

# Front mounted mowers NOVACAT 301 a-motion PRO

3763

Machine No.: +..00001



### PÖTTINGER - Trust creates Affinity since 1871

"Quality pays for itself." We therefore apply the highest quality standards to our products, which are permanently monitored by our in-house quality management team and our management board Because the safety, perfect function, highest quality and absolute reliability of our machines in operation are the core competencies for which we stand.

### **Technical alterations**

There may be deviations between these document and the product as we are constantly developing our products. Therefore no claims may be derived from the data, illustrations and descriptions. Please contact your Specialist Service Centre for any binding information about specific features of your machine.

### Legal notes

Please note that only the German operating manual constitutes the original operating manual in regards to the guidelines 2006/42/EC. Operating manuals on languages different than German, are translations of the German original manual of operation.

We would ask you to please understand that changes to the scope of supply with regard to form, equipment and technical specifications are possible at any time.

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Please note that the statutory guarantees and warranties granted voluntarily by PÖTTINGER Landtechnik GmbH can only be invoked for damage stemming from construction, production and / or material faults.

PÖTTINGER Landtechnik GmbH cannot be held liable for damage stemming from the use of consumables such as belts, chains, shafts, gears, tyres, knives teeth or tarpaulins or covers made from fabric materials or for damage stemming directly or indirectly from contact with foreign bodies (stones, metal fragments, etc.).

#### You can find additional information about your machine in MyPöttinger.

Are you looking for suitable accessories for your machine? No problem! All the information you require is here at your disposal. And if we don't have what you're looking for, then your Specialist Service Centre is there for you with help and advice.

Scan the QR code on the type plate of the machine or visit http://www.mypoettinger.com

#### Dear Customer,

These Operating Instructions are intended to allow you to familiarise yourself with the machine and provide you with clear information on the safe and correct handling, care and maintenance. Therefore, please take the time to read these instructions.

These Operating Instructions are a part of the machine. They are to be kept in a suitable place and be accessible to personnel at any time throughout the entire service life of the machine. Instructions based on existing national regulations on accident prevention, road traffic regulations and environmental protection are to be supplemented.

Any persons commissioned with the operation, maintenance or transport of the machine must read and understand these instructions prior to starting work, particularly the safety information. If these instructions are not observed, the warranty claim will be forfeited.

If there are any questions regarding the contents of these Operating Instructions or further questions regarding the machine, contact your PÖTTINGER service partner.

Timely, meticulous care and maintenance, according to the specified maintenance intervals, will ensure the machine's operational and traffic safety, and its reliability.

Use only original spare parts or spare parts and accessories that are approved by PÖTTING-ER Landtechnik GmbH. Only the original spare parts approved by us have been tested by us and thus have the suitable prerequisites for use in your machine. The use of any unapproved parts forfeits any guarantee or guarantee claim. Even after the guarantee period has expired we recommend the use of genuine replacement parts in order to ensure the continuous performance of the machine.

When selling machines, the Product Liability Act obliges the manufacturer and/or the authorised dealer to pass on a manual to customers and to instruct the customer on the machine with reference to the safety, operating and maintenance requirementss. Confirmation in the form of a Declaration of Transfer is required to verify that the machine and manual have been passed on correctly. The Declaration of Transfer was enclosed with the machine on delivery.

For the purposes of the Product Liability Act, every self-employed person and farmer is an entrepreneur. Entrepreneurial property damage within the meaning of the Product Liability Act is therefore excluded from liability by PÖTTINGER. Property damage within the meaning of the Product Liability Act is damage caused by a machine, but not to it.

The operating instructions are part of the machine, therefore pass them on to any new owner when passing on the machine. Instruct the new owner and make them aware of the regulations mentioned.

Your PÖTTINGER service team wishes you every success.

### **Representation conventions**

This section contains explanations for a better understanding of the illustrations, safety and warning notes and textual descriptions used in these operating instructions.

#### Safety instructions / warnings

Safety instructions of a general nature are always placed at the beginning of a section. They warn of dangers that may occur during machine operation or when preparing to work on the machine. Warnings indicate hazards that may occur directly during an operation or work step on the machine. Warnings are listed together with the relevant procedures / work steps in the written instructions.

Safety instructions and warnings are presented as follows:

### **DANGER**

If you do not follow the instructions in a text section with this marking, there is a *risk* of fatal or life-threatening injury.

► All instructions in such text sections must be followed!

### **WARNING**

If you do not follow the instructions in a text section with this marking, there is a *risk* of severe *injury*.

▶ All instructions in such text sections must be followed!

### 

If you do not follow the instructions in a text section with this marking, there is a *risk* of *injury*.

► All instructions in such text sections must be followed!

### **NOTICE**

If you do not follow the instructions in a text section with this marking, there is a *risk* of damage to property.

All instructions in such text sections must be followed!

#### 

Text sections marked in this way contain recommendations and advice for handling the machine.

#### 

Text sections marked in this way contain advice on the subject of environmental protection.

Text

#### Directions

Directions (such as left, right, front, rear) are given based on the normal "working travel direction" of the machine.

Orientation information for an illustration of a machine's details refers to this illustration itself and is only understood to be relative to the direction of travel in certain cases. The meaning of the orientation information (if required) is clearly evident from the accompanying text itself.

#### Designations

These operating instructions designate the interchangeable equipment for agricultural vehicles (as defined in European Directive 2006/42/EC) as *machine*.

Vehicles intended to drive the existing machine are designated as *tractor*.

Equipment designated as *optional* is available only for certain machine models or only in certain countries.

#### **Cross-references**

Cross-references to another location in the operating instructions or another document are provided in the text, specifying the chapter and subchapter, or section. The naming of subchapters or sections is in inverted commas. (Example: Check all screws on the machine for tightness. See "Tightening torques" on page xxx). A subchapter or section can be found in the document via an entry in the table of contents.

#### Action steps

An arrow 🕨 or sequential numbering indicates action steps you should take.

A black bordered, indented arrow <sup>b</sup> or sequential, indented numbering indicates intermediate results or intermediate steps that should be performed.

#### Illustrations

Illustrations may differ in detail to your machine and should only be considered as a principle representation/symbol illustration.

#### Use of colours

Illustrations in this printed document are shown only in grey scale or black and white.

Illustrations in electronically distributable documents (PDF) are displayed in colour also and can be printed out in colour if required.

#### Use of symbols

Illustrations may contain additional symbols, arrows and other lines that serve to improve the comprehensibility of the image content or are intended to draw attention to a specific area of the image.

#### Instructions for product handover

Please verify the listed items in accordance with the product liability obligation

$\bowtie$	Please, tick off where appropriate.
	Machine checked according to delivery note. All packing materials removed, all safety devices, cardan shafts and control elements present.
	Machine operation, commissioning and maintenance discussed with and explained to the clients using the operational instructions.
	Tyre air pressure verified.
	Tightness of wheel nuts verified.
	Reference to correct p.t.o. speed and direction of rotation.
	Adaptation to tractor complete; three point adjustment, drawbar height, attachment of handbrake lever in tractor cab, forced steering set, compatibility of all necessary electrical, hydraulic and pneumatic connectors to tractor checked and established.
	Cardan shaft correctly cut to length.
	Test run of all machine functions in addition to parking brake and operating brake completed and no defects noted.
	Function explanation during test run.
	Tilting to transport and working position explained.
	Information regarding optional equipment provided.
	References made to compulsory reading of the operational instructions.

Confirmation is required as evidence that the machine and the operating instructions (with a supplement to the operating instructions for North America depending on the country of destination) have been delivered properly. For this purpose you have received a confirmation e-mail from PÖTTINGER. If you have not received this mail, please contact your local dealer. Your dealer can fill in the handover declaration online.

#### Austria

PÖTTINGER Landtechnik GmbH Industriegelände 1 4710 Grieskirchen Phone+43 7248 600-0 Fax+43 7248 600-2513 info@poettinger.at

### Amendment index

Index	Amendment reason	Amended chapter
No time-stamp available in Noxum	Prototype is VS	
V.0	Chapter "Control", section "Work menu":	
	"Triggering single sensor" and "Pressure defi- cit in the lifting system" indicators	
	Input: Mechatronics	
	Index No time-stamp available in Noxum V.0	IndexAmendment reasonNo time-stamp available in NoxumPrototype is VSV.0Chapter "Control", section "Work menu": "Triggering single sensor" and "Pressure defi- cit in the lifting system" indicators Input: Mechatronics

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## Supplement to USA / CANADA operating instructions

## **Crane loading**

### Unload / load machine

### Implementation

• Carefully attach and secure to the attachment points (1-2).



- Remove the fastenings from the loading surface.
- Lift the machine from the truck loading surface.
- Remove lifting device
- ► Load machine: Carry out process in the reverse order.

## **Tightening torque**

This factory standard applies to all metric bolts for which no special tightening torque is specified in the drawing/manual. The relevant grade is visible on the bolt head.

- The values given are nominal and are valid for a head friction rate of IJ=0.14 and a thread friction of IJ=0.125 Slight tensioning force differences can exist through differing friction rates. The values given are to be kept to a tolerance of ± 10%.
- By using the given tightening torque and the existing friction rate used, then up to 90% of the minimum yield strength of the bolt material is used in accordance with DIN ISO 898.
- If a specific tightening torque is given for a bolt connection, then all these bolt connections are to be tightened to the specified tightening torque using a torque wrench.

Thread	Grade 8.8		Grade 10.9	
	Tightening tor- que in Nm	Tensioning force in N	Tightening tor- que in Nm	Tensioning force in N
M 4	3.1	4000	4.4	5700
M 5	6.2	6600	8.7	9300
M 6	10.5	9300	15	13000
M 8	25	17000	36	24000
M 10	50	27000	70	38000
M 12	86	39500	121	56000
M 14	135	54000	195	76000
M 16	215	75000	300	105000
M 20	410	117000	580	164000
M24	710	168000	1000	237000
M 30	1400	270000	2000	380000
M 8 x 1	27	18700	38	26500
M 10 x 1.25	53	29000	74	41000
M 12 x 1.25	95	44500	130	63000
M 14 x 1.5	150	60000	210	85000
M 16 x 1.5	230	81000	320	115000
M 20 x 1.5	460	134000	650	189000
M 24 x 2	780	188000	1090	265000

## **Functional elements**

### Names and functions

Pos.	Element	Function		
1	External protection	Protect against ejection of foreign bodies		
2	Front protection			
3	External protection			
4	Rear safeguard			
5	Locking mechanism	Swath former - swath width adjustment		
6	Limiting chains	Mounting support		
7	Mounting frame	Attaching to tractor		
8	Adjustable right relief spring	Unloading adjustable to corresponding local re- quirements		
9	Locking mechanism	Swath former - swath width adjustment		
10	Rear safeguard	Protect against ejection of foreign bodies		
without il- lustration	High cut skids	Can be retro-fitted underneath the cutter bar to in- crease the distance between the knife and the ground.		

## 

Elements marked as "left" or "right" are present on both sides of the machine.



## Accessories included in the scope of delivery

- Blade spanner (1)
- Blade box (2)
- Operational instructions, spare part list and declaration of transfer (3)



## Upgrade program

The PÖTTINGER Landtechnik GmbH upgrade program offers many upgrade possibilities. You can receive additional information from your service dealer.

## Identification

## Type plate with CE marking



T = type plate

#### Type plate

Before making any enquiries about the machine or technical details, note down the model and type from the nameplate and keep them handy. Chassis no. and/or serial no. are required for ordering spare parts.

#### CE marking

The CE marking on the identification plate confirms the conformity of the machine at the time of its launch, with the provisions of the valid version of the machine guidelines at the time of launch.

#### Included data

The type plate shows the following data.

Data	
Chassis number	
Model	
Туре	
Serial number	
Basic weight	
Model year	

### Year of mfr

Year of manufacture information can be found on a sticker near the type plate.



## **EU - declaration of conformity**

The EC norm is not valid in the United States and Canada.



EU declaration of conformity

Name and address of the manufacturer:

PÖTTINGER Landtechnik GmbH Industriegelände 1 AT - 4710 Grieskirchen

Machine (interchangeable equipment):

mower Type Serial no. NOVACAT 301 a-motion PRO 3763

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

machinery 2006/42/EG Electromagnetic compatibility 2014/30/EU

Source of applied, harmonised norms:

EN ISO 12100:2010 EN ISO 4254-12:2012 EN ISO 14982:2009 EN ISO 4254-1:2015 EN ISO 4254-12:2012/A1:2017

Source of applied miscellaneous technical norms and / or specifications:

Person authorised to compile the technical file: Martin Baumgartner Industriegelände 1 AT - 4710 Grieskirchen

Markus Baldinger, CTO R&D

Jörg Lechner,

**CTO Production** 

Grieskirchen, 14.01.2022

This document is not valid in the United States and Canada.

PÜTTINGER

**Declaration of conformity** 

Name and address of the manufacturer:

#### PÖTTINGER Landtechnik GmbH Industriegelände 1 AT - 4710 Grieskirchen

Machine (interchangeable equipment):

mower NOVACAT 301 a-motion PRO Type 3763 Serial no.

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The object described above complies with the following statutory requirements :

Supply of Machinery (Safety) Regulations 2008 2008, 2008 NO. 1597

The following designated standards were applied::

EN ISO 12100:2010 EN ISO 4254-12:2012 EN ISO 14982:2009 EN ISO 4254-1:2015 EN ISO 4254-12:2012/A1:2017

The following standards and technical specifications were applied::

Person authorised to compile the technical documentation: Melanie Jane Gardner St. Marks Road 15 GB - NN188AN Corby

Markus Baldinger, CTO R&D

Jörg Lechner, CTO Production

Grieskirchen, 14.01.2022

## Intended use

- The trailed mower is intended exclusively for the mowing of fields and short stemmed fodder.
- Intended use also signifies that all contents of this manual must be followed and the warning symbols (pictograms) on the machine must be observed.

## Non-approved useage

### The following misuses of the machine will void the manufacturer's warranty

- Storage and transport of seed/fertiliser or other materials/substances on the machine.
- Keeping animals on the machine.
- Transporting persons or animals on the machine.
- Immersion in liquids during transport, operation or storage of the machine.
- Working of roads, stony ground and other surfaces consisting essentially or partially of stone, sand or asphalt.

## Dimensions

Designation	NOVACAT 301
Туре	3760
	3763
3-point coupling	Kat. II
Working width	3.04m
Transport width of external protection in road transport position	2.98m
Conditioner width	2.41m
Swath width without condi- tioner and without swath former	2.10m
Swath width with swath former	1.70m
Swath width with swath former and additional swath discs	1.30m
Area output	3.00

## Weights

Designation			Туре	Weight
NOVACAT 301 alphamotion master			3760	850kg
Designation	Туре	Weight		
NOVACAT 301 alphamo- tion pro		905kg		
NOVACAT 301 alphamo- tion pro ED	3763	1145kg		
NOVACAT 301 alphamo- tion pro RC		1215kg		

## 

If your machine is equipped with accessories, the indicated weight may be incorrect!

## Sensosafe weight (Option)

Designation	Туре	Weight
SENSOSAFE front beam		148kg

## Mower discs and cutter blades

Designation	Туре	Mower discs (unit)	Cutter blades per mower disc (unit)
NOVACAT 261	3750	6	2
	3753		
NOVACAT 301	3760	7	
	3763		
NOVACAT 351	3810	8	
	3813		

### Cutter blade direction of rotation



### 

The blade equipment used is shown on the sticker on the tool box. The top lines show the blade equipment suitable for disc mowers, the bottom lines show the blade equipment suitable for drum mowers.



