



Silage trailers

CAREX 370 S
CAREX 390 K

CAREX 410 S
CAREX 430 K

CAREX 450 S
CAREX 470 K

CAREX 490 S
CAREX 510 K

SHUTTLE 370 S
SHUTTLE 390 K

SHUTTLE 410 S
SHUTTLE 430 K

SHUTTLE 450 S
SHUTTLE 470 K

SHUTTLE 490 S
SHUTTLE 510 K

Series: 2-139 - ...
Type: SL11
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1 General

1.1 Identification

- | | | | | | | | |
|--------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | CAREX 370 S | <input type="checkbox"/> | CAREX 390 K | <input type="checkbox"/> | CAREX 410 S | <input type="checkbox"/> | CAREX 430 K |
| <input type="checkbox"/> | CAREX 450 S | <input type="checkbox"/> | CAREX 470 K | <input type="checkbox"/> | CAREX 490 S | <input type="checkbox"/> | CAREX 510 K |
| <input type="checkbox"/> | SHUTTLE 370 S | <input type="checkbox"/> | SHUTTLE 390 K | <input type="checkbox"/> | SHUTTLE 410 S | <input type="checkbox"/> | SHUTTLE 430 K |
| <input type="checkbox"/> | SHUTTLE 450 S | <input type="checkbox"/> | SHUTTLE 470 K | <input type="checkbox"/> | SHUTTLE 490 S | <input type="checkbox"/> | SHUTTLE 510 K |

Type: _____

Vehicle identification number (VIN): _____

Delivery date: _____

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1.5 Preface

Dear customer,

You have made a good choice. We would like to thank you for placing your trust in us by purchasing a Bergmann vehicle. As a supplier of agricultural machinery, we offer you efficient machinery at high quality standards with the service to match.

These operating instructions provide a detailed technical description, general and special explanations with regards to correct use and operation as well as tips for troubleshooting. Please read these operating instructions carefully before operating the vehicle for the first time. Please follow the recommendations for proper preventive maintenance and service for your trailer, which will ensure a long operating life and a continuous operational readiness. Also observe the safety notices listed in these operating instructions.

Modifications that are not in accordance with or allowed by these operating instructions may only be carried out with written permission from Bergmann.

Due to the fact that our products and technical standards are constantly being developed, these operating instructions are subject to change without notice.

Important! If the vehicle is transferred by the customer to a third party, the operating instructions must be passed on to the new owner.

1.5.1 Instructions for work safety



All sections in the operating instructions which concern personal safety have been marked with this symbol. Pass all safety instructions on to other users.

Important! Particularly useful information for the user

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2 Notices for the User

2.1 Product Liability, Obligation to Inform

Product liability requires the manufacturer and dealer to go through the operating instructions and to instruct the customer at the time of transfer, paying particular attention to operational, safety and maintenance requirements.

In order to prove that the vehicle and the operating instructions were transferred properly, written confirmation is needed.

You will find a transfer statement below which must be filled out and returned to Bergmann after transfer.

According to the German product liability law, every farmer is the owner of a business.

According to the German product liability law, property damage is damage which is caused by a vehicle, but not damage caused to a vehicle. The liability includes a 500 Euro excess. In accordance with the German product liability law, damages to the business are not covered.

Attention!

If the vehicle is transferred by the customer to a third party, the operating instructions must also be given to the new owner and the new owner must be made aware of the requirements.

Attention!

Be advised that the right to make claims under guarantee only exists after this transfer statement has been filled out, signed and returned to Bergmann.

		<h1>Transfer Statement</h1>	
1.) Vehicle type	vehicle no.	4.) Delivery date	Dealer's / Importer's no.
2.) Customer's / owner's address Last name, Surname		5.) Dealer's / Importer's address (Invoicee)	
Street		Signature / Company stamp	
Country	Zip Code	Dealer's address Branche office	
City		Company Stamp / Signature if not same as 5).	
3.) Knowing and accepting the warranty stipulations, I / we have purchased and received the vehicle mentioned in 1), in a brand-new and operational condition. All Bergmann vehicles remain our property until payment has been received in full. The following items were handed over to me at delivery:		6.) The vehicle has been delivered to the customer according the manufacture's guidelines	
<input type="checkbox"/> Operating instructions <input type="checkbox"/> EG conformity statement		signature of Customers Expert	
Owner's signature	Date	Date	

We reserve the right to process personal information, received within the framework of this business relationship in accordance with the federal privacy act.

2.2 Product Transfer Instructions

According to product liability requirements, the following listed points must be checked.

Please mark applicable boxes.

- Vehicle was checked against the delivery note. All individually packed parts have been removed. All safety equipment, PTO shafts and control elements are present.
- Operation, initial start-up and maintenance of the vehicle according to the operating instructions has been addressed and explained to the customer.
- Tires checked for proper air pressure.
- Wheel nuts checked for tightness.
- Instructed on proper PTO shaft RPM.
- Mechanical functions demonstrated and explained.
- Electrical connection to the tractor was made and the connection was checked. Observe notices in the operating instructions!
- Fitting to tractor carried out.
- PTO shaft shortened to proper length.
- Electrical system functions were checked and explained.
- Hydraulic connection to the tractor was made and checked checked for proper connection.
- Hydraulic functions were demonstrated and explained.
- Parking and service brake function tested.
- Test run was made and no deficiencies were found.
- Explanation of functions during test run.
- Information about optional and extra equipment was provided.
- Informed that reading the operating instructions is absolutely necessary

In order to prove that the vehicle and operating instructions were transferred properly, the transfer statement must be filled out, signed and returned to Bergmann.

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2.3 General Information

Read the operating instructions thoroughly and observe safety notices before initial start-up!

2.3.1 Intended Use

The "CAREX" / "SHUTTLE" trailer is intended solely for standard use in agricultural work (intended use). Authorised uses are loading, transporting and unloading of roughage, green forage, silage and straw. It is also permitted to transport and unload chopped material (grass / maize). Any other use is not considered to be the intended use. The manufacturer is not liable for damages attained during unintended use. In this case the user is solely responsible.

Observing the manufacturer's operating, service and maintenance requirements is also considered intended use, as well as the exclusive use of original spare parts.

The vehicle may only be operated, serviced and maintained by persons who are familiar with it and who have been instructed on the hazards.

They must be made familiar with all equipment and control devices as well as their functions before operation.

The vehicle is designed for one-man operation. The operator's work place is in the driver's seat in the cab of the tractor. The operator may only drive and operate the vehicle when no other persons are in danger zones! (Pay special attention to children!)

Foreign objects as well as hard and heavy particles in the forage can be thrown far by the dosing unit. Ensure sufficient distance is kept from persons.

Before working on the vehicle (e.g. maintenance or repair work), turn off the engine and remove the key from the ignition.

Do not enter the vehicle when the spreading unit / dosing unit is in operation or the tractor motor is running. Persons and animals may not be transported on the vehicle.

The vehicle is designed for operations under typical Central European temperatures. Ensure the scraper floor does not freeze up while operating in temperatures under freezing. This could cause significant damage.

All safety equipment must be properly mounted at all times.

The applicable accident prevention requirements as well as other recognised safety, industrial medicine and traffic regulations must also be observed.

The manufacturer is not responsible for damages caused by unauthorized changes.

2.4 Designation

The designation shall include the following:

- Vehicle identification number (VIN)
- Identification plate
- CE Symbol

	NOTICE
	The entire designation is a legal document and must not be altered made illegible.

2.4.1 Vehicle Identification Number (VIN)

With the vehicle identification number (VIN) it is possible to clearly identify your vehicle. The VIN can be found on the identification plate and is also engraved on the machine frame near the identification plate.



For this, also observe the instructions and notices in the operating instructions in the "Identification plate - Vehicle" section!

Please enter the vehicle identification number along with the date of delivery and the vehicle type on page 2 in the operating instructions immediately after vehicle transfer. Queries and/or guarantee claims cannot be processed without this number.

2.4.2 CE Symbol

The CE symbol, which is applied by the manufacturer, documents to the public that this vehicle conforms to vehicle regulations requirements.

The CE symbol is located on the vehicle identification plate.



Image 1: CE Symbol



For this, also observe the instructions and notices in the operating instructions in the "Identification plate - Vehicle" section!

2.4.3 Identification Plate - Vehicle

The following information can be found on the identification plate (Image 2):

Manufacturer		
VIN No.	=	Vehicle identification number
Gross vehicle weight	kg	= Gross vehicle weight
Dead weight	kg	= Dead weight
Gross axle weight, front	kg	= Gross axle weight, front
Gross axle weight, rear	kg	= Gross axle weight, rear
Maximum speed	km/h	= Maximum speed
Type		
Year manufactured		
Drive rotational speed	min-1	
Max. hydraulic pressure	cash	= Maximum hydraulic pressure



Image 2: Identification plate - vehicle

	NOTICE
	Weights and other data specified on the identification plate must not be exceeded.

2.4.3.1 Position of identification plate

The identification plate (Image 3 / Pos. 1) is located at the front, on the cross beam of the frame.



Image 3: Position of identification plate

2.4.4 Identification Plate - Drawbar

In case of inspection, a identification plate is located directly on the drawbar. The following information can be found on the identification plate (Image 4):

Manufacturer			
Drawbar type			
Ident. No.	=	Identification number	
Gross trailer weight	kg	=	Gross trailer weight
Gross nose weight	kg	=	Gross nose weight
Maximum speed	km/h	=	Maximum speed



Image 4: Identification plate - drawbar

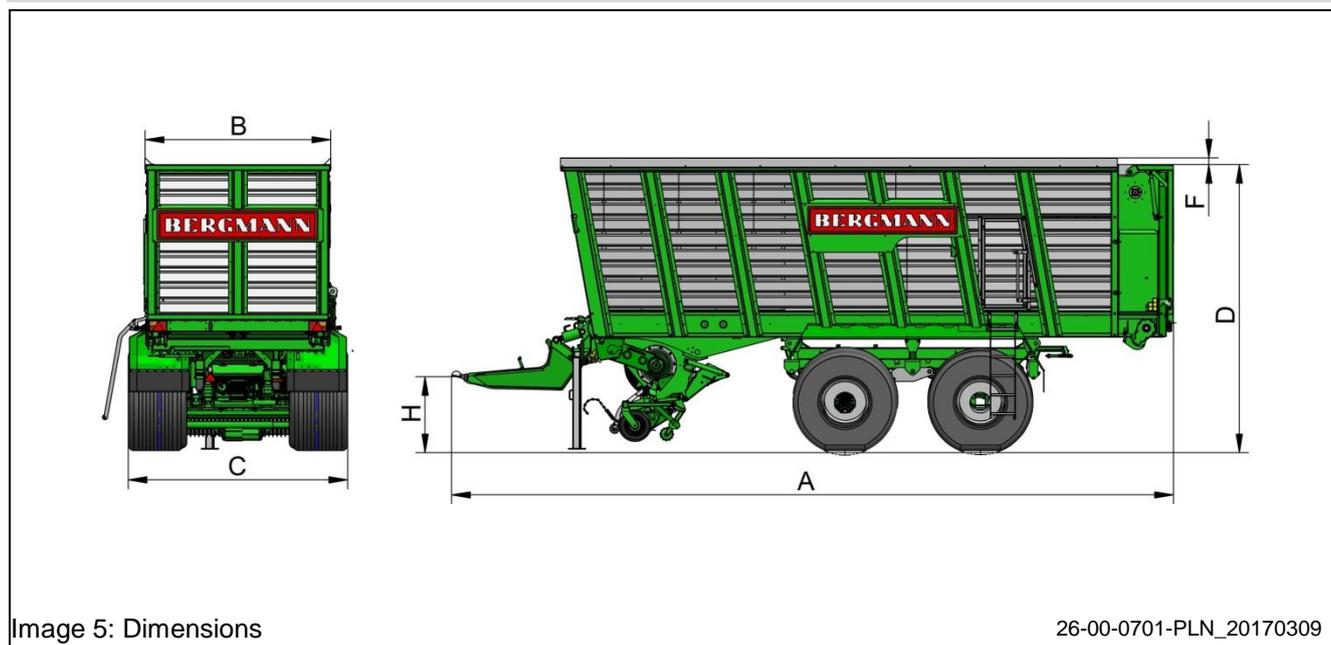
	NOTICE
	Weights and other data specified on the identification plate must not be exceeded.

2.5 Technical data

All information, illustrations and technical data contained in these operating instructions corresponded to the latest state of technology at the time of publication. Technical data may deviate depending on equipment on the delivered vehicle and is therefore non-binding.

We reserve the right to make changes to the design at any time without prior notice.

	NOTICE
	<p>Technical limit values for the vehicle must be complied with. If these limits are not complied with,</p> <ul style="list-style-type: none"> - the vehicle could be damaged, - it could lead to accidents - or it could cause serious injury or death.
	<p>The following limit values are important for safety:</p> <ul style="list-style-type: none"> - gross vehicle weight - maximum axle load - maximum payload - maximum nose weight - maximum total height - maximum speed <p>These limit values must be complied with. Limit values can be found on the next page.</p>

2.5.1 CAREX 370 S / 390 K / 410 S / 430 K / 450 S / 470 K / 490 S / 510 K
2.5.1.1 Dimensions


Model			370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Vehicle dimensions										
Length	A	mm	9650	9650	11400	11400	11150	11150	11900	11900
Width (frame)	B	mm	2480	2480	2480	2480	2480	2480	2480	2480
Width (tires)	C	mm	2932	2932	2932	2932	2932	2932	2932	2932
Height	D	mm	3885	3885	3885	3885	3885	3885	3885	3885
Extension height	F	mm	90	90	90	90	90	90	90	90
Height, high drawbar	G	mm	-	-	-	-	-	-	-	-
Height, low drawbar	H	mm	850	850	850	850	850	850	850	850
Cargo capacity i.a. DIN 11741										
at side wall height		m ³	35.5	37.0	39.5	41.0	43.5	45.0	47.5	49.0
with extension walls		m ³	37.5	39.0	41.5	43.0	45.5	47.0	49.5	51.0

The data on the vehicle's identification plate, as well as the data in the documents "operating permit", "registration" and "vehicle title", are relevant for your vehicle. All entries are based on series tires.

2.5.1.2 Weights

Model			370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Gross vehicle weight										
with high drawbar	kg		-	-	-	-	-	-	-	-
with low drawbar	kg		24000	24000	24000	24000	-	-	-	-
Gross axle weight	kg		20000	20000	20000	20000	20000	20000	30000	30000
Gross nose weight										
with high drawbar	kg		-	-	-	-	-	-	-	-
with low drawbar	kg		4000	4000	4000	4000	4000	4000	4000	4000
Dead weight*	kg		9.820	9.470	10.320	9.970	-	-	-	-
Payload										
with high drawbar	kg		-	-	-	-	-	-	-	-
with low drawbar	kg		14180	14530	13680	14030	-	-	-	-

The data on the vehicle's identification plate, as well as the data in the documents "operating permit", "registration" and "vehicle title", are relevant for your vehicle. All entries are based on series tires.

2.5.1.3 Pick-Up

Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Pick-up* clearance	mm	400	400	400	400	400	400	400	400
Clearance with extended high-lift drawbar	mm	600	600	600	600	600	600	600	600
Pick-up width	mm	2050	2050	2050	2050	2050	2050	2050	2050
Number of knives	Piece	41	41	41	41	41	41	41	41
Shortest theoretic cutting length	mm	35	35	35	35	35	35	35	35

All entries are based on series tires.

2.5.1.4 Chassis

Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Design									
Series		Tandem	Tandem	Tandem	Tandem	Tandem	Tandem	Tridem	Tridem
Option		-	-	-	-	Tridem	Tridem	-	-
Tyres Min / Max		See tires acceptance list							
Standard tires		710/50 R 26.5							
Wheel connection	Hole	10	10	10	10	10	10	10	10
Track width (at ET 0)	mm	2100	2100	2100	2100	2100	2100	2100	2100
Maximum speed	km/h	40	40	40	40	40	40	40	40
Brake		Dual-line compressed air brake system operating pressure 7.3 bar							

2.5.1.5 Supply

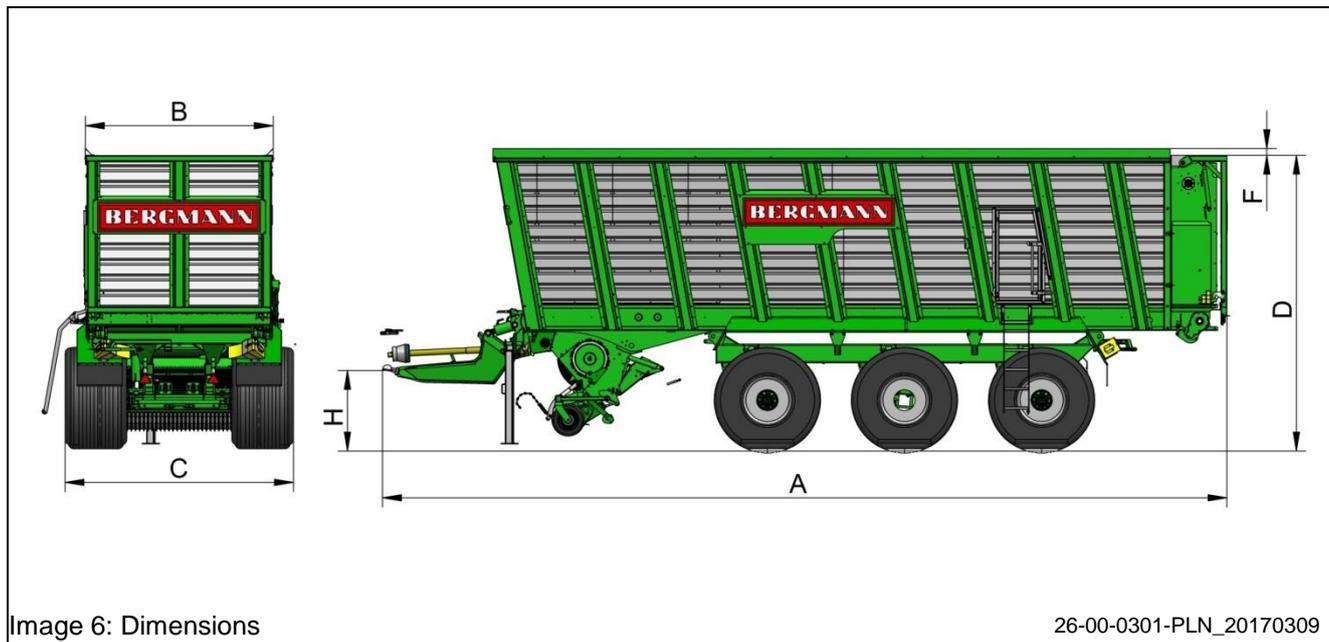
Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Max. hydraulic pressure	cash	210							
Max. Oil flow	l/min	100							
Hydraulic connections		See chapter "Functions & Settings" section "Hydraulics"							
Power requirements	KW (hp)	110 – 220 (150 – 300)							
PTO rotational speed	min-1	1000 (clockwise as seen on the free shaft end)							
Power supply	Volt	12 V DC							
Lighting system		7-pin socket, 12 V DC							

2.5.1.6 Airborne acoustical noise emissions

Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Continuous sound pressure level	DB (A)	< 70							

2.5.1.7 Ambient temperature

Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Temperature for vehicle operation	°C	-5°C to +45°C							

2.5.2 SHUTTLE 370 S / 390 K / 410 S / 430 K / 450 S / 470 K / 490 S / 510 K
2.5.2.1 Dimensions


Model			370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Vehicle dimensions										
Length	A	mm	9650	9650	11400	11400	11150	11150	11900	11900
Width (frame)	B	mm	2480	2480	2480	2480	2480	2480	2480	2480
Width (tires)	C	mm	2932	2932	2932	2932	2932	2932	2932	2932
Height	D	mm	3885	3885	3885	3885	3885	3885	3885	3885
Extension height	F	mm	90	90	90	90	90	90	90	90
Height, high drawbar	G	mm	-	-	-	-	-	-	-	-
Height, low drawbar	H	mm	850	850	850	850	850	850	850	850
Cargo capacity i.a. DIN 11741										
at side wall height		m ³	35.5	37.0	39.5	41.0	43.5	45.0	47.5	49.0
with extension walls		m ³	37.5	39.0	41.5	43.0	45.5	47.0	49.5	51.0

The data on the vehicle's identification plate, as well as the data in the documents "operating permit", "registration" and "vehicle title", are relevant for your vehicle. All entries are based on series tires.

2.5.2.2 Weights

Model			370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Gross vehicle weight										
with high drawbar	kg		-	-	-	-	-	-	-	-
with low drawbar	kg		-	-	-	-	24000-34000	24000-34000	34000	34000
Gross axle weight	kg		20000	20000	20000	20000	20000	20000	30000	30000
Gross nose weight										
with high drawbar	kg		-	-	-	-	-	-	-	-
with low drawbar	kg		4000	4000	4000	4000	4000	4000	4000	4000
Dead weight*	kg									
Payload										
with high drawbar	kg		-	-	-	-	10820	10470	13100	12750
with low drawbar	kg		-	-	-	-	13180	13530	20900	21250

The data on the vehicle's identification plate, as well as the data in the documents "operating permit", "registration" and "vehicle title", are relevant for your vehicle. All entries are based on series tires.

2.5.2.3 Pick-Up

Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Pick-up clearance	mm	400	400	400	400	400	400	400	400
Clearance with extended high-lift drawbar	mm	600	600	600	600	600	600	600	600
Pick-up width	mm	2050	2050	2050	2050	2050	2050	2050	2050
Number of knives	Piece	41	41	41	41	41	41	41	41
Shortest theoretic cutting length	mm	35	35	35	35	35	35	35	35

All entries are based on series tires.

2.5.2.4 Chassis

Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Design									
Series		Tandem	Tandem	Tandem	Tandem	Tandem	Tandem	Tridem	Tridem
Option		-	-	-	-	Tridem	Tridem	-	-
Tyres Min / Max		See tires acceptance list							
Standard tires		710/50 R 26.5							
Wheel connection		10	10	10	10	10	10	10	10
Track width (at ET 0)	mm	2100	2100	2100	2100	2100	2100	2100	2100
Maximum speed	km/h	40	40	40	40	40	40	40	40
Brake		Dual-line compressed air brake system operating pressure 7.3 bar							

2.5.2.5 Supply

Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Max. hydraulic pressure	cash	210							
Max. Oil flow	l/min	100							
Hydraulic connections		See chapter "Functions & Settings" section "Hydraulics"							
Power requirements	KW (hp)	180 – 350 (132 – 257)							
PTO rotational speed	min-1	1000 (clockwise as seen on the free shaft end)							
Power supply	Volt	12 V DC							
Lighting system		7-pin socket, 12 V DC							

2.5.2.6 Airborne acoustical noise emissions

Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Continuous sound pressure level	DB (A)	< 70							

2.5.2.7 Ambient temperature

Model		370 S	390 K	410 S	430 K	450 S	470 K	490 S	510 K
Temperature for vehicle operation	°C	-5°C to +45°C							

2.6 Warning Symbols and Notice Stickers

The warning symbols on the vehicle are provided for the safety of all persons who work with the vehicle, and warn about other dangers. The notices identify vehicle specific characteristics which need to be observed in order to provide for flawless vehicle operation.

- All warning symbols / safety notices should be strictly adhered to!
- Pass all safety instructions on to other users.
- Keep the warning symbols and notices on the vehicle in good condition!
- Replace missing warning symbols and notices (Order numbers are located on the warning symbols and notices)!

The following are warning symbols and notice stickers with their meanings.

2.6.1 Definition of the Warning Symbols and Notice Stickers

2.6.1.1 General



B06-0084

Lubrication points

(For lubrication points see "Care and maintenance / lubrication diagram.)



B06-0256

Maximum speed 25km/h



B06-0380

Maximum speed 40km/h



B06-0534

Only stand in dangerous areas when safety devices are engaged!



B06-0539

Tighten wheel nuts and other bolted connections after the first operating hours!



Carfully read operating instructions before operating. GB
Observe instructions and safety notice when operating.

Cleaning instructions

when using a high-pressure cleaner:

- Not before **8 weeks** after delivery (paint curing)
- Minimum spraying distance **50 cm**
- Maximum pressure **50 bar**
- Maximum temperature **50°C**
- Spraying angle **25°**
- Do **not use** detergents
- **Keep away** from seals for bearings, gears and hydraulic parts



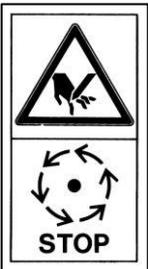
B06-0541-GB

B06-0541
Read and observe operating instructions and safety notices before initial operation!

Cleaning instructions pressure washer use



B06-0542
Be careful of moving parts! Never reach into the running machine! Do not open or remove safety equipment while motor is running!



B06-0543
Only touch machine parts when they come to a complete standstill!
Before working on spreader disks, switch off PTO shaft and motor and remove ignition key!



B06-0545
Riding on stepping areas or platforms is not authorized!



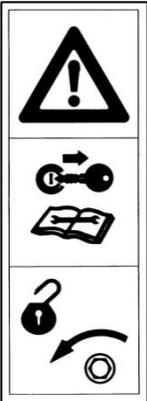
B06-0546
Before uncoupling the vehicle, use wheel wedges to secure the vehicle against accidental rolling!



B06-0547
The carrying and transportation of persons is prohibited unless appropriate seats are available.



B06-0549
Switch off motor and remove ignition key before maintenance and repair work!



B06-0556
Switch off motor and remove ignition key before maintenance and repair work!



B06-0602
Jack stand must be in the upper most position during operation. The jockey wheel must be rotated upwards and towards the rear of the vehicle.



B06-0607
Only stand in dangerous areas when safety devices are engaged! Never reach into areas where the hands can be crushed as long as parts are moving! Danger, rotating machine parts! Keep sufficient distance from rotating parts!



B06 0608
Do not stand in the movement range of the lift drawbar during operation.



B06-0609
Never reach into areas where hands can be crushed as long as parts are moving!



