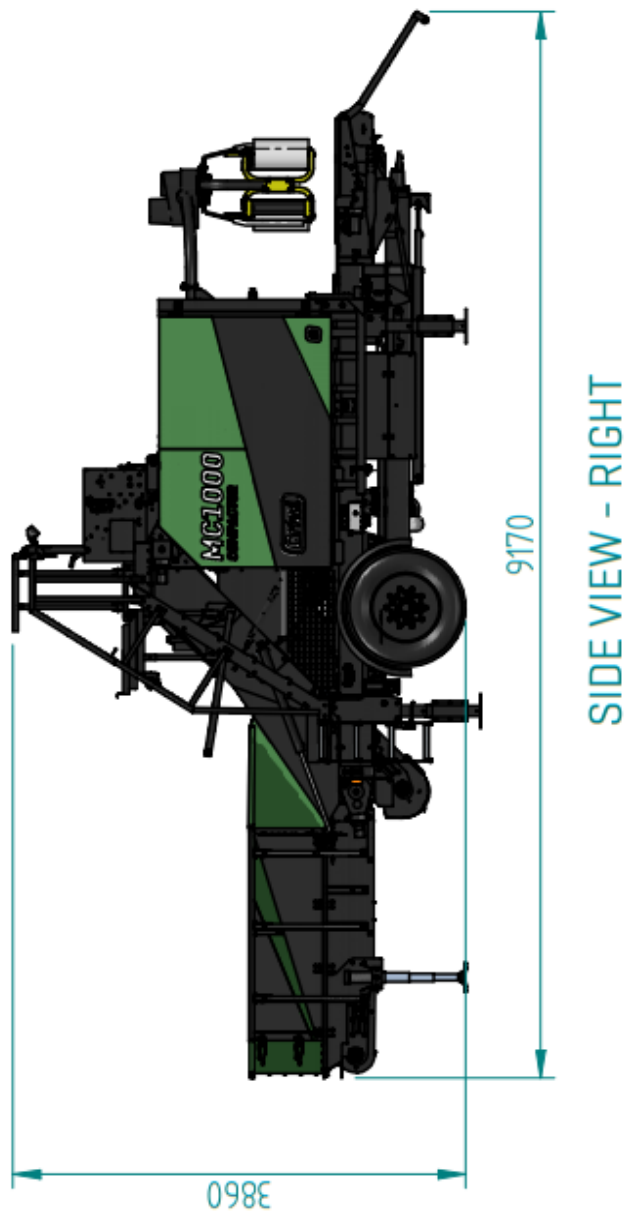
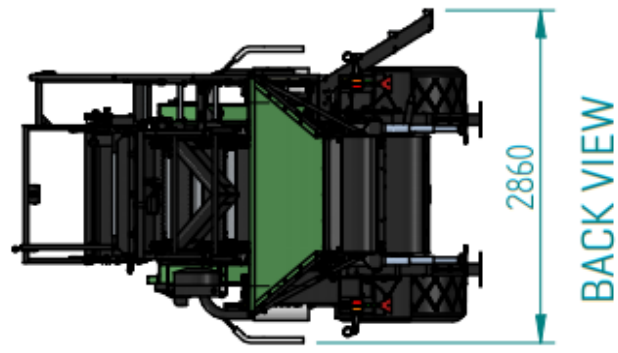
12.6.1 Measurements

| | |
|-----------------------------------|---------------------------------|
| Net weight: | 7120 kg |
| Allowed total weight: | 12500 kg |
| Allowed vertical load on drawbar: | 2500 kg |
| Height, transport mode: | 3390 mm |
| Height, operating mode: | 3860 mm |
| Length, transport mode: | 7860 mm |
| Length, operating mode: | 9170 mm |
| Width, transport mode: | 2180 mm |
| Width, operating mode: | 2860 mm |
| Chamber size: | Width 850 mm x Diameter 1000 mm |
| Bale volume | 0,63 m ³ |
| Feed hopper volume: | 3 m ³ [F10] |