Blade equipment

## **Power requirements**

Designation	Туре	Equip- ment	Tractor	PTO speed and direction of rotation	Cardan shaft
NOVACAT 261	1 3750 without from condi- 30kW tioner	from 30kW			
	3753	with con- ditioner	from 45kW	1000 rpm	Overload protection 1,500Nm
NOVACAT 301 NOVACAT 351	3760	without condi- tioner	from 35kW		
	3763	with con- ditioner	from 52kW		
	3810	without condi- tioner	from 45kW		
	3813	with con- ditioner	from 60kW		

## **Hydraulics**

Hydraulic oil			
Hydraulic oil specification		DIN 51524 Part 1 and 2	
Oil temperature		Max. 80 °C	
Operating pressure		140 to max. 200 bar	
Hydraulic connec- tions			
Minimum equip- ment	1 single-acting front connection or 1 single-acting rear connection (with extension hose) - ALPHA MOTION lift cylinder		
Standard	1 single	e-acting front connection - ALPHA MOTION lift cylinder	
	1 doubl	e-acting front connection - hydraulic external protection	

## **Electrics**

Voltage	12 V DC
Connections	1x 7-pin plug in accordance with DIN-ISO 1724 (lighting)

## **Noise emission**

Model	Туре	Continuous sound pressure level dB(A)
NOVACAT 261	3750	82.2
	3753	
NOVACAT 301	3760	84.3
	3763	
NOVACAT 351	3810	84.3
	3813	

## 

The actual noise level in the workplace may differ from the measured continuous sound level depending on the different tractor designs.

We recommend wearing hearing protection while mowing!



## Safety advice

The safety instructions and warning signs, described in these instructions and attached to the machine, warn against damage to property and personal injury in the event of improper use of the machine!

Read this manual carefully and thoroughly before starting up and servicing the machine, and observe the safety instructions given in this manual as well as the safety instructions and warning signs on the machine. If the safety instructions and warning signs in this manual or those attached to the machine are disregarded, the machine operator is responsible for all resulting consequences!

## **Qualification of personnel**

- Work with the machine can only be carried out by persons that have attained the legal minimum age, are physically and mentally capable of performing the work and have received appropriate training or instruction. Persons that still require training or instruction, or that are still being educated, can work with the machine only under constant supervision of an experienced person.
- Testing and adjustment work may only be performed by authorised specialists. Authorised specialists are people who have been trained by PÖTTINGER Landtechnik GmbH or a PÖTTINGER service specialist.
- Assembly, repair and modification work can only be carried out by specialists. A specialist is a person who is able to assess and properly implement the tasks entrusted to them on the basis of their professional training, knowledge and experience. The specialist has an understanding of all relevant standards and risks associated with their activity.

## **Performing maintenance work**

### 

This manual does not only describe maintenance activities that the operator may perform independently.

Maintenance activities that may only be carried out by trained specialist personnel / specialist workshops are marked accordingly in these instructions.

## **Organisational measures**

- Always keep these instructions handy.
- Familiarise yourself with the functions of all the operating devices prior to starting work.
- In addition to the information in these Instructions, the respective country-specific regulations on occupational safety and the generally valid, statutory or otherwise binding regulations on accident prevention are also to be observed. For example,sSuch obligations may concern the wearing of personal protective equipment or the road traffic regulations.

### Safety and the environment

• Appropriate workshop equipment is required to perform testing, adjustment and repair work.

## Maintaining operational safety

- The implement may be used only if it is in impeccable condition, if it is used for the designated purpose and the operator is danger- and safety-aware.
- Immediately remedy any deficiencies that could impair safety or have them remedied by a workshop.
- Observe the warning signs on the implement.
- The operator must make sure during the entire duration of operation that all warning signs are available and legible.
- Do not undertake any unauthorized modifications of the machine. This also applies to the installation and setting of safety devices as well as welding or drilling in stress-bearing parts.
- Use only spare parts and accessories that are original parts or that are specifically approved by PÖTTINGER Landtechnik GmbH. For these parts the reliability, safety and suitability of PÖTTINGER machines has been tested. We cannot evaluate other products and therefore cannot vouch for them.
- Maintenance work, as described in this manual, must be fully carried out at the given time intervals or have them completed in a specialist workshop.
- Do not make any software alterations to the programmable control system.

## Special hazards

### 

Crushing and pulling affecting the whole body due to driven machine parts!

- No long, loose hair or loose clothing is permitted. Use personal protective equipment if necessary or required by regulation.
- Put the implement into operation only if all safety devices are mounted properly, they are intact and stable in locked position.
- During operation it is forbidden to reach into the area of moving machine parts.
- ▶ Do not approach the switched off implement before all moving parts have stopped.
- Only perform care, maintenance and repair work with the drive at standstill. Always secure the machine against accidental switching on, rolling off and/or tipping over.

### 

#### Fire or explosion!

Before any grinding work, clean dust and flammable substances from the machine and the surroundings, and ensure that there is sufficient ventilation.

### 

Irritation of skin, eyes or respiratory tract caused by oils, greases, solvents and detergents!

- Observe the safety regulations applicable to the respective product.
- Provide sufficient ventilation.
- ▶ Use personal protective equipment such as protective clothing, gloves /safety goggles.

### 

Hydraulic oil that is discharged under pressure may pierce the skin and cause severe infection!

- Before carrying out maintenance work always relieve pressure in the hydraulic system.
- Use personal protective equipment.
- ▶ Before starting operation always verify the wear and damage to the hydraulic system.
- Look for leaks using only appropriate equipment (for example, special spray for identifying leaks). Have any defects remedied immediately in a specialist workshop.
- Never seal off leaks using your hands or other body parts.
- Should injuries occur, contact a doctor immediately.

### **WARNING**

#### Danger of injury through ejected foreign objects!

Stones and other foreign objects can fly past the machine's protective devices at high speed during operation.

 Take special care during operation near buildings, grazing animals and areas of pedestrian traffic.

Slow down, reduce PTO speed to below 1000 rpm and continue driving at reduced speed until the danger zone can be exited.

▶ If in doubt, stop and switch off the p.t.o. until the possibility of danger can be eliminated.

## **Operational danger area**

Entering the danger area whilst the machine is in operation and / or the tractor motor is running is strictly prohibited!

### 

### Crushing, pulling in and severing of body parts!

When approaching moving machine parts, clothing, hair and body parts can become caught so that an escape is not possible without sustaining serious to fatal injuries.

- Do not enter the machine's danger area as long as machine parts can move there.
- Check that protective devices are complete and ready for operation before start-up.
- Before commissioning and during operation, direct persons away from the danger zone in and around the machine.



Marking = danger area of the machine

## Warning signs

Listed below are the positions and meanings of all warning signs used.

### 

Warning signs (icons) point to residual risks and how to avoid them.

Damaged or lost warning signs must be replaced.

If machine parts with warning stickers are replaced, the corresponding warning stickers must be placed on the new components.

### Explanation

Po s.	Warning signs	Meaning
1		Do not touch rotating machine components. Wait until they have stopped completely.
		Stay clear of mower blade area as long as tractor engine is running with p.t.o. connected.
		Close both side protective coverings before engaging p.t.o
		Keep a safe distance as danger exists through parts being ejected while motor is running.
2		Do not stand in the machine's swivel range.
3		Machine parts from above. The hazard area may only be entered once the safety lock has been activated.
4		Danger of hands being crushed.
		Never reach into the crushing danger area as long as parts are able to move there.
5	<ul> <li>Achtung! Während des Arbeitseinsatzes das Hydraulik Steuergerät auf "Schwimmstellung od. Senken" stellen.</li> <li>Увага! Під час роботи встановити гідравліки</li> </ul>	During operation, set the hydraulic control unit to "float position" or "lower".
	начинного пристрою в плаваюче аоо опущене положення.	

## Po Warning signs s.

6



Do not touch rotating machine components. Wait until they have stopped completely.

Stay clear of mower blade area as long as tractor engine is running with PTO connected.

Close both side protective coverings before engaging p.t.o..

Keep a safe distance as danger exists through parts being ejected while motor is running.



Pos. Warning signs

7



Meaning

Beware!

Read the operating manual thoroughly before putting the machine into operation.





#### Safety and the environment



### **Tine conditioner**





#### **Roller conditioner**



Upper belt guard presented transparently.

Pos.	Warning signs	Meaning
21		Keep a safe distance as danger exists through parts being ejected while motor is running.
22		Do not touch rotating machine components. Wait until they have stopped completely.
23	Clean every 100 ha! Alle 100 ha reinigen!	Clean secondary drive every 100 hectares!

### Safety and the environment

### **Roller conditioner**



## **SENSOSAFE** (Option)




# **Traffic safety equipment**

Traffic safety equipment is required when travelling on public roads. The equipment may vary depending on the country of destination.

### 

#### USA / CANADA

For machines which are operated in the USA / CANADA, a "Flasher Control Module" (to adapt the blinking frequency of the direction indicators to the current applicable regulations) is available from PÖTTINGER!

### Standard front lighting



- 1 = front LED white marker lights
- 2 = warning signs

#### Safety and the environment

### Standard rear lighting



- 1 = rear LED = red marker lights
- 2 = warning signs

### Front lighting USA/Canada



1-4 = red reflective film

### **Rear lighting USA/Canada**



5 = yellow reflective film

6 = LED - yellow warning lights

# Handling hazardous substances

In addition to the information in these Instructions, the generally applicable, statutory or otherwise binding regulations on environmental protection are to be observed.

# Fuel efficiency and soil protection

Careful adjustment of the machine preserves machine/soil and saves fuel.

# **Disposal of the machine**

### **\*** ENVIRONMENT

At the end of its service-life, the machine should be taken to a legally regulated waste material recycling center.

#### Pressure vessels, shock absorbers, gas springs, ec.

- Built-in hydraulic pressure tanks in the different machines are under high gas pressure (nitrogen) and need to be emptied using an appropriate device before they are scrapped.
- Empty compressed air vessels and compressed air brakes prior to disposal via the condensate outlet.
- Gas springs, gas pressure units or oil pressure units are subject to high pressure and must be removed before the machine is scrapped and if necessary taken to the waste material recycling center separately from the metal waste.

#### **Disposal of lubricants and consumables**

- Drain, collect and dispose appropriately of gear lubricants and hydraulic oils.
- Empty lubricant containers from the central lubrication system and dispose of the lubricant appropriately.

#### Dispose of electrical and electronic components

• Remove lighting systems, control computers, sensors and cables and take separately to the waste material recycling center.

#### **Dispose of plastic parts**

• Plastic parts are supplied with a label which provides information on the material composition. Plastic parts can therefore be correctly sorted before being taken to the recycling center.

#### Disposal of metal parts

- All metal parts should be correctly sorted as far as possible before the corresponding recycling process is carried out.
- Remove lubricants such as gear oil, hydraulic oil, etc. from components before they are scrapped.

#### **Disposal of rubber parts / tyres**

• Take tyres with and without rims and other rubber components to the corresponding recycling point.

# Auxiliary and special functions

## Apron carrier operation

## 

### Ejected impurities / defects in machine parts

- ▶ Never open safety devices whilst the machine parts are rotating.
- ▶ Never leave safety devices open whilst the machine parts are rotating.
- ▶ Wait until all rotating machine parts are stationary before approaching the machine.

## 

The protectors may be operated hydraulically via the tractor control device depending on the machine. In this case, no further manual intervention is required.

### **Operate protectors hydraulically**

## 

#### Crushing, pulling in and severing of body parts!

When approaching moving machine parts, clothing, hair and body parts can become caught so that an escape is not possible without sustaining serious to fatal injuries.

- ▶ Do not enter the machine's danger area as long as machine parts can move there.
- Check that protective devices are complete and ready for operation before start-up.
- Before commissioning and during operation, direct persons away from the danger zone in and around the machine.

### Implementation

Depending on the design of the tractor / control device and / or activate the control terminal to move the corresponding protector into the required position.

#### Manual operation of side protection apron carrier

### 

Not with hydraulic side protection!

## 

#### Ejecting impurities / machine parts at high speeds!

- ▶ Never open safety devices or leave them open whilst the machine parts are rotating.
- ▶ Wait until all rotating machine parts are stationary before approaching the machine.



#### Left side protection

- 1 = protective apron
- 2 = clamping piece
- 3 = locking device

#### Opening the lateral cover

#### Preparation

• Thin screwdriver, pin punch or similar tool.

#### Prerequisite

- Machinery parked in working position and secured against rolling.
- All rotating machine parts are stationary.

#### Implementation

Insert screwdriver in the hole in the spring-loaded bolt (3), pull the bolt to the side until the side protection is unlocked and hold in position.



Swing the side protection upwards, release the bolt and swing the side protection backwards until the sleeve locks into the clamping piece.



- Make sure that the protection has locked in properly, twisting the clamping piece if necessary.
- Carry out procedure similarly on both sides of the machine.
- ► Fold down the side protection carry out the process in reverse order.

#### **Open / close ALPHA MOTION PRO front protection**



#### 1 = front protection

#### Prerequisite

- All rotating machine parts are stationary.
- The machine is standing on even, load-bearing ground in the working position.
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

#### Implementation

#### 

The lever for protective operation is more stable in machines with a working width of 3-3.5m. The operating process is analogous in all cases.

#### Valves / cover / auxiliary equipment

Pull spring-loaded bolts (2) sideways with the left hand using a screwdriver or similar tool and hold in place.



- Pull the lever (3) forwards with the other hand until the spring-loaded bolt can no longer lock into place.
- ▶ Release the spring-loaded bolt (2) and pull the lever (3) forward as far as it will go



- ▷ The protection will be pushed backwards by activating the lever and the protective apron will fold up.
- Close protection: Press the lever backwards until the spring-loaded bolt locks into the hole on the lever.



## Front frame covering for ALPHA MOTION PRO

#### Fit / remove covering

#### 

The covering must be removed beforehand when setting the relief.

#### Implementation

Open the central bayonet catch (2) of the front cover (1) by turning it to the left (spanner size 13mm).



▶ Pull central bayonet connection downwards.



Swing cover (1) upwards as shown.



- ▶ Push cover (2) backwards out of the guide and remove.
- ► Replace cover in reverse order and secure with the bayonet connection.

## **Conditioner support stand**

The centre of gravity is further back in machines with a conditioner than in those without a conditioner. In order to achieve tilt-free support in the parking position, the conditioner support stand must be extended and locked before the machine is detached from the tractor.



Symbol illustration of tine conditioner support stand

#### Extend / retract support stand

#### Prerequisite

- Park tractor and machine on level and stable ground in transport position and secure against rolling.
- Switch off tractor engine during work, apply parking brake, remove ignition key and keep it safe.

#### Implementation

► Hold handle (3) on support stand with one hand.



- Remove the spring-loaded bolt (2) with the other hand and hold in position to unlock the support stand.
- Move the support stand downwards until the bolt (2) can no longer lock into place.
- Release the bolt (2) and move the support stand downwards again until the bolt (2) automatically locks into the next possible position.
  Turn the support stand by the headle (2) if passes or until the bolt (2) locks into place.

Turn the support stand by the handle (3) if necessary until the bolt (2) locks into place.

If the position is not low enough, repeat the process from point 1 and move the support stand into the next lowest position. ► Retract the support stand Carry out process in the reverse order.

# **Initial operation**

- Before intial operation, make sure the tractor is suitable for use with the machine. Compare the machine data with the corresponding data in the tractor's operating instructions.
- Ensure that any transport safeguards have been removed.
- Ensure that the spare parts / machine components supplied have been removed.

# Coupling

## 

#### Collisions with other road users!

Collisions with the other road users may occur when driving in traffic areas with other road users with the flaps, covers, doors open or in a position other than the road transport position.

- Before driving in traffic areas with other road users, place all guards, covers and doors in road transport position.
- Before driving in traffic areas with other road users, bring the machine into road transport position.