B06 0626
Keep sufficient distance from hot surfaces.



B06-0869
Prior to every use, make sure that no one is in the immediate area (Especially children!) Ensure sufficient view e.g. when backing up!



B06-0870
The height can exceed 4000 mm when Machine parts are moved out for work. Be careful of overhead lines and bridge crossings. Safety distance:
Nominal voltage Overhead lines
Up to 1 KV 1 m
over 1 - 110 KV 3 m
over 110 - 220 KV 4 m
over 220 - 380 KV 5 m

Attention!

(GB)

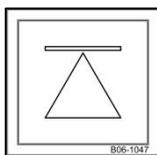
Retighten wheel nuts:

- ⇒ after 50 km of driving
- ⇒ after further 150 km of driving
- ⇒ after further 400km of driving.

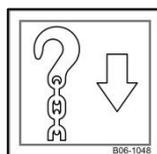
- Within the first operating week the wheel nuts have to be checked on firm fit each day.
- For further operating the wheel nuts have to be checked weekly.

B06-0968-GB

B06-0968
Tighten wheel nuts.
(See "Care and maintenance" section)



B06-1047
Features attachment points on the axes for lifting devices.



B06-1048
Indicates lashing eyes. These eyelets are used for secure attachment, for example, when transporting the machine on a truck.

2.6.1.2 Drive



B06-0551

The drive speed of the propeller shaft is:

max. 540 min-1!

(Depends on vehicle type, see ID plate)



B06-0599

The drive speed of the propeller shaft is:

max. 750 min-1!

(Depends on vehicle type, see ID plate)



B06-0538

The drive speed of the propeller shaft is:

max. 1000 min-1!

(Depends on vehicle type, see ID plate)



B06-0550

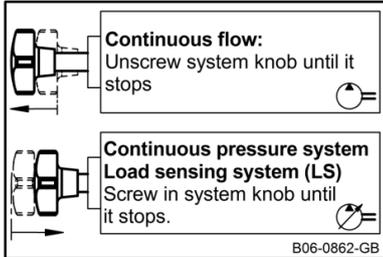
Do not stand near the drive shaft. Danger of injury!

2.6.1.3 Hydraulic



B06-0548

Be careful of high-pressure liquid leaks. Observe notice in technical handbook!



B06-0862

Constant current system:
Unscrew knob until it stops

Constant pressure system / Load-sensing system (LS):
Screw in knob until it stops

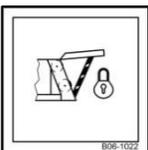
2.6.1.4 Scraper floor



B06-0544

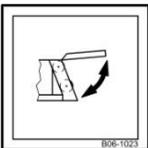
Never enter cargo area if drive is engaged and motor is running!

2.6.1.5 Tailgate



B06-1022

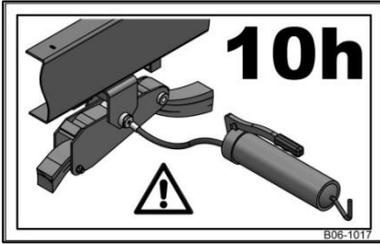
Position shut-off valve of the tailgate.
In this position the tailgate is locked and the position cannot be accidentally changed.



B06-1023

Position shut-off valve of the tailgate.
In this position the tailgate is not locked and can be opened and closed.

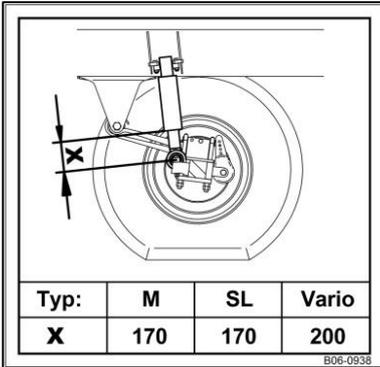
2.6.1.6 Chassis- Tandem axle unit



B06-1017

On all vehicles with a tandem axle unit and a lubricated middle rocker the lubrication pin in the middle spring saddle must be lubricated every 10 operating hours to ensure proper function and to reduce wear.

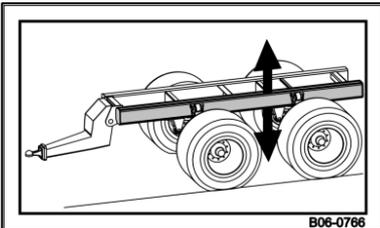
2.6.1.7 Chassis - with Hydraulic Axle Compensation



B06-0938

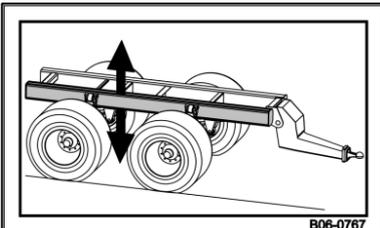
The clearance and with that the height of the entire vehicle must be checked once daily and adjusted if necessary.

When the vehicle is in a horizontal position the four chassis cylinders should be in a position as shown in the image below. If this value is not correct the clearance must be corrected.



B06-0766

Raise / lower the chassis on the left.



B06-0766

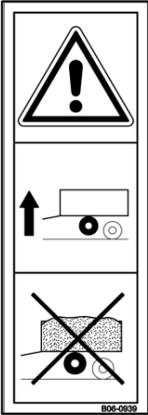
Raise / lower the chassis on the right.

2.6.1.8 Lift axle

When operating a loaded or partially loaded vehicle, lower lift axle before driving on public roads.

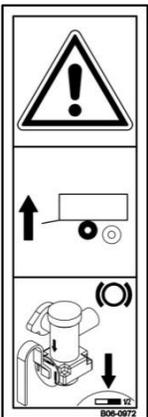
B06-0817

When operating a loaded or partially loaded vehicle, lower lift axle before driving on public roads.



B06-0939

Lift axle only to be operated when the vehicle is completely empty.



B06-0972

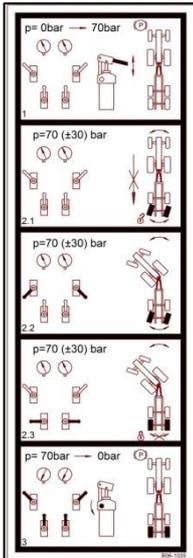
With lifted lift axle set the manual control of the air brake system to "half-load".

2.6.1.9 Forced Steering



B06-0666

When coupling the hydraulic cylinder, no people are allowed or their limbs should be in the stroke range of the cylinder (risk of injury by sudden movement of piston rod)!

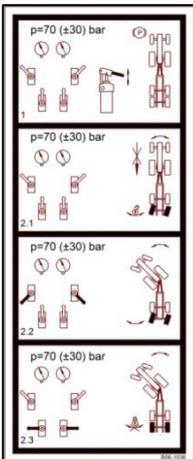


Tandem

B06-1035

- Type: SL
- Chassis: Tandem
- Axle: 2nd axle steered
- Adjusting the steering variants

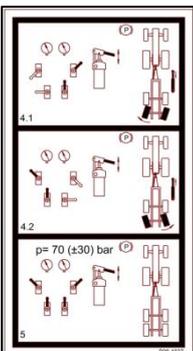
(Note instructions in the manual under „Initial Start-up and Functions / forced steering“!)



B06-1036

- Type: M / HW / Vario
- Chassis: Tandem
- Axle: 2nd axle steered
- Adjusting the steering variants

(Note instructions in the manual under „Initial Start-up and Functions / forced steering“!)

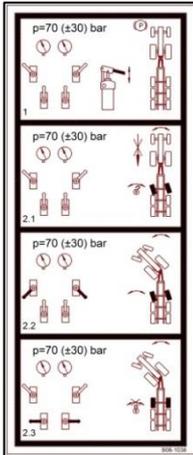


B06-1037

- Type: M / HW / Vario
- Chassis: Tandem
- Axle: 2nd axle steered
- Adjusting the forced steering

(Note instructions in the manual under „Initial Start-up and Functions / forced steering“!)

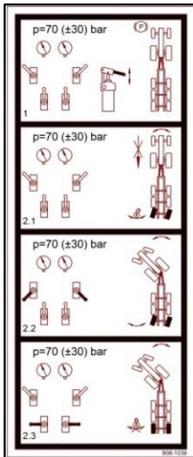
Tridem



B06-1038

- Type: M / HW / Vario / SL
- Chassis: Tridem
- Axle: 1st axle steered
- Adjusting the steering variants

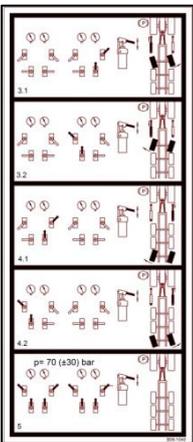
(Note instructions in the manual under „Initial Start-up and Functions / forced steering“!)



B06-1039

- Type: M / HW / Vario / SL
- Chassis: Tridem
- Axle: 3rd axle steered
- Adjusting the steering variants

(Note instructions in the manual under „Initial Start-up and Functions / forced steering“!)



B06-1037

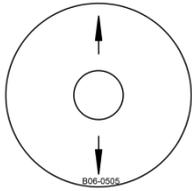
- Type: M / HW / Vario / SL
- Chassis: Tridem
- Axle: 1st / 3rd Axle steered
- Adjusting the forced steering

(Note instructions in the manual under „Initial Start-up and Functions / forced steering“!)

2.6.1.10 Silage Trailer



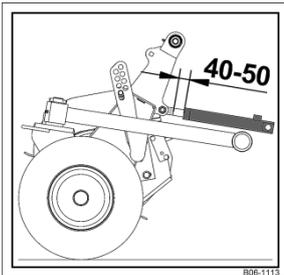
B06-0504
Vehicle side controls
left: drawbar
right: cutting unit



B06-0505
Vehicle side controls
up: raise drawbar /
cutting unit on
down: lower drawbar
cutting unit off



B06 0606
Never reach into the pick-up area, as long as the tractor engine is running when the PTO is on.



B06-1113
For an optimum pick-up operating height, the pick-up cylinder reference dimension must be correct:

- 40 - 50 mm

2.7 Safety and Accident Prevention Requirements

2.7.1 Basic rules

- Inspect vehicle for road and operation readiness before each use!
- In addition to the instructions in this manual also observe general safety and accident prevention regulations.
- Observe relevant regulations when using public transport routes.
- Familiarize yourself with all equipment and operating elements as well as their functions before beginning operation. When work has begun it is too late!
- Ensure no one is in the immediate area before each start-up (especially children). Ensure there is adequate visibility e.g. when reversing (Use a ground guide if necessary)!
- The operator's clothing should fit snugly. Loose fitting clothing should be avoided!
- To avoid fire risk keep the vehicle clean.



- The carrying and transportation of persons is prohibited unless appropriate seats are available!



- Special care must be taken when working on the vehicle, and such work must be performed when the scraper floor, dosing roller drive and the engine are off. Remove ignition key!

- Regularly inspect safety equipment for wear and replace if necessary!
- It is important to ensure that unauthorized persons are kept away from the vehicle.
- Ensure that all protective equipment is in place and in the proper position before operation.
- During vehicle operation, the continuous sound level is not higher than 70dB(A). This continuous sound level was measured at a distance of 1 meter. The vehicle was driven by an electric motor using the PTO shaft.

2.7.2 Driving

- Couple the trailer and equipment properly. Handling, steering and braking ability are influenced by attachments, trailers and ballast weight. Therefore, ensure there is sufficient steering and braking ability!
- Observe allowable axle loads and total weight!
- Check air pressure regularly! Observe prescribed air pressure!
- During vehicle operation, the continuous sound level is not higher than 70 dB(A).
- The vehicle may be used up to an angle of 10° perpendicular to the incline. If this is exceeded there is danger of tipping!

2.7.3 Road traffic regulations

The following regulations must be observed in Germany (in foreign country-country specific regulations):

- When driving on public roads, the vehicle requires operating permit. This permit is issued by the Road Traffic Authorities.
- Agricultural trailers up to 25 Km/h do not require registration
- Agricultural trailers faster than 25 Km/h require registration (license plate and liability insurance)
- Vehicles used for business purposes (up to and over 25 Km/h) require registration.

2.7.4 Coupling, loading, transport

- Use only specified connections to couple the vehicle!
- Be especially careful when coupling the vehicle!



Secure the vehicle against rolling prior to uncoupling (parking brake, wheel chocks).



Do not stand in the movement range of the high-lift drawbar.

- Ensure that all protective equipment is in place and in the proper position before operation.
- Unevenly loaded trailers can tip, especially when uncoupled. Ensure sufficient nose-weight! Minimum nose-weight in the uncoupled state 200 kg.
- If the trailer is only partially loaded, steering could be impaired. In this case, drive especially carefully.
- When the trailer is loaded ensure that the steering on the front tractor axle is not impaired by observing the nose weight.
- Observe allowable axle loads and total weight! The weights given on the vehicle are binding! Ensure there is sufficient steering and braking ability!
- Avoid sudden cornering in ascents and descents, as well as driving across a slope. Adjust the speed according to conditions.
- The vehicle may only be uncoupled when unloaded. The parking area must not exceed a maximum incline of 7°. When uncoupling, the parking brake must be applied and the wheel chocks are to be properly used.
- Caution tipping hazard!
Maximum allowed angle of inclination perpendicular to the direction of travel is: 10°

2.7.5 PTO Shaft Operation



Mount and dismount the PTO shaft only when the motor is off and the ignition key has been removed!

- Safety tube and guard cone as well as the drive shaft guard must be mounted and in proper condition!



When working on the PTO shaft itself, no one should be in the area of the rotating PTO shaft!

- Never engage the PTO shaft when the motor is off!



After the power has been switched off the unit can continue to run due to momentum. During this time, keep a safe distance. Only when the drive has come to a complete stop, may it be approached!

- Overload or overrun clutches are to be mounted on the trailer. The clutch may only be mounted on the tractor when it is covered by the tractor's protective equipment.

2.7.6 Hydraulic system

- Hydraulic system is under high pressure!
- The cutting unit hydraulic system is equipped with a hydraulic accumulator. This can be under high pressure even when the hydraulic system is not!
- When connecting hydraulic cylinders and motors, ensure that only prescribed hydraulic hose fittings are used!
- When connecting hydraulic hoses to the tractor hydraulic system, ensure that the hoses are not under pressure on the tractor side and trailer side!
- When hydraulic connections between the tractor and trailer are made coupling sleeves and plugs should be marked in order to rule out operating errors! If the connections are reversed, the opposite function will occur (e.g. lifting / lowering) danger of an accident!
- Inspect hydraulic hoses regularly and replace if damaged or signs of wear are found! Hydraulic hoses are subject to an aging process. They become brittle with time and no longer meet the set requirements. Persons can be injured by sudden high pressure hydraulic oil leaks. For this reason hydraulic hoses must be replaced 4 years after initial delivery of the vehicle, and every 4 years thereafter. The replacement hoses must meet the requirements of the manufacturer!
- To avoid injury, use proper equipment when inspecting for leaks!



Hydraulic oil, which leaks out under high pressure, can penetrate the skin and cause serious injury! In case of injury, notify a doctor immediately. Danger of infection!

- Prior to working on the hydraulic system, lower the equipment, depressurize the system and switch the motor off!
- Only qualified personnel may carry out repair work on the hydraulic system!
- Only mineral hydraulic oil with the specification ISO VG 46 or equivalent may be used. Biodegradable oil may not be used for technical reasons.
- Hydraulic oil must not get into the soil. Dispose of used oil in accordance with requirements. In case of disposal problems, consult your oil supplier. Keep hydraulic oil out of the reach of children.

2.7.7 Brakes and Tires

- Check the brakes prior to every use!
- A thorough brake system inspection is to be conducted on a regular basis!
- Adjustments and repairs to the brake system may only be carried out by a qualified workshop or an authorized brake service!
- When working on the tires the trailer must be safely parked and secured against rolling (wheel chocks)!
- When tires are defective the vehicle may only be raised to change the tires when the vehicle is empty. When changing tires a jack must be placed under the affected axle. Then the trailer can be raised and the wheel can be changed (ensure the vehicle is secured against rolling). The mounting of tires and wheels requires sufficient knowledge and proper tools!
- Repair work on tires and wheels may only be performed by qualified personnel with appropriate tools!
- Check tyre pressure regularly! Observe prescribed air pressure!



Attention! Tighten wheel nuts.

- after driving 50 km
- after driving another 150 km
- after driving another 400 km

During the first few weeks of use the vehicle wheel nuts must be to check for tightness every day. During further operation the wheel nuts must be checked for tightness weekly.

2.7.8 Maintenance



Repairs, maintenance, and cleaning tasks, as well as troubleshooting, should only be carried out, when the drive and motor has been switched off! - remove tractor ignition key.

Regularly check nuts and bolts for proper tightness.

If maintenance work is carried out in a raised position, always secure the vehicle with appropriate support elements!

- When replacing working parts, always use appropriate tools and wear work gloves!
- Hydraulic oil, which leaks out under high pressure, can penetrate the skin and cause serious injury. Therefore, consult a doctor immediately, otherwise this can lead to serious infection!
- Dispose of oil, grease and filters in appropriately!
- The mounting of tires and wheels requires sufficient knowledge and proper tools!
- Tighten wheel nuts after several hours of operation!
- Switch power supply off prior to working on the electrical system!
- Safety equipment that is subject to wear must be inspected regularly and promptly replaced if necessary!
- Spare parts must at least meet the manufacturer's technical requirements. This is provided for by using original spare parts!
- When conducting arc-welding on a tractor and or mounted devices, disconnect the generator and battery cables!

2.8 Important Information for Vehicle Operation

- The length of the PTO shaft must be adapted to the tractor being used! Observe the PTO shaft manufacturer's maintenance and installation instructions. Max 1000 rpm
 - Raise the jack stand and lock it in place prior to operation!
 - Set pick-up drum to proper operating height!
 - Adapt swath size and driving speed to working conditions!
 - Only pick-up mowed material in the direction of mowing!
 - Only switch rotor, pick-up and dosing roller on when not moving!
Observe notices in the operating instructions!
 - Do not overload the vehicle! The specified total weight is binding!
 - Observe the optical fill indicator during loading!
This will prevent blocking of the dosing rollers!
 - When loading, ensure that the maximum weight is not exceeded!
 - Always ensure that the knives in the cutting unit are sharp!
 - Never drive the silage trailer backwards onto the unload material.
Danger of breaking scraper floor!
 - When driving on the horizontal silos, only lift the drawbar as much as necessary!
 - When the pick-up is in transport position, it must be secured by switching off the oil supply to the pick-up cylinder! – lock valve!
 - The vehicle should be thoroughly lubricated regularly! - See lubrication arrow!
Observe the (lubrication diagram)
 - The wheel nuts on the service wheels are to be tightened after several hours of operation! See section [Brakes and tyres]
 - Also check that all major threaded connections are tight after the first hours of operation!
 - Check the drive chains regularly!
Pick-up drive, dosing roller drive and feed chains! – tension if necessary (do not over-tension!).
 - Pay particular attention to the operating notices in the operating instructions for the [scraper floor], die [pick-up] and the cutting unit!
 - Observe the accident prevention regulations of the Agricultural safety associations!
 - When working with the vehicle, nobody is allowed in the danger zone.
 - When working with or on the vehicle it is necessary to wear personal protective equipment (e.g. gloves)!
 - No one may climb the machine during operation!
-

2.9 Other Hazards

- There is a danger of being crushed when raising and lowering the jack stand.
 - There is also danger of being crushed when closing protective devices.
 - When driving over rough terrain there is danger of being crushed due to the reduction of the clearance between the tire and frame.
 - There is a danger of being crushed between the scraper floor chain and chain wheels.
 - There is a danger of being crushed when opening and closing the tailgate.
 - There is a danger of being crushed when operating the high-lift drawbar.
 - There is a danger of being crushed when operating the knife bar.
-

2.10 Safety Notice

Subsequent installation of electrical and electronic equipment and / or components

The machine is equipped with electronic components and assemblies whose function may be affected by electromagnetic emissions from other devices. Such affects can be hazardous to personnel if the following precautions are not followed.

- If electrical and electronic equipment and / or components are subsequently installed in the vehicle with a connection to the electrical system, the user must independently verify whether the installation causes disturbances to the vehicle electronics or other components.
 - It is important to ensure that subsequently installed electrical and electronic components meet the requirements of the EMV - Directive 89/336/EWG in accordance with the current version and that they bear the CE symbol.
 - For wiring and installation as well as the max. allowable power use the machine manufacturer's installation instructions must be followed.
-

3 Initial Start-up and Functions

3.1 Vehicle Functions

The harvested material is picked up from the ground and transported to the conveyor unit by a pick-up equipped with spring-tines, which is attached to the front of the vehicle. The material is transported by the loading rotor, through the conveyor canal and the cutting unit where it is cut to variable lengths depending on the number of knives. The loading rotor compresses the material and transports it to the cargo area.

The cargo space is limited at the top by a filling hood, which intensifies the compression of the material with the loading rotor. The floor of the cargo space is equipped with a scraper floor which moves the material to the back of the vehicle, and provides for fast unloading.

Depending on the vehicle type and equipment, the silage trailer can also be used for forage transport. The ability to close off the conveyor canal and the extra robust structure make it possible to load the vehicle from the top with a harvester.

Vehicle type K

For type "K" vehicles, the rear of the cargo space is limited by the tailgate. When unloading, the material is transported via scraper floor to the rear of the vehicle and discharged through the open tailgate.

Vehicle type S

Type "S" vehicles are equipped with a dosing unit. Here the harvested material is also moved to the rear of the machine by the scraper floor. Here, however, dosing rollers (2 or 3 depending on the type of vehicle and equipment) loosen the material and unload it through the open tailgate, for an even unload e.g. on silos, or specifically in stable walkways.

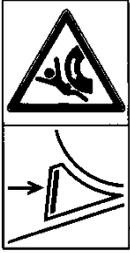
Drive

The scraper floor drive shaft is powered by the tractor's hydraulic system, via a hydraulic motor and feed gearbox. The adjustment is made manually or electrically (depending on the type of vehicle and equipment). The conveying unit and dosing unit are driven by the tractor PTO. The pick-up is driven hydraulically.

3.2 After Delivery

- After delivery, remove all wiring and transportation aids.
- All lubrication points must be greased before initial start-up.
- If the vehicle comes into contact with de-icing salt during transport, it must be thoroughly washed with water to prevent possible corrosion damage.

3.3 Coupling to the Tractor



When coupling and uncoupling the vehicle with the tractor there is danger of injury! For this reason never stand between or the vehicle and the tractor or behind the trailer during coupling operations if the trailer is not secured against rolling with the parking brake or wheel chocks.

Couple the vehicle to the designated device on the tractor. The vehicle is to be coupled using the drawbar eye located on the front of the frame.

Ensure that the coupling on the tractor is approved for the drawbar eye on the vehicle. The maximum load of the coupling must at least match the maximum nose weight of the trailer.

Before operating the vehicle, ensure that the brake and lighting systems are connected and functioning properly.



Keep Children Clear!

3.3.1 Preparation

- Set the coupling on the tractor so that there sufficient space for PTO shaft (also with extended drawbar).
- Drive tractor to the vehicle.

3.3.2 Coupling the Hydraulic

- Depressurize controller on tractor.
- Connect the pressure line and return line (cross section size)
- Couple LS line (if applicable)

3.3.3 Coupling the Controller

- Fix terminal to tractor
- Connect controller to the tractor using the 3-pin plug

3.4 Jack Stand

The following is to be observed:

- The parking area must not exceed a maximum incline of 7°.
- The vehicle is to be secured with the parking brake and wheel chocks when using the jack stand.
- During driving, the support leg, jockey wheel, or towing-support leg (depending on the type of vehicle and equipment) must be in the uppermost position.
- Before storing the machine it is particularly important to ensure that remnants of materials spread and loaded are removed from the (disk) spreader / dosing unit (depending on the type of vehicle and equipment) and the rear cargo space.



The vehicle may never be placed on the jack stand when loaded.



When adjusting the jack stand there is a danger of crushing fingers and hands. Do not reach between the individual components! When lifting or lowering the hydraulic jack stand, ensure that no one is in the danger area.

3.4.1 Mechanical Jack Stand

3.4.1.1 Couple the Vehicle

- Couple hydraulic and electric lines.
- Set the drawbar eye to the height of the tractor coupling using the side controller or the terminal.
- Couple the vehicle
- Relieve the weight on the jack stand by raising (Image: Jack stand Pos. 1) the drawbar.
- Hold the jack stand (Pos.1) by the handle (Pos.3) and pull out the locking bolt (Pos.2).
- Swing the jack stand (Pos.1) to the side and release the locking bolt (Pos.2).
- Continue to swing the jack stand (Pos.1) up until the locking bolt (Pos.2) automatically locks into place.
- Connect PTO shaft with tractor
- Before operating the vehicle, ensure that the brake system is connected and functioning properly.

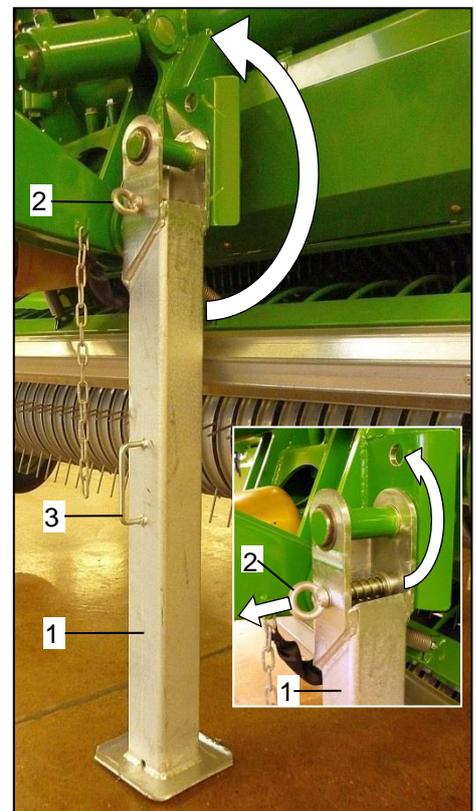


Image: Jack stand

3.4.1.2 Coupling the Vehicle

- Using the jack stand (Image: Jack stand Pos. 1) place the vehicle on level ground
- Hold the jack stand (Pos.1) by the handle (Pos.3) and pull out the locking bolt (Pos.2).
- Swing the jack stand (Pos.1) to the side and release the locking bolt (Pos.2).
- Continue to swing the jack stand (Pos.1) down until the locking bolt (Pos.2) automatically locks into place.
- Apply weight to the jack stand by lowering the drawbar until the weight is relieved from drawbar eye
- Uncouple hydraulic and electric lines
- Uncouple PTO shaft from tractor
- Uncouple vehicle

3.5 Drawbar

3.5.1 Drawbar Adjustment (Hydraulic)

On vehicles with a hydraulically adjustable drawbar, the drawbar height can be adjusted

- to tractor height while uncoupled using the cylinders on the drawbar (Image 7).