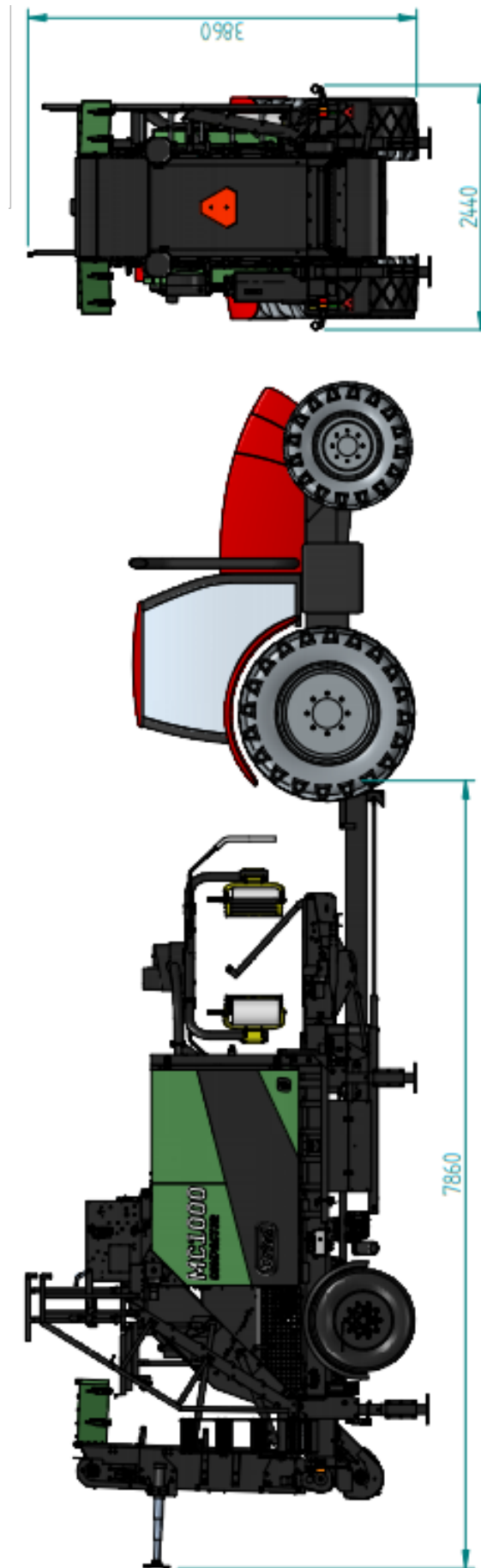
12.6.2 Power requirements

| |
|--------------------------------|
| 100 hp / 73 kW [diesel engine] |
| 90 hp / 75 kW [electric motor] |

12.6.3 Dimensional sketch, operating mode



12.6.4 Dimensional sketch, transport mode



Glossary

B

Bale chamber

The material is transported into the chamber and shaped into a compact bale. After shaping the material, several layers of net/film is laid on the bale by the net/film system ensuring that the bale maintains its shape during the transport to the wrapping table. Usually referred to as "the chamber".

E

Elevator

Transfers the material from the feed hopper to the chamber.

F

Feed hopper

The feed hopper is made for loading material into, which is fed into the chamber via the elevator. It is mounted at the back of the compactor, and comes in several types; F5, F10, F25. The number indicates the loading capabilities of the hopper in m³.

P

Plastic tying unit

Placed on top of the chamber, responsible for feeding film into the chamber so that the bale is partially wrapped and contains its form.

S

Serial number

Identification number for each individual machine, also referred to as "Chassis Number".

Sub conveyor

Conveyor belt placed along the frame under the chamber, for transporting the bale from the chamber to the wrapping table, as well as transporting material spillage back to the elevator.

W

Wrapping arms

Wraps the bale with film while it lays on the wrapping table by rotating the arms around the bale. Safety features are mounted on the arms so that the emergency stop is triggered if something hits the safety features.

Wrapping table

The wrapping table is placed at the front of the compactor, and retains the bale while it is being wrapped in film by the wrapping arms. After this process is completed the wrapping table tilts forward so that the bale rolls off and onto the ground.

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