## 

#### Pulling and severing of body parts!

Secure the PTO drive against unintentional starting.

## **WARNING**

#### Crushing and rolling over!

Do not remain in the danger area around the tractor and the machine unless the mower combination has been secured against rolling and accidental operation.

- ▶ Instruct bystanders to leave the danger area around the tractor and the machine.
- Remove ignition key and keep safe.
- Apply the emergency brake.
- Place the wheel chocks.

## **WARNING**

#### Crushing of limbs when operating the power lift!

- Direct people from the risk area around the power lift.
- Do not enter the area between the tractor and the machine when operating the power lift.
- Position the operating element for the tractor control valve in neutral before approaching the power lift.

## Potential attaching problems and solutions

#### No front hydraulic connection

• If the tractor has no hydraulic connection at the front, then a hydraulic hose must be run from the rear to the front.



• On some tractors it may be necessary to switch between the front linkage (HW) and the front control unit (SG) using a three-way valve.



#### Lifting gear with cross member

 When using lifting gear with a cross member (Q) between the lower links, damage could occur to the cardan shaft when lowering the attached machine.

To avoid damage, an extension must be installed between the lifting gear and the attachment frame.

## 

In such a case, please contact the PÖTTINGER customer service.



Left = Cross brace

Right = Attachment heightening between lifting gear and A-frame

#### PTO shafts are very far forward

 On tractors where the PTO shaft stub is very far forward, the PTO shaft would have to be considerably shortened. If the machine is raised, there would then be insufficient PTO shaft pipe overlap, or the maximum PTO shaft angulation would be exceeded. In this case, an accessory kit is necessary which positions the implement approx. 200 mm forwards.

## 

In such a case, please contact the PÖTTINGER customer service.



## Attaching on tractor

## **WARNING**

#### Crushing and rolling over!

Do not remain in the danger area around the tractor and the machine unless the mower combination has been secured against rolling and accidental operation.

- ▶ Instruct bystanders to leave the danger area around the tractor and the machine.
- Remove ignition key and keep safe.
- Apply the emergency brake.
- ► Place the wheel chocks.

## 

#### Crushing of limbs when operating the power lift!

- Direct people from the risk area around the power lift.
- Do not enter the area between the tractor and the machine when operating the power lift.
- Position the operating element for the tractor control valve in neutral before approaching the power lift.

#### Prerequisite

- Machine and tractor have been placed on a level, load-bearing surface.
- Lower link correctly adjusted and mounted.
- Tractor sufficiently ballasted. See "Tractor ballast" on page 53.

#### 3-point coupling

#### Implementation

1 Hook the expander on the rear guard on both sides of the machine at position 1 and make sure that the protective apron is properly positioned in the protection area.



- 2 Set front hydraulics to position control.
- 3 Bring the tractor up until it is just in front of the machine, stop and apply the locking brake.



- 4 Set the two lower links in parallel in the required setting for the height and width of the headstock and secure against lateral movement.
  - Attach spacer sleeves and lower link balls on the lower link bolts if required, and secure with linchpin if not already done.
- 5 Bring the tractor up to the machine, attach the machine to the headstock with the lower links and lock the catch hooks.
- 6 Attach upper link ball on the machine if not already done.
- 7 Attach upper link ball and secure as specified.
  - Adapt cardan shaft to tractor and machine if not already done. See "Adjustment of the cardan shaft" on page 59.
- 8 Connect the correctly adapted cardan shaft to machine and tractor as described in the cardan shaft manufacturer's operating instructions.
  - ▷ Swivel cardan shaft retainer (2) into working position



Left = parking position

Right = working position

- 9 Secure cardan shaft protection to prevent it from rotating as described in the cardan shaft manufacture's operating instructions.
  - Make sure that r.p.m. and direction of rotation of the PTO are correct (see sticker beside or underneath the input gearbox). See page 25.
- 10 Connect the electric and hydraulic lines to the tractor. See "Electrics" on page 25.See "Hydraulics" on page 25.
  - If work is to be done with the machine afterwards, lower linkage height position and cutting height See "Cutting height" on page 65. and attach limiting chains if required. See "Limiting chains" on page 64.

## Front beam attachment

The Sensosafe front beam monitors the area directly in front of the tractor. A sound will be emitted and the cutter bar will be raised if an animal is detected. Stop the machine and remove the animal!

- 1. Connect the front-mounted mower with the SENSOSAFE front beam to the front linkage on the tractor.
- 2. Connect hydraulic lines and electric cable.

## **Tractor ballast**

## **NOTICE**

### Risk of property damage through incorrect weighing methods!

Incorrect weighing of machine combinations can result in incorrectly configured tractor ballast.

This affects the steering and braking ability of the tractor.

Machines and machine combinations (e.g. LION together with AEROSEM or VITASEM) which can be operated in different coupled configurations or as stand-alone machines must also be weighed in these configurations.

Bear in mind that in the case of machine combinations, the position of the machine that projects furthest to the rear must always be determined before weighing.

## 

Example: When weighing the Lion and Vitasem machine combination, the machine combination must be raised to the headland position. The seed drill must be simultaneously lowered to working position per top link or Hydrolift and must not touch the ground.

## 

#### Danger of serious injuries!

Incorrect ballasting can make the tractor impossible to steer and cause it to tip over!

Incorrect ballast can significantly lengthen the braking distance!

Always pay attention to correct ballast.

20% of the tractor's tare weight must be available as front axle load to ensure steering and braking ability. Axle loads, total weight and tyre load capacity must not be exceeded.

For correct tractor ballasting, refer to the tractor operating manual.

Two different methods can be used to determine the appropriate ballasting.

#### Methods to determine tractor ballast weights

Weighing method

The most accurate result is achieved through the weighing method. Possible deviations from specified weights are also taken into account.

• Calculation method

The calculation method gives only the mathematical results using the weights in the machine and tractor technical data at the moment of delivery. These figures may differ from the actual weight due to subsequent technical changes.

## 

Always use the weighing method if possible!

Determine the required tractor ballast weights per tractor.

#### Table of values to be filled out

	Actual value	Permissible value	Permissible typre load capacity
Minimum front ballast	kg ( $G_{V \min}$ )	-	-
Total weight	kg ( $G_{act}$ )	= kg (G<sub perm)	-
Front axle load	kg ( $T_{V act}$ )	kg (T <sub>V perm</sub> )	= kg</td
Rear axle load	kg (T <sub>H act</sub> )	= kg (T<sub H perm)	= kg</td

#### Determine the required tractor ballast weights using the weighing method

These methods (preferable) can be used to control the tractor ballast determined purely by mathematical calculations. See "Determine the required tractor ballast weights using calculation" on page 57.

#### Implementation

#### Weigh the tractor

- Dismantle mounted machines and ballast weights from the tractor, if any.
- ▶ Drive the tractor with the front and rear axle on the scales.



• Write down weight as tractor unladen weight  $(T_L)$  and enter in the value table.

#### Weigh the front axle load

- Attach the machine to the tractor and set in transport position.
- Drive the tractor with the front axle on the scales.



- Write down weight as actual front axle load  $(T_{Vact})$  and enter in the value table.
- Calculate whether the actual front axle load (T<sub>V act</sub>) still corresponds to at least 20% of the tractor dead weight (T<sub>L</sub>). If the front axle load is insufficient, add ballast until the actual front axle load (T<sub>V act</sub>) corresponds to at least 20% of the tractor dead weight (T<sub>L</sub>).
- Check that the maximum permissible front axle load (T<sub>V perm</sub>) has not been exceeded taking the tyre load into account. See the tractor operational instructions.

#### Weigh the total weight

Drive the tractor together with the machine in transport position and the ballast weights with the front and rear axle on the scales.



- Write down weight as total weight ( $G_{act}$ ) and enter in the value table.
- Check to determine whether the measured value exceeds the maximal permissible total weight (G<sub>perm</sub>) of the tractor. See the tractor operational instructions.

### Weigh the read axle load

Drive the tractor together with the machine and the ballast weights with the rear axle on the scales.



- Enter weight as actual rear axle load  $T_H$  in the value table.
- Check to determine whether the measured value exceeds the maximum authorized rear axle load (T<sub>H perm</sub>) taking the tyre bearing capacity into account. See the tractor operational instructions.
- Verify if the technical data of the tyres and rims correspond to the tractor manufacturer requirements. See the tractor operational instructions.

#### Determine the required tractor ballast weights using calculation

#### Implementation

• Distance (a) from centre of gravity of front ballast  $(G_V)$  to centre of front axis:

```
a = ..... mm (see operational instructions of the tractor or measure)
```

- Tractor centre distance (b):
   b = ...... mm (see operational instructions of the tractor or measure)
- Distance (d) from the rear coupling point to the centre of gravity (G<sub>H</sub>) of the machine combination:

d = ..... mm (measure)

- Front axle load for unloaded tractor (TV):
   TV = ...... mm (see operational instructions of the tractor)
- Rear axle load for unloaded tractor (TH):
   TH = ...... mm (see operational instructions of the tractor)
- Unladen weight of the tractor (TL):
  - TL = ..... mm (see operational instructions of the tractor)
- Calculate minimum front ballast (G<sub>V min</sub>) and enter it in the table of values above.
   G<sub>V min</sub> = (G<sub>H</sub> \* (c + d) T<sub>V</sub> \* b + 0.2 \* T<sub>L</sub> \* b) / (a + b)

.....

• Calculate the actual front axle load  $(T_{Vact})$  and enter it in the table of values.  $T_{Vact} = G_V * (a + b) + T_V * b - G_H * (c + d) / b$ 

.....

- Enter the value for the permissible front axle load (T<sub>V perm</sub>) according to the tractor operating instructions in the table of values.
- ► Calculate the actual total weight (G<sub>act</sub>) and enter it in the table of values.

 $G_{act} = G_V + T_L + G_H$ 

. . . . . . . .

.....

. . . . . . . .

.....

- Enter the value for the permissible total weight (G<sub>perm</sub>) according to the tractor operating instructions in the table of values.
- Calculate the actual rear axle load  $(T_{Hact})$  and enter it in the table of values.

 $T_{H act} = G_{act} - T_{V act}$ 

.....

Enter the value for the permissible rear axle load (T<sub>H perm</sub>) according to the tractor operating instructions in the table of values.

Double the permitted tyre load capacity according to the tractor operational instructions or the documentation of the tyre manufacturer (two tyres per axle) and enter in the value table.

# Adjustment / retrofitting

Before starting work, carry out the adjustment and conversion work described below and/or check the machine for correct adjustment and equipment.

### 

Careful adjustment of the machine protects the machine, the soil and saves fuel!

## 

Gripping and drawing in of the entire body can occur through moving machine parts.

- ► Long, open hair or loose clothing is not permitted.
- Use personal protective equipment.
- Put the implement into operation only if all safety devices are mounted properly, they are intact and stable in locked position.
- It is forbidden for any person to reach into the area of moving machine parts during operation!
- Do not approach the switched-off machine before all moving machine parts have stopped.
- Only perform cleaning, maintenance and repair work when the drive is stationary. Always secure the machine against accidental switching on, rolling and/or tipping over.

## **WARNING**

#### Crushing, cutting, pinching and knocks over the whole body!

All adjustment work presents risks due to heavy and sometimes spring-loaded and sharpedged machine parts.

- Adjustment work must only be carried out by suitably qualified staff!
- Suitable protective clothing must always be worn!
- The applicable regulations concerning operating safety and accident prevention must be strictly observed.

## Adjustment of the cardan shaft

Checking and adjusting the length of cardan shafts with tube sliding profile.

## 

#### Danger of injury due to damaged or flying shaft parts.

If the profile overlap is insufficient due to an improperly adjusted or structurally modified cardan shaft, or if the cardan shaft is compressed when angled, persons may be hit and/or injured by damaged or ejected cardan shaft parts.

- Only an authorised service specialist may make adjustments to the cardan shaft. Observe the cardan shaft manufacturer's instructions.
- Before using the cardan shaft for the first time, check it in all operating conditions at the Service Centre and have it adjusted there if necessary.
- When the machine is used with another tractor, it may be necessary to adjust the cardan shaft again.
- For an cardan shaft with overload or freewheel coupling, the coupling point is on the machine.
- Do not attach any profile adapters or profile extensions to the cardan shaft or PTO shaft.

#### Instructions for the authorized service specialist

Check the cardan shaft length in all operating positions to ensure that the required sliding distance is available and that the profile overlap is sufficient.

#### Check sliding distance for shortest operating position



#### Implementation

- 1 Couple the machine to the tractor.
- 2 Dismantle the cardan shaft.
- 3 Push the lock of the cardan shaft half onto the input shaft on the machine until the lock engages.
- 4 Push the lock of the cardan shaft half with the tractor symbol on the guard tube (1) onto the PTO shaft of the tractor until the lock engages.
- 5 Hold both shaft halves next to each other. The articulated shaft halves must not collide with one another. There must be an available sliding distance of (a) 40 mm.
- 6 If necessary, have the cardan shaft shortened by an authorized service specialist.
- 7 Check the permissible cardan shaft angulation. Refer to the cardan shaft's operating manual.
- 8 The clearance around the cardan shaft must be sufficient, otherwise it will be damaged.

### Check profile overlapping for the longest operating position



a = Total profile length of an cardan shaft half

PULB = Profile overlap

#### Implementation

- 1 Establish the longest possible operating position between tractor and machine.
- 2 Pull the cardan shaft apart and hold the two shaft halves next to each other.
- 3 Check profile overlapping.
- 4 The minimum profile overlap (PULB) must be half the total length of the profile (a/2). The greatest possible profile overlap must be sought.
- 5 During transport and when the drive is switched off, the profile overlap (PULB) must be at least 100 mm.
- 6 The protective shield on the tractor and the protective cup on the machine must cover the cardan shaft protective funnels by at least 50 mm.
- 7 If profile overlapping is insufficient in one of the above-mentioned situations, order a new protective tube or a new cardan shaft from your authorized service specialist.

#### Shorten cardan shaft

Only the service specialist is authorised to make adjustments to the cardan shaft. Observe the cardan shaft manufacturer's instructions.



### Implementation

- Hold the articulated shaft halves next to each other and mark the minimum sliding distance of 40 mm from the edge of the inner protective tube to the external protective tube.
- Remove the cardan shaft parts.
- Shorten the exterior protective tube at the marked point.
- Shorten the inner protective tube to the same length as the external protective tube.

- Shorten the external and interior profile tube to the same length as the external protective tube.
- ▶ Round off the cut edges and carefully remove any splinters.
- ► Grease the profile tubes.
- ▶ Insert the shortened cardan shaft halves into one another.
- Check PTO drive.

#### Check PTO drive

## **WARNING**

#### Pulling and severing of body parts!

With a powered PTO shaft, body parts, loose clothing or long hair can be caught and retracted.

- ▶ Instruct all persons to leave the hazard area around the machine prior to the trial run.
- Start the trial run from the tractor cabin.
- ▶ In the event of abnormalities, immediately switch off the PTO from the tractor.

#### Implementation

- 1 Couple machine to tractor.
- 2 Make sure that r.p.m. and direction of rotation of the PTO are correct (see sticker beside the input gearbox).
- 3 Slowly increase the PTO speed to the nominal speed.
  - Switch off the PTO immediately if unusual noises or strong vibrations occur.
- 4 In this case, before continuing to operate the machine, search for faults along the entire drive train and then make repairs.

## **Remove / reposition conveyor cones**

The pre-assembled conveyor cones may be installed on another mower disc if necessary. If the conveyor cones are not required, they may also be replaced by the coverings supplied.



#### Symbol illustration!

The number, appearance and fitting position of the conveyor cones may differ from the picture!