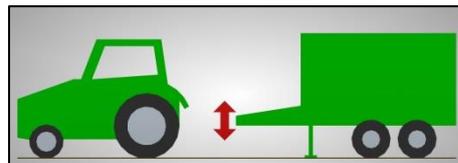


Image 7: Drawbar adjustment

- while uncoupled to adapt the drawbar height to height of the tractor (Image 8).

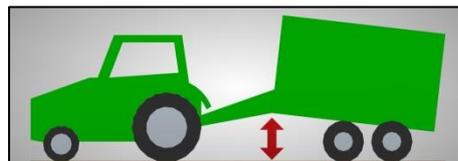


Image 8: Drawbar Adjustment

Operation depends on vehicle configuration and on the hydraulic system. The procedure for adjusting the drawbar can be seen in the following sections.

	WARNING!
	<p>Fingers or hands can be crushed while the drawbar is being raised or lowered!</p> <ul style="list-style-type: none"> • When lifting or lowering the hydraulic drawbar, ensure that no one is in the danger area. • Do not reach between moving components!

	WARNING!
	<p>When extending working elements damage can be caused to the vehicle or accidents can occur if the total height is not observed!</p> <p>This can cause accidents or severe damage to the machine.</p> <ul style="list-style-type: none"> • Ensure that the vehicle does not exceed the maximum height of 4.00 meters when driving on public roads.

3.5.1.1 E-controls (operated using terminal)

The drawbar is operated hydraulically using the terminal. Proceed as follows:

- Couple the hydraulic supply lines from the control block on the respective supply system to the appropriate tractor connections.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the Hydraulics" and the "Coupling the Hydraulic Supply Line" sections.

- Couple the supply lines and the connection lines to the terminal.
- Switch the terminal on.
- Move the drawbar into the desired position by activating the "Raise drawbar" / "Lower drawbar" function on the terminal.



For this, the notices and instructions in the operating instructions in the chapter "Operation" are to be observed.

3.5.1.2 Vehicle controls

A controller for operating the drawbar (Image 9) and the cutting unit is mounted on the side of the vehicle frame for easy operation (see chapter "Cutting Unit"). With this, the drawbar can be easily raised and lowered.

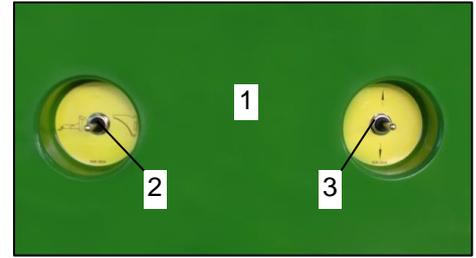
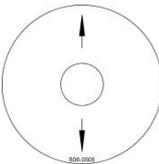


Image 9: Vehicle controls

Switch Pos. 2:

	<p>B06-0504</p>
	<p>Control Drawbar / Cutting Unit</p> <p>Toggle switch for operation of drawbar and cutting unit</p> <ul style="list-style-type: none"> • left: drawbar • right: cutting unit

Switch Pos. 3:

	<p>B06-0505</p>
	<p>Control Raising / Lowering</p> <p>Toggle switch for raising / lowering a machine function</p> <ul style="list-style-type: none"> • Above: Lift • Bottom: Lower

Procedure:

The drawbar is operated hydraulically using the vehicle controls. Proceed as follows:

- Couple the hydraulic supply lines from the control block on the respective supply system to the appropriate tractor connections.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the "Hydraulics" and the "Coupling the Hydraulic Supply Line" sections.

- To increase the clearance under the machine / to raise the drawbar, proceed as follows: Hold the left switch (Image 9 / Pos. 2) to the left (drawbar) and press the right switch up (Pos. 3) (upward arrow) until the vehicle reaches the desired height.
- If the front of the vehicle / drawbar is to be lowered, proceed as follows: Hold the left switch (/ Pos. 2) to the left (drawbar) and press the right switch down (Pos. 3) (downward arrow) until the vehicle reaches the desired height.

3.5.2 Drawbar Sensor, Right

Pos. 1:	Drawbar Sensor, Right
Function:	Detection of drawbar position
Design	Angle sensor



Fig. 10: Drawbar Sensor, Right

Description:

When the drawbar moves, the sensor detects the position of the drawbar / machine and transmits it to the terminal.

Values displayed:

	<u>Machine uncoupled:</u>	<u>Machine coupled:</u>
0 %	Drawbar raised completely	Machine lowered completely
100 %	Drawbar raised completely	Machine raised completely

Setting:



If the distance "X" between the sensor and the signal transmitter is to be adjusted (e.g. if replaced), observe the operating instructions in the chapter "Function and Settings" in the "Electric" / "Sensor Setting" section!

The adjustment of display value to the sensor value is possible in the factory menu. If the displayed values are not plausible, please contact your BERGMANN representative or the BERGMANN customer service department.



BERGMANN contact information can be found in the chapter "Contact Info & Contact Persons".

3.5.2.1 Angle sensor

Pos.1: Angle sensor

- Detects the position of components.

Pos.2: Nuts (2 pcs)

- For fastening the sensors.

Pos.3: Signal transmitter

- Moving component (e.g. tailgate)

Pos.4: Sensor mount

- Fixed component (e.g. mount)

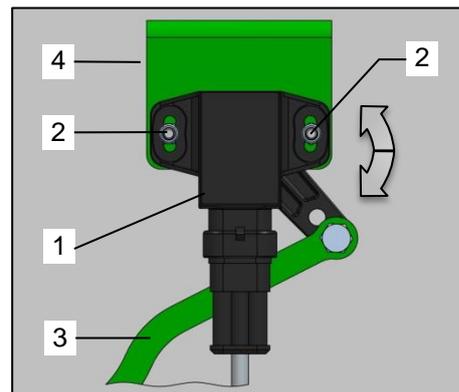


Image 11: Angle sensor

Sensor data:

Maximum tightening torque: 2.5 Nm

Connections:	PIN 1	=	-
	PIN 2	=	+ (12 Volt)
	PIN 3	=	Signal

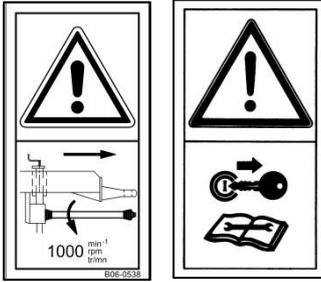
Preparation:

- Move the adjustment element in the start position:
 - E.g. Tailgate completely closed.
 - E.g. Move end wall completely into the cargo space and then back approx. 1 ° - 2 °.
 - E.g. Drawbar hydraulic cylinder fully retracted.

Setting:

- Loosen both nuts (Image 32 / Pos.2) on the sensor (Image 32 / Pos.1).
- Twist the sensor (Image 32/ Pos.1) until the terminal shows the value 0% for the respective sensor function.
- When this value is reached, hold the angle sensor in this position and retighten the two nuts (Image 32 / Pos.2) considering the maximum tightening torque.

3.6 PTO shaft



Only couple the PTO shaft when the motor is off, the PTO shaft is disengaged and the ignition key has been removed!

Never engage the PTO shaft when the motor is off!

Before engaging the PTO shaft, ensure that nobody is in the immediate area of the trailer!

Before engaging the tractor's PTO shaft, ensure that the chosen PTO shaft rotational speed and rotation direction correspond to the unit's allowed rpms.

When working on the PTO shaft no one may be in the area of the rotating PTO shaft or drive shaft!

- After the disengaging the PTO shaft the driven unit can continue to run due to momentum. During this time, not to stand too close, only when the unit has stopped can it be worked on.
- If the supplied drive shaft is altered (factory setting) or another drive shaft is used, all warranty claims become invalid.
- The drive shaft is coupled to the tractor with a quick coupler. For this ensure that the gear independent PTO shaft with min. 1000 rpm is used.
- The PTO shaft must be adapted to fit the tractor. This means it must not be compressed during the tightest of turns to the left or right or when the hydraulic high-lift drawbar is used.

The correct shaft length is found by holding the two shafts parallel to each other. The largest possible overlapping of the tubes in operating position should be obtained. When shortening the PTO shaft, the two protective tubes should be shortened the same as the shaft. After cutting the shaft it should be deburred and the contact areas should be greased.

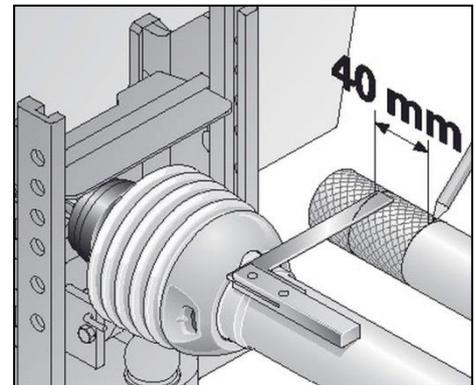


Image: Shortening the PTO Shaft

- If a one-sided wide-angle PTO shaft is installed, the wide-angle joint must be mounted on the tractor.
- Equipping the vehicle with a cam clutch ensures that the power flow is interrupted immediately when the clutch is overloaded, thus protecting the vehicle. The re-engagement of the cam clutch can only be achieved by switching off the tractor PTO.
- The overload clutch is preserved when its use is avoided. The clutch is used primarily as an overload protection and should therefore not be used as a loading limit.



Reduce tractor speed after switching off the drive shaft, otherwise the clutch tends to slip back into place at idle speed. Danger of breakage!

Important! If the supplied drive shaft is altered (factory setting) or another drive shaft is used, all warranty claims become invalid.

Using the Quick Coupling

Coupling:

The black plastic ring (a) is pushed back and locked into place. Slide the mounting yoke over the coupling shaft. Push the yoke until the catch (a) locks into place (The locking is clearly audible and the black plastic ring slips forward). Check that the yoke is firmly seated by pushing it back and forth. The yoke is to be checked for proper seating at regular intervals during operation.



Image: Quick coupling

Uncoupling:

The black plastic ring (a) is pushed back. The mounting yoke slides from the connecting shaft. The black ring locks into the retracted position.

The protective tubes are to be secured rotating using a chain. Also observe the PTO shaft manufacturer's operating instructions.

Using the CC – conical clamp connector

Coupling:

Loosen and unscrew the conical clamp (c). Slide clutch (d) or mounting yoke over the mounting shaft. Position the mounting hole over the ring nut on the mounting shaft. Screw the conical clamp (c) into the mounting hole and tighten it while moving the clutch (d) or mounting yoke carefully back and forth (approx. 70 Nm). Check for proper seating of the clutch hub or mounting yoke by pushing it back and forth. The clutch or yoke (d) is to be checked for proper seating at regular intervals during operation.

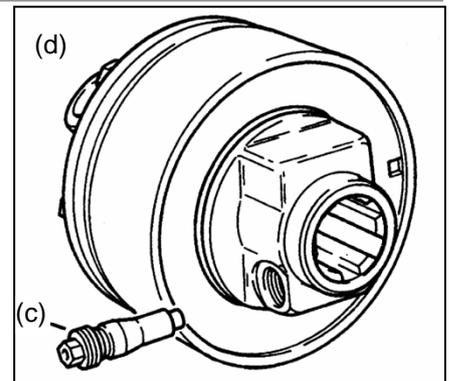


Image: Coupling the conical clamp

Uncoupling:

Loosen and remove the conical clamp (c) from the clutch hub (d) or mounting yoke. In case this is not possible by hand, a hammer and pin punch can be used on the opposite side to remove the conical clamp.

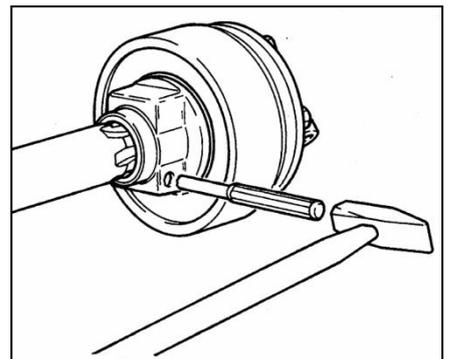


Image: Coupling the conical clamp

3.7 Pick-up

The pick-up (Image 12 / Pos.1) is mounted to the front of the vehicle. It gently picks up the material from the ground and continuously feeds it into the rotor in the conveyor unit.

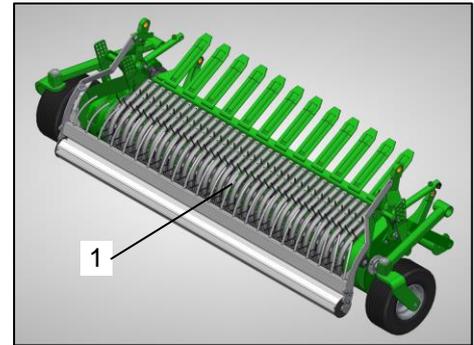


Image 12: Pick-Up

The pick-up area consists of the following individual components:

- pick-up
- guide wheels (sides)
- guide roller (rear)
- guide comb
- swath roller



For this, also observe the instructions and notices in the operating instructions in the following sections!

3.7.1 Locking / Unlocking the Pick-up



WARNING!

Danger of injury from unintentional pick-up movement!

If the pick-up is not secured, it can move when not intended. This can cause severe injury to persons.

- Always secure the pick-up against unintentional lowering before working on or under the pick-up.
- Keep people out of the tractor and vehicle danger areas and away from moving vehicle parts!

The hydraulic lines to the pick-up cylinders can be locked against unintended activation and lowering using a shut-off valve (Image 13 / Pos.1). The shut-off valve (Image 13 / Pos.1) is located on the control block.

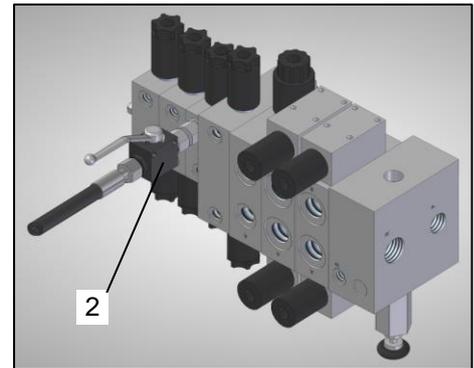


Image 13: Shut-off valve

Shut-off valve open

With the switch in this position the pick-up is not locked and can be raised and lowered.

This switch position must be selected under the following conditions:

- Before raising or lowering the pick-up.

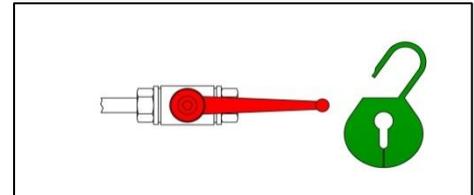


Image 14: Shut-off valve open

Shut-off valve closed

With the switch in this position the pick-up is locked and the position cannot be accidentally changed.

This switch position must be selected under the following conditions:

- When working under the raised pick-up.
- For transporting

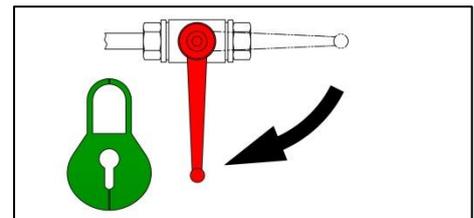


Image 15: Shut-off valve closed

3.7.2 Raising / Lowering the Pick-up

	WARNING!
	<p>Fingers or hands can be crushed when the pick-up is being raised or lowered!</p> <ul style="list-style-type: none"> • Ensure that no persons are in range of the pick-up during raising and lowering. • Do not reach between moving components!

	NOTICE
	<p>Raise the pick-up first when there is no more material on the pick-up or in the conveyor canal.</p>

E-controls (operated using terminal)

The pick-up is operated hydraulically using the terminal. Proceed as follows:

- Couple the hydraulic supply lines from the control block on the respective supply system to the appropriate tractor connections.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the Hydraulics" and the "Coupling the Hydraulic Supply Line with E-controls" sections.

- Move the pick-up into the desired position by activating the "Raise pick-up" / "Lower pick-up" function on the terminal.



For this, the notices and instructions in the operating instructions in the chapter "Operation" are to be observed.

3.7.3 Switching the Pick-up On / Off

	WARNING!
	<p>Danger of the entire body being pulled in or caught on the pick-up and rotor while they are running!</p> <p>These hazards can cause severe injuries and possible death.</p> <ul style="list-style-type: none"> • Never reach into the pick-up as long as the tractor motor is running and the PTO shaft is coupled. • Keep people out of the tractor and vehicle danger areas and away from moving vehicle parts!

Fehler! Verweisquelle konnte nicht gefunden werden.

E-controls (operated using terminal)

The pick-up is switched on and off using the tractor PTO shaft. Proceed as follows:

- Couple the hydraulic supply lines from the control block on the respective supply system to the appropriate tractor connections.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the Hydraulics" and the "Coupling the Hydraulic Supply Line with E-controls" sections.

- Ensure the PTO shaft is standing still and select the "Load" menu in the terminal. The following steps will not function if the "Load" menu is not selected.



For this, the notices and instructions in the operating instructions in the chapter "Operation" are to be observed.

- When the PTO shaft is switched on, the pick-up is switched on. If the PTO shaft was already switched on, it must be switched off first. The pick-up will not start until the PTO shaft is switched on again.
- When the PTO shaft is switched off, the pick-up is switched off.
- Additional function CCI / ISOBUS: Reverse the pick-up
The pick-up direction of rotation can be reversed by pressing and holding the "Reverse Pick-up" button. Activate this function for a short time in order to free up the pick-up.



For this, the notices and instructions in the operating instructions in the chapter "Operation" are to be observed.

3.7.4 Setting the Pick-up Working Height

	WARNING!
	<p>Danger of injury from moving tractor or vehicle, or from vehicle parts!</p> <ul style="list-style-type: none"> • Before working on the vehicle, secure the tractor and the vehicle against unintentional rolling and starting! • Keep people out of the tractor and vehicle danger areas and away from moving vehicle parts! <p> For this, the notices and instructions in the operating instructions in section "Commissioning" under "Securing vehicle against unintentional rolling and starting" are to be observed.</p>

	WARNING!
	<p>Danger of injury from unintentional pick-up movement!</p> <p>If the pick-up is not secured, it can move when not intended. This can cause severe injury to persons.</p> <ul style="list-style-type: none"> • Always secure the pick-up against unintentional lowering before working on or under the pick-up. • Keep people out of the tractor and vehicle danger areas and away from moving vehicle parts! <p> For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the Hydraulics" in the "Pick-up / Lock / Unlock Pick-up") sections.</p>

The pick-up working height must be set correctly in order to make optimum use of the pick-ups operating range. This is done by adjusting the height of the guide wheels, which influences the distance between the ground and the pick-up's spring tines.

The distance between the ground and the pick-up's spring tines depends on the stubble height, material being loaded and ground conditions.

Higher setting: For high stubble and extremely uneven ground.

Lower setting: For short green fodder and even ground.

	NOTICE
	<p>To avoid soiling the fodder the tines should never dig into the ground. Set the operating height so that the harvested material is picked up without loss.</p>

When adjusting the pick-up working height, proceed as follows:

- Place the tractor and the empty vehicle on level, firm ground.
- Secure the tractor and vehicle against unintentional rolling and starting.
- Raise the pick-up high enough that there is enough space to adjust the guide wheels (Image 16 / Pos.1).
- Secure the pick-up against unintentional lowering.

- Remove the spring pin (Image 16 / Pos.2) for securing the coupling rod (Image 16 / Pos.3).
- Hold the guide wheel up using the handle (Image 16 / Pos.4) and remove the coupling rod (Image 16 / Pos.3) from the locating pin.
- Adjust the height of the guide wheels as desired and hang the coupling rod (Image 16 / Pos.3) on the locating pin in the respective hole.
- Secure the coupling rod (Image 16 / Pos.3) with the spring pin (Image 16 / Pos.2).

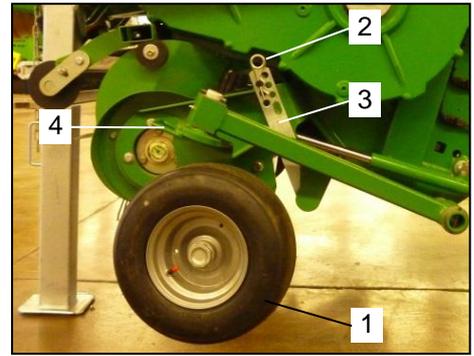


Image 16: Guide Wheels



NOTICE

Ensure that the guide wheels are in the same hole of the coupling rod on both sides and are thus at the same height on both sides.

- Release the safety on the pick-up so that the height can be adjusted.
- Lower the pick-up until the guide wheels are on the ground.
- Then, the pick-up cylinder reference measurement must be checked, (as shown in Image 17) and must be the following size.

Pick-up cylinder reference measurement: 40 - 50 mm

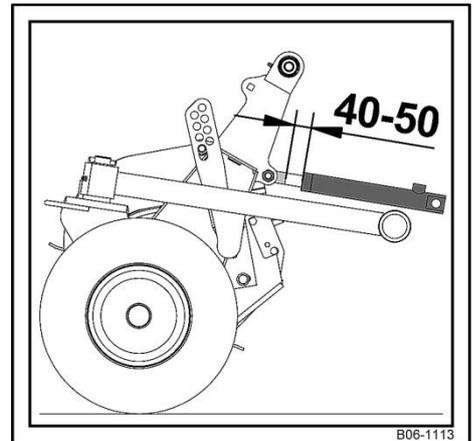


Image 17: Pick-up cylinder

If the pick-up cylinder reference measurement is incorrect, the drawbar cylinder must be adjusted. This must be done as follows:

- Completely retract the drawbar cylinder (Image 18 / Pos.1).
- Loosen lock nuts (Image 18 / Pos.2).
- Adjust the drawbar by alternately turning the left and right piston rods (Image 18 / Pos.3).
- When the correct measurement has been reached, retighten the lock nuts (Image 18 / Pos.2).

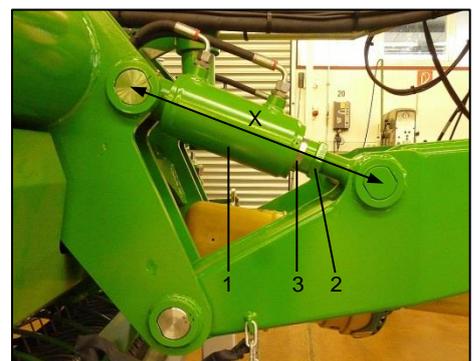


Image 18: Drawbar cylinder

In order to find the value of X, the cylinder must be completely retracted:

- x=370mm (minimum length)
- x=400mm (Standard setting)
- x=430mm (maximum length)

3.7.5 Guide Wheels

The vehicle is equipped with wide, air-filled tyres as guide wheels (Image 19 / Pos. 1) for use on less stable ground. Their follow-up steering protects the grass, e.g. in curves.

Um den Pendelbereich der Pick-Up optimal nutzen zu können, muss die Arbeitshöhe der Pick-Up eingestellt werden. Dies erfolgt durch die Einstellung der Höhe der Tasträder, welche den Abstand zwischen Boden und Federzinken der Pick-Up beeinflussen.

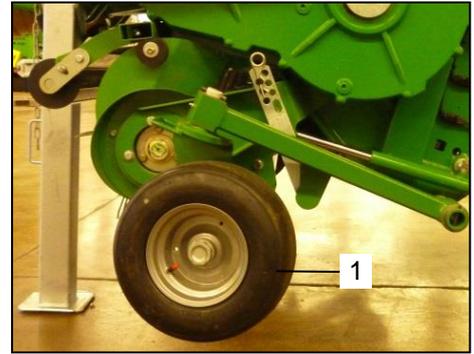


Image 19: Guide Wheels



For this, observe the notices and instructions in the operating instructions in chapter "Commissioning" in the "Adapting to the tractor" / "Setting the pick-up working height") section.

3.7.6 Guide roller

The guide roller behind the pick-up supports the guide wheel vertical guidance on uneven or soft ground.

The guide roller height setting depends on the distance between the ground and the spring tines. This means:

Pick-up working height = guide roller working height

When adjusting the guide roller working height, proceed as follows:

- Place the tractor and the empty vehicle on level, firm ground.
- Set the pick-up working height according to the guide wheel height



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the "Setting the pick-up working height") section.

- Remove the spring pins (Image 20 / Pos.1) on both sides of the guide roller frame in order to release the coupling rod (Image 20 / Pos.2) .
- Remove the coupling rod (Image 20 / Pos.2) from the locating pin on one side.
- Hold the guide wheel frame up and remove the coupling rod (Image 20 / Pos.2) from the locating pin on the other side.
- Adjust the height of the guide wheels as desired and hang the coupling rod (Image 20 / Pos.2) on the locating pin in the respective hole.
- Hang the coupling rod (Image 20 / Pos.2) on the locating pin in the respective hole on the other side.
- Secure the coupling rod (Image 20 / Pos.2) with the spring pin (Image 20 / Pos.2).