#### Prerequisite

- Flathead screwdriver, 15 mm socket spanner 1x long and 1x short / ratchet.
- 2x covers supplied and 2x screws M10x30 Verbus Ripp 10.9 supplied for fitting the covers if required.
- The machine is standing on even, load-bearing ground in the working position.
- PTO turned off
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

#### Implementation

Remove the covering cap from the conveyor cone and keep handy.



Loosen M10x35 screw, remove conveyor cones and keep both handy. Assemble and tighten the cover supplied with the machine using the M10x30 screw.



## **Limiting chains**

## 

Limiting chains are used if the machine is operated with tractors that are only equipped with single-acting front hydraulics or do not have a reliable memory function for the front hydraulic height.

The limiting chains serve to easily and quickly restore the optimal height position of the front hydraulics in working position. In the event that the height needs to be changed during operation, e.g. because the lifting height is not sufficient in headland position to avoid an obstacle.

#### 

If the height of the lower link has not been set correctly, the limiting chains cannot be set correctly.

#### Adjustment

#### Prerequisite

- All rotating machine parts are stationary.
- Machine is fully attached and secured to a suitable tractor. See "Attaching on tractor" on page 51.
- The machine is standing on even, load-bearing ground in the working position. See "Establish working position based on the road transport position" on page 77.
- Lower link height correctly adjusted.
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

#### Implementation

Attach limiting chains (1) on both sides between the upper linkage and lower linkage and adjust on both sides so that the set height can be maintained as accurately as possible during operation.



Adjust the height of the front hydraulics slightly if necessary so that the chain can be attached.

## **DANGER**

#### Machine parts ejected with high momentum!

The limiting chains make break if the front hydraulics are set to "lower" and the set height is exceeded due to the exertion of force from double-acting hydraulics.

- On tractors with double-acting front hydraulics, only lower depressurized as long as limiting chains are fitted.
- ► Lock front hydraulics in working position before working with fitted limiting chains.
- ▶ If the machine is to be worked on afterwards, lock the front hydraulics.

## **Cutting height**

The cutting height is set by adjusting the upper link.

### 

If the standard cutting height is insufficient, the machine can also be fitted with high-cut skids (option).

## **NOTICE**

#### Damage to skids!

If the upper link is not properly adjusted, the skids will be burdened and scoured on one side.

Adjust the top link so that the skids rest entirely on the ground.

## **NOTICE**

#### Damage to blades and turf!

If the upper link is not properly adjusted, the blades may penetrate uneven areas of ground or cut the fodder too short.

Adjust the top link so that the skids rest entirely on the ground.

## Set cutting height

### Prerequisite

- Machine is fully attached to a suitable tractor
- Tractor lower link correctly set.
- Release and height correctly set.
- The machine is standing on even, load-bearing ground in the working position.

#### Implementation

Adjust the upper link and set the cutting height so that the surface of the skids underneath the cutter bar rest entirely on the ground.



Top link correctly set!



Not like this! Top link incorrectly set!



Not like this! Top link incorrectly set!

- Check the operating setting over the first few meters of mowing based on the cut.
  - ▷ If the cutting height is 50-60 mm, the upper link is correctly set.
  - If the cutting height is less than 50 mm or more than 60 mm, the upper link settings needs to be checked and adjusted if necessary.

## 

An unclean cut can be caused by dull blades, incorrect height setting, incorrectly set relief, wrong PTO speed, wrong PTO direction of rotation and unsuitable drive speed selection!

## Fit conditioner / swath former

#### Prerequisite

- Machine and tractor in parking position on level and stable ground and secured against rolling.
- Conditioner / swath former dismantled.

#### Implementation

- 1 Clean the conditioner/swath former and the mower unit thoroughly, especially the connecting points.
- 2 Insert the conditioner or swath former into the bracket on the mower unit.
- 3 Close retaining bolt.



The conditioners are each attached to the mower unit with 2 retaining bolts.

- 6 = standard retaining bolts with screw and sleeve
- 7 = optional retaining bolts with spring-assisted quick closure
- 4 Remove chassis.
- 5 Adjust and secure conditioner fixing device. The optimum alignment between mower unit and conditioner is adjusted using the conditioner fixing (4). The belt pulleys on the inside of the conditioner must be aligned flush with the belt pulleys of the mower unit.



6 Install belt, tension and attach protective cover.

7 Activate blade key (1) and move belt tensioner to park position. Lay all belts (2) on the belt pulleys.



- 8 Activate blade key (2) and move belt tensioner to working position.
  - ▷ Make sure that the belts (2) run properly in both belt pulleys.
- 9 Reset relief pressure on the mower unit the next time a tractor is attached. See "Mechanical relief" on page 68.

## **Mechanical relief**

The cutter bar weighing approx. 150 kg (75kg on each side) should be positioned on the ground (basic factory setting). The reference values for the basic relief settings can be found in the table below.



#### Cutter unit with swather

Туре	E (mm)	R (mm)	L (mm)
NOVACAT 261 ALPHA MOTION PRO	245	55	25

Туре	E (mm)	R (mm)	L (mm)
NOVACAT 301 ALPHA MOTION PRO	270	25	60
NOVACAT 351 ALPHA MOTION PRO	250	25	90

#### **Cutter unit with Conditioner ED**

Туре	E (mm)	R (mm)	L (mm)
NOVACAT 261 ALPHA MOTION PRO	180	45	45
NOVACAT 301 ALPHA MOTION PRO	205	45	45
NOVACAT 351 ALPHA MOTION PRO	185	25	25

#### Cutter unit with conditioner RC

Туре	E (mm)	R (mm)	L (mm)
NOVACAT 301 ALPHA MOTION PRO	160	45	45
NOVACAT 351 ALPHA MOTION PRO	210	25	25

## 

Increase loading accordingly in wet weather or if the crop is heavy or damp = the cutter bar weight on the ground will be reduced.

The driving speed should be reduced at the same time to prevent the mower unit from jumping at higher driving speeds (due to reduced adaptation to terrain).

## 

#### Damage to health due the manual heavy lifting!

The checking of settings can cause physical strain if carried out manually.

- Do not lift manually.
- Use a crane, forklift truck or similar equipment together with a suitably sized spring balance.

#### Establish the loading

#### Preparation

- Spring balance weighing scales
- Lifting sling
- Crane, forklift truck or similar equipment.

#### Prerequisite

- Park tractor and machine on level and stable ground in working position and secure against rolling.
- Lifting gear height correctly set!
- Cutting height correctly set

- Mower unit in float position
- External protection in working position
- Tractor motor turned off, parking brake applied, ignition key removed and stored during the assembly work.

### Implementation

Complete weighing process: Raise outer mower unit as shown using the hoisting sling and interconnected spring balance.



- If the recorded weight corresponds to the factory setting (75kg) or the current requirement, skip the following procedures and continue with step 4.
- ▷ If the recorded wright does not correspond to the factory setting or the current requirement, adjust loading as described below.
- Remove front frame covering. 44
- Adjust length of spring tensioning screws, as listed in the above tables, according to machine type.
- ▶ Replace front frame covering. 44

## Swath former

A narrow swath is formed when using the swath plates while mowing. This avoids driving over the crop with wide tractor tyres.



Protective apron masked!

Swath former with additional swath discs (option)

#### Adjust working range

#### Prerequisite

- Machine is fully attached and properly secured to a suitable tractor.
- Park tractor and machine on level and stable ground in working position and secure against rolling.

#### Implementation

Adjust the working depth using the bolts (1) in the slotted hole so that the swath discs run under the lower edge of the cutter bar at a maximum distance of 10 mm.





► Adjust the distance from the guide plate using the bolts (2) in the slotted hole so that the front swath disc is 15 - 20 mm away from the guide plate.



• Carry out procedure similarly on both sides of the machine.

### Adjust additional swath discs



#### Z = additional swath discs

#### Prerequisite

• Machine is fully attached and properly secured to a suitable tractor.
• Park tractor and machine on level and stable ground in working position and secure against rolling.

#### Implementation

 Attach compression spring (3) to bored hole (c) if working with large, dense quantities of fodder (maximum spring counter-pressure)



- Attach compression spring (3) in bored hole (b) for standard setting.
- Attach compression spring (3) to bored hole (a) when working with short and generally small quantities of fodder (reduced counter-pressure in the spring).
- Carry out procedure similarly on both sides of the machine.

## Work assignment

### 

#### Danger of injury!

- Verify traffic and operational safety of the machine before starting work. Operate the machine only when all safety devices are properly installed and in working order.
- Correctly and completely couple the machine with the tractor before beginning work.
- Direct people out of the danger area.
- The driving behaviour is significantly impacted by ballast weights and by the size of the attached machines/implements. Avoid fast or sudden cornering, in particular when driving up or down slopes or driving transverse to a slope, due to possible tipping risk.
- Before leaving the tractor pull the parking brake, turn off the motor and put away the ignition key. If necessary, use wheel chocks.

### 

#### Damage to health due to noise!

- ▶ If the noise level exceeds 85dB(A), hearing protection is highly recommended.
- ► If the noise level exceeds 90 dB(A), hearing protection is compulsory.
- You can close the tractor cab to reduce the noise level further.

## 

#### Ejected material (e.g. stones, lumps of earth...) can hit and injure people!

- Particular caution should be taken in stony fields, and near roads and paths.
- Put the protective covers in working position.
- Keep a safe distance while engine is running!

No-one is permitted in the danger zone during the work operation. Direct people out of the danger area.

No-one is permitted to travel on the machine during operation.

Stop the PTO shaft and wait for the drive to come to a standstill before raising the machine.

## **NOTICE**

#### Damage due to driving over obstacles!

- Drive carefully.
- Remove known obstacles if possible before starting work.

#### 

Avoid unnecessary change procedures. Before starting work, consider how the area could be optimally processed.

# Establish road transport position on the basis of the parking position

The machine can be moved to 3 different positions (parking position, road transport position, working position) using the support plate (1) on both sides of the machine. The support plate serves as a transport safeguard in road transport position.

## 

The procedure is presented below without the use of limiting chains! The use of limiting chains is See page 64. described on

## 

#### Swinging machine parts!

If the transport safeguard is not inserted, uncontrolled movements may occur in the machine which could endanger other road users.

Always activate transport safeguard before driving on public roads.



Left support plate (1) and the possible positions. Right support plate similar.

Left = parking position

Centre = working position (support plate [1] inactive)

Right = road transport position / transport safeguard

#### Prerequisite

- Machine is fully attached and secured to a suitable tractor. See "Attaching on tractor" on page 51.
- Park tractor and machine on level and stable ground in parking position and secure against rolling.
- Support plates in parking position.
- External protection in parking position
- Support stand (if available) in parking position.
- Tractor motor turned off, parking brake applied, ignition key removed and stored during the work.

#### Implementation

• Open shut-off lever on hydraulic connection if present.

#### Operation

- ► Raise machine to headland position using the ALPHA MOTION lift cylinder.
  - ▷ This releases the support plates.
- Move support stand, if available, to road transport position.
- Swing support plates (1) on both sides of the machine from the parking position towards to working position.



Left support plate (1) in working position

Raise machine with the ALPHA MOTION lift cylinder towards headland position and swing the support plates on both sides of the machine towards the road transport / parking position.



▷ This causes the support plates (1) to butt against the pivot (B) as shown.



 Raise / lower machine with the ALPHA MOTION until the support plates on both sides of the machine lock into place on the pivot (B) as shown.



- Set tractor control device to float position for ALPHA MOTION lifting cylinder.
  - ▷ If the mower is to be driven afterwards, activate front lifting gear and raise the machine into road transport position again if required.
  - ▷ Lock shut-off lever on the hydraulic connection.

## Establish working position based on the road transport position

The machine can be moved to 3 different positions (parking position, road transport position, working position) using the support plate (1) on both sides of the machine.

#### 

The procedure is presented below without the use of limiting chains! The use of limiting chains is See page 64. described on

#### 

Knocks and bruises over the whole body due to moving machine parts!

▶ Direct persons out of the danger area around the machine before moving the machine.



Left support plate (1) and the possible positions. Right support plate similar.

Left = parking position

Centre = working position (support plate [1] inactive)

Right = road transport position / transport safeguard

#### Prerequisite

- Machine is fully attached and secured to a suitable tractor.
- Park tractor and machine on level and stable ground in road transport position and secure against rolling.

#### Operation

- Support stand (if available) in road transport position.
- Tractor motor turned off, parking brake applied, ignition key removed and stored while working.

#### Implementation

- Lower machine with front lifting gear if required so that the support plates can be easily accessed.
- Activate tractor control device for the ALPHA MOTION lift cylinder and raise the cutter bar until the support plates (1) are released on both sides of the machine and can be moved manually.



Swing support plates (1) on both sides of the machine from the road transport towards to working position.



Left support plate (1) in working position

▷ If the machine is to be subsequently used for mowing, activate the front lifting gear and move the machine to the preset lower link position.

#### 

Height adjustments are not generally necessary during normal operation.

> Swing external protection manually or hydraulically to working position.

## **Mowing work**

#### Prerequisite

- Machine is fully attached to a suitable tractor. See "Attaching on tractor" on page 51.
- Protections in working position.
- Tractor sufficiently ballasted. See "Tractor ballast" on page 53.
- Linkage height correctly set.

- Upper link is set in such a way that the entire surface of the cutter bar rests on the skids. See "Cutting height" on page 65.
- Check blades, blade fixings and mower discs for damage.

#### Implementation

- Move machine in work location to working position. See "Establish working position based on the road transport position" on page 77.
- Slowly engage PTO away from the crop and quickly and smoothly accelerate to full speed.
- Accelerate the tractor and adapt the drive speed to the crop and terrain.

#### Carry out turning manoeuvre

#### 

Do not drive backwards in working position, always raise to headland position first!

#### Implementation

 Reduce speed and raise the machine to headland position at the end of the mowing area.

#### 

The speed of the PTO must be reduced during this process.

- Complete the turn at a reduced speed and control the direction in the unmown area.
- Shortly before the unmown area, lower the machine into the working position, and where possible, do not mow the already mown areas (swathe) again.
- Accelerate the tractor and adapt the drive speed according to the crop and terrain.

# Establish road transport position on the basis of the parking position

The machine can be moved to 3 different positions (parking position, road transport position, working position) using the support plate (1) on both sides of the machine. The support plate serves as a transport interlock in road transport position.

#### 

The procedure is presented below without the use of limiting chains! The use of limiting chains is See page 64. described on

## 

#### Swinging machine parts!

If the transport safeguard is not inserted, uncontrolled movements may occur in the machine which could endanger other road users.

Always activate transport safeguard before driving on public roads.

### Operation



Left support plate (1) and the possible positions. Right support plate similar.

Left = parking position

Centre = working position (support plate [1] inactive)

Right = road transport position / transport interlock

#### Prerequisite

- Machine is fully attached and secured to a suitable tractor.
- Park tractor and machine on level and stable ground in working position and secure against rolling.
- Support plates in working position.
- Support leg (if present) in road transport position.
- Tractor motor turned off, parking brake applied, ignition key removed and stored during the work.

#### Implementation

Swing support plates (1) on both sides of the machine from the parking position towards to road transport position.



Left support plate (1) in working position

▷ The support plate (1) now butts against the bolt (B).



Raise or lower the machine until the spring-loaded support plate locks into place on the pivot with the recess on both sides of the machine.



- In this position the support plate (1) supports the frame in a stationary position compared with the rest of the machine and serves as a transport interlock when driving on public roads.
- Swing the external protections to road transport position if the machine has to be driven on public roads.
  - ▷ Close the stopcock of the hydraulic connections.
  - ▷ Set tractor control device to float position for ALPHA MOTION lifting cylinder.
  - Activate front lifting gear and raise the machine to road transport position again if required.