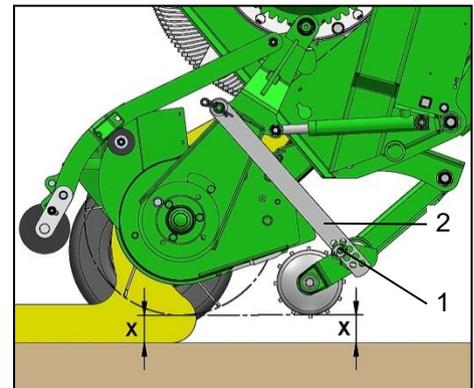


Image 20: Guide roller



NOTICE

Ensure that the guide wheels are in the same hole of the coupling rod on both sides and are thus at the same height on both sides.

3.7.7 Guide Comb and Swath Roller

The vehicle is equipped with a guide comb (Image 21 / Pos.1) and a swath roller (Image 21 / Pos.2), which are located above the pick-up. This ensures flawless pick up of short materials. The guide comb presses the feed against the pick-up tines, which prevents the feed from falling forward.

Depending on the swath thickness the guide comb (Image 21 / Pos.1) and swath roller (Image 21 / Pos.2) can be moved into the correct position by adjusting the chain length (Image 21 / Pos.3).

Thick swath: Large distance between pick-up and guide comb / swath roller.

No swath: Small distance between pick-up and guide comb / swath roller.

In most cases the guide comb (Image 21 / Pos.1) is guided by the swath roller (Image 21 / Pos.2). It lays on the swath and follows its contours. For flawless function the swath roller must turn freely.

3.7.7.1 Adjusting the height

	NOTICE
	<p>Setting of the guide comb / swath roller incorrectly can cause damage to the machine. The result can be bent or broken pick-up tines.</p> <ul style="list-style-type: none"> Ensure that the guide comb and the swath roller do not come into contact with the pick-up tines during operation.

When adjusting the working height, proceed as follows:

- Lower the pick-up until the guide wheels are on the ground.
- Set the desired distance using the chains on both sides of the vehicle (Image 21 / Pos.3).

	NOTICE
	<p>Check the setting</p> <ul style="list-style-type: none"> to ensure that the chains are the same length on both sides of the vehicle so that there is no contact with the pick-up tines.

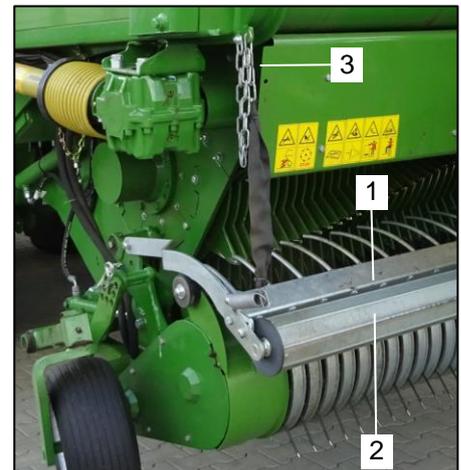


Image 21: Guide Comb & Swath Roller

3.7.7.2 Setting the angle of inclination

The swath roller (Image 22 / Pos.1) angle of inclination can be adjusted. This must be done as follows:

- Loosen the nuts (Image 22 / Pos.2) on both sides.
- Adjust the swath roller (Image 22 / Pos.1) in the slot.
- Tighten the nuts (Image 22 / Pos.2) on both sides.

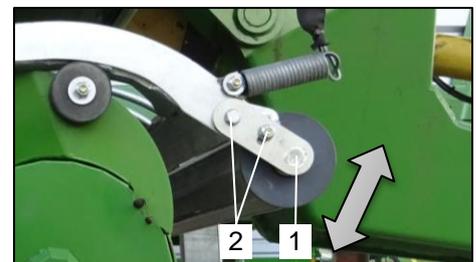


Image 22: Angle of inclination

3.8 Conveyor Unit

The conveyor unit (Image 23 / Pos.1) is located in the material flow chain, behind the pick-up. The conveyor rotor with its spirally arranged feed tines transports the material uniformly through the conveyor channel into the vehicle cargo space. Scrapers located between the feed tines prevent the conveyor rotor from clogging. In the conveyor channel, the material is cut by the cutting unit knives.

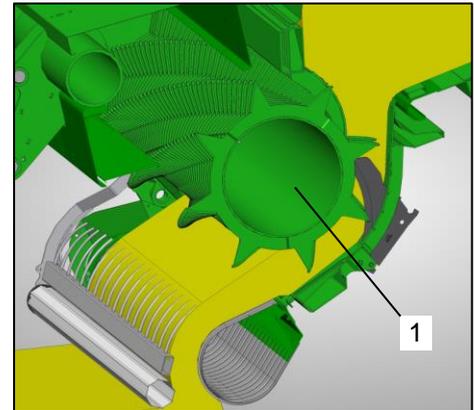


Image 23: Conveyor Unit

3.8.1 Switching Conveyor Unit On / Off



WARNING!

Danger of the entire body being pulled in or caught on the pick-up and rotor while they are running!

These hazards can cause severe injuries and possible death.

- Never reach into the rotor area long as the tractor motor is running and the PTO shaft is coupled.
- Keep people out of the tractor and vehicle danger areas and away from moving vehicle parts!

Fehler! Verweisquelle konnte nicht gefunden werden.

E-Controls

The conveyor unit is switched on and off using the terminal and tractor PTO shaft. Proceed as follows:

- Couple the hydraulic supply lines from the control block on the respective supply system to the appropriate tractor connections.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the Hydraulics" and the "Coupling the Hydraulic Supply Line with E-controls" sections.

- Select the "Load" menu in the terminal.



For this, the notices and instructions in the operating instructions in the chapter "Operation" are to be observed.

- When the PTO shaft is switched on, the conveyor unit is switched on.
- When the PTO shaft is switched off, the conveyor unit is switched off.

	NOTICE
	Do not switch the conveyor unit off until there is no more material in the conveyor channel.

3.8.2 Conveyor Unit Cover

If the vehicle is used as a harvest transport trailer it is advisable to put the cover over the unused conveyor channel.

	WARNING!
	<p>There is a danger of being crushed, caught, wound up or pulled in when persons enter the cargo space during operation.</p> <p>Secure the tractor and the trailer against unintentional starting and rolling, before entering the cargo space.</p>

Procedure:

- Place the cover (Image 24 / Pos.1) over the conveyor channel.
- Loosen the screws in the immediate vicinity of the two locking hooks (Image 24 / Pos.2) on the adjacent plates.
- Swivel the locking hooks around (Image 24 / Pos.1) so that they engage the screws.
- Retighten the screws to fix the cover in place.

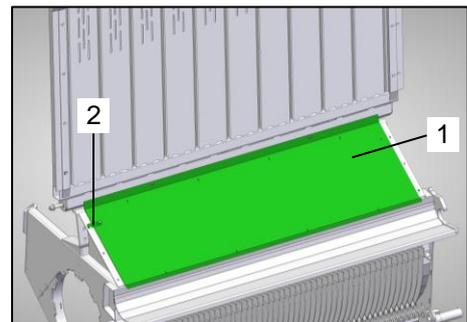


Image 24: Conveyor Unit Cover

	NOTICE
	The conveyor channel cover must be removed before the conveyor unit is used again.

3.9 Cutting Unit



When working with the knives, never touch the sharp side of the knives. Danger of injury! Gloves must be worn.

Each knife is individually protected against foreign objects. After the safety mechanism has been tripped, the knives move back into cutting position automatically. The response threshold is set at the factory. The cutting unit is switched on and off via electromagnetic controls. This makes it possible to easily deal with conveyor unit blockages from the tractor seat.

After activation, the cutting unit pivots out so that the knives go through the cutter housing and are slightly in the conveyor canal. The position of the sensors (Image: Cutting unit Pos. 1) determines how far the knives protrude into the conveyor canal.

After a blockage in the conveying unit has caused the overload clutch to respond, the tractor PTO shaft must be switched off. Then the cutting unit must be hydraulically retracted and the blockage removed by switching the conveyor unit on. Then the cutting unit is swung back in while the rotor is turning slowly.

The vehicle cutting unit is equipped with a control system (Image: Cutting unit Pos. 2). If the cutting bar is not completely in place, the terminal display signals it.



Image: Cutting Unit

Important! The setting of the sensors, as well as information and instructions in the "Care and Maintenance" section under "cutting unit" must be observed.

3.9.1 Cutting Unit

A controller for operating the cutting unit (and drawbar, see "Drawbar" section) is mounted on the side of the vehicle frame for easy operation. With this, the cutting unit can be easily extended and retracted.

3.9.1.1 Procedure:

The cutting unit is moved out hydraulically using (Image: Cutting unit / Drawbar controls Pos. 1) the controls. This must be done as follows:

- Hold the left switch (Image: Cutting unit / Drawbar controls Pos. 2) to the right (knives) and the right switch (Image: Cutting unit / Drawbar controls Pos. 3) down (arrow down) until the cutting unit is extended.

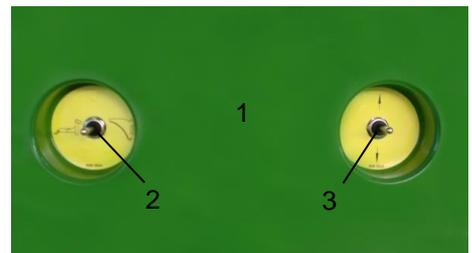


Image: Cutting unit controls

If the cutting unit is to be retracted using the side controls (Image: Cutting Unit / Drawbar Controls Pos. 1), proceed as follows:

- Hold the left switch to (Image: Cutting unit / Drawbar controls Pos. 2) the right (knives) and the right switch (Image: Cutting unit / Drawbar controls Pos. 3) up until the (arrow up) cutting unit is in place. When moving the cutting unit back into place, ensure that the knives seat properly in the cutting housing.

3.9.2 Sharpening the Knives

Always ensure that the knives are in good and sharp condition. This make easy and material friendly work possible. The knives must be removed for sharpening

This must be done as follows:

- Remove material residue from behind the cutting unit.
- Lower the cutting unit hydraulically as far as possible with the side controls.
- Remove the knives from the cutting unit without the use of tools and without danger of injury.
- Only grind the smooth sharp side. Careful grinding without heating the knife will guarantee a long service life.
- After sharpening, place the knives back in the cutting bar and move the bar back into place hydraulically.



Image: Cutting bar

3.9.3 Cleaning

To ensure trouble-free operation, the cutting unit must be cleaned daily.

3.10 Chassis (hydraulic Axle Balance)



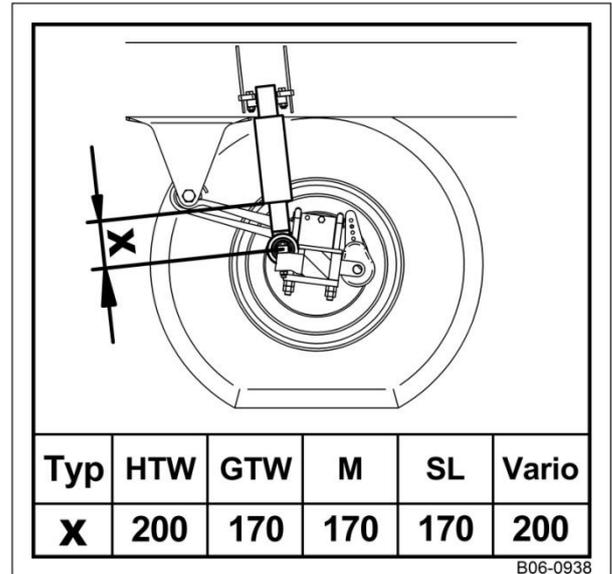
After coupling the trailer the free return hydraulic line must be coupled first!



When driving on public roads ensure that the vehicle does not exceed the maximum height of 4.00 meters.

3.10.1 Setting the Clearance

The clearance and with that the height of the entire vehicle must be checked once daily and adjusted if necessary. When the vehicle is in a horizontal position the four chassis cylinders should be in a position as shown in the image below. If this value is not correct the clearance must be corrected.



(B06-0938)

3.10.2 Position of the ball valves:

Ball valves closed

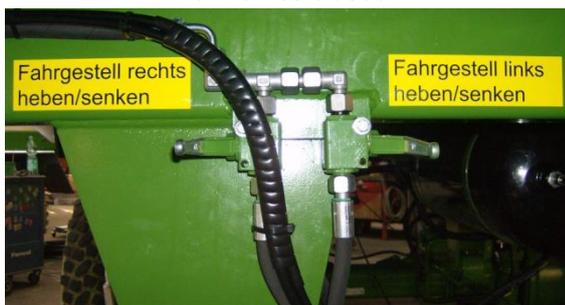


Image: Ball valves closed

Ball valves open

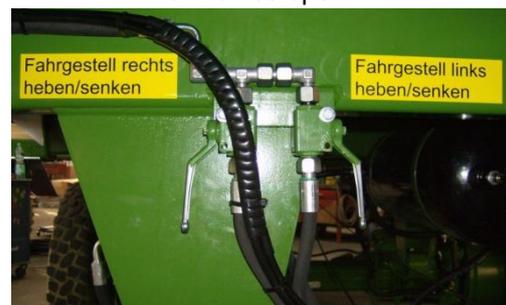


Image: Ball valves open

3.10.3 Setting



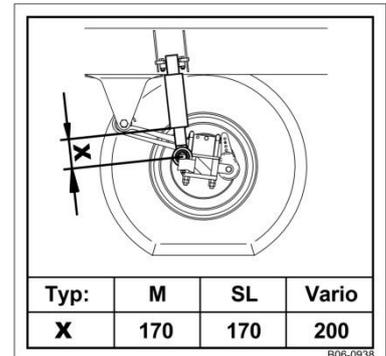
The setting of the clearance may not be done directly on the chassis using the ball valves!
Danger of injury!
 The vehicle must be the same height on both the left and right sides of the chassis!



If the chassis is inclined to one side, the ball valve that controls the lower side can be opened for filling. It is essential that the order of the procedure listed below is followed!
 An incorrect clearance level causes risk of breakage!

Procedure for "raising chassis":

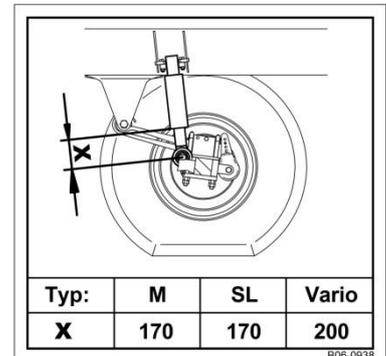
- Align completely empty vehicle on a flat, paved surface
- Couple the free return hydraulic hose to the tractor
- Couple the clearance hydraulic hose to the tractor
- Place operating valve on tractor in the neutral position
- Carefully open both valves on the chassis (Transport trailer and Vario), or on the front wall (spreaders)
- Pressurize the hydraulic line
- Use the tractor to fill the hydraulic system until the chassis has reached the appropriate height (see adjacent label / B06-0938). Observe maximum vehicle height!
- After reaching the appropriate height ensure that valves are completely closed.
- Depressurize hydraulic line on tractor.
- Disconnect the niveau hydraulic connection between the tractor and trailer, but do not the separate the free return hydraulic connection.



(B06-0938)

Procedure for "lowering chassis":

- Align vehicle on a flat, paved surface
- Couple the free return hydraulic hose to the tractor
- Couple the clearance hydraulic hose to the tractor
- Place operating valve on tractor in the neutral position
- Carefully open both valves on the chassis (Transport trailer and Vario), or on the front wall (spreaders)
- Leave the valve on the tractor open until the chassis is lowered to the proper height. Observe maximum vehicle height!
- After reaching the appropriate height ensure that valves are completely closed.
- Depressurize hydraulic line on tractor.
- Disconnect the niveau hydraulic connection between the tractor and trailer, but do not the separate the free return hydraulic connection.



(B06-0938)

3.11 Follow up Steering

The follow-up steering axle makes it possible to drive over vegetation without damaging it. When the steering axle is unlocked, the wheels on the follow-up axle can adjust when driving through curves. If the vehicle is equipped with a follow-up steering axle, the following must be observed:



If the following instructions are not followed, there is danger of an accident!



The axles must be in the straight position when they are locked, otherwise there is a danger of breaking!

Driving forwards

The steering axle must be locked when

- travelling on public roads,
- when driving on uneven or bumpy roads
- when driving on silos
- when driving on slopes
- the rigid axles alone do not provide for adequate lateral support of the vehicle.

Driving in Reverse

The follow-up axle must be locked before driving in reverse. This means that the wheels must be positioned straight ahead and hydraulically locked. It may be helpful to drive slowly forward during alignment.

3.12 Forced Steering

If desired, the steering axles can be used as forced axles. In practical use a forced steering axle provides for more driving safety, because it absorbs transverse forces (such as when cornering) as opposed to a follow-up axle. In addition, a forced-steered vehicle can be driven in reverse more easily, as the wheels are automatically placed in the correct angular position. The forced steering axle makes it possible to drive over vegetation without damaging it.

With forced steering, the steering axles of the trailer can be controlled according to the angle between the tractor and trailer. Power is transmitted hydraulically by the slave cylinder on the steering axles, which receives the oil required for steering directly from the master cylinder to the drawbar. To compensate for impacts from roadway unevenness, both hydraulic circuits (for steering left and right) are provided with a pressure accumulator.

For the hydraulic forced steering, a hydraulic oil HLP 46 (DIN 51524 Part 2) or a higher-quality hydraulic oil is to be used. This is filled into the container of the hand pump.



Every day before operation a check should be carried out to ensure that the steering hydraulic pressure is at 70 bar (all gauges), and adjust, as shown in Image: Setting 1 – 3. Axle pos. 1, as illustrated. If the pressure in the system falls more than 10 bar within 24 hours, a specialist workshop must immediately check for leaks and repair them.

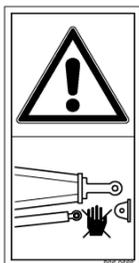
3.12.1 Safety Notice

Important! For this the "General safety and accident prevention requirements" listed in the operating instructions in the section on "User notices" must be observed!



Hydraulic reservoirs are under pressure (check gauge)! Depressurize the system before working on it.

- Align axes before departure, check the hydraulic pressure in the lines and add pressure if necessary.
- When uncoupling the trailer from the tractor always drain the hydraulic pressure in the forced steering to 0 bar.



- When coupling the hydraulic cylinder, no people are allowed or their limbs should be in the stroke range of the cylinder (risk of injury by sudden movement of piston rod)!

- The steering axle may not be used as a follow-up axle, but rather as a forced steering axle, or locked when
 - travelling on public roads,
 - when driving on uneven or bumpy roads
 - when driving on silos
 - when driving on slopes
 - when the rigid axles alone do not provide for adequate lateral support of the vehicle.
 - when driving in reverse

3.12.2 Adapting the Tractor to the Trailer

To establish the connection to the tractor coupling points are needed on the tractor, which adhere to the standard proposed by the VDMA Special Interest Group Agricultural Machinery (Image: Image of the master cylinder).

The mounting bracket for the forced steering master cylinder is to be fitted on the tractor by a specialist workshop and to be designed for a cylinder force of 65000 N.

The line connecting the centres of the ball hitch ball $\varnothing 80$ ISO 24347:2005 and / steering points (s) $\varnothing 50$ (Image: Master cylinder mount) must be parallel to the rear axle of the tractor. A tolerance of ± 5 mm in the vertical and horizontal directions is permitted. The position of the steering point (s) must be $80\varnothing$ relative to the ball coupling, in accordance with ISO 24347:2005 Image: correspond with the master cylinder mount.

Attention! When adapting the trailer to the tractor, appropriate measures must be taken to ensure that the master cylinder cannot collide with the drawbar at the maximum steering angle between the tractor and trailer in left and right directions. In addition, the piston rod of the master cylinder on the drawbar may not be extended or retracted to the maximum stroke limit (from the middle ± 250 mm). The hydraulic pressure may not increase above 180 bar in any of the two steering circuits at maximum turning angle between the tractor and trailer.

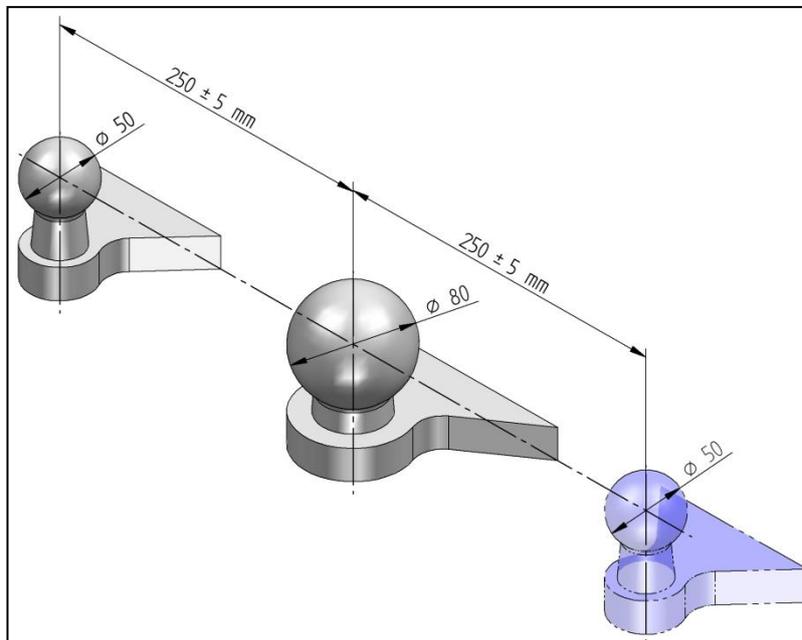


Image: Image of the master cylinder).

3.12.3 Coupling

- Couple the trailer as always.
- Open Shut-off valves on the control panel, as shown in Image: Settings 1.-3. Open Axle pos. 1 . If necessary also open the valve on the hand pump.
- Fix drawbar cylinder on the tractor's coupling points.
- Loosen the locking pin 1 on the drawbar (Image drawbar with forced steering) by lifting and turning it out of its seat and lock it into the cylinder. Should the locking pins not lock into place, drive forward very slow (<2 km / h) and lock the pin into place by making light steering movements with the tractor.
- Align tractor and trailer in a straight line.
- Close hand pump valve.
- Pump the hydraulic system up to the given pressure (Image: Settings 1.-3. Axle pos. 1)

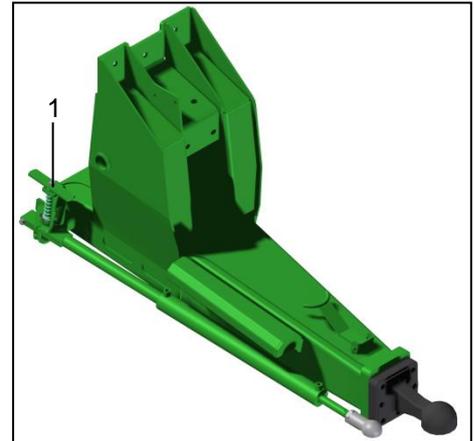


Image: Forced steering drawbar

3.12.4 Uncoupling:

- Open all shut-off valves (Image: Settings 1.-3. Axle pos. 1). Relieve pressure in the hydraulic system to $p = 0$ bar by opening the pump valve.
- Loosen the drawbar cylinder bearing pin by lifting it and turn it to lock into place.
- Release cylinder from the tractor coupling points.
- Uncouple the trailer as always.



When uncoupling the trailer from the tractor always drain the hydraulic pressure in the forced steering to 0 bar.

Important! For forced steering lubrication plan see [Care and maintenance - Forced steering]

3.12.5 Adjusting the Steering

The setting of the steering axle is to be tested after coupling, and daily before operation and corrected if necessary. This is carried out as follows:

1. Park the tractor on a flat, level surface after moving straight forward.
2. Set the ball valves as shown in image: Settings 1.-3. Axle pos. 1 and drive the tractor straight until the trailer is aligned behind the tractor.
3. Set the ball valves as shown in image: Settings 1.-3. axle pos. 1 and set the pressure in the two circuits simultaneously to 70 bar.
4. Set the ball valves as shown in image: Settings 1.-3. axle pos. 2.2 and the forced steering is active.

3.12.6 Steering Variations

The forced-steering trailer can also be operated with follow-up or locked axle. The required actions are described below:

Design with 2 Axles: 2. Steered axle	Design with 3 Axles: 1. Steered axle	Function: 3. Steered axle	
			Pos. 1: Setting
			Pos. 2.1: Follow-up-steered axle
			Pos. 2.2: Force-steered axle
			Pos. 2.3: locked steering axle

Image: Setting 2 Axle Image: Setting 1 Axle Image: Setting 3 Axle

Driving with follow-up steering axle (Image: Settings 1.-3. Axle pos. 2.1)

With follow-up steering shown in valves remain open (Image: Settings 1.-3. Axle pos. 2.1). The wheels of the steering axle are free and can follow the steering movements of the tractor when moving forwards. Reversing is not possible in this position.

Driving with forced steering (Image: Settings 1.-3. Axle pos. 2.2)

With the force steering the valves on the drawbar are closed (Image: Settings 1.-3. Axle pos. 2.2). The wheels of the steering axle turn with the steering angle between the tractor and trailer. The forced steering works in both forward and in reverse directions.

Driving with locked steering axle (Image: Settings 1.-3. Axle pos. 2.3)

If the steering axle is to be locked, the vehicle must first move into the straight ahead position. The axle shut-off valves are closed. Image: Settings 1.-3. Axle pos. 2.3). The wheels of the steering axle cannot make steering movements. Driving in reverse is possible.

3.13 Cargo Space



DANGER!

Danger of entire body being caught or pulled in when the system is running.

These hazards can cause severe injuries and possible death.

Never enter cargo space if drive is engaged and motor is running!

- Always switch off all drives, stop the engine and remove the ignition key before working in the cargo space.
- Before working on the vehicle, secure the tractor and the vehicle against unintentional rolling and starting!
- Keep people out of the tractor and vehicle danger areas and away from moving vehicle parts!



For this, the notices and instructions in the operating instructions in section "Commissioning" under "Securing vehicle against unintentional rolling and starting" are to be observed.

3.13.1 Access to Cargo Space

When entering the cargo space for work reasons (maintenance and repair work), use the ladder and access door on the side.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the "Ladder and Access Door" section.

3.13.2 Ladder and Access Door

	NOTICE
	<p>Before driving:</p> <ul style="list-style-type: none"> • The access door must be closed, • and the ladder must be raised and fixed with the lever.

Lowering the ladder and opening the cargo space access door:

To lower the ladder (Image 25 / Pos.1) and open the access door (Image 25 / Pos. 2) proceed as follows:

- Hold the ladder with one hand (Image 25 / Pos.1) to prevent it from falling and press the safety (Pos. 3) back with the other hand and pull the lever (Image 25 / Pos.4) down to unlock it .
- Lower the ladder (Image 25 / Pos.1) with both hands until it rests completely on the the base step (Image 25 / Pos.5).
- In order to prevent unintended movement, fully open the access door (Image 25 / Pos. 2) and lock the door open  with the lever (Image 25 / Pos.4) by moving it upwards.
- Use the handrail (Image 25 / Pos. 6) when entering or leaving the cargo space

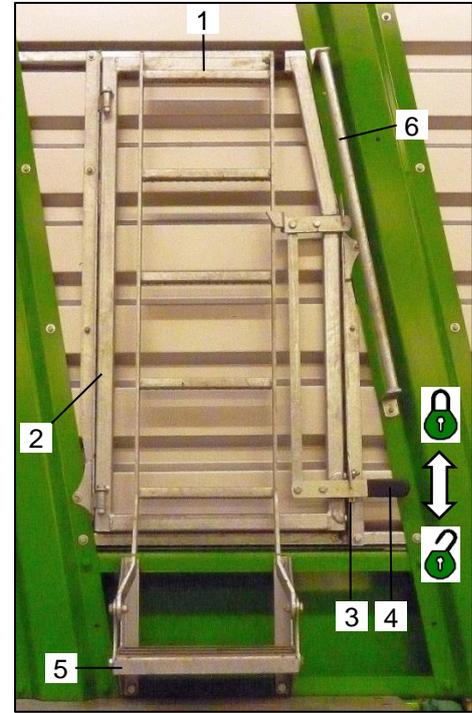


Image 25: Ladder and access door

Closing the cargo space door and raising the ladder.

To close the access door (Image 26 / Pos.2) and return the ladder (Image 26 / Pos.1) back the the uppermost position, proceed as follows:

- Pull the lever (Image 26 / Pos.4) down to release  the access door (Image 26 / Pos.2) and close it completely. The lever then remains in the unlocked position .
- Raise the ladder (Image 26 / Pos.1) with both hands until it rests completely on access door (Image 26 / Pos.2).
- Lock the access door (Image 26 / Pos.2) and ladder (Image 26 / Pos.1) in place by pushing the lever (Image 26 / Pos.4) up . The safety latch (Image 26 / Pos.3) locks automatically, preventing accidental opening.

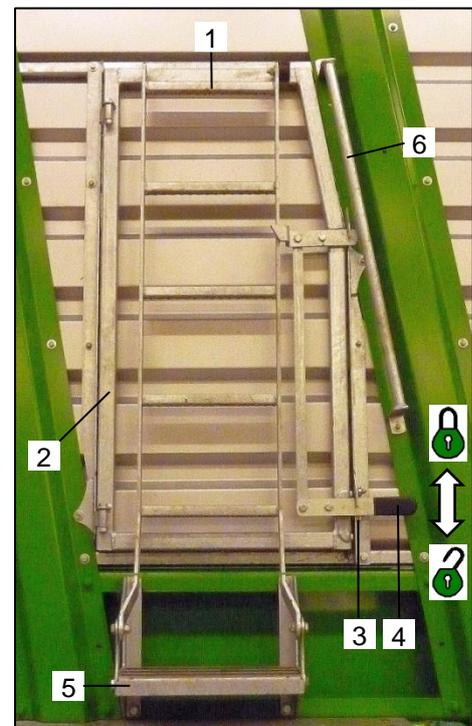


Image 26: Ladder and access door

3.13.3 Front Wall - Hydraulic Swivel Mechanism



WARNING!

When extending working elements damage can be caused to the vehicle or accidents can occur if the total height is not observed!

This can cause accidents or severe damage to the machine.

- Ensure that the vehicle does not exceed the maximum height of 4.00 meters when driving on public roads.



WARNING!

Risk of crushing fingers or hands on accessible moving vehicle parts!

- Never reach into areas where body parts can be crushed while vehicle parts are moving.
- Ensure that persons keep a safe distance away.



CAUTION!

Risk of damaging the vehicle during operation if the vehicle is operated with the cargo space cover closed.

In order to prevent damage to the vehicle, open the cargo space cover:

- Before starting the loading or unloading procedure.
- Before moving the front wall into the desired position.



NOTICE

Before driving on public roads the front wall must be moved into the transport position. All front wall elements are completely inside of the vehicle cargo space.

3.13.3.1 Front wall elements

The front wall consists of the following swivelling elements.

- Front wall bottom element (Image 27 / Pos.1)
- Front wall top element (Image 27 / Pos.1)

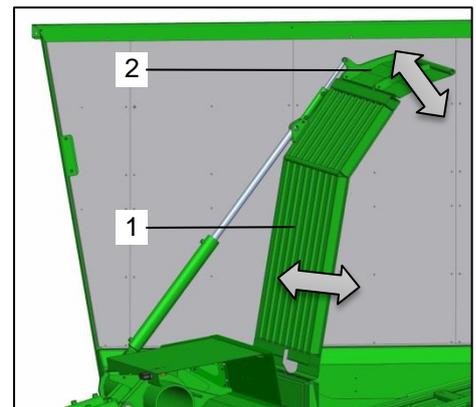


Image 27: Front Wall Elements

3.13.3.2 Front Wall Positions

The front wall's hydraulic pivoting sections make different positions possible for optimum adaptation to the required operating conditions.

The respective positions are described in more detail in the next sections.

Position 1

Front wall bottom element: (Image 28 / Pos.1)	<ul style="list-style-type: none"> - Pivoted back toward the cargo space - Cylinder (Image 28 / Pos. A) is completely extended
Front wall top element: (Image 28 / Pos.2)	<ul style="list-style-type: none"> - Pivoted back toward the cargo space - Cylinder (Image 28 / Pos. B) is completely extended
Application:	<ul style="list-style-type: none"> - Transport position - Start to loading - End loading

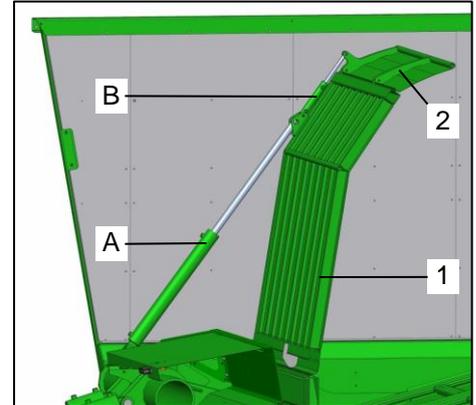


Image 28: Front wall position 1

Position 2

Front wall bottom element: (Image 29 / Pos.1)	<ul style="list-style-type: none"> - Pivoted forward toward the tractor - Cylinder (Image 29 / Pos. A) is completely retracted
Front wall top element: (Image 29 / Pos.2)	<ul style="list-style-type: none"> - Positioned in line with front wall bottom element - Cylinder (Image 29 / Pos. B) is almost completely extended
Application:	<ul style="list-style-type: none"> - End loading - Start unloading

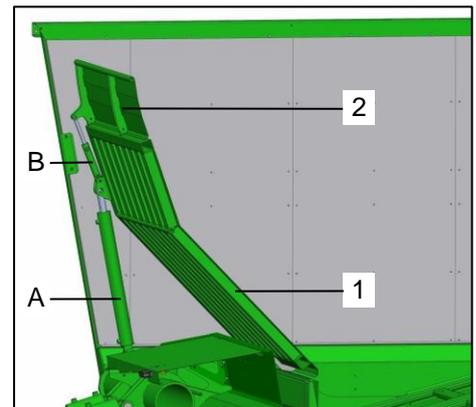


Image 29: Front wall position 2

Position 3

Front wall bottom element: (Image 30 / Pos.1)	<ul style="list-style-type: none"> - Pivoted forward toward the tractor - Cylinder (Image 30 / Pos. A) is completely retracted
Front wall top element: (Image 30 / Pos.2)	<ul style="list-style-type: none"> - Pivoted forward toward the tractor - Cylinder (Image 30 / Pos. B) is almost completely retracted
Application:	<ul style="list-style-type: none"> - Chopping from the front

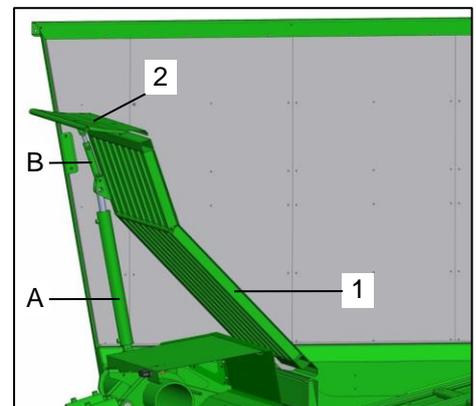


Image 30: Front wall position 3

3.13.3.3 Moving the front wall

Operation depends on vehicle configuration and on the hydraulic system. The procedure for raising and lowering the front wall can be seen in the following sections.

Preparation:

- If the vehicle is equipped with a cargo space cover, the cover must be fully opened first. Only then can the front wall be moved.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the "Cargo Space Cover" section.

E-controls (operated using terminal)

The front wall is moved hydraulically using the terminal. Proceed as follows:

- Couple the hydraulic supply lines from the control block on the respective supply system to the appropriate tractor connections.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the "Hydraulics" and the "Coupling the Hydraulic Supply Line" sections.

- The front wall bottom element is moved into the desired position using the "Forward / Back Front Wall Bottom Element" on the terminal. The function must be activated until the respective end position is reached.
- The front wall top element is moved into the desired position using the "Raise / Lower Front Wall Top Element" on the terminal. The function must be activated until the respective end position is reached.



For this, the notices and instructions in the operating instructions in the chapter "Operation" are to be observed.

3.13.4 Front Wall Sensor, Bottom (Right)

Pos. 1:	Front wall sensor, bottom (right)
Function:	Detection of front wall position
Design	Angle sensor



Image 31: Front wall sensor, right

Description:

When the front wall moves, the sensor detects the position of the front wall and transmits it to the terminal.

Values displayed:

0 %	Front wall completely in cargo space
100 %	Front wall moved completely toward tractor

Setting:



If the distance "X" between the sensor and the signal transmitter is to be adjusted (e.g. if replaced), observe the operating instructions in the chapter "Function and Settings" in the "Electric" / "Sensor Setting" section!

The adjustment of display value to the sensor value is possible in the factory menu. If the displayed values are not plausible, please contact your BERGMANN representative or the BERGMANN customer service department.



BERGMANN contact information can be found in the chapter "Contact Info & Contact Persons".

3.13.4.1 Angle sensor

Pos.1: Angle sensor

- Detects the position of components.

Pos.2: Nuts (2 pcs)

- For fastening the sensors.

Pos.3: Signal transmitter

- Moving component (e.g. tailgate)

Pos.4: Sensor mount

- Fixed component (e.g. mount)

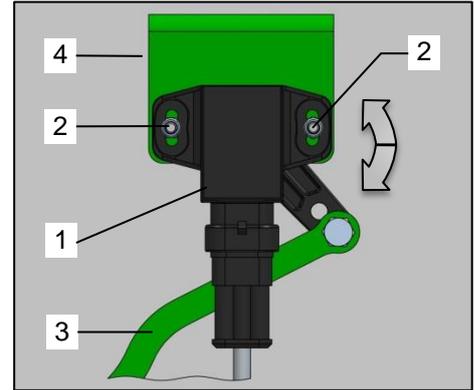


Image 32: Angle sensor

Sensor data:

Maximum tightening torque: 2.5 Nm

Connections:	PIN 1	=	-
	PIN 2	=	+ (12 Volt)
	PIN 3	=	Signal

Preparation:

- Move the adjustment element in the start position:
 - E.g. Tailgate completely closed.
 - E.g. Move end wall completely into the cargo space and then back approx. 1 ° - 2 °.
 - E.g. Drawbar hydraulic cylinder fully retracted.

Setting:

- Loosen both nuts (Image 32 / Pos.2) on the sensor (Image 32 / Pos.1).
- Twist the sensor (Image 32/ Pos.1) until the terminal shows the value 0% for the respective sensor function.
- When this value is reached, hold the angle sensor in this position and retighten the two nuts (Image 32 / Pos.2) considering the maximum tightening torque.

3.13.5 Front Wall Sensor, Middle

Pos. 1:	Front wall sensor, middle
Function:	Automatic filling system (pressing force)
Design	Inductive sensor "Opener"
LED on:	 <p>The front wall rungs are moved forward to the preset position, so that there is no longer any overlap with the signal transmitter. The scraper floor switches on automatically and runs until the rungs are in back their original position.</p>
LED off:	 <p>The rungs are still in the set range and there is an overlap with the signal transmitter.</p>

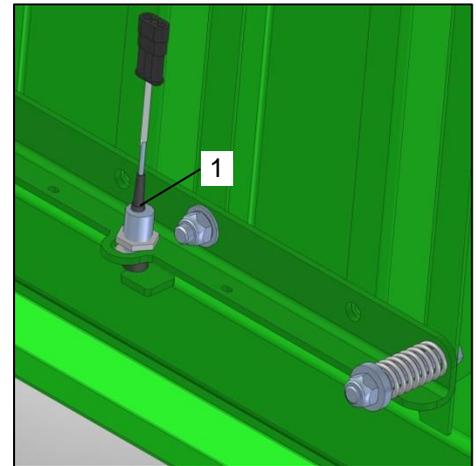


Image 33: Front wall sensor, middle

Sensor data:

Thread:	M18
Maximum tightening torque:	25 Nm
Connections:	PIN 1 = -
	PIN 2 = + (12 Volt)
	PIN 3 = Signal

Description:

With auto-fill the scraper floor switches on automatically when a predefined material pressure is reached. A sensor (Image 34 / Pos.1) detects movement of the middle rungs in the front wall. If the automatic filling system engages too quickly, the sensors need to be adjusted.

Setting:

The sensor (Image 34 / Pos.2) on the front wall (Image 34 / Pos.1) is set when the unit in rest position. The front wall middle rungs (Image 34 / Pos.1) are not under load.

The sensor (Image 34 / Pos.2) is moved while taking into consideration the distance "X" between sensor (Image 34 / Pos.2) and signal transmitter (Image 34 / Pos.4). This must be done as follows:

- Move the front wall (Image 34 / Pos.1) into the transport position.
- Loosen the nut (Image 34 / Pos.3) on the sensor (Image 34 / Pos.2).
- If the automatic filling system engages too quickly, place the sensor (Image 34 / Pos.2) closer to the front wall (Image 34 / Pos.1).
If the automatic filling system does not engage quickly enough, place the sensor (Image 34 / Pos.2) further away from the front wall (Image 34 / Pos.1).
- Hold the sensor (Image 34 / Pos.2) in this position and tighten the nut (Image 34 / Pos.3) taking the maximum tightening torque into consideration.

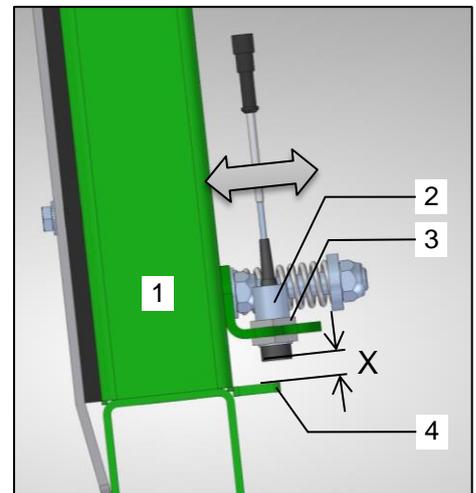


Image 34: Sensor settings

If the automatic filling system engages too slowly or quickly, the sensors (Image 34 / Pos.2) need to be readjusted.



If the distance "X" between the sensor and the signal transmitter is to be adjusted, observe instructions the operating instructions in the chapter "Function and Settings" in the "Electric" / "Sensor Setting" section!

3.13.5.1 Inductive sensor "Opener" & "Closer"

Pos.1: Inductive sensor "Opener" & "Closer"

- Opener: Sensor switches if there is no overlap with the signal transmitter, PIN 1 and PIN 2 are connected.
- Closer: Sensor switches if there is an overlap with the signal transmitter, PIN 1 and PIN 2 are connected.

Pos.2: Nuts (2 pcs)

- For fastening the sensors.

Pos.3: Signal transmitter

- Moving component (e.g. tailgate)

Pos.4: Sensor mount

- Fixed component (e.g. mount)

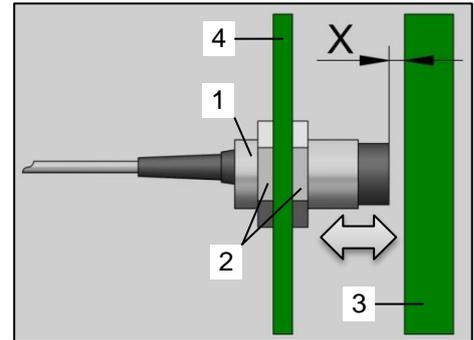


Image 35: Opener & closer

Sensor data:

Thread:	M18
Maximum tightening torque:	25 Nm
Connections:	PIN 1 = -
	PIN 2 = + (12 Volt)
	PIN 3 = Signal

Preparation:

- Move the adjustment element with the signal transmitter (Image 38 / Pos.3) that the sensor (Image 38 / Pos.1) is overlapped.

Setting:

Clearance:

X = 2 - 4 mm

- Loosen both nuts (Image 38 / Pos.2) on the sensor (Image 38 / Pos.1).
- Rotate the nuts (Image 38 / Pos.2), until distance X between the sensor and the signal transmitter is reached.
- Retighten both nuts (Image 38 / Pos.2) considering the maximum tightening torque.

3.13.6 Tailgate Sensor, Top (Left & Right)

Pos. 1:	Tailgate sensor, top (left & right)
Function:	Automatic filling system (volumes)
Design	Inductive sensor "Closer"
LED on:	 <p>The filling hood is raised to the point that it has overlapped the signal transmitter. The scraper floor switches on automatically and runs until the filling hood drops back down.</p>
LED off:	 <p>The filling hood is not raised and it has not overlapped the signal transmitter.</p>

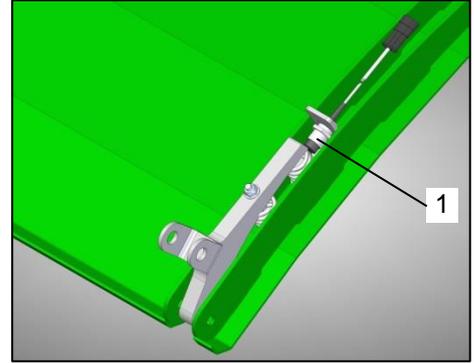


Image 36: Front wall sensor, top

Sensor data:

Thread:	M18
Maximum tightening torque:	25 Nm
Connections:	PIN 1 = - PIN 2 = + (12 Volt) PIN 3 = Signal

Description:

With auto-fill the scraper floor switches on automatically when the material reaches a predefined height. A sensor (Image 37 / Pos.1) detects movement of the filling hood (Image 37 / Pos.1).

Setting:

The sensor (Image 37 / Pos.2) on the front wall (Image 37 / Pos.1) is set when the unit in rest position. The front wall (Image 37 / Pos.1) is not raised.

The sensor (Image 2 / Pos.2) is moved while taking into consideration the distance "X" between sensor (Image 2 / Pos.2) and signal transmitter (Image 2 / Pos.4). This must be done as follows:

- Loosen the nut (Image 37 / Pos.3) on the sensor (Image 37 / Pos.2).
- If the automatic filling system engages too quickly, place the sensor (Image 37 / Pos.2) closer to the filling hood (Image 37 / Pos.1).
If the automatic filling system does not engage quickly enough, place the sensor (Image 37 / Pos.2) further away from the filling hood (Image 37 / Pos.1). Note that the diode should not light up here, otherwise the filling system will activate immediately.
- Hold the sensor (Image 37 / Pos.2) in this position and tighten the nut (Image 37 / Pos.3) taking the maximum tightening torque into consideration.

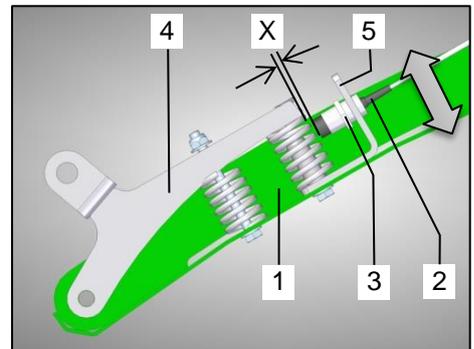


Image 37: Sensor Adjustment

If the automatic filling system engages too slowly or quickly, the sensors (Image 37 / Pos.2) need to be readjusted.



If the distance "X" between the sensor and the signal transmitter is to be adjusted, observe instructions the operating instructions in the chapter "Function and Settings" in the "Electric" / "Sensor Setting" section!

3.13.6.1 Inductive sensor "Opener" & "Closer"

Pos.1: Inductive sensor "Opener" & "Closer"

- Opener: Sensor switches if there is no overlap with the signal transmitter, PIN 1 and PIN 2 are connected.
- Closer: Sensor switches if there is an overlap with the signal transmitter, PIN 1 and PIN 2 are connected.

Pos.2: Nuts (2 pcs)

- For fastening the sensors.

Pos.3: Signal transmitter

- Moving component (e.g. tailgate)

Pos.4: Sensor mount

- Fixed component (e.g. mount)

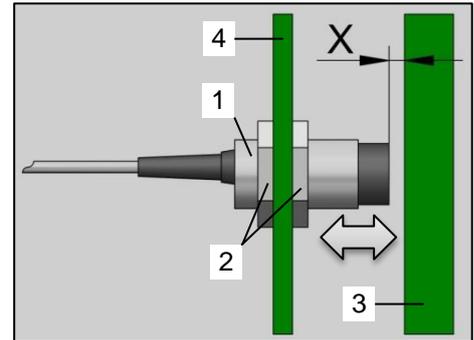


Image 38: Opener & closer

Sensor data:

Thread:	M18
Maximum tightening torque:	25 Nm
Connections:	PIN 1 = -
	PIN 2 = + (12 Volt)
	PIN 3 = Signal

Preparation:

- Move the adjustment element with the signal transmitter (Image 38 / Pos.3) that the sensor (Image 38 / Pos.1) is overlapped.

Setting:

Clearance:

X = 2 - 4 mm

- Loosen both nuts (Image 38 / Pos.2) on the sensor (Image 38 / Pos.1).
- Rotate the nuts (Image 38 / Pos.2), until distance X between the sensor and the signal transmitter is reached.
- Retighten both nuts (Image 38 / Pos.2) considering the maximum tightening torque.

3.13.7 Cargo Space, Rear

Pos. 1:	Cargo space, rear
Function:	Detection of the cargo space fill level
Design	Ultrasonic sensor
LED D1:	 If an object is within the set range, LED D1 lights green.
	 If no object is within the set range, LED D1 lights red.

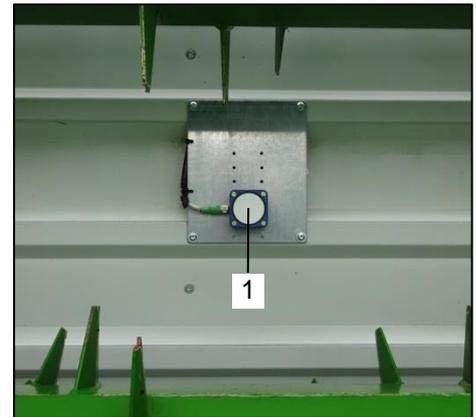


Image 39: Cargo space, rear

Description:

A sensor is mounted in the cargo space on the tailgate which detects the cargo space fill level. The determined value can be seen on the terminal.

Setting:

The sensors are optimally set and positioned at the factory. It is not possible to adjust their position.

3.13.8 Extension Walls**WARNING!**

Damage can be caused to the vehicle or accidents can occur if the total weight is not observed!

- When using extension walls, ensure that the authorized axle loads and gross weights are not exceeded! The weights given on the vehicle are binding!

The side wall height and thus the loading volume of the machine can be optionally increased using extension walls.

The following extension walls are available for this model

- 90 mm / straight

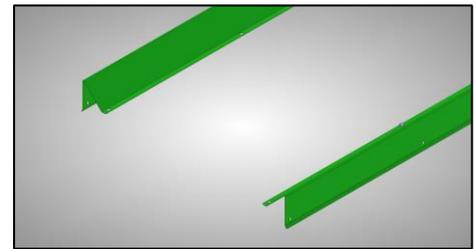


Image 40: Extension walls

3.13.9 Cargo Space Cover

The machine can be optionally equipped with a cargo compartment cover. It serves to cover the entire cargo space and protects the load during transport.

	WARNING!
	<p>Risk of damage and accident risk if the vehicle components are not placed in the transport position!</p> <p>This can cause severe damage to the machine or accidents which can lead to severe injuries and possible death.</p> <ul style="list-style-type: none"> • Before operating the cargo space cover, ensure that there are no persons in the movement range of the cargo space cover. • The cargo space cover must be closed before driving on public roads. The loader cargo space cover is only in the closed position in the transport position.

	CAUTION!
	<p>Risk of damaging the vehicle during operation if the vehicle is operated with the cargo space cover closed.</p> <p>In order to prevent damage to the vehicle, open the cargo space cover:</p> <ul style="list-style-type: none"> • Before starting the loading or unloading procedure. • Before moving the front wall into the desired position. • Before moving the tailgate into the desired position.

3.13.9.1 Opening / Closing the Cargo Space Cover

Operation depends on vehicle configuration and on the hydraulic system. The procedure for opening and closing the cargo space cover can be seen in the following sections.