## Uncoupling

### **DANGER**

Risk of serious injury resulting in death due to machine tipping over

Park the machine only on firm, level ground.

Park the machine stably.

Use the support stands when parking the machine and secure the stands correctly with the safety bolts.

### **DANGER**

#### Pulling and severing of body parts!

Secure the PTO drive against unintentional starting.

### 

#### Crushing of limbs when operating the power lift!

- ▶ Direct people from the risk area around the power lift.
- Do not enter the area between the tractor and the machine when operating the power lift.
- Position the operating element for the tractor control valve in neutral before approaching the power lift.

## 

#### Crushing and rolling over!

Do not remain in the danger area around the tractor and the machine unless the mower combination has been secured against rolling and accidental operation.

- ▶ Instruct bystanders to leave the danger area around the tractor and the machine.
- Remove ignition key and keep safe.
- Apply the emergency brake.
- Place the wheel chocks.

## Establish parking position

The machine can be moved to 3 different positions (parking position, road transport position, working position) using the support plate on both sides of the machine. If the support plate (1) is inactive, the machine will be in working position.

#### 

ED or RC conditioners, if required, can only be expanded in working position!

### 

The procedure is presented below without the use of limiting chains! The use of limiting chains is See page 64. described on

### 

#### Swinging machine parts!

If the transport safeguard is not inserted, uncontrolled movements may occur in the machine which could endanger other road users.

Always activate transport safeguard before driving on public roads.



Left support plate (1) and the possible positions. Right support plate similar.

Left = parking position

Centre = working position (support plate [1] inactive)

Right = road transport position / transport interlock

#### Prerequisite

- Machine is fully attached and secured to a suitable tractor.
- Park tractor and machine on level and stable ground in road transport position and secure against rolling.
- Support plates in working position.
- Support leg (if present) in parking position.
- Tractor motor turned off, parking brake applied, ignition key removed and stored during the work.

#### Implementation

- ▶ Raise machine to headland position if not already done.
- Swing support plates (1) on both sides of the machine from the working position towards to parking position.



Left support plate (1) in working position

- Lower machine and stand on the cutter bar (and on the support leg of a conditioner if available).
  - ▷ The support plate (1) supports the frame underneath and prevents the frame from lowering to working position.

#### Operation



If the machine is subsequently removed from the tractor, attrach / remove expander on the rear protective arpon on both sides of the machine in position (2).



## Uncouple the cardan shaft

#### Prerequisite

- Tractor motor turned off, parking brake applied, ignition key removed and stored.
- Machine is parked on level and stable ground and secured against rolling away.

#### Implementation

- Move the cardan shaft holder to the stop position.
- Unhook the protective retaining chain from the tractor.
- Depending on the cardan shaft version, remove the clamping screw at the tractor end or loosen the spring-loaded coupling device at the tractor end and pull the cardan shaft off the PTO shaft.
- Place the cardan shaft with the front third in the cardan shaft holder. Ensure that the protective cover is not deformed by storage.
- Make sure that cardan shaft is protected from the weather during storage!

## Uncouple the machine from the tractor

### 

Knocks and bruises over the whole body due to moving machine parts!

▶ Direct persons out of the danger area around the machine before moving the machine.

## 

#### Crushing of limbs when operating the power lift!

- Direct people from the risk area around the power lift.
- Do not enter the area between the tractor and the machine when operating the power lift.
- Position the operating element for the tractor control valve in neutral before approaching the power lift.

#### Prerequisite

- Park tractor and machine on level and stable ground in parking position and secure against rolling.
- External protection pivoted to road transport position.
- Support leg (if present) in parking position.
- Tractor motor turned off, parking brake applied, ignition key removed and stored during the work.

#### Implementation

- Activate lifting gear and lower the machine until the cutter bar and support legs are positioned on the ground, if not already done.
- Attach / remove expander on the rear protective apron on both sides of the machine in position (2), if not already done.



- Remove limiting chains and attach to the hitch-on rack.
- Swivel cardan shaft retainer (2) into parking position



Left = parking position Right = working position

Uncouple cardan shaft from the tractor and place in the cardan shaft holder.

#### Operation

- Remove the upper link.
  - ▷ Remove upper link ball if necessary.
- Unlatch lower link on lower link balls and lower lower link.
  - ▷ Remove lower link balls and spacer sleeves if necessary.
- ▶ Place the control device in float position to release pressure in the hydraulic line.

### 

In the event your control unit does not have such floating position, move the control lever to and fro several times with the engine switched off.

- Uncouple hydraulic hose and cable from the tractor, apply dust caps and place rolled up on the hitching frame.
  - Make sure that there are no connections remaining on the machine and drive off slowly with the tractor taking care to observe the coupling point.

## Decommissioning

### **NOTICE**

Corrosion due to unsuitable storage conditions!

- Store the machine in a weather-protected area, dry and not near artificial fertiliser or stabling.
- Apply rust protection to bare machine parts, e.g. hydraulic cylinder piston rods or similar.

## **SENSOSAFE front beam**

## Start menu

The start menu shows the software versions (1) used and offers options for entering other specialised menus in the software via function keys (2).



## 

With the [left arrow, right arrow] keys, more than three function keys are available. Press the corresponding arrow key to display non-visible function keys.

Function	keys
WORK	Work menu
	Set menu
	Keep the key pressed down for 10 seconds to access the configuration menu (only for customer service!)
TEST	Test menu
	Data menu
	Further function keys

## Work menu

The work menu provides a status report on the SENSOSAFE System. You can activate the sensor bars displayed and adjust the sensitivity of the sensors.

The upper part of the screen is the display area. The bottom lines contain the function keys.



Fig. 1

- 1... Bar display active / inactive
- 2... Sensitivity selection display



#### Fig. 2

- 1... Bar display active / inactive
- 2... Sensitivity selection display



#### Fig. 3

- 4... "X" activating bar display
- 5...Display "5" activating single sensor
- 6...Display "P!" Activating pressure too low

#### Display

1 Sensor bar

Displayed sensor bars (1) are configured in the configuration menu.

If the sensor bar is shown with an blank surface, the lifting mechanism is not activated. This means that when activated, the cutter bar is not lifted away from any animals that may be killed.

If the sensor bars are shown with a dark surface, the lifting mechanism is activated.

Even when the lifting mechanism is not active, the sensors are still working and an acoustic signal will be emitted if a wild animal is detected.

In figure 1, only the front sensor bar is configured but inactive. In figure 2, 3 sensor bars are configured but none are active.

If the front sensor bar is activated but not yet active because one of the activation conditions has not been fulfilled, the front sensor bar will flash.

2 Sensor sensitivity

The activation threshold for the preselected sensor bars can be adjusted using the [SENSE] key on the terminal. The sensor bars can be preselected with the function keys. If you have not preselected a sensor bar, the setting will apply to all configured sensor bars.

Setting range [0 (highest sensitivity) - 30 (lowest sensitivity)]

The activation threshold remains stored when the system is restarted: 5

An NDI of 5 is recommended as the default value. If there are too many false activations, you can change the activation threshold here. The default step size is 5.

3 Cardan shaft movement

If the cardan shaft is moving, this will be displayed here.

- 4 Display "X" in the sensor bar means that several sensors of a bar have activated at the same time. The "X" indicates which bar it is (left / right / front).
- 5 Display "5" in the sensor bar means that a single sensor has activated. If several sensors have activated, an "X" is displayed instead of the sensor number.
- 6 Display "P!" Activation pressure too low (only for beams with automatic lifting mechanism)

The system pressure is too low to raise the bar when an animal is detected. Increase the pressure within the system until the pressure deficit display disappears, and then continue.

#### 

Currently, only the front cutter bar has a mechanism to raise the bar when an animal is detected.

Function keys

Preselect / deselect left sensor bar
Preselect / deselect front sensor bar
Preselect / deselect right sensor bar

### 

The function key bar at the bottom of the screen (2) indicates whether a sensor bar is preselected or not.

If you want to change the sensitivity of the sensors for individual bars, preselect this bar. Preselected sensor bars are not filled. Call Sensor bars which have not been preselected have a dark surface.

If you wish to change the sensitivity of all the bars, all the bars must have the same filling. It does not matter whether it is light or dark.

## Set menu

In the set menu, parameters such as screen contrast or the number of sensors on a specific sensor bar can be set.

SET 1	*
<b>45</b> Z	* 50%

#### Adjustment mode

Press the [ 2010] I key to access the setting mode. The function keys for setting adjustments will be displayed.



- Press the [ ] key to select the parameters to be changed A selected parameter is shown with a black background.
- Press the [ ], [ ] keys to change the value of the parameter shown with a black background.
- If you are happy with the setting, press the [ ] key to save the new value.
  If you have selected the wrong parameter, press the [ESC] key to reject the new parameter value and return to the previous menu with the old parameter value.

## Set menu 1 - Contrast and Brightness



#### Display

- Contrast Select Control Screen contrast settings
   Keypad lighting ON / OFF
- 3 Screen brightness as percentage.

Function	key	/s
i unouon	NC 1	

433	Set parameters
	See setting mode section for details
	Next
	Go to next menu

## Set menu 2 - Bars and Sensors



#### Display

1 Left sensor bar

 $[\mathbf{\Omega}]$  with oil pressure tank / [] bar not configured / [S] without oil pressure tank Number of sensors: (26) with 3m bar working width / (31) 3.5m working width The number of sensors per bar is factory set

2 Front sensor bar

 $[\square]$  with oil pressure tank / [] bar not configured / [S] without oil pressure tank Number of sensors: (26) with 3m bar working width / (31) 3.5m working width The number of sensors per bar is factory set

3 Right sensor bar

 $[\mathbf{\Omega}]$  with oil pressure tank / [] bar not configured / [S] without oil pressure tank Number of sensors: (26) with 3m bar working width / (31) 3.5m working width The number of sensors per bar is factory set

### 

At the moment an oil pressure tank is only available for the front bar.

Function keys	
43	Set parameters
	See setting mode section for details
	Back
	Go to previous menu
	Next
	Go to next menu

## Set menu 3 - NA

## Set menu 4 - Oil pressure

SET 4 B1:999	Modul	: Fron	1 3
B2: 999	6	50 🔶	5
43		]	

#### Display

- 1 Sensor bar (at the moment the front bar is the only one with an oil tank)
- 2 Current pressure in oil tank
- 3 Nominal pressure in oil tank
- 4 Current pressure in tank line to tractor
- 5 Pressure threshold in tank line to tractor with mower in working position Value should be less than or equal to the pressure threshold.

Function keys	
433	Set parameters
	See setting mode section for details
	Back
	Go to previous menu

## **TEST MENU**

You can test the sensors and electrical system of your SENSOSAFE in the test menu. But only for the set bar.

Set the bar in test menu 1. Then go to the menu of your choice using the [

## Test menu 1 - preselect sensor bar

TEST 1	
MODUL: Front	
Display	
MODUL: Front	Module
	You can preselect the sensor bar (= module) that you wish to test in the submenus of the test menu.
Function keys	

4	Set parameters See setting mode section for details
	next Go to next menu

## Test menu 2 - sensor values

TEST 2	] Sens	ori	0
WL1 nm	: 0	NDI:	+ 0
WL2 nm	: 0	°C:	0
			<b>V</b> )

### Display

Sensor: 0	Sensor
	Your can preselect the sensor that you would like to check here.
WL1:	Sensor voltage with wavelength 1
WL2:	Sensor voltage with wavelength 2
NDI:	NDI - current sensor activation index
	If the NDI - activation index is above the threshold value set in the WORK menu, the system will be activated. An animal has been detected. The device bleeps.

#### **TEST MENU**

Display	
°C:	°C - circuit board temperature
Function keys	
43	Set parameters
	See setting mode section for details
	Back
	Go to previous menu
	next
	Go to next menu

## Test menu 3 - NA

### Test menu 4 - Oil



#### Display

B1:	Current oil pressure in oil tank
B2:	Current oil pressure in tank line
B3:	Cardan shaft speed
B4:	Working position sensor

## Function keys

Back Go to previous menu
next Go to next menu

## Test menu 5 - operating conditions

You can determine here which conditions have been fulfilled for the use of SENSOSAFE.



Display	
B1	Current oil pressure in oil tank above the set threshold
B2	Current oil pressure in the tank line below the set threshold
B3	☑ PTO shaft speed sufficiently high
B4	Working position sensor activated
active:	$\blacksquare$ Oil tank in work menu tensioned when the conditions B1 to B4 have been fulfilled.

Back
Go to previous menu
next
Go to next menu

## Test menu 6 - voltage monitoring

TEST 6	0,7 U	Min	0,70
X1A CAN	0,00	Min Min	8,80
X1B GAN	0,00	Min	8.80
RESET		00	

	<ol> <li>Row: Control panel supply voltage (current / minimum)</li> </ol>
X1A CAN	2. Row: X1A extension module supply voltage (current / minimum)
	3. Row: Reference voltage source voltage (current / minimum)
X1B CAN	4. Row: X1B extension module supply voltage (current / minimum)
	5. Row: Reference voltage source voltage (current / minimum)

Function k	keys
RESET	Reset
	Press the key to reset the minimum value to the current voltage value.
	Back
	Go to previous menu
	next
	Go to next menu

## Test menu 7 - NA

## Test menu 8 - current software versions

TEST	8 Version	Info
	SENSOSAFE	
Vers.	SC120:	V1.03
Vers.	CAN-IO A:	V0.00
Vers.	CAN-IO B:	<u>V0.00</u>

Display	
SC120:	SENSOSAFE software version with Select Control Terminal
CAN-IO A:	CAN-IO A software version
CAN-IO B:	CAN-IO B software version
Function keys	
	Back
	Go to previous menu
	next
	Go to next menu

You can display data such as the number of activations or working time and reset the partialhour counter in the data menu.

## DATA MENU

## Data menu 1 - working time



#### Display

1		
÷.		
· •	1.7	Ι.
~	a./ .	

Σ

Partial-hour counter
The rotation duration of the PTO shaft is counted
Total-hour counter
The rotation duration of the PTO shaft is counted

Function keys	
X	Reset partial-hour counter
DATA 1 2 0 0.1h 8.9h Χ	<ol> <li>Keep the key pressed down until the end of the count- down</li> <li>The counter is reset at the end of the countdown.</li> </ol>
	next
	Go to next menu

## Data menu 2 - activations



Display	
L: 0	L - number of activations of left sensor bar
F: 0	F - number of activations of front sensor bar

#### DATA MENU

Display		
R: 2	R - number of	activations of right sensor bar
Function k	keys	
		Back
		Go to previous menu

## **CONFIGURATION MENU**

## 

The configuration menu is reserved for the customer service. The entry of incorrect parameter can massively reduce the system functionality and may cause total failure!

## **ERROR DISPLAYS**

## Error 1 - CAN I/O

## 

This fault message cannot be ignored. Call the client service!



Meaning	Causes		
Error in CAN - bus connection	•	Connection to extension module is inter-	
The connection to an extension module has		rupted	
been interrupted	•	Extension module is faulty or missing	

## Error 2 - master bus connection

## 

This fault message cannot be ignored. Call the client service!



Meaning	Са	uses
Fault in the master-bus connection	•	Connection to the master module has been interrupted. The system is not working.
	•	Faulty operating panel

### **Error 3 - sensor number**



Meaning	Causes	
Number of reported sensors does not corre- spond to the number of configured sensors.		The configuration is not correct.
		3.5m bar 31 sensors
	•	Connection to the sensors is interrupted
		Faulty sensor

Functior	n keys
DEAKT	Press this key to suppress the error until the control starts again. Emergency op- eration will then be possible.
X	Press the key to reset the counter.
OK )	Single error acknowledgement
	The next time the error occurs, it will be displayed again.