Preparation:

- First, ensure that the front wall is in an end position. This means that the front wall is moved completely into the cargo space, or completely forward. If this is not the case, move the front wall into the respective position. Only then can the cargo space cover be moved.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the "Cargo Space / Front Wall" section.

Manual control (Operated using tractor control units)

The opening and closing of the cargo space cover is carried out hydraulically by means of tractor control units. Proceed as follows:

- Couple the hydraulic supply lines for "Open / Close Cargo Space Cover" functions to the appropriate tractor control units.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the "Hydraulics" and the "Coupling the Hydraulic Supply Line" sections.

- Open or close the cargo compartment cover by activating the respective control unit on the tractor. The tractor control unit must be actuated until the respective end position is reached.

3.13.10 Cargo Space Cover Sensor, Right

Pos. 1:	Cargo space cover sensor, right
Function:	Check when cargo space cover is closed
Design	Inductive sensor "Opener"
LED on:	 The cargo space cover is not completely closed, it is not possible to move the front wall
LED off:	 The cargo space cover is completely open

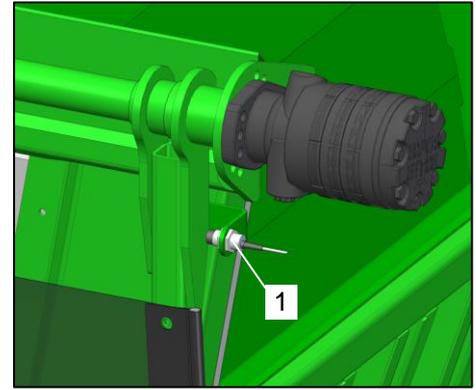


Image 41: Cargo space cover sensor, right

Description:

In order to prevent the front wall from colliding with the closed cargo space cover, there is a sensor for checking the position of the cargo space cover. It is not possible to move the front wall when the cargo space cover is not completely open. On the other hand, the cargo space cover can only be moved when the front wall is completely in the cargo space or completely to the front.

Setting:

The sensors are optimally set and positioned at the factory. It is not possible to adjust their position.



If the distance "X" between the sensor and the signal transmitter is to be adjusted, observe instructions the operating instructions in the chapter "Function and Settings" in the "Electric" / "Sensor Setting" section!

3.13.10.1 Inductive sensor "Opener" & "Closer"

Pos.1: Inductive sensor "Opener" & "Closer"

- Opener: Sensor switches if there is no overlap with the signal transmitter, PIN 1 and PIN 2 are connected.
- Closer: Sensor switches if there is an overlap with the signal transmitter, PIN 1 and PIN 2 are connected.

Pos.2: Nuts (2 pcs)

- For fastening the sensors.

Pos.3: Signal transmitter

- Moving component (e.g. tailgate)

Pos.4: Sensor mount

- Fixed component (e.g. mount)

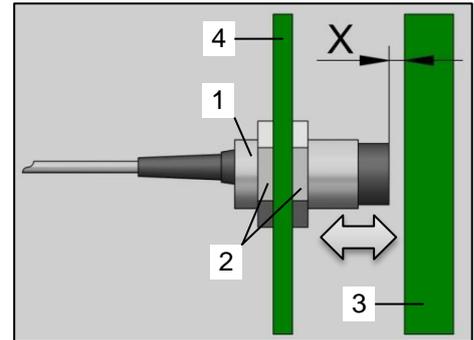


Image 42: Opener & closer

Sensor data:

Thread:	M18
Maximum tightening torque:	25 Nm
Connections:	PIN 1 = -
	PIN 2 = + (12 Volt)
	PIN 3 = Signal

Preparation:

- Move the adjustment element with the signal transmitter (Image 38 / Pos.3) that the sensor (Image 38 / Pos.1) is overlapped.

Setting:

Clearance:

$X = 2 - 4 \text{ mm}$

- Loosen both nuts (Image 38 / Pos.2) on the sensor (Image 38 / Pos.1).
- Rotate the nuts (Image 38 / Pos.2), until distance X between the sensor and the signal transmitter is reached.
- Retighten both nuts (Image 38 / Pos.2) considering the maximum tightening torque.

3.14 Scraper Floor

3.14.1 Scraper floor chains

The scraper floor consists of four chain strands with transport bars. The fact that the steel floor is lower in the front reduces the power consumption due to the lower conveyor channel length. This design ensures the load is properly transported to the spreader unit.



Image: Scraper Floor

3.14.2 Scraper Floor Chain Tensioning System

The transport floor chains are tensioned under the vehicle on the front cross member of the cargo space.

The chains must be checked regularly for proper tension. The instructions and notices under "care and maintenance" found in the "Scraper floor" section are also to be observed.



Image: Tensioning system

3.14.3 Scraper Floor Drive

The scraper floor is driven by the tractor's hydraulic system. The hydraulic oil flow is fed under controlled volume into an oil motor which transfers its rotational movement by way of a gearbox to the feed drive shaft on the rear of the vehicle.

The scraper floor is equipped with an overdrive gear. The speed of the scraper floor can be substantially increased for emptying purposes.

All scraper floor functions can be operated from the terminal in the tractor.

Important! The notices and instructions in the separate operating instructions for the "BCT 20 & ISOBUS machine control system" must be observed.



Image: Scraper Floor Drive

3.15 Dosing Unit

The machines can be equipped with 3 aggressive dosing rollers for uniform distribution of the harvested material on the horizontal silo. The dosing unit drive is protected separately by a cam clutch.



The dosing rollers are coupled automatically when the tailgate is opened. For this reason the tailgate may only be opened when the tractor PTO shaft is not moving. Otherwise the clutch could break.

3.15.1 Dosing Unit Sensor Left

Pos. 1:	Dosing Unit Sensor Left
Function:	Level indicator (type S)
Design	Inductive sensor "Opener"
LED on:	 The dosing roller is moved back and the terminal display signals "FULL" in the "Loading" menu.
LED off:	 The dosing roller is positioned completely to the front and thus in the rest position.

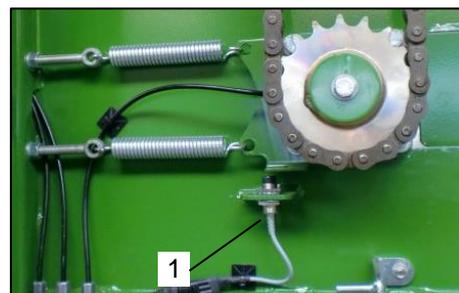


Fig. 1: Dosing Unit Sensor Left

Description:

Loading:

When the material reaches the lower dosing roller during loading, the dosing roller is moved backwards (max. 10 mm) against the force of the tension springs. This dosing roller movement is registered by a sensor, the transport floor is stopped and the terminal display signals "FULL".

Unloading:

If the scraper floor feeds too quickly for the dosing rollers during unloading (the roller is pushed back) the scraper floor stops until the dosing rollers have worked themselves free again.

Setting:

The Sensor (Fig. 2 / Pos. 1) on the lower dosing roller (Fig. 2 / Pos. 2) is deactivated. The dosing roller (Fig. 2 / Pos. 2) is located in the forward most position. Taking into account the distance "X" between sensor (Fig. 2 / Pos. 1) and signal transmitter (Fig. 2 / Pos. 3) the spring force in the tension springs (Fig. 2 / Pos. 4) is adjusted. The following applies:

Screw in the screws:	Screw out the screws
- Increase spring force in tension springs	- Decrease spring force in tension springs
- Scraper floor stops later	- Scraper floor stops sooner

When making adjustments, proceed as follows:

- Loosen the two nuts (Fig. 2 / Pos. 5).
- Adjust the spring force of the tension springs (Fig. 2 / Pos. 4) by turning the screws (Fig. 2 / Pos. 6) in or out. Ensure that both screws (Fig. 2 / Pos. 6) are adjusted equally.
- Retighten the two nuts (Fig. 2 / Pos. 5).

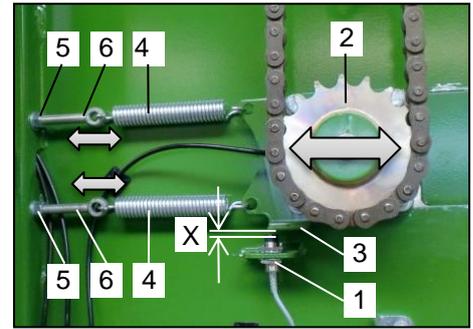


Fig. 2: Sensor settings



If the distance "X" between the sensor (Fig. 2 / Pos.1) and the signal transmitter (Fig. 2 / Pos.3) is to be adjusted, observe instructions the operating instructions in the chapter "Function and Settings" in the "Electric" / "Sensor Setting" section!

3.15.1.1 Inductive sensor "Opener" & "Closer"

Pos.1: Inductive sensor "Opener" & "Closer"

- Opener: Sensor switches if there is no overlap with the signal transmitter, PIN 1 and PIN 2 are connected.
- Closer: Sensor switches if there is an overlap with the signal transmitter, PIN 1 and PIN 2 are connected.

Pos.2: Nuts (2 pcs)

- For fastening the sensors.

Pos.3: Signal transmitter

- Moving component (e.g. tailgate)

Pos.4: Sensor mount

- Fixed component (e.g. mount)

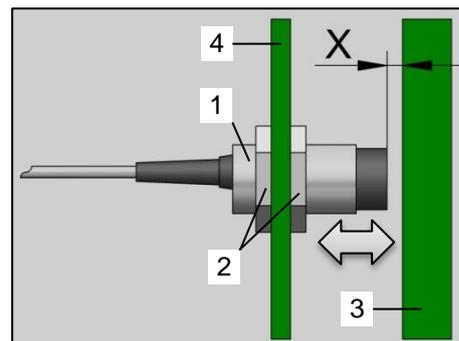


Image 43: Opener & closer

Sensor data:

Thread:	M18
Maximum tightening torque:	25 Nm
Connections:	PIN 1 = -
	PIN 2 = + (12 Volt)
	PIN 3 = Signal

Preparation:

- Move the adjustment element with the signal transmitter (Image 38 / Pos.3) that the sensor (Image 38 / Pos.1) is overlapped.

Setting:

Clearance:

X = 2 - 4 mm

- Loosen both nuts (Image 38 / Pos.2) on the sensor (Image 38 / Pos.1).
- Rotate the nuts (Image 38 / Pos.2), until distance X between the sensor and the signal transmitter is reached.
- Retighten both nuts (Image 38 / Pos.2) considering the maximum tightening torque.

3.16 Tailgate

- Only stand in dangerous areas when safety devices are engaged!
- Never reach into areas where the hands can be crushed as long as parts are moving! Danger, rotating machine parts! Keep sufficient distance from rotating parts!
- Do not stand in the movement range of the tailgate while the tractor motor is running!
- Use the side access door for doing repair work in the cargo space.



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On vehicles with dosing rollers, the tailgate may only be opened when the tractor PTO shaft is not moving. Otherwise there is a danger of breaking the clutch.

Machines with dosing rollers (type S)

When conducting maintenance or repair work in the cargo space on machines with dosing rollers (type S) the side ladder with access door is to be used.

Important! The instructions and notes are found in the „Initial Start-up and Functions“ in section „Initial Start-up and Functions“ must be taken into consideration.

Machines with dosing rollers (type K)

When conducting maintenance or repair work in the cargo space on machines without dosing rollers (type S) it is possible to access the cargo space through the open tailgate.

- Before entering into the cargo space, the raised tailgate must be secured against lowering using the shutoff valve.
- A non-slip step that is secured against tipping is to be used for entering.

3.16.1 Locking and Unlocking the Tailgate

The hydraulic line to the tailgate cylinders can be closed using a shut-off valve to prevent accidental opening and unintentional lowering. The shut-off valve is located on the right side of the frame.



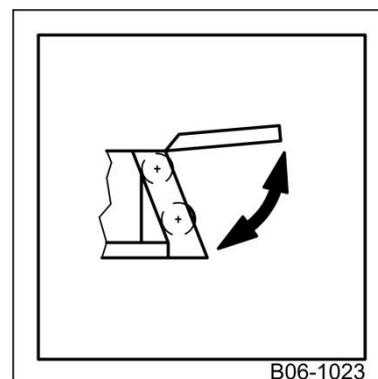
Image: Tailgate shut-off valve

Shut-off valve open:

In this position the tailgate is not locked and can be opened and closed.

This position must be selected under the following conditions:

- When operating the tailgate



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Shut-off valve closed:

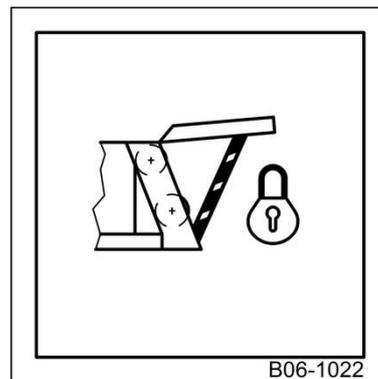
In this position the tailgate is locked and the position cannot be accidentally changed.

Tailgate open and locked:

- For working under the opened tailgate

Tailgate closed and locked:

- For transporting



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3.16.2 Tailgate Sensor, Bottom (Left & Right)

Pos. 1:	Tailgate sensor, bottom (left & right)
Function:	Level indicator (type K)
Design	Inductive sensor "Opener"
LED on:	 The tailgate is slightly open on both sides and the terminal display signals "FULL".
LED off:	 The tailgate is completely closed and is not under load.



Image 44: Tailgate sensor

Description:

If the vehicle is not equipped with a dosing unit, the tailgate assumes the level indicator function. If the harvested material reaches the tailgate during loading, the tailgate opens slightly. When the sensors on the left and right register the opening, the transport floor is switched off and the terminal signals "FULL".

Setting:

The sensors are optimally set and positioned at the factory. It is not possible to adjust their position.



If the distance "X" between the sensor and the signal transmitter is to be adjusted, observe instructions the operating instructions in the chapter "Function and Settings" in the "Electric" / "Sensor Setting" section!

3.16.2.1 Inductive sensor "Opener" & "Closer"

Pos.1: Inductive sensor "Opener" & "Closer"

- Opener: Sensor switches if there is no overlap with the signal transmitter, PIN 1 and PIN 2 are connected.
- Closer: Sensor switches if there is an overlap with the signal transmitter, PIN 1 and PIN 2 are connected.

Pos.2: Nuts (2 pcs)

- For fastening the sensors.

Pos.3: Signal transmitter

- Moving component (e.g. tailgate)

Pos.4: Sensor mount

- Fixed component (e.g. mount)

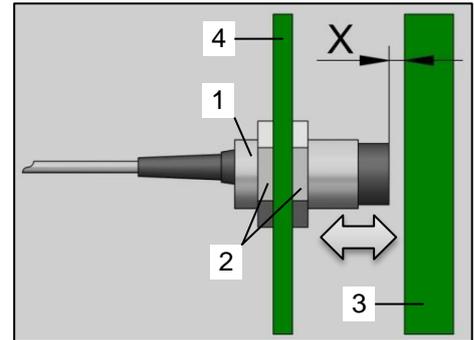


Image 45: Opener & closer

Sensor data:

Thread:	M18
Maximum tightening torque:	25 Nm
Connections:	PIN 1 = -
	PIN 2 = + (12 Volt)
	PIN 3 = Signal

Preparation:

- Move the adjustment element with the signal transmitter (Image 38 / Pos.3) that the sensor (Image 38 / Pos.1) is overlapped.

Setting:

Clearance:

X = 2 - 4 mm

- Loosen both nuts (Image 38 / Pos.2) on the sensor (Image 38 / Pos.1).
- Rotate the nuts (Image 38 / Pos.2), until distance X between the sensor and the signal transmitter is reached.
- Retighten both nuts (Image 38 / Pos.2) considering the maximum tightening torque.

3.16.3 Tailgate Sensor, Top (Right)

Pos. 1:	Tailgate sensor, top (right)
Function:	Detection of frontwall position
Design	Angle sensor



Image 46: Tailgate sensor, top

Description:

When the front wall moves, the sensor detects the position of the front wall and transmits it to the terminal.

Values displayed:

0 %	Tailgate is completely closed.
1 - 10 %	Tailgate is raised and in locked / unlocked position.
11 - 99 %	Tailgate is open.
100 %	Tailgate is completely closed.

Setting:



If the distance "X" between the sensor and the signal transmitter is to be adjusted (e.g. if replaced), observe the operating instructions in the chapter "Function and Settings" in the "Electric" / "Sensor Setting" section!

The adjustment of display value to the sensor value is possible in the factory menu. If the displayed values are not plausible, please contact your BERGMANN representative or the BERGMANN customer service department.



BERGMANN contact information can be found in the chapter "Contact Info & Contact Persons".

3.16.3.1 Angle sensor

Pos.1: Angle sensor

- Detects the position of components.

Pos.2: Nuts (2 pcs)

- For fastening the sensors.

Pos.3: Signal transmitter

- Moving component (e.g. tailgate)

Pos.4: Sensor mount

- Fixed component (e.g. mount)

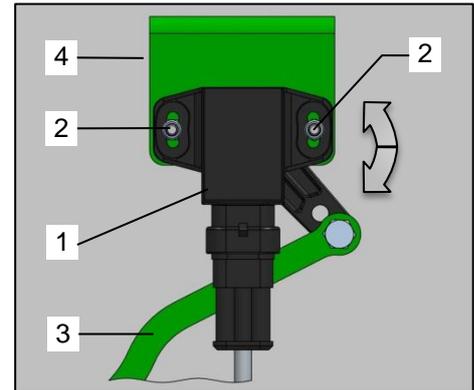


Image 47: Angle sensor

Sensor data:

Maximum tightening torque: 2.5 Nm

Connections:	PIN 1	=	-
	PIN 2	=	+ (12 Volt)
	PIN 3	=	Signal

Preparation:

- Move the adjustment element in the start position:
 - E.g. Tailgate completely closed.
 - E.g. Move end wall completely into the cargo space and then back approx. 1 ° - 2 °.
 - E.g. Drawbar hydraulic cylinder fully retracted.

Setting:

- Loosen both nuts (Image 32 / Pos.2) on the sensor (Image 32 / Pos.1).
- Twist the sensor (Image 32/ Pos.1) until the terminal shows the value 0% for the respective sensor function.
- When this value is reached, hold the angle sensor in this position and retighten the two nuts (Image 32 / Pos.2) considering the maximum tightening torque.

3.16.4 Tailgate Positions

The tailgate's hydraulic adjustment make different tailgate positions possible for optimum adaptation to the required operating conditions.

The respective positions are described in more detail in the next sections.

Position 1

Width of opening:	- The tailgate is completely open.
Application:	- Vehicles without dosing rollers
Advantages:	- Quick emptying of the cargo space



Image 48: Tailgate position 1

Position 2

Width of opening:	- The tailgate is partially open.
Application:	- Vehicles with dosing rollers
Advantages:	- Targeted unloading of material on silage clamps and in stable lanes

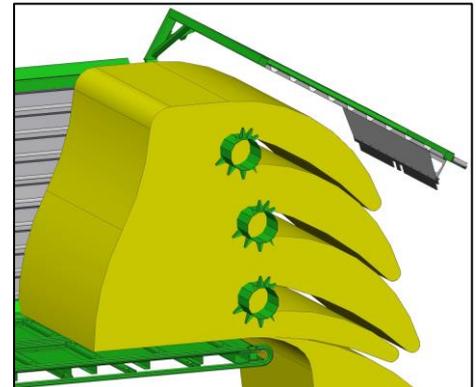


Image 49: Tailgate position 2

3.17 Hydraulics



WARNING!

Danger caused by not observing basic safety instructions.

This can cause serious injuries.



For this, it is essential to observe the safety instructions in the "Safety" chapter in the "General Safety Instructions" section, in particular the "Hydraulic System" section.



WARNING!

There is danger of infections and serious injuries to persons can occur when hydraulic oil escapes under high pressure and penetrates into the body!

- When coupling and uncoupling the hydraulic supply lines, ensure that the hydraulic system is pressureless on both the vehicle and the tractor side. The tractor control units must always be set in the floating position before coupling.
- To prevent personal injury, always use appropriate equipment and wear protective goggles when looking for leaks.
- In case of injury, notify a doctor immediately. There is a risk of infection.
- Regularly inspect hoses and replace them with original BERGMANN hoses if old or damaged.



For this, also observe the instructions and notices in the operating instructions from the tractor manufacturer!

3.17.1 Storing the Supply Lines

Disconnected hydraulic system supply lines (as well as brake system supply lines, power cables) must be mounted on the supply line rack (Image 50 / Pos.1) in the corresponding park position at the front of the machine.



Image 50: Rack

3.17.2 Hydraulic Supply Line Markings

	WARNING!
	<p>Danger due to incorrect supply line connection</p> <p>Incorrect connection of the supply lines can lead to considerable hazards for persons due to machine malfunctions.</p> <ul style="list-style-type: none"> • When coupling the hydraulic lines, always check for correct connection.

The hydraulic supply lines for the individual vehicle hydraulic functions are marked with color codes and corresponding function symbols.

	NOTICE
	<ul style="list-style-type: none"> • If coupling markings are missing, check the hydraulic line function prior to coupling. • Replace the missing markings immediately! Assembly instructions can be found in the following Image 51 section.

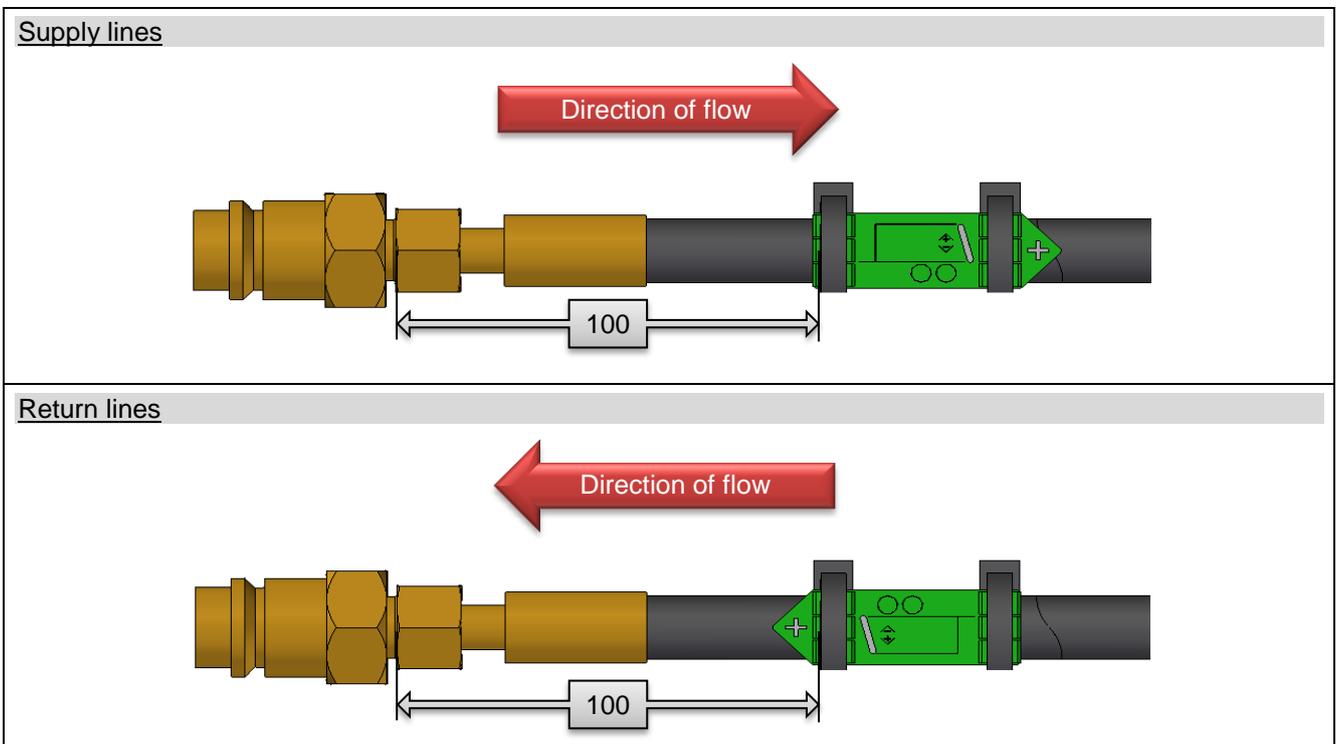


Image 51: Position of markings



The possible connection lines and the corresponding color markings with function symbols (depending on vehicle equipment) can be seen in the following "Hydraulic Systems" sections.

3.17.3 Hydraulic System "E-Control"

The vehicle can be equipped with an "E-control" hydraulic system depending on the vehicle type and equipment. This is a circulating hydraulic system with an electro-hydraulic control block. After coupling the supply lines to the tractor, the vehicle hydraulic functions can be actuated directly from the terminal.

	NOTICE
	The maximum allowable system pressure is 210 bars.

3.17.3.1 Control block

If the machine is equipped with an electro-hydraulic control block, pressurized oil must be fed into the hydraulic system at all times during the vehicle operation. The operating speed depends on the tractor hydraulic system. Depending on the type of tractor, it may be necessary to correct the operating speed on the tractor control unit.

The vehicle functions which can be actuated by the control block are shown in the following section. The figure below shows a fully equipped control block. Actual vehicle equipment may differ.

3.17.3.1.1 Control block emergency operation

	WARNING!
	<p>Danger due to moving components during emergency actuation!</p> <ul style="list-style-type: none"> • Ensure third persons leave the vehicle danger area before using the emergency control on the control block.

	NOTICE
	In case of a power failure, check the fuses in the tractor and control unit (supply line). Check cables and connections.

Electrically controlled hydraulic valves which are used for "Emergency control" can be controlled manually. The valves can be controlled using a pointy object.

The diagram below shows a fully equipped control block. When the vehicle has less equipment, the valve order advances. In this case the assignment of the valves for each function corresponds to the cable marking, or by tracking the hydraulic lines.

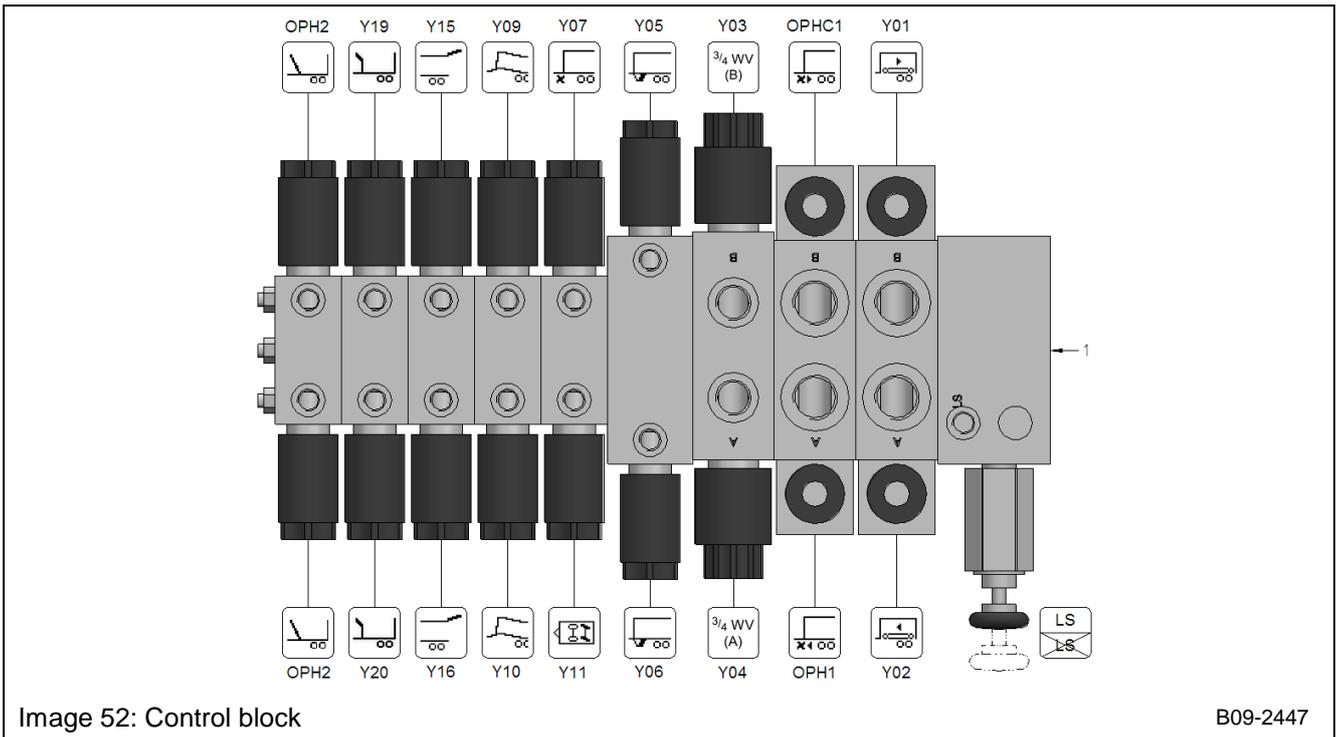


Image 52: Control block

B09-2447

			Y01	Y02	Y03	Y04	Y05	Y06	Y07	Y09	Y10	Y11	Y15	Y16	Y19	Y20	OPHC1	OPH1	OPH2
Drawbar		↕			X					X	X								
		↕			X					X	X								
Front wall (Top section)		↕			X										X	X			
		↕			X										X	X			
Front wall (Total)		→			X														X
		←			X														X
Pick-up (Raise / Lower)		↕			X				X										
		↕			X				X										
Pick-up (Drive)		→															X		
		←															X		
Cutting Unit		↕			X		X	X											
		↕			X		X	X											
Scrapper Floor		→	X																
		←		X															
steering axle		↕										X							
		↕				X						X							
Tailgate		↕			X								X	X					
		↕			X								X	X					

3.17.3.2 Hydraulic System Supply Line “E-Control”

In the following list, the hydraulic supply lines which can be used with the types of vehicles are listed with the respective hydraulic system "E-control" markings. The hydraulic supply lines can vary depending on vehicle equipment.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the Hydraulics" and the "Hydraulic Supply Line Markings" sections.

Supply lines for the control block:

The control block hydraulic supply lines must be connected to the appropriate tractor connections depending on the supply system settings.

Which control block hydraulic supply lines must be coupled with the appropriate tractor connections depends on the respective supply system and the associated control block hand wheel adjustment.



For this, observe the operating instructions and other instructions in the operating instructions in the chapter "Hydraulics" and the "Supply System for E-control" section!

	Power	18-13-0209
	Hose:	18L
	Tractor connection:	1 single action control unit
	Colour:	Red

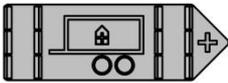
	Return (tank)	18-13-0210
	Hose:	22L
	Tractor connection:	1 free return line
	Colour:	Red

Always connect the "return" line to the appropriate tractor connection first!

	Load sensing (LS)	18-13-0211
	Hose:	12L
	Tractor connection:	1 LS Connection
	Colour:	Red

Supply lines for additional functions with no control block connection:

Depending on the type of vehicle and equipment, the vehicle additional hydraulic functions without control block connection can be actuated directly using the tractor controller when the supply lines are coupled to the tractor in accordance with hydraulic system manual control.

	Chassis (Raising and Lowering) 18-13-0207
	Hose: 12L Tractor connection: 1 single action control unit Colour: Grey

The following additional connection line is always required:

	Return (tank) 18-13-0210
	Hose: 22L Tractor connection: 1 free return line Colour: Red

Always connect the "return" line to the appropriate tractor connection first!

	Cargo Compartment Cover (Open / Close) 18-13-0220
	Hose: 12L Tractor connection: 1 double action control unit Colour: Orange

3.17.3.3 Supply System with "E-control"

The tractor hydraulic system can vary depending on type and equipment, and determines the power system settings for the coupled vehicle. The change between the different supply systems is done without tools by simply turning the hand wheel on the control block on or off (Image 53 / Pos. 1).

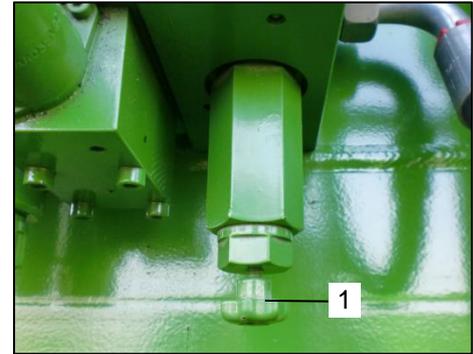


Image 53: knob

The control block hydraulic supply lines must be connected to the appropriate tractor connections depending on the supply system settings.

The following sections show the different supply systems and the required hydraulic supply lines and settings.

Supply system with constant volume flow (OC)

The oil is pumped from the pump through the tractor valve to the pulled vehicle. It flows according to the volume flow setting on the tractor valve. If the vehicle does not need oil, it flows to the tank via the 3-way pressure compensator. If oil is directed to consumers via directional control valve, only the residual flow flows to the tank through pressure compensator.

If a tractor with load sensing hydraulics is used and the pulled vehicle is supplied via the tractor valve, this is a constant delivery pumping system.

With such a system, the handwheel must be turned out to the stop.

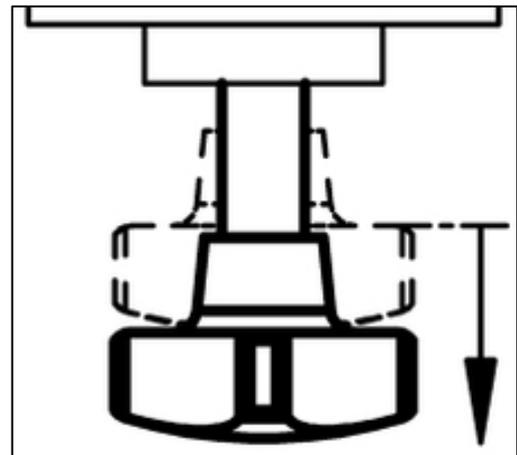


Image 54: Hand wheel turned out

Attach the following hydraulic supply lines from the control block to the appropriate connections on the tractor in the following sequence:

	Return (tank)	18-13-0210
	Hose:	22L
	Tractor connection:	1 free return line
	Colour:	Red

Always connect the "return" line to the appropriate tractor connection first!

	Power	18-13-0209
	Hose:	18L
	Tractor connection:	1 single action control unit
	Colour:	Red

Supply system with constant system pressure

Constant pressure systems are still found in some older tractors. In such systems, the tractor pump always tries to maintain the maximum pressure. If the consumers do not need oil, the pump does not supply any oil. Since the pump always provides the maximum pressure, pressure drops (Δp) must be limited by the pressure compensator in the inlet plate.

With such a system, the hand wheel must be turned in to the stop.

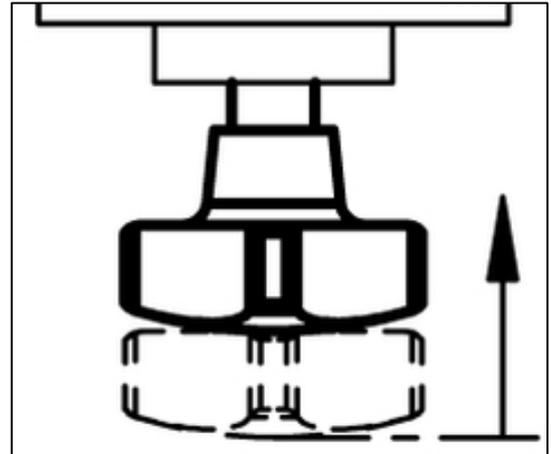


Image 55: Hand wheel in

Attach the following hydraulic supply lines from the control block to the appropriate connections on the tractor in the following sequence:

	Return (tank)		18-13-0210
	Hose:	22L	
	Tractor connection:	1 free return line	
	Colour:	Red	
Always connect the "return" line to the appropriate tractor connection first!			

	Power		18-13-0209
	Hose:	18L	
	Tractor connection:	1 single action control unit	
	Colour:	Red	

Supply system, load sensing (CC)

The control block input plate is equipped with a relief controller. 0.7 l/min flow through it and into the tank. Load sensing ensures that the pump is reset as soon as a consumer is switched off. If the pulled vehicle is to be connected to a load sensing system, it must be supplied via "Power Beyond". The pressure compensator in the control block is blocked and as a result no oil flows from the pressure connection (P) to the tank. The load sensing pump continues to pump oil until the set pressure drop (Δp) between pressure connection (P) and load sensing line is reached. If consumers require oil, the load sensing pump supplies oil until the pressure drop (Δp) is reached again. There is no residual flow which must be directed to the tank.

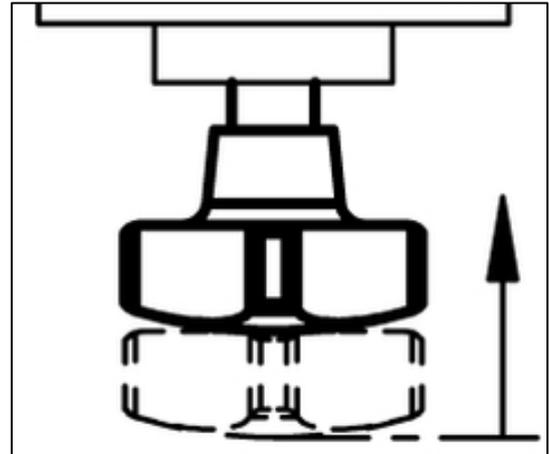


Image 56: Hand wheel in

With such a system, the hand wheel must be turned in to the stop.

Pressure drops and fluctuations in tractor hydraulics have an effect on the volume flows to the consumers. Some tractors are also equipped with load sensing relief. This can lead to supply shortages to the consumers. In this case load sensing on the tractor must be closed.

Attach the following hydraulic supply lines from the control block to the appropriate connections on the tractor in the following sequence:

	Return (tank)	18-13-0210
	Hose:	22L
	Tractor connection:	1 free return line
Colour:		Red
Always connect the "return" line to the appropriate tractor connection first!		

	Power	18-13-0209
	Hose:	18L
	Tractor connection:	1 single action control unit
Colour:		Red

	Load sensing (LS)	18-13-0211
	Hose:	12L
	Tractor connection:	1 LS Connection
Colour:		Red

3.17.3.4 Coupling the hydraulic supply lines with "E-control"

	NOTICE
	<p>Ensure that:</p> <ul style="list-style-type: none"> • When coupling and uncoupling the hydraulic supply lines the hydraulic system is pressureless on both the vehicle and the tractor side. The tractor control units must always be set in the floating position before coupling. • No hydraulic oil escapes into the environment while the hydraulic supply lines are being coupled. • That the hydraulic plugs are pushed into the socket until they audibly engage and lock. • That hydraulic lines do not rub on foreign objects during vehicle movements (e.g. in curves), lines should not be tensioned, kinked or rubbed.

When coupling proceed as follows:

- Move the relevant adjustment element on the tractor to the float position.
- Secure the tractor and vehicle against unintentional rolling and starting.
- Clean the plugs and the sleeves before coupling the elements to prevent malfunctions in the hydraulic system.
- Adjust the control block hand wheel according to the respective supply system.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the Hydraulics" / "Hydraulic Supply System with E-control" sections.

- Couple the hydraulic supply lines from the control block on the respective supply system to the appropriate tractor connections.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the Hydraulics" / "Hydraulic Supply System with E-control" sections.



Which tractor connections are needed can be found in the operating instructions in chapter "Functions and Settings" in the Hydraulics" / "Hydraulic Supply System with E-control" sections.

- Connect the required hydraulic supply lines for additional functions without control block connection to the appropriate tractor control units for the functions to be carried out.



Which tractor connections are needed can be found in the operating instructions in chapter "Functions and Settings" in the Hydraulics" / "Hydraulic Supply System with E-control" sections.

3.17.3.5 Uncoupling the hydraulic supply lines with "E-control"

**NOTICE**

Ensure that:

- When uncoupling the hydraulic supply lines the hydraulic system is pressureless on both the vehicle and the tractor side. The tractor control units must always be set in the floating position before coupling.

When uncoupling proceed as follows:

Move the relevant adjustment element on the tractor to the float position.

- Secure the tractor and vehicle against unintentional rolling and starting.
- Uncouple the of the hydraulic supply lines plugs from the tractor hydraulic sleeves.
- Protect the hydraulic plugs and sleeves from dirt using dust caps.
- Place the hydraulic supply lines in their respective positions in the supply line rack.



For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the Hydraulics" and the "Storing the Hydraulic Supply Lines" sections.

3.18 Terminal

3.18.1 Terminal BCT 20

The "Terminal BCT 20" section is only a quick reference for the procedure and the handling for quick start of the machine.

Important! For this reason the handling instructions and notices in the separate operating instruction manual "machine control BCT20 / ISOBUS" must be observed. There the exact terminal functions can be seen

3.18.1.1 User Interface

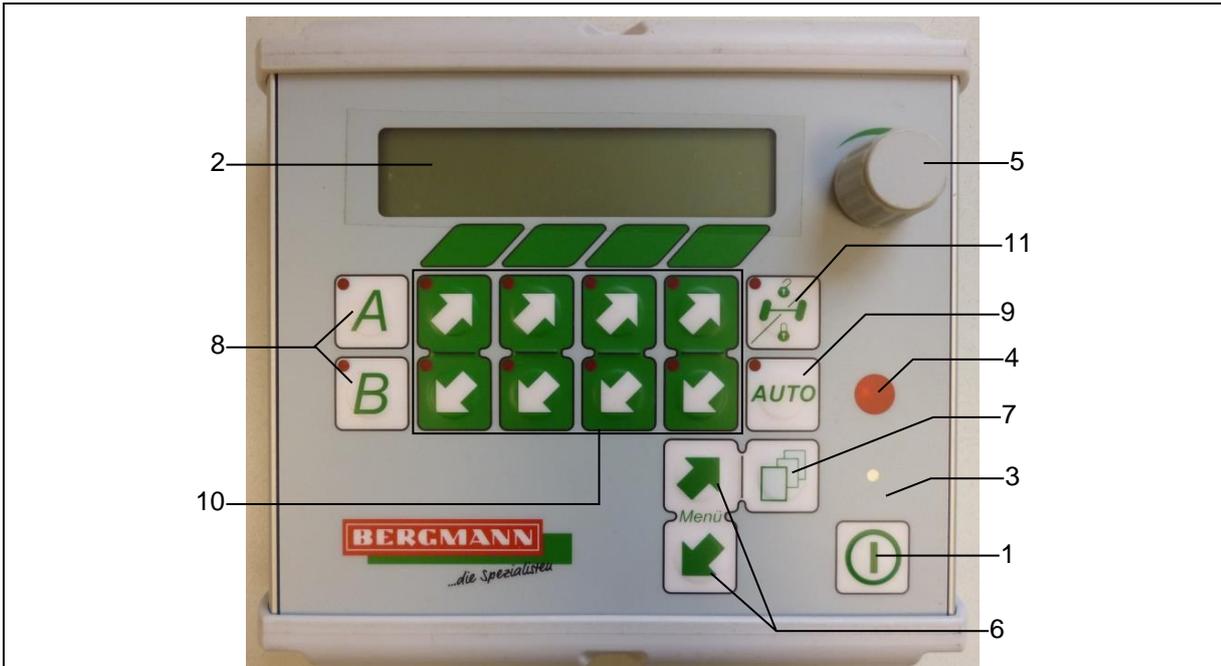


Image: Terminal BCT 20

1.	Main switch	Switches terminal on and off
2.	Display	Shows the menu with the respective functions
3.	Audio signal	Signals e.g. "FULL" (in combination with lights)
4.	Light (red)	Signals e.g. "FULL" (in combination with audio signal)
5.	Turn and press knob (Poti)	For changing settings such as scraper floor speed
6.	Menu forward / back	For changing menus
7.	Shift key	Calling up other functions within a menu
8.	Function storage "A" & "B"	Programmable sequence of different functions
	- press briefly	Functions are carried out
	- press during functions	Stops function sequence
	Setting mode:	
	- press long	Opens setting mode
	- press briefly	Settings are saved and setting mode is closed
9.	Auto key	For activating the auto function e.g. scraper floor permanently on, or Auto fill (depends on veh. type and menu level)
10.	Function key	Use of functions shown in display
11.	Open / close steering axle	Use of steering axle function:
	- close steering axle:	Press key once, briefly
	- Open steering axle	Press key once, briefly (red LED lights)

Further functions (e.g. work lights, tailgate, jack stand, ...) can be called up by pressing the shift key and can be used through the function keys (raise / lower key)

3.18.1.2 Quick Start

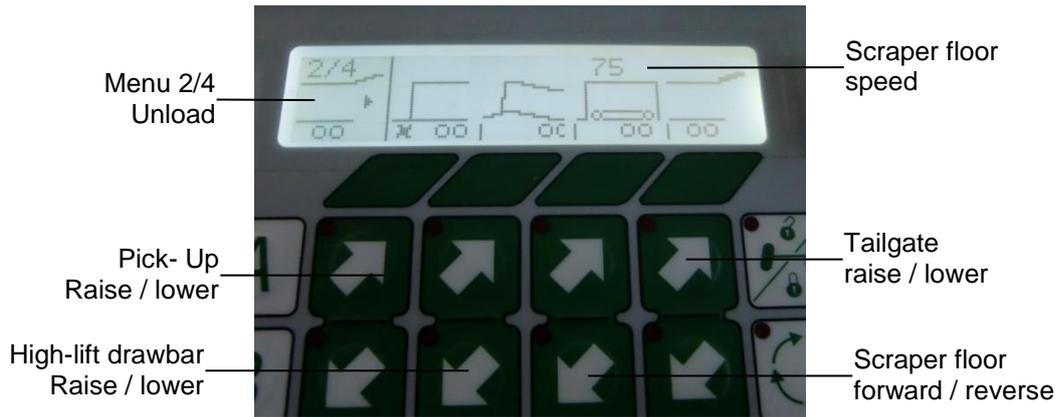
- | | |
|--------------------------------|--|
| 1. Switch on controls: | Press main switch |
| 2. Select menu: | Spreader: 2/3 unload
Transport trailer 2/4 unload or 4/4 load |
| 3. Switch PTO shaft on | (Monitor speed according to type & design) |
| 4. Switch oil supply on | (Not necessary with load- sensing) |
| 5. Carry out functions: | e.g. raise dosing wall, lower pick-up, etc.. |
| 6. Switch scraper floor on: | Press Auto key |
| 7. Adjust scraper floor speed: | Turn Poti |
| - only turn | Changes current scraper floor speed |
| - turn + press 1x quickly: | Changes the saved starting speed |

3.18.1.3 Menu Structure

Transport trailer	
1/4 Street operation t	
2/4 Unload	
3/4 Trip counter	
4/4 Load	

3.18.1.4 Menu Examples – Transport Trailer

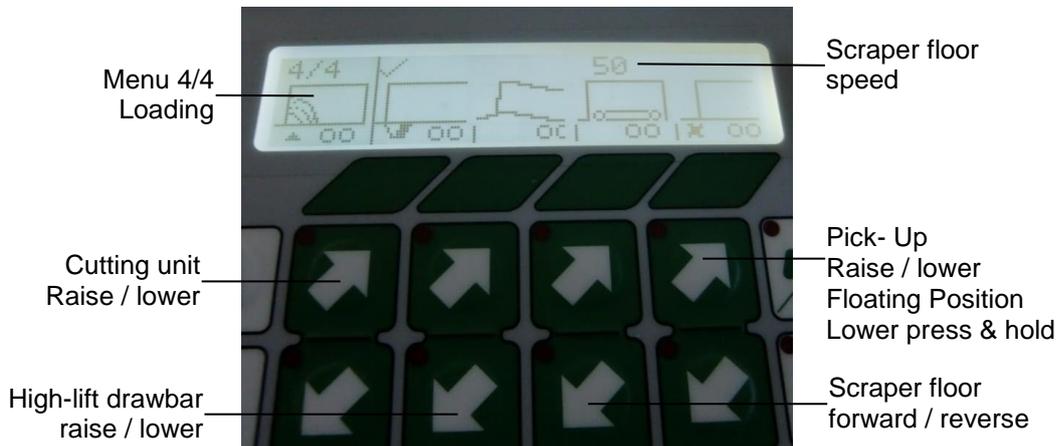
Menu 2/4 – Unload transport trailer



Menü 2/4 – Abladen beim Ladewagen

- In menu 2/4 the Auto key switches the scraper floor off.
- In menu 2/4 the scraper floor speed is changed with the turn & press knob (Poti)

Menu 4/4 – Loading the Transport Trailer



Menü 4/4 – Aufladen beim Ladewagen

- In menu 4/4 the Auto key switches the Auto-fill on. Full signal (3x beep + 3x large, red LED Auto-fill switches off).
- In menu 4/4 the scraper floor speed is changed with the turn & press knob (Poti).

4 Operating the Vehicle

- First thoroughly lubricate the vehicle. See [Lubrication diagram].
- Couple the vehicle with the tractor. Notices under [Commissioning and Operation] must be observed.



If the instructions above are not followed, there is danger of an accident!

4.1 Loading Procedure

- To achieve good cutting quality ensure a strong material flow.
- Only pick up mowed material in the direction of mowing! When working with dosing rollers a minimum cutting length of 70 mm must be maintained.
- The PTO shaft must be switched off in tight curves to prevent overloading the PTO shaft. If the overload clutch responds the PTO shaft must be switched off and the cause must be identified.
- Do not lift the pick-up until it is free of harvested material.
- Do not switch the conveyor unit off until the conveyor channel is empty.

4.1.1.1 Start the loading procedure

- Provide oil to the control block
- Select "Load" menu
- Switch the tractor PTO shaft on
- PTO speed max. 1000 rpm
- Lower pick-up
- Move both the front wall top element and bottom element toward the cargo space.

4.1.1.2 Loading Procedure

- If the conveyor unit is blocked the cutting unit can be swivelled out. (see section „Commissioning“ under "Cutting unit")
- The cargo space fill level can be seen on the terminal.
- The scraper floor is to be switched on when the material height in the front of the cargo space reaches approx. 1.2 m. Then the scraper floor is to be switched on briefly depending on the material height in the front of the vehicle
- When the harvested material reaches the dosing rollers or tailgate, this is signalled in the terminal display. In order to prevent damage to the tailgate on type "K" vehicles or to prevent the dosing rollers from being blocking on type "S" vehicles, the transport floor must not be switched on. The front wall automatically moves forward toward the tractor. This provides additional cargo space. When this cargo space is filled, the loading process must be ended.

4.2 Unloading Procedure

The unloading process is controlled from the terminal in the tractor cabin. The tailgate position can be seen at any time with the indicator on the front wall.

4.2.1.1 Unloading without dosing rollers

- Select "Unload" menu
 - Open tailgate
 - Switch scraper floor on
 - Drive forwards at a speed suited to unloading
 - After the scraper floor has moved a certain distance, the front wall automatically moves back.
 - The speed of the scraper floor can be increased for emptying purposes.
 - Switch scraper floor off
 - Close tailgate
-

4.2.1.2 Unloading with dosing rollers

The drive switches from rotor to dosing rollers automatically when the tailgate is opened.



On vehicles with dosing rollers, the tailgate may only be opened when the tractor PTO shaft is not moving. Otherwise there is a danger of breaking the clutch.

This is done as follows:

- Select "Unload" menu
- Open tailgate
- Switch the dosing rollers on by activating the PTO shaft.
PTO speed max. 1000 rpm
- If the friction clutch responds, let the scraper floor run toward the front momentarily and restart the dosing rollers.
- Switch scraper floor on
- After the scraper floor has moved a certain distance, the front wall automatically moves back.
- Drive forwards at a speed suited to unloading
- The speed of the scraper floor can be increased for emptying purposes.
- Switch scraper floor off
- Switch the PTO shaft and with it the dosing rollers off.
- Close tailgate

If the vehicle is to be unloaded in stages, first switch off the scraper floor and then the tractor PTO shaft and with it the dosing rollers. This provides for trouble-free restarting of the dosing rollers.