## Error 4 - oil pressure sensors B1 / B2

ERROR	CAN	I/0	A:	B1
~	<b>_</b> 1D			
DEAKT	)		C	ОК

## 

Do not continue working if this error appears!

It cannot be guaranteed that the lifting mechanism will be activated, which means that wild animals could be driven over.

Meaning	Ca	uses
No feedback from the oil pressure senors in the oil tank and supply line	•	Faulty sensor
	•	Faulty connection

Functior	n keys
DEAKT	Press this key to suppress the error until the control starts again. Emergency operation will then be possible.
	Warning - the system is no longer activated independently.
OK	Single error acknowledgement
	The next time the error occurs, it will be displayed again.

## Error 5 - voltage shortfall

## 

#### Meaning

Voltage supply

- To the extension module
- To a sensor

#### Causes

- Tractor battery voltage too low
- Faulty extension module
- Short circuit
- Wiring fault

Function	keys
DEAKT	Press this key to suppress the error until the control starts again. Emergency operation will then be possible.
OK )	Single error acknowledgement
	The next time the error occurs, it will be displayed again.

## **Error 6** - electrical problem in sensor bar



Meaning	Ca	uses
Exclamation mark above a sensor bar	1.	Connection to the bar has been inter-
An electrical problem has occurred in the sen-		rupted
sor bar.	2.	Module missing or faulty

## 

#### Risk of trailer tipping over

Only use SENSOSAFE on suitable ground. The front end of the tractor is longer than that of the front-mounted mower without SENSOSAFE. This means that the centre of gravity will be further towards the front than is usual with the front-mounted mower.

Drive carefully particularly on slopes and be aware of the additional loading of the rear axle.

### 

#### Knocks and bruises over the whole body!

Implement components can cause movements which are not expected by persons in the hazard area.

Instruct persons to leave the hazard area around the implement before the implement functions are activated.

#### 

SENOSAFE is an optical system which means that the density of the meadow has a significant influence on the recognition quality.

## Start

- ▶ Move SENOSAFE front bar to working position.
  - Keep [move SENOSAFE] button pressed down to switch the hydraulic paths to sensor bar movement.
  - ▷ Move SENOSAFE front bar to working position with the control device
  - ▷ Release [move SENOSAFE] key.
- In work menu: Activate SENOSAFE
  - Press [activate system] key

#### 

If the system is not yet active, check which activation conditions have been fulfilled and which have not in test menu 4 (see software chapter).

## Move bar to working position

- Keep the [move SENOSAFE] key pressed down on the terminal to preselect the sensor bar for the movement. You can release the [move SENOSAFE] key again once the movement is complete.
- Lower the sensor bar with the double-acting control device.

#### Operation

Check the working height: The optimum working height is when the lens is at a distance of 1m (+/- 10 cm) from the ground.

## Move bar to transport position

- Keep the [move SENOSAFE] key pressed down on the terminal to preselect the sensor bar for the movement. You can release the [move SENOSAFE] key again once the movement is complete.
- ► Raise the sensor bar with the double-acting control device.

## **SENOSAFE front configurations**

1. Solo with front mower

### 

Ballast weights (B) are required for these applications to guarantee the functionality of the system.



2. Combined for front and rear mowers (SENSOSAFE and SENSOSAFE 300)





3. Combined for front and rear mowers (SENSOSAFE and SENSOSAFE 1000)

Operation



## Maintain operational readiness

Regular care and maintenance, at least according to the intervals stated in this operator's manual, are basic requirements to ensure that your machine remains powerful, operational and safe for a long time.

## WARNING

Risk of injury when working on the machine!

- Only park implement on even, solid ground.
- Stop the tractor motor, remove and store the ignition key.
- Secure the machine against tipping over and rolling away.
- ▶ Work only with the drive turned off and a fully lowered machine.
- When working on the raised machine, use suitable support elements to prevent machine parts from accidental lowering or swivelling.
- Secure the work area so that bystanders / unauthorized persons cannot enter it.
- ► Use personal safety equipment such as protective glasses and gloves.
- ► After the work is completed, verify the function of safety and protection devices and verify the tightness of all previously loosened screw connections.

## **General tips**

Re-tighten all screws after the first hours of operation!

#### Spare parts

**PÖTTINGER original parts and accessories** are specially designed for the respective machines.

Please be advised that spare parts and accessories not supplied by or tested by us are not approved for use on PÖTTINGER machines.

The installation and use of such products may affect the given characteristics of your machine. The manufacturer accepts no liability whatsoever for damage caused through the use of non-genuine parts and accessories.

The manufacturer accepts no liability for unauthorised modifications to the machine or the use of components and attachments that are not factory fitted to the machine.

#### **Control terminals**

Before wintering the machine, unplug the control terminals and store them in a dry, frostproof area which is protected from direct sunlight. Fully charge battery-operated terminals before winter storage and then check the battery status regularly to prevent its destruction through being totally discharged.

#### Cardan shafts

In principle, the instructions in this manual apply for the maintenance of cardan shafts
If there are no special instructions in this manual, then the instructions in the manual supplied by the relevant cardan shaft manufacturer apply.

#### **Repair welding**

Prior to any welding work on the tractor while the machine is attached, unplug the connectors on the machine's job computer. Prior to any welding work directly on the machine, the plug connections on the job computer must also be disconnected.

#### Battery charging and jump-start procedures

If the tractor battery is charged by means of a charger with the machine attached, all electrical plug connections to the machine must be disconnected beforehand.

If the tractor has to be started by means of a starting aid with the machine attached, all electrical plug connections to the machine must be disconnected beforehand.

# **Cardan shaft maintenance**

Regular maintenance guarantees ease of application and a long lifespan.

### 

For complete information on cleaning and maintenance of the cardan shafts, please refer to the operating and maintenance instructions of the cardan shaft manufacturer enclosed with each cardan shaft!

#### Winter operation

If the cardan shaft is used in winter, the protection tubes must be greased with universal grease to prevent them from freezing.

#### Implementation

- Extend the cardan shaft to the maximum possible length and apply a thin layer of universal grease to the inner protective tube.
- Push the cardan shaft back together.

#### Clean and grease cardan shaft

After a prolonged standstill, always clean and lubricate with brand-name grease before first operation, otherwise lubricate according to the cardan shaft manufacturer's instructions.



Symbol illustration of possible lubrication points

# Daily maintenance

Maintenance is to be carried out at the beginning of each working day before using the machine.

# Check hydraulic system

## 

Hydraulic oil that is discharged under pressure may pierce the skin and cause severe infection!

- Before carrying out maintenance work always relieve pressure in the hydraulic system.
- Use personal protective equipment.
- Before starting operation always verify the wear and damage to the hydraulic system.
- Look for leaks using only appropriate equipment (for example, special spray for identifying leaks). Have any defects remedied immediately in a specialist workshop.
- Never seal off leaks using your hands or other body parts.
- Should injuries occur, contact a doctor immediately.

#### Check for damage and leaks

### **H**TIP

Hydraulic hoses that are older than 5-6 years should be replaced. Use only replacement hoses with the same specifications. See the spare parts list.

#### Prerequisite

• Machine must be standing on level, stable ground and secured against rolling.

• Tractor motor turned off, ignition key removed and stored.

#### Implementation

Check hydraulic system (e.g. hydraulic hoses, pressure reservoir) for damage and leaks and replace components if necessary (see spare parts list).

## 

Possible damage to hydraulic hoses

- Kinks
- Bubble formation
- Porous or cracked hose surface
- · Abrasion points and exposed mesh on the hose sheathing
- ▷ If there are leaks in the screw connection then retighten the respective screw connection where necessary.

# Check / change lighting of lamps

#### 

Faulty lights or lamps must be changed before driving on public highways (with the exception of working lights).

### 

#### LED luminaire maintenance

The illuminants cannot be changed in LED luminaires!

Change the LED-lights when faulty.

#### White/red LED marker lights



#### Care and maintenance

### Yellow LED warning lights USA / CANADA



# Check / replace warning signs, warning triangles, warning sheets



Symbol illustration

- 1 = Warning sign
- 2 = Warning foils (red and yellow)
- 3 = Warning triangle (SMV emblem)

# ВТІР

Warning signs, warning triangles, warning foils consist of a slide (different materials) and a layer of light-reflecting material applied to it.

Design and assembly positions vary depending on the machine and country of destination.

# 

Accident risk due to poorly visible warning signs, warning triangles, warning foils, especially in the dark and with bad visibility.

- Clean soiled warning signs, warning triangles, warning foils before travelling in public traffic areas with the machine.
- Replace damaged warning signs, warning triangles, warning foils before travelling on public roads with the machine.

#### Implementation

- Check that warning signs, warning triangles and warning foils are clean.
  - Remove all dirt using an acid and alcohol-free cleaner, a smooth cloth or sponge and if possible a little warm water.
- Check warning signs, warning triangles and warning foils for damage.
  - Replace all warning signs, warning triangles and warning foils that have been damaged by adverse weather or mechanical influences (see spare parts list).

### 

When replacing the warning signs, be aware of the direction of the warning sign stripes when fitting!

# **Clean sensor lenses**

#### Prerequisite

- Machine is attached correctly and fully, to a suitable tractor.
- Tractor PTO switched off
- Park tractor and machine on level and stable ground in working position.
- Tractor motor turned off, ignition key removed and stored, an parking brake applied.

The sensor lenses register the fawn and trigger the alarm.

Check the cleanliness of the sensor lenses after every field run and wipe them with a soft, damp cloth if necessary.

# Before every season

# **Checking the friction clutch**

Before initial use of a brand-new cardan shaft and after prolonged standstill, the friction clutch function may be impaired as a result of the friction linings sticking together. Therefore, the friction clutch must be checked for correct function before use.

#### Implementation

### 

Under no circumstances endeavour to make clutch linings functional with oils, greases or rust removers!

Measure and note the dimension (L) on the compression spring (for friction clutch K90, K90/4) or on the setting screw (for friction clutch K92E, K92/4E).



- Loosen the screws to relieve the clutch linings.
- ► Turn the clutch a few turns. This will remove impurities from the friction linings.
- Adjust the screws to the previously noted dimension (L).
  The clutch is ready for use again.

# After every season (winter storage)

Machines that are stored without appropriate rust protection may sustain damage when they are put back into operation at the beginning of the season. In order to ensure a long service life, the machine should be protected against dust deposits from artificial fertilizers and seed treatments, and not be stored against the weather in the vicinity of stables.

# **NOTICE**

#### Rust damage on bare machine parts without rust protection!

If bare machine parts are not protected, rusting may cause damage when machines are restarted.

- Clean bare hydraulic cylinder piston rods before storing the machine for the winter and protect with universal grease.
- Clean shaft stubs on gearboxes and cardan shaft profiles before wintering the machine, and protect them with universal grease.
- Lubricate all greasing points according to the maintenance instructions before winter storage. See also chapter on care and maintenance.

# Clean and protect the machine

### Prerequisite

- Machine is to be set over levelled and stable ground and secured against rolling away.
- Tractor motor turned off, ignition key removed and stored.

#### Preparation

- High-pressure cleaner
- Preserving oil

#### Implementation

1 Thoroughly clean with a high-pressure cleaner.

# **NOTICE**

#### High-pressure cleaners can damage machine components.

- Max. water temperature of 80°C / 176°F
- ▶ Do not use round jet nozzles, dirt blasters or power cleaner nozzles.
- Ensure a minimum distance of approx. 30 cm between the high-pressure nozzle and the surface.
- ▶ During cleaning always keep the water jet moving.
- Do not direct water jet directly at electrical or hydraulic components, bearings, suction openings, cardan shafts, stickers and tyres.
- 2 After wet cleaning let the machine dry.
- 3 Correct possible coating damages.
- 4 Oil/spray bare machine components with preservative oil.
- 5 Check that warning symbols are complete and replace if necessary.

# As required

# **Replace / refit reversible cutter blades**

If one side of the reversible blades is worn out, the blades can be remounted rotated 180°.

If both sides of the reversible blades are worn out or the blade is damaged, the blades must be replaced.

Always replace the blades with new blades in twos to avoid imbalances.



- 1 = knife wrench
- 2 = mower disc
- 3 = mower blade
- 4 = blade holder

### 

#### Mower blade breakage and ejected mowing blade parts!

- ▶ Do not repair damaged mower blades, replace them with new ones.
- ► Always change all mower blades at the same time.
- Always replace worn mower blades, never re-sharpen them and likewise with mowing discs / mowing drums, always replace them with new ones to avoid imbalances.
- Always note direction of rotation markings when fitting new mower blades.

#### Preparation

- Remove the blade wrench from the tool box.
- If necessary, mark new mower blades with the corresponding direction of rotation.

#### Prerequisite

- The machine is standing on even, load-bearing ground in the working position.
- Tractor motor turned off, ignition key removed and stored, and parking brake applied.
- Front guard folded up.
- Side side folded up.

#### Mower blades

#### Implementation

Place the knife wrench (1) on any side of the blade between the mowing disc and the blade holder as shown.



Push the blade spanner down and hold it firmly.
 The blade holder is also pushed down and the blade is released.

▷ Loosen and remove the blade in a circular motion.



- Swing the blade spanner back to its original position.
- Clean the contact surfaces of the blade, the blade holder and mowing disc and activate the knife wrench if required.
- ▶ If required, repeat procedure for all blades.

#### Fit the mower blade

#### Prerequisite

- Contact surfaces of the blade, the blade holder and mowing disc have been cleaned.
- With new mower blades, remove the anti-corrosion paint at the attachment points around the hole.

#### Implementation

Place the blade wrench (1) on any side between the mowing disc and the blade holder as shown.



- Push the blade wrench downwards.
  The blade holder is also pushed down and the blade bolt is released.
- ► Fit the mower blade to the blade bolt in the correct direction of rotation for the mower disc in question (see embossed arrow on the blade).



- Swivel blade wrench back to the original position. The blade holder is pressed against the blade contact surface and holds it in position.
- Ensure that the blade can move on the blade bolt and that the blade rests fully on the cutting disc and the blade holder on the blade.



- Remove blade wrench.
- Carry out the same procedure for all cutter blades.



# Check / adjust tine conditioner drive belt tension

#### Preparation

- Box spanner / ratchet, width 13mm (belt guard)
- Open-end or ring spanner, width 30mm (belt tension adjustment)
- New V-belt set (see spare parts list)

#### Prerequisite

- Park tractor and machine on level and stable ground, and secure against rolling.
- Machine parked in working position
- PTO turned off
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

#### Implementation

Adjust belt tension to factory setting: Twist the nut on the tension roller spring and move the lower edge of the underlying disc to the covering with the pointer tip.





# Tine conditioner, tines and tine fastening assembly work

# **NOTICE**

#### Bearing and transmission damage due to unbalance.

- If damaged tines are temporarily removed without replacement, the same number of tines on the 180° opposed rotor side must also be removed.
- If worn tines are replaced with new ones, the same number of tines on the 180° opposed rotor side must also be replaced.
- If worn tine attachments are replaced with new ones, the same number of tine attachments must also be replaced on the 180° opposed rotor side.



Symbol illustration of possible tine assembly positions on the rotor

### Preparation

- Fitting mandrel (special tool SK09977-0379)
- Fitting aid (special tool SK08936-0379)
- Tines and tine holder if required (see spare parts list)

### Prerequisite

- Park tractor and machine on level and stable ground, and secure against rolling.
- PTO turned off
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

### Remove tines and tine attachment

### Implementation

▶ Remove screw (1) and cover (2).



Attach the fitting aid and counteract the pressure of the internal rubber buffer using the fitting aid.



Fitting aid SK08936-0379

 Tap out spring pin with pin punch, adapt applied pressure on fitting aid accordingly if required.



#### Care and maintenance

► Remove fitting aid.



► Remove individual parts.



- Replace faulty individual parts with new ones if required.
- Carry out the same procedure on all conditioner tines if required.

#### Assemble tines and tine attachment



- 1 = bracket
- 2 = rubber buffer
- 3 = guide plate
- 4 = nut M8 DIN6927
- 5 = left tine
- 6 = right tine
- 7 = covering
- 8 = spring pin 13x36mm
- 9 = bolt M8x55 DIN931

#### Implementation

Assemble individual parts paying particular attention to the fitting position of brackets (1), rubber buffers (2) and tines (5-6) as shown!

00



Attach fitting aid and make bore holes for the spring pin (+fitting mandrel) in the covering.



M = fitting mandrel

Push the fitting mandrel into the dowel pin as shown and drive the dowel pin together with the fitting mandrel step by step into the hole. Make sure that the tine bore holes are aligned and the slit in the spring pin points towards the tine tip.



Spring pin assembly position

• Knock the dowel pin in until it stops and remove the fitting mandrel.



► Remove fitting aid.



► Fit and tighten the cover (2) and bolt (1) M8x55 (1).



• Carry out the same procedure on all conditioner tines if required.

# **Replace roller conditioner drive V-belt**

When the drive belts show signs of damage or wear, they must be replaced.

# 

Always replace all V-belts simultaneously!



### Preparation

- Box spanner / ratchet, width 13mm (belt guard)
- Open-end or ring spanner, width 30mm (belt tension adjustment)
- New V-belt set (see spare parts list)

#### Prerequisite

- Park tractor and machine on level and stable ground, and secure against rolling.
- Machine parked in working position
- PTO turned off
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

#### Implementation

► Remove upper belt guard Loosen screws and remove protection.



Symbol illustration

▶ Remove lower belt guard Loosen screws and remove protection.



Symbol illustration

1 Insert blade spanner (K) into the guide with the handle side and press down until the lever engages in the plate (H).

# 

### Blow from the blade spanner if the spanner is released too early!

- Hold the blade spanner firmly whilst pivoting the spring-loaded belt tensioner roller out of the working position.
- Do not release the blade spanner until the pressure on the spanner is equal to zero by locking in the plate (H).



Symbol illustration



Symbol illustration

- 2 Replace all V-belts with new ones.
- 3 Remove blade spanner (K) from the plate (H) and slowly pivot upwards so that the tension roller is pressed against the V-belts.

### 

#### Blow from the blade spanner if the spanner is released too early!

- Hold the blade spanner firmly whilst pivoting the spring-loaded belt tensioner roll into the operating position.
- Do not loosen and remove the blade spanner until the pressure on the spanner is equal to zero.
- ▷ Make sure that the belts do not overlap the rollers.
- 4 Check tensioner pulley run
- 5 Adjust belt tension to factory setting: Twist the nut on the top of the tension roller spring and set the length of the threaded bolt (X) = 173mm.



6 Reassemble the machine unit in reverse sequence.

# Replace toothed belt conditioning roller

### **HR**TIP

Have the toothed belt replaced by a specialist dealer!

The toothed belt tension cannot be properly adjusted during a repair without a frequency measurement tool! See repair instructions.

# After service life

# After 1 operating hour

#### Check taper bushing seating

Taper bushings are used as fastening elements on conditioner belt drives (ED, RCB, RC), swath merging systems (crossflow) and cutter bars.



Conditioner drive symbol illustration

- 1 = stud bolt (lock)
- 2 = forcing hole (number dependent on design)
- 3 = taper bushing (bushing number lasered onto the front)
- 4 = stud bolt (lock)
- 5 = belt pulley

#### Preparation

Torque wrench

### Prerequisite

- Park tractor and machine on level and stable ground in working position.
- Tractor PTO switched off
- Tractor motor turned off, ignition key removed and stored, an parking brake applied.
- Drive shafts uncoupled if necessary.
- Covering removed from transmission to be verified.

#### Implementation

- ► Read and note lasered bushing numbers on all installed taper bushings.
- Retighten stud bolts (1) and (4) with torque wrench according to following table corresponding to the lasered bushing number.
- Check whether the forcing hole (2) is filled with grease (numbers depending on design).
  - ▷ If this is not the case, fill the bore hole with universal grease right up to the edge.

## 

Filling with grease prevents the penetration of foreign bodies which can cause problems during assembly work

Bushing no.:	Key width (mm)	No. of screws	Thread size (inches)	Torque (Nm)
1008	3	2	1/4	5.6
1108	3	2	1/4	5.6
1210	5	2	3/8	20
1215	5	2	3/8	20
1610	5	2	3/8	20
1615	5	2	3/*8	20
2012	6	2	7/16	30
2017	6	2	7/16	30
2517	6	2	1/2	50
2525	6	2	1/2	50
3020	8	2	5/8	90
3030	8	2	5/8	90
3525	10	3	1/2	90
3535	10	3	1/2	90

### **Retighten blade bolts**

# 

Mower discs with attached conveyor drums or conical discs will also be referred to simply as mower discs below!



Illustration of mower disc without conveyor drum and conical disc

- 1 = mower blade
- 2 = blade bolt

#### Preparation

- 17mm box spanner
- Torque wrench adjustable to at least 120Nm tightening torque.

#### Prerequisite

- The machine is standing on even, load-bearing ground in the working position.
- Tractor motor turned off, ignition key removed and stored, an parking brake applied.
- Front protection folded up (if possible).
- Side protection folded up (if possible).

#### Implementation

- Start on the very outer edge of the cutter bar and retighten both blade bolts on the outermost cutter disc to 120Nm before moving to the next adjacent cutter disc.
  - Repeat the process as many times are necessary until all blade bolts on all cutter discs in the entire mower unit have been checked.

# After 8 hours of operation

#### Check / correct conditioner drive and tension roller run

Check after the first use and after every modification to the drive (e.g. when changing the V-belt).

# **NOTICE**

### Damage due to diagonally running tensioner pulley!

► The tensioner pulley must always run absolutely parallel to the belt pulley.

### 

Carry out the procedure in the same way on all conditioner variants.



1 = belt guard tine conditioner

2 = belt guard roller conditioner

### Preparation

- Tool
- Check ruler

### Prerequisite

- Park tractor and machine on level and stable ground in working position and secure against rolling.
- PTO turned off
- Tractor motor turned off, parking brake applied, ignition key removed and stored during the work.

#### Implementation

- 1 Remove upper and lower parts of belt guard
- 2 Check the tension roller run by using the check ruler.



- ▷ If the tension roller runs exactly parallel, continue with step 8.
- ▷ If the tension roller does not run exactly parallel, continue with the next step.
- 3 Loosen the eccentric with an Allen key and adjust the eccentric sleeve with an open-end wrench as shown in the picture.



- 4 Tighten the Allen screw without turning the eccentric sleeve.
- 5 Recheck that tension roller is running parallel using the check ruler.
  - ▷ If the tension roller runs exactly parallel, continue with step 8.
  - ▷ If the tension roller does not run exactly parallel, then repeat the procedure from step 4.
- 6 Carry out assembly in the reverse order!
- 7 Repeat procedure correspondingly on both sides of the machine.

# Every 50 operating hours

#### Mowing blade holder wear check

To fully inspect the mower blade holder, it is necessary to remove the mower blades and blade bolts.

### 

If the machine is frequently operated on stony ground or under difficult operating conditions, the interval for checking wear should be shortened.

### **CAUTION**

#### Mower blade holder or blade bolt breakage and ejected mower machine parts!

- ▶ Worn blade bolts must not be reused but replaced with new ones.
- ▶ Worn mower blade holders must not be reused but replaced with new ones.
- ▶ Do not reuse blade bolts that have become loose but replace them with new ones.

#### Preparation

- Calipers
- 17mm box spanner
- Blade bolts and nuts as required (see spare parts list).

#### Prerequisite

- The machine is standing on even, load-bearing ground in the working position.
- Tractor motor turned off, ignition key removed and stored, an parking brake applied.
- Mower blades dismantled.
- Front protection folded up (if possible).
- Side protection folded up (if possible).

#### Remove blade bolts

### **BR**TIP

If it is confirmed that the blade bolts have obliviously already worked loose, replace the blade bolt with a new bolt and nut rather than carrying out the check.

- Unscrew nut anti-clockwise.
- Remove the blade bolt downwards through the hole in the blade holder.



#### Check / fit the blade bolt

#### 

If it is confirmed before dismantling that the blade bolts have obliviously already worked loose, replace the blade bolt with a new bolt and nut rather than carrying out the check.

Re-measure the diameter at the widest part of the blade bolt cone. The minimum diameter should not be less than 15mm.



B = blade bolt head

- ▷ If the minimum diameter has already been almost reached or even fallen short of, the blade bolt must be replaced with a new bolt immediately.
- If the minimum diameter has not been almost reached, the bolt can still be used unless the blade bolt head shows signs of wear.
- Check blade bolt head (B).
  - If the blade bolt head shows signs of wear, the blade bolts must be replaced in any event.
  - If the blade bolt does not show any signs of wear whatsoever, the blade bolt can still be used unless excessive wear and tear was detected on the bolt cone at the start of the verification.
- Remove any dirt from the area around the blade bolt and the hole.
- ▶ Refit the blade bolt in the reverse sequence to its removal and tighten to 120Nm.
- ▶ The cutter blade can then be reassembled if required (observing direction of rotation).

#### Check mower blade holder

► The mower blade holder may show some traces of wear and tear in the area of the holes but this must not reach the extent of the marking as shown in the picture below.



The red marking shows unacceptable traces of wear on one of the mower blade holders. Arrow = Rotation direction during operation.

- If traces of wear and tear are found in the extent shown in the picture, the machine must no longer be used. Have the mower blade holder replaced with a new holder immediately by a specialist dealer.
  - ▷ Replace mower blade holders in twos for each mower disc to avoid imbalances.
- Carry out the inspection on all mower blade holders in the same way.

#### Care and maintenance

#### Roller conditioner toothed belt drive (variant) cleaning

#### Preparation

- Vacuum cleaner if required
- Air-blow gun compressed pressure
- Use personal safety equipment such as a dust mask and safety goggles.

#### Prerequisite

- Park tractor and machine on level and stable ground, and secure against rolling.
- Machine parked in working position
- PTO turned off
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

#### Implementation

Screw off covers (A1) and (A2) as shown.



- ▶ Thoroughly clean / vacuum the case with compressed air.
- Reattach the covers and tighten the screws.

#### Toothed belt tension tine conditioner

#### 

The toothed belt tension does not change noticeably during normal operation, but in the event of a fault it cannot be properly adjusted without frequency measurement.

In case of problems with tine conditioner which can only stem from the toothed belt drive (rubber rollers colliding in the gearing, etc.), do not continue working but contact a specialist dealer to overhaul the machine.

### Check toothed belt tension (long belt)

### 

Checking the toothed belt tension on the longer of the two toothed belts should only be taken as a guide in the detection of any damage to the belt.

The belt tension can only be checked on long toothed belts in the manner described below.

Torn belts can be identified by inspecting the cleaning openings in the belt drive.

### Prerequisite

- Park tractor and machine on level and stable ground, and secure against rolling.
- Machine parked in working position
- PTO turned off
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

### Implementation

1 Try to twist the sleeve (H) by hand (belt tensioning device for the long timing belt).



Belt drive view with transparent belt cover

- ▷ If the sleeve can be twisted and there is no play other along the longitudinal axis, then the setting is largely correct and no further action is required.
- ▷ If the sleeve can be twisted very slightly and there is extra play along the longitudinal axis, continue with step 2.
- 2 Have the machine overhauled by a specialist dealer.

#### Lubricate roller conditioner roller bearings.

# 

Damage to bearings due to contamination entering through the lubrication nipple!

- Clean lubrication nipple before the lubrication process.
- Clean lubricant nozzle before the lubrication process.
- Contaminated lubricant should not be used and should be disposed of correctly.

### Care and maintenance

#### Prerequisite

- Park tractor and machine on level and stable ground in working position.
- Tractor PTO switched off
- Tractor motor turned off, ignition key removed and stored, an parking brake applied.

### Implementation

• Grease all available lubrication points on V-belt drive side.

# Lubrication nipple (S)



• Grease all available lubrication points on toothed belt drive side / chain drive side.

### Lubrication nipple (S)



# For the first time after 50 operating hours and then every 100 operating hours

#### Change cutter bar oil

#### 

So that the oil can be drained as completely as possible, it is necessary to bring it almost up to operating temperature.

We recommend carrying out the change on warm days of >15°C.



- 1 = Conveyor drum
- 2 = Conical disc
- 3 = Mower disc
- 4 = Cutter bar
- 5 = Skid
- 6 = Cutter bar
- 7 = Input gear
- 8 = Oil drain plug

#### Preparation

- Tool
- Wooden block or similar item for positioning
- Cleaning paper or similar
- Oil catch pan with adequate capacity (at least 4 litres)
- New gear oil operating material code (III) according to operation material specifications / lubrication plan

#### Prerequisite

- Oil has nearly reached operating temperature
- Machine and tractor on level and stable ground and secured against rolling.
- Machinery parked in working position

# 

### Machine slipping and falling!

▶ Lift or prop up the machine so that it cannot slip / fall down.

#### Implementation

- Raise machine using front lifting gear until the cutter bar no longer touches the ground and the oil catch pan can be placed underneath.
- ► Jack up the right side of the cutter bar using wooden blocks or similar items so that the left side reaches the maximum possible cutter bar inclination when the front lifting gear is lowered. The cutter bar should not come into contact with the waste oil catch pan during this process.

# 

Otherwise it would not be possible to drain the oil completely!



A = Waste oil catch pan

H = Wooden block or similar item

- Clean dirt away from the area around the drain plug.
- Clean dirt away from the area around the filler plug.
- Open drain plug and drain lubricant completely.
- ▶ Wait until the lubricant has stopped dripping out of the opening in the drain plug.
- ► Re-insert and tighten the drain plug.
- Add new gear oil as described in chapter "Check / replenish cutter bar oil level". See "Check / replenish cutter bar oil level" on page 147.
- ▶ Repeat procedure correspondingly on both sides of the machine.
- Dispose of cleaning paper which has been contaminated with lubricant correctly.
- Dispose of lubricant correctly.

#### Change cutter bar drive angular gear oil

### 

So that the oil can be drained as completely as possible, it is necessary to bring it almost up to operating temperature.

We recommend carrying out the change on warm days of >15°C.



#### Preparation

- Tool
- 0.8 litres of new gear oil operating material code (III) according to operation material specifications / lubrication plan
- Waste oil collecting pan with a minimum capacity of 1.5 litres.
- Cleaning paper or similar

#### Precondition

- Machine is attached correctly and fully, to a suitable tractor.
- Gear oil close to operating temperature.
- Tractor PTO switched off
- Park tractor and machine on level and stable ground in working position.
- Tractor motor turned off, ignition key removed and stored, an parking brake applied.

#### Care and maintenance



1= Oil level control plug with dipstick

2 = Oil drain plug

#### Implementation

- 1 Clean dirt away from the area around the oil level inspection plug.
- 2 Clean dirt away from the area around the drain plug.
- 3 Loosen oil level inspection plug, but do not remove yet.
- 4 Place catch pan underneath.
- 5 Open drain plug and drain lubricant completely.
- 6 Reinsert cleaned oil drain plug and tighten.
- 7 Clean oil residue away from the area around the drain plug.
- 8 Remove oil level inspection plug and pour new transmission oil in gradually, up to the top mark on the dipstick.
- 9 Check oil level continuously during filling.

### **NOTICE**

#### Maximum level has been exceeded!

- Fill gears up to the maximum level of the upper marking on the measuring rod.
- 10 Clean oil level inspection plug and screw back in with a new seal, and tighten.
- 11 Clean oil residue away from the area around the oil level inspection plug.
- 12 Dispose of lubricant, lubricant contaminated cleaning paper and other lubricant residues properly.