The drive switches from dosing rollers to rotor automatically when the tailgate is opened.

Important! The tailgate must be closed when driving on roads

4.3 Driving on Roads

Important! It is absolutely necessary that the "General Road Safety and Accident Prevention Requirements" in the section "User Notices" are observed.



When driving on public roads, the national road traffic regulations must be observed and adhered to.

Before driving on public roads, the following must be done:

- Lighting equipment must be properly mounted and connected to the tractor. It is absolutely necessary to check lights for damage, function and cleanness
- Inspect the braking action prior to driving! In case of brake malfunction, stop operation immediately and have brakes repaired.
- Supply lines are to be properly connected.
- Ensure that it is not possible to accidentally operate the hydraulic functions.
- Release the parking brake completely.
- All protective equipment must be properly mounted and secured!
- On vehicles with a control terminal, "Road Operation" should be selected.

4.3.1 Set Vehicle Parts in Driving Position

Before driving, all vehicle parts must be set to driving position and secured. This includes but is not limited to components / functions (depending on vehicle type and equipment):

- The tailgate must be completely lowered.
- The jack stand must be retracted.
- The cutting unit must be completely retracted.
- If applicable, the steering axle must be locked (for this, see the following section).
- The chassis with hydraulic axle compensation must be adjusted so that the maximum height of 4.00 meters is not exceeded.

4.3.2 Locking the Steering Axle

To increase the vehicle driving stability the forced steering must be deactivated and the steering axle locked when

- travelling on public roads,
- driving on uneven or bumpy roads
- driving on silos
- driving on slopes
- the rigid axles alone do not provide for adequate lateral support of the vehicle.
- driving in reverse.

It may be necessary to unlock the steering axle momentarily when driving around tight curves.

4.3.3 Driving

The vehicle is to be driven so that it is under control at all times. Here, personal skills are to be considered along with outside conditions such as the road, curves, traffic, weather and visibility. The driving speed is to be adapted to the conditions.

If the trailer is only partially loaded, tractor manoeuvrability could be impaired. In this case, drive especially carefully. When the trailer is loaded ensure that the steering on the front tractor axle is not impaired by observing the nose weight.

When driving through curves increased care must be taken since the driving behaviour has changed. Never drive through curves at high speeds. Sudden cornering should be avoided when driving on slopes. There is a danger of tipping.

4.4 Weights and Capacity Information



The maximum weight of the vehicle may not be exceeded!

Exceeding this value will result in cancellation of guarantee. The gross vehicle weight, payload, load capacity, power requirements, etc., are available under "Technical data" in the "User notices" section. The information in the chart can vary depending on the vehicle type. The values in the operating permit / registration / ownership document are relevant.

5 Care and Maintenance

5.1 General:



- Cleaning and maintenance work may only be done when the PTO shaft is disengaged and the motor is switched off! - Remove the ignition key!
- Dispose of used oil properly!
- Replace protective equipment after maintenance work.
- Safety tube and guard cone as well as the drive shaft guard must be mounted and in proper condition!
- Areas where the PTO guard between the tractor and the trailer rub together should be well greased.

5.2 Cleaning and Maintenance in the Cargo Space



When working in or on the machine (e.g. for cleaning and maintenance), special care is necessary! The access is only permitted when the PTO shaft is switched off, the engine is stopped and the ignition key has been removed. Secure the vehicle against rolling.

Machines with dosing rollers (type S)

When conducting maintenance or repair work in the cargo space on machines with dosing rollers (type S) the side ladder with access door is to be used.

Important! For this, the instructions and notes in the chapter „Initial Start-up and Functions“ in section „Cargo Space Ladder and Access Door“ must be taken into consideration.

Machines with dosing rollers (type K)

When conducting maintenance or repair work in the cargo space on machines without dosing rollers (type S) it is possible to access the cargo space through the open tailgate.

Important! For this, the instructions and notes in the chapter „Initial Start-up and Functions“ in section „Tailgate“ must be taken into consideration.

5.3 Maintenance Schedule

Important! For the individual maintenance points in the "Care and Maintenance" section there are maintenance tips and intervals listed on the individual function and components which must also be observed and implemented accordingly.

Important! In the supplied external documents, such as operating and maintenance instructions from manufacturers of various components (the components are included), such as set time intervals, mileage and maintenance intervals are to be observed and complied with.

Important! The maintenance intervals are intended for normal working conditions. Under harder working conditions maintenance and/or repair intervals must be shortened.

Important! Lubrication intervals are to be carried out according to the lubrication schedule. (see "Care and Maintenance" section, "Lubrication")



A vehicle that has not been properly maintained may not be operated.

First use

- Check following bolted connections for tightness.
 - wheel nuts
 - drawbar
 - drawbar eye
 - chassis
 - spreading unit / dosing unit
 - conveyor unit
- Check hydraulic system for leaks
- Check oil level of all gearboxes
- Grease all lubrication points
- Check tyre pressure

After the first runs under load conditions

- Tighten wheel nuts.
- Check wheel hub for play and tighten if necessary.
- Adjust brakes.
- Check steering axle settings (if applicable).
- Tighten hydraulic connections.

After the first 50 trips:

- Check wheel hub for play and adjust if necessary.

After 20 trips (daily)

- Lubricate according to lubrication chart
 - Check light functions
 - Check brake functions
 - Check scraper floor tension, adjust or shorten if necessary
 - Check chain tension in spreader drive / dosing unit drive
 - Lubricate roller chains (if present)
 - Drain water from compressed air tank
 - Visually check the following vehicle components for damage and defects:
 - lubrication lines
 - gearboxes
 - universal joints
 - Spreader unit / dosing unit
- Defects must be corrected immediately.

Every 100 trips:

- Conduct all checks as after 20 trips.
- Check brake settings and adjust if necessary.
- Check condition of dosing rollers (if applicable).
- Check the condition and mounting of transport floor bars.
- If applicable, check wear plates and replace other wear parts.

Every 500 trips:

- Conduct all checks as after 100 trips.
- Check brake setting and adjust if necessary.
- Check all cables for damage
- Check brake pad thickness. At a minimum brake pad thickness of 5mm (riveted brake pads) or 2mm (adhesive bonded brake pads) the pads must be renewed.
- Check for play in wheel bearings
- Check drawbar for wear and proper mounting
- Check all bearings
- Check all bolted connections for tightness.
- Check vehicle for cracks
- Check brake system for leaks

Every 1000 trips (at least annually):

- Change grease in the wheel hub bearing check the tapered roller bearing for wear.

5.4 Screw torques

Thread	M 6	M 8	M 10	M 12	M 14	M 16	M 18	M 20	M 22	M 24	M 27	M 30
Wrench size	10	13	17	19	22	24	27	30	32	36	41	46
Tap hole	5	6,8	8,5	10,2	12	14	15,5	17,5	19,5	21	24	26,5
Thread condition	dry*	lubricated**										
	lubricated**	dry*										
Torque m (Nm) with	11	27	54	93	148	180	329	464	634	798	1176	1597
Screws of the following strength class	16	40	79	137	218	338	469	661	904	1136	1674	2274
12,9	19	47	93	160	255	395	549	773	1057	1329	1959	2662
12,9	15	37	73	126	201	309	432	605	824	1041	1526	2077

* dry – galvanized or normal thread w/o lubrication

** lubricated – thread is lubricated (e.g. with oil or has been phosphate treated)

Strength classes:

- The bolt's strength class is found on the top of the head (e.g. 8.8, 10.9, 12.9 etc.)
- A hex nut's strength class is found on its face
- A high strength classification shows that a fastened bolt can withstand high amounts of tension

If other torque values are used in these instructions, the table values are void. Regularly inspect nuts and bolts for tightness. If bolts or nuts are replaced, the equivalent or a higher strength class must be used. If a higher strength class is used, the torque should coincide with the original strength class that was used before.

Shear bolts may only be replaced with bolts that have the same dimensions and strength class. When assembling, ensure that the thread is clean and undamaged. Tighten self-locking nuts in accordance with table values for dry bolts.

Table of standard torque values for bolts

5.5 Cleaning the machine

Care of the vehicle includes cleaning as well as lubrication. The following must be observed:

- Switch off all drives as well as the power supply!
- Disengage PTO shaft, switch motor off and remove ignition key!
- Before standing under the open tailgate it is to be secured using the stop valve on the spreader unit!
- Before standing under the open tailgate it is to be secured using the stop valve on the spreader unit!

- When using a pressure washer, note the following:
 - Not earlier than 8 weeks after delivery (Paint hardening)
 - Minimum nozzle distance 50 cm
 - Maximum pressure 50 bar
 - max. Water temperature 50 ° C
 - Spray jet angle 25 °
 - do not use cleaning additives
 - keep away from bearing, gearbox and hydraulic



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- Lubricate all the bearings thoroughly, especially the front deflection rollers and bearings in the rear feeder shaft after each cleaning and after each use. Also places that are not specifically mentioned in the lubrication diagram, such as hinges on the tailgate which must be supplied with oil or grease.
- Cleaning the vehicle after use and the subsequent lubrication ensure operational readiness, and prevent the drying and hardening of the spread material.



Please check the drive chains regularly!
For vehicle lubrication see section [Care and Maintenance - Lubrication Diagram]!

5.6 Suspension

Minor damage to the surface of the springs will lead to fatigue. In order to ensure long spring service life observe the following instructions:

- Cover springs during welding
- Never use sharp objects, hammers etc. when working on springs
- Never attach the negative terminal to the springs when working with electrical welding equipment.
- Replace damaged components immediately.

5.7 Tires and Wheels

Only tires and rims which have been approved by Bergmann may be used. Tire repair work may only be carried out by professionals with the proper tools! When working on the tires the trailer must be safely parked and secured against rolling (wheel chocks)! The required vehicle jack may only be used on the prescribed locations. When tires are defective the vehicle may only be raised to change the tires when it is empty. Before jacking up the vehicle it must be secured with the parking brake and wheel chocks. When changing a tire, the vehicle is to be lifted by placing a jack under the axle that the damaged tire is on and lifting the vehicle so the tire can be changed.

The tires should be checked regularly for abnormal folds and other deformations. Foreign objects on or in the tires must be removed immediately, since these will work their way into the tires and lead to destruction. Cuts should be repaired immediately.

5.7.1 Wheel nuts and wheel bolts



Attention! (GB)

Retighten wheel nuts:

- ⇒ after 50 km of driving
- ⇒ after further 150 km of driving
- ⇒ after further 400km of driving.

- Within the first operating week the wheel nuts have to be checked on firm fit each day.
- For further operating the wheel nuts have to be checked weekly.

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After initial operation of a new vehicle and after a tire change the wheel nuts must be retightened after driving 50 km. Furthermore, the nuts must be retightened after 150 km of driving and again after 400 km of driving.

During the first few weeks of use the vehicle wheel nuts must be to check for tightness every day. During further operation the wheel nuts must be checked for tightness weekly.

- Only original wheel fixing elements may be used.
- Damaged, stiff or rusted wheel nuts and bolts are to be replaced.
- The threads should only be oiled lightly.
- Tighten the wheel nuts crosswise, to the indicated torque using a torque wrench (Tightening torques are found in the following chart).

5.7.1.1 Maximum Wheel Nuts Torque

Thread	Wrench size mm	No. of bolts per hub Piece	max. torque	
			black Nm	Galvanized Nm
M 18 x 1.5	24	6	290 Nm (275 - 305 Nm)	320 Nm (300 - 340 Nm)
M 20 x 1.5	27	8	380 Nm (360 - 400 Nm)	420 Nm (400 - 440 Nm)
M 22 x 1.5	32	10	510 Nm (485 - 535 Nm)	560 Nm (535 - 585 Nm)
M 22 x 2	32	10	460 Nm (435 - 485 Nm)	505 Nm (480 - 530 Nm)

Chart: Maximum Wheel Nuts Torque

5.7.2 Tire Pressure

The tire pressure should be checked at least every 14 days when tires are cold. Caps must be mounted on the valves.

Tire Size		PR / Ply	Data from	Tyre pressure	CAREX + SHUTTLE*
				bar	
22.5"	550/60 - 22.5	16	BKT	2,8	x
22.5"	600/55 - 22.5	16	BKT	2,6	x
22.5"	650/50 R 22.5	163E	Alliance	4,0	x
22.5"	650/50 R 22.5	163D	Nokian	4,0	x
22.5"	650/50 R 22.5	157D	Vredestein	3,2	x
22.5"	700/50 - 22.5	16	BKT	2,4	x
22.5"	710/45 R 22.5	165D	Michelin	2,4	x
22.5"	710/45 R 22.5	165D	Nokian	4,0	x
22.5"	710/45 R 22.5	165D	Vredestein	4,0	x
22.5"	750/45 R 22.5	166E	Alliance	4,0	x
26.5"	600/55 - 26.5	16	BKT	2,6	x
26.5"	600/55 R 26.5	165D	Michelin	4,0	x
26.5"	600/55 R 26.5	165D	Mitas	4,0	x
26.5"	620/55 R 26.5	166D	Vredestein	4,0	x
26.5"	650/55 R 26.5	167E	Alliance	4,0	x
26.5"	650/55 R 26.5	167D	BKT	4,0	x
26.5"	650/55 R 26.5	169D	Mitas	4,0	x
26.5"	700/50 - 26.5	16	BKT	2,4	x
26.5"	710/50 R 26.5	172D	Alliance	4,0	x
26.5"	710/50 R 26.5	170D	BKT	4,0	x
26.5"	710/50 R 26.5	170D	Michelin	2,2	x
26.5"	710/50 R 26.5	170D	Mitas	4,0	x
26.5"	710/50 R 26.5	170D	Nokian	4,0	x
26.5"	710/50 R 26.5	170D	Vredestein	4,0	x
26.5"	750/45 R 26.5	170E	Alliance	4,0	x
26.5"	750/45 R 26.5	170D	Vredestein	4,0	x
26.5"	800/45 - 26.5	16	BKT	2,2	x
26.5"	800/45 R 26.5	R	Michelin	2,2	x
26.5"	800/45 R 26.5	174D	Vredestein	4,0	x
30.5"	710/50 R 30.5	173D	BKT	4,0	x
30.5"	710/50 R 30.5	173D	Michelin	2,2	x
30.5"	710/50 R 30.5	173D	Vredestein	4,0	x
30.5"	800/45 - 30.5	16	Alliance	2,2	x
30.5"	800/45 R 30.5	176D	Michelin	4,0	x
30.5"	800/45 R 30.5	176D	Vredestein	4,0	x

Chart: Tire Pressure

When driving on slopes and difficult terrain, the air pressure must be increased by 25%. The maximum tire pressure may not be exceeded! When pumping up the tires and when tire pressure is too high there is a risk of bursting!

At speeds above 40km/h the air pressure in the tires must be brought to the requirements of the tire manufacturer.

5.8 Axles

Axles must never be overloaded!

- No illegal overloading of the vehicle by exceeding the maximum allowable weight.
- Do not exceed the maximum speed.
- No one-sided overloading caused by incorrect loading, or by driving for example, on curbs, etc.
- Do not mount non-approved wheels.
- To maintain operational safety the wheel brakes setting should be checked regularly. See notices under [\[Air brakes\]](#).
- All maintenance and repair work on the axles and the brake system may only be carried out by specialist workshops or by authorized personnel.
- When working on the tires the trailer must be safely parked and secured against rolling (use wheel chocks)!

5.8.1 Maintenance

- The maintenance intervals can be found in the general maintenance schedule ("Care & Maintenance" section).
- Lubrication intervals are to be carried out according to the lubrication schedule. (see "Care and Maintenance" section, "Lubrication")



Maintenance of the axles and brakes may only be carried out by authorized workshops.

5.8.2 Check wheel hub for play

To check wheel hub for play proceed as follows:

- Jack up the vehicle until the tire hangs freely.
- Release brake.
- Check for play in bearings.

When play in bearings can be felt proceed as follows:

- Remove hub cap.
- Remove cotter pin from axle nut.
- Tighten axle nut while rotating the wheel simultaneously clockwise until the rotation of the wheel hub is slightly braked.
- Turn axle nut back to the next possible cotter pin hole. If necessary turn back another splint hole.
- Insert new cotter pin.
- Fill some grease into the hub cap and remount it onto the wheel hub.
- Check for bearing play and free rotation.



Maintenance of the axles and brakes may only be carried out by authorized workshops.

5.8.3 Changing the grease in the wheel hub bearing

- Jack up the vehicle safely and release the brakes. Remove the wheels and hub caps.
- Remove the cotter pin and unscrew the axle nut.
- Pull the wheel hub with brake drum and tapered bearing off of the axle with a proper puller.
- Mark wheel hubs and bearing cages to avoid accidental switching during reassembly.
- Clean the brakes and check for wear, breakage and function, and replace worn parts. The inside of the brakes must be free of lubricants and dirt.
- Clean wheel hub thoroughly inside and out. Remove old grease completely. Clean bearing and seal thoroughly (with diesel) and check that the parts are still usable.
- Before installing the bearing grease the bearing seat lightly. Assemble all parts in the reverse order. Carefully drive press fit parts into seat with a pipe socket without jamming.
- Fill the bearing, the wheel hub space between the bearings and the hub cap with grease. The amount of grease should fill one quarter to one third of the space in the assembled hub.
- Mount the axle nut set the bearing adjustment (do not forget the cotter pin) and make the brake adjustments.
- Finally, carry out a function test and a test drive, and correct and discrepancies found.



Maintenance of the axles and brakes may only be carried out by authorized workshops.

5.8.4 Follow-up Axles

The follow-up steering axle makes it possible to drive over vegetation without damaging it. When the steering axle is unlocked, the wheels on the follow-up axle can adjust when driving through curves.

Important! If the vehicle is equipped with a follow-up axle, the notices under [Commissioning and Operation - Follow-up Axle] must be observed.

Every 40 operating hours:

- Grease steering arm bearing.

Every 100 operating hours:

- Thoroughly grease all remaining lubrication points on the axle.



Maintenance of the axles and brakes may only be carried out by authorized workshops.

5.8.5 Forced Steering

The precision of the forced steering and the service life of the individual components is highly dependent on maintenance. Lubricate the joints with sufficient grease as defined in the Lubrication diagram (Image: lubrication chart forced steering) and immediately after each washing. Only good bearing grease can be used here. Clean the dirt from the grease nipples before lubricating.

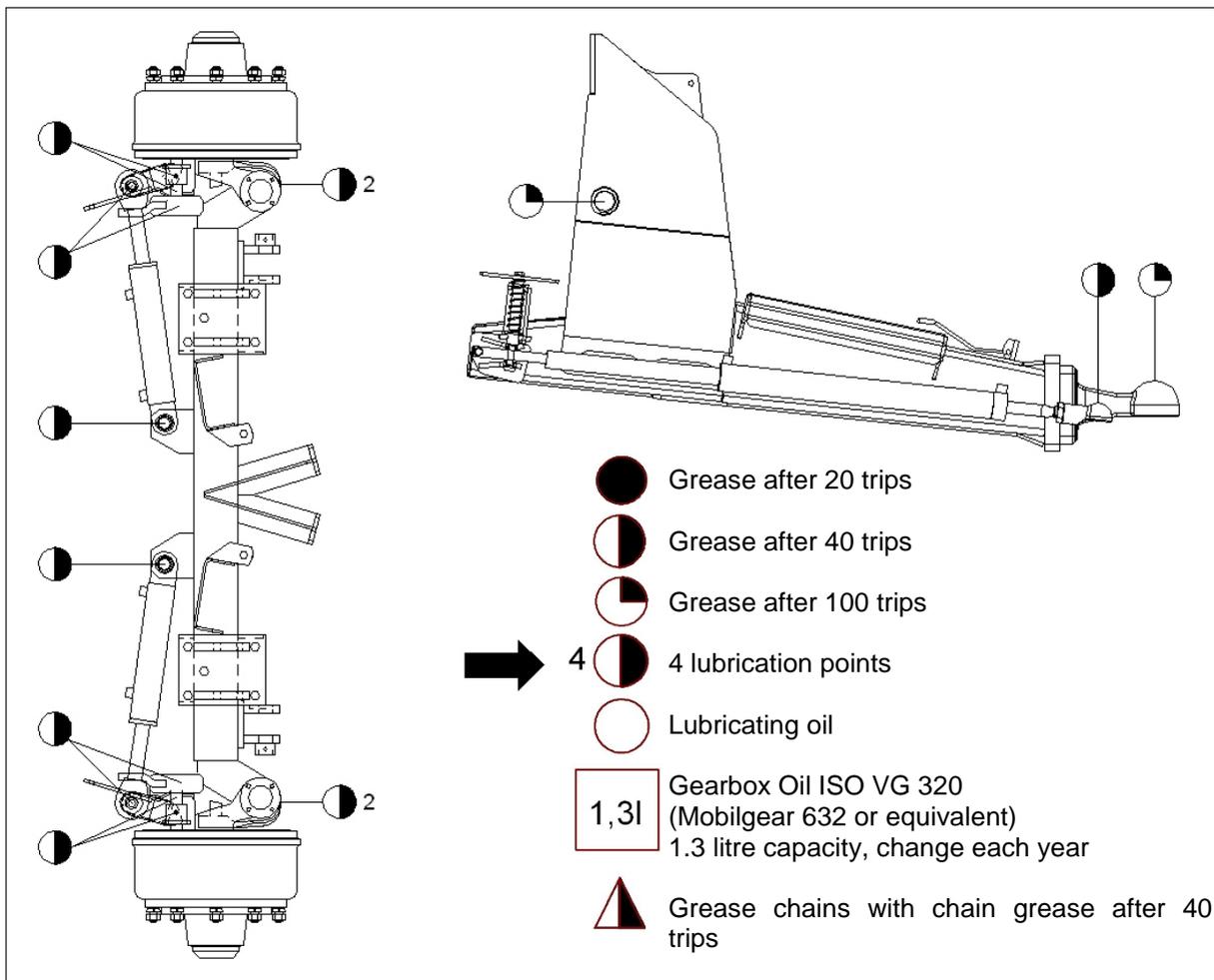


Image: Lubrication diagram forced steering

5.9 Air Brake System

- A thorough brake system inspection is to be conducted on a regular basis!
- Adjustments and repairs to the brake system may only be carried out by a qualified workshop or an authorized brake service!
- Ensure that seals are clean and in good condition before coupling the brake system. Replace damaged seals. Ensure no air escapes when coupled.
- Observe assignment of couplings:
 - Coupling head red → Storage
 - Coupling head yellow → Brake line
- Ensure correct positioning of the hoses.
- A diagram of the compressed air system is located in the spare parts list.

5.9.1 Trailer Brake Effect Regulator (Manual Adjustment) (If Available)

When operating the trailer, the brake effect must be adapted to the trailer load. For this the trailer brake effect regulator must be adjusted manually.

The regulator can be set to full load, half load, empty or released. An explanation of the symbols on the valve follows.

-  = Full load (trailer is under maximum load)
 -  = Half load (trailer is under half of the working load)
 -  = Empty (No load)
 -  = Release (the uncoupled trailer can be manoeuvred, the brakes are released)
- Depending on outfitting, a separate (blue button) near the control valve can control this function.



An improper brake setting can cause increased brake and tire wear. If the air pressure is set too high this can cause the wheels to block. If the air pressure is set too low this can reduce the brake effect which will lead to a dangerous driving condition.

5.9.2 ALB – Automatic load sensing brake effect regulator (if available)

The brake pressure automatically adapts to the load. The settings must be in accordance with the ID plate and may not be changed.

Check the brake effect regulator adjusting shaft for freedom of movement and the hinge for possible damage every 3-4 months.

5.9.3 De-watering the air tank

The air tank must be drained of water daily. To do this pull the drain valve pin at the bottom of the air tank to the side until no more water comes out. If the drain valve is dirty it is to be removed from the depressurized tank and cleaned.

The air tank may not be damaged or loosely mounted in the retaining straps. It may not be corroded from the outside. If this is the case, the tank must be replaced.

5.9.4 Cleaning the Line Filter

The reserve line and brake line are both equipped with a line filter. These must be cleaned every 3-4 months. This is done as follows:

- Press the cap (a) into the housing and remove the retaining ring (b) from the housing after having compressed it.
- Remove cap with O-ring, compression spring and filter.
- Clean filter insert with gasoline or thinner (flush) and dry with compressed air.
- Damaged filter inserts must be replaced!
- Check O-Ring for damage and replace if necessary.
- Reassemble filter in the reverse order and ensure that the O-ring does not become jammed into the guide slot.

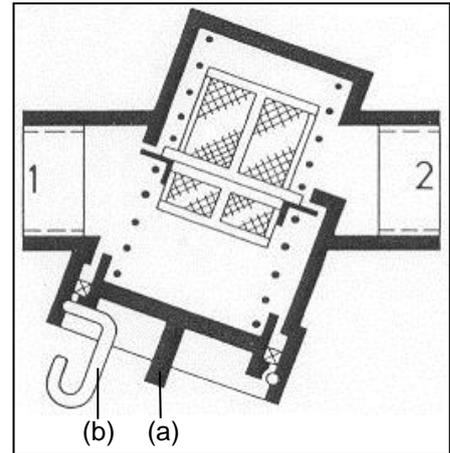


Image: Line Filters

5.9.4.1 Tightness test

Bolted connections in the air brake system are to be checked for tightness after the first operating hours and tightened if necessary!

The entire brake system must be checked for leaks every 3-4 months.

- Check all connections, pipe, hose and bolted connections for tightness.
- Repair any leaks.
- Repair any abrasion points in tubes and hoses.
- Replace porous and defective hoses.
- The dual-line operating and brake system is considered tight when the pressure loss does not exceed 0.15 bar within 10 minutes.

5.9.5 Check Pressure in Reserve Tank

The pressure in the reserve tank must be checked every 3-4 months. The pressure should be 6.0 to 8.1+0.2 bar.

5.9.6 Check Brake Cylinder Pressure

The brake cylinder pressure must be checked every 3-4 months.

Set point:	For non-activated brakes	0.0 bar
	For activated brakes	depends on the setting of