#### Change mower input gear oil

#### 

So that the oil can be drained as completely as possible, it is necessary to bring it almost up to operating temperature.

We recommend carrying out the change on warm days of >15°C.



### Preparation

- Tool
- 0.85 litres of new gear oil operating material code (III) according to operation material specifications / lubrication plan
- Waste oil collecting pan with a minimum capacity of 1.5 litres.
- Cleaning paper or similar

#### Precondition

- Machine is attached correctly and fully, to a suitable tractor.
- Gear oil close to operating temperature.
- Tractor PTO switched off
- Park tractor and machine on level and stable ground in working position.
- Tractor motor turned off, ignition key removed and stored, an parking brake applied.



1= Oil level control plug with dipstick

2 = Oil drain plug

#### Implementation

- 1 Clean dirt away from the area around the oil level inspection plug.
- 2 Clean dirt away from the area around the drain plug.
- 3 Loosen oil level inspection plug, but do not remove yet.
- 4 Place catch pan underneath.
- 5 Open drain plug and drain lubricant completely.
- 6 Reinsert cleaned oil drain plug and tighten.
- 7 Clean oil residue away from the area around the drain plug.
- 8 Remove oil level inspection plug and pour new transmission oil in gradually, up to the top mark on the dipstick.
- 9 Check oil level continuously during filling.

### 

#### Maximum level has been exceeded!

- Fill gears up to the maximum level of the upper marking on the measuring rod.
- 10 Clean oil level inspection plug and screw back in with a new seal, and tighten.
- 11 Clean oil residue away from the area around the oil level inspection plug.
- 12 Dispose of lubricant, lubricant contaminated cleaning paper and other lubricant residues properly.

# **Every 100 hectares**

#### **Clean primary drive conditioner**

#### Preparation

- Vacuum cleaner if required
- Air-blow gun compressed pressure
- Use personal safety equipment such as a dust mask and safety goggles.


- 1 = Tine conditioner primary drive
- 2 = Roller conditioner primary drive

#### Prerequisite

- Park tractor and machine on level and stable ground in parking position and secure against rolling.
- PTO turned off
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

#### Implementation

- Unscrew covers.
- ► Thoroughly clean / vacuum the case with compressed air.
- Reattach the covers and tighten the screws.

## **Every 100 operating hours**

#### Change conditioner gear oil

Gearing is always located on the inner side of the conditioner.

#### 

So that the oil can be drained as completely as possible, it is necessary to bring it almost up to operating temperature.

We recommend carrying out the change on warm days of >15°C.



A = Waste oil drain plug

E = Filler plug

## 

#### Burns due to hot surfaces and operating materials!

- ► Use protective gloves and eye protection.
- ► Allow housing and lubricant to cool down if possible.

#### Preparation

- 0.7 litre gear oil (fully synthetic gear oil, SAE 75W 90 according to API-GL 5)
- Waste oil collecting pan with a minimum capacity of 1.5 litres.
- Cleaning paper or similar

#### Prerequisite

- Park tractor and machine on level and stable ground, and secure against rolling.
- Machine parked in working position
- PTO turned off
- Tractor motor turned off, parking brake applied, ignition key removed and stored.

#### Implementation

- Clean oil residue away from the area around the drain plug.
- Clean dirt away from the area around the filler plug.
- Open drain plug and drain lubricant completely.
- ▶ Re-insert and tighten the drain plug.
- Remove filler plug.
- Fill with fresh lubricant.
- Clean the filler plug, reinsert and tighten.
- Clean dirt away from the area around the filler plug.

Dispose of lubricant, lubricant contaminated cleaning paper and other lubricant residues properly.

### x per year

#### Check / replenish cutter bar oil level



- 1 = Conveyor drum
- 2 = Conical disc
- 3 = mower disc
- 4 = Cutter bar
- 5 = Skid
- 6 = Cutter bar
- 7 = Input gear
- 8 = Oil drain plug

#### Preparation

- Tool
- Cleaning paper or similar
- New gear oil operating material code (III) according to operation material specifications / lubrication plan

#### Precondition

- Machine is attached correctly and fully, to a suitable tractor.
- Park tractor and machine on level and stable ground in working position.
- Tractor motor turned off, ignition key removed and stored, an parking brake applied.
- Machine secured against unintentional lowering by positioning.

#### Care and maintenance

• Gear oil close to operating temperature.

## 

#### Machine slipping and falling!

▶ Lift or prop up the machine so that it cannot slip / fall down.

#### Implementation

Prop up the cutter bar on the long side opposite the oil drain plug, as shown.



X3 = X2 + X1

X1 = Distance from ground to upper skid edge.

X2 = 300mm = Distance from the left upper skid edge to the right upper skid edge.

- ▷ Let the side of the cutter bar where the oil filler plug is located rest on the ground.
- ► Lift the other side of the mower bar (X1) and support with a suitable prop.
- When propping up, make sure that the cutter bar is not inclined on the broad side but is in a fully horizontal position. Otherwise the oil level shown at the oil filler plug will be incorrect.



Symbol illustration Horizontally incorrectly aligned!



Symbol illustration Horizontally correctly aligned!

- Clean dirt away from the area around the filler plug.
- ► Leave cutter bar in this position for at least 15 minutes so that the transmission oil collects in the lower part of the cutter bar.
- ▶ Remove oil filler plug and check oil level.
  - Insert a clean, firm object (e.g. screwdriver or straight piece of wire) as a dipstick vertically in line with the hole close to the "lower" edge of the hole as shown until it stops. Remove improvised measuring stick and measure the oil level.

The distance between the lower edge of the measuring stick and the upper edge of the oil fill level (= measurement X) should be a maximum of 16mm.



X = 16mm

- If the oil level is less than 16mm, gradually replenish the oil to the required level.
- $\triangleright$  If the oil level is already 16mm, continue with the next step.
- Clean the filler plug, reinsert and tighten.
- Clean dirt away from the area around the filler plug.
- Dispose of cleaning paper which has been contaminated with lubricant correctly.

# **Every 6 years**

#### Hydraulic hoses

#### 

Hydraulic oil that is discharged under pressure may penetrate the skin and cause severe infection.

- Depressurise the hydraulic system before connecting or disconnecting the hydraulic hoses.
- Depressurise the hydraulic system before carrying out maintenance and repair work on the hydraulics.
- Should injuries occur, contact a doctor immediately.

Hydraulic hoses that are older than 6 years should be replaced. Only use replacement hoses having the same specification, as well as adopting attachment points and attachment methods of the "old" hoses or transferring them to the new hoses. See Spare Parts List also.

# **Lubrication plans**

#### Lubrication plan symbol explanation

Symbol	Explanation
X <sup>h</sup>	Every "X" operating hours
1 J	Annually
100 ha	Every 100 hectares
	Grease
	Oil
$\overline{\mathbb{V}}$	The number and position of the grease nipple
(III), (IV)	Operating materials code (see Operating materials specifications)
[I]	Quantity of operating materials in litres
	Observe the manufacturer's safety instructions!

#### ALPHA MOTION PRO



# Equipment specification

## 

Minimum quality standards specified by PÖTTINGER Landtechnik G.m.b.H. for equipment used on PÖTTINGER machines.

# **NOTICE**

### Danger of machinery damage!

If operating materials with lower quality standards than those specified are used, the machine may become damaged.

Equipment refer- ence number	Designation	Specification
According to lubri- cation plan		
I	Hydraulic oil	HLP DIN 51524 Section 2
II	Motor oil	SAE 30 according to API CD/SF
III	Gear oil	SAE 90 or SAE 85W - 140 according to API- GL 4 or API-GL 5
IV	Lithium grease	DIN 51 502, KP 2K
V	Liquid grease for gears	DIN 51 502:GOH
VI	Complex grease	DIN 51 502:KP 1R
VII	Gear oil	SAE 90 or SAE 85W - 140 according to API- GL 5

# Working materials and fill quantities

Where	Operat- ing ma- terials code	Designation	Specification	Quantity
Lubricating points (also with grease nipples)	(IV)	Lithium uni- versal grease	NLGI 12	If required
Cutter bar	(111)	Gear oil	SAE 90 or SAE 85W - 140 ac- cording to API-GL 4 or API-GL 5	NOVACAT 301 - 3.0 li- tres
Cutter bar drive angular gear	(111)	Gear oil	SAE 90 or SAE 85W - 140 ac- cording to API-GL 4 or API-GL 5	0.8 litres
Mower input gear	(111)	Gear oil	SAE 90 or SAE 85W - 140 ac- cording to API-GL 4 or API-GL 5	0.85 litres

# **Operating materials**

Where	Operat- ing ma- terials code	Designation	Specification	Quantity
Conditioner gearing	-	Gear oil	Fully synthetic lubricating oil for high temperature lubrica- tion, ISO-VG class 220	0.7 litres

# Cardan shaft - cam clutch

The cam clutch is an overload clutch that completely disengages the torque in the event of an overload. Therefore, no torque is transmitted at the moment of overload. The prerequisite for the intended function is that the cardan shaft with the overload clutch is run in the prescribed direction of rotation and in the prescribed installation position.

The disengaged clutch automatically engages again when the PTO speed drops to around 200 rpm, without the cardan shaft coming to a complete standstill.

#### 

Frequent cam clutch engagements reduce the service life due to increased wear.

As a rule, do not allow the cam clutch to rotate for more than 10 seconds.

# What to do if...

This section describes possible faults and remedies. If the recommended measures are not sufficient to remedy the fault, please contact your service dealer.

## **WARNING**

#### Risk of injury when working on the machine!

- Only park implement on even, solid ground.
- Stop the tractor motor, remove and store the ignition key.
- Secure the machine against tipping over and rolling away.
- ► Work only with the drive turned off and a fully lowered machine.
- When working on the raised machine, use suitable support elements to prevent machine parts from accidental lowering or swivelling.
- Secure the work area so that bystanders / unauthorized persons cannot enter it.
- Use personal safety equipment such as protective glasses and gloves.
- After the work is completed, verify the function of safety and protection devices and verify the tightness of all previously loosened screw connections.

# Lighting

#### The lighting does not work

#### **Causes and remedies**

- Defective fuse.
  - ▷ Replace with fuse of identical specification.
- Present contact error of the cable.
  - $\triangleright$  Turn lighting off and on again.
  - ▷ Verify correct connection of the cable connector.

▷ Defective cable. Have it replaced or repaired by the service workshop.

#### The lighting does not work completely

- Defective lamp.
  - ▷ Replace with lamps of identical specification.
  - ▷ With LED lighting the lamps may be impossible to exchange (for example, side marking lamps). In that case the lamps must be replaced in a service workshop.
- Present contact error of the cable.
  - ▷ Turn lighting off and on again.
  - ▷ Verify correct connection of the cable connector.
  - > Defective cable. Have it replaced or repaired by the service workshop.
- Defective fuse.
  - ▷ Replace with fuse of identical specification.
- Defective relay. Have it replaced by the service workshop.

## **Conditioner blockages**

Different weather and field conditions can result in different forage friction and adhesion properties. This can also lead to situations in which blockages occur which would not normally be problematic.

#### 

Unsuitable drive speeds increase the possibility of blockages and reduce the conditioner quality.

### 

#### Risk of injury when working on the machine!

- Only park implement on even, solid ground.
- Stop the tractor motor, remove and store the ignition key.
- Secure the machine against tipping over and rolling away.
- ▶ Work only with the drive turned off and a fully lowered machine.
- When working on the raised machine, use suitable support elements to prevent machine parts from accidental lowering or swivelling.
- Secure the work area so that bystanders / unauthorized persons cannot enter it.
- Use personal safety equipment such as protective glasses and gloves.
- After the work is completed, verify the function of safety and protection devices and verify the tightness of all previously loosened screw connections.

#### 

If the blockage is difficult to remove, it can be helpful to break down the fodder manually.

#### Help and advice

#### Remove blockages in the tine conditioner



2

4-level adjustment lever for conditioning intensity

3

Adjustment lever for left swath plate (swath width)

4

Adjustment lever for right swath plate (swath width)

5

Belt tensioner transmission

#### Prerequisite

• Park tractor and machine on level and stable ground, and secure against rolling.

#### Implementation

Memorise the conditioning intensity of the tine conditioner and set to level "0" using the adjustment lever (2) to make it easier to remove blockages.



- Break down the fodder if required and remove without damaging the conditioner tines.
- Reset the conditioning intensity on the adjustment lever (2) of the tine conditioner to the previous setting using the adjustment lever (2).

#### Remove blockage in tine conditioner



1 = Adjusting spring for conditioning intensity and setting for distance between rollers.

#### Implementation

Measure and not spring length in both spring compressors.



Example of left spring compressor

## **WARNING**

#### **Ejection of machine parts**

If the nuts are removed from the spring compressor, parts of the spring compressor may be ejected due to the sudden reduction in spring tension.

- ▶ Do not remove nuts from the spring compressors during adjustment work!
- Reduce the conditioning intensity of the conditioner to make it easier to remove blockages: Twist the nuts (3) on the spring compressors to reduce the spring tension but do not remove the nuts completely!



- Break down the fodder if required and remove without damaging the rollers.
- Reset the spring compressors on both sides to the previously measured spring length (=tension) without resetting according to factory specifications.

## Vibrations with tine conditioner during mowing operation

If tines are lost from the tine conditioner, the conditioner rotor will become unbalanced and noticeable, partially audible, vibrations will occur during operation.

### **NOTICE**

#### Damage to bearings and guides due to unbalance!

Rectify unbalance as soon as it occurs.

#### Rectify unbalance in tine conditioner

#### Prerequisite

- Park tractor and machine on level and stable ground in working position and secure against rolling.
- Tractor motor turned off, parking brake applied, ignition key removed and stored during the work.

#### Implementation

- ► Turn tine rotor manually and carry out visual control on the tines.
  - ▷ Replace lost or damaged tines / tine fastenings immediately.
- Carry out assembly work according to maintenance instructions. See "Tine conditioner, tines and tine fastening assembly work" on page 120.

# **Electric**

# **Select Control Terminal**



# **Hydraulics**

# Hydraulic plan



1...Dual-action hydraulic connection

## 2...Sensor pivoting

- 3...Lifting
- 4...Dual-action hydraulic connection
- 5...Dual-action hydraulic connection for SENSOSAFE bars
- 6...Dual-action hydraulic connection

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# Secure towing of loads

Stopping distance increases with speed and weight of towed loads, and on slopes. Towed loads with or without brakes that are too heavy for the tractor or are towed too fast can cause loss of control. Consider the total weight of the equipment and its load. Observe these recommended maximum road speeds, or local speed limits which may be lower. Also reduce your speed in poor road conditions or poor weather.

- If towed equipment does not have brakes, do not travel more than 32 km/h (20 mph) and do not tow loads more than 1.5 times the tractor weight.
- If towed equipment has a brake system with a control line and a supplementary line, do not travel more than 40 km/h (25 mph) and do not tow loads more than 4.5 times the tractor weight.
- If towed equipment has a brake system with a control line only, do not travel more than 40 km/h (25 mph) and do not tow loads more than 1.5 times the tractor weight.

In case you do not know which brake system your implement has, consult the manual, ask the owner or your dealer. While uncertain about the type of brake system, do not allow the tow load to exceed 1.5 times the tractor weight.

Ensure the load does not exceed the recommended weight ratio. Add ballast to recommended maximum for tractor, lighten the load, or get a heavier towing unit. The tractor must be heavy and powerful enough with adequate braking power for the towed load. Use additional caution when towing loads under adverse surface conditions, when turning, and on inclines. Supplement to USA / CANADA operating instructions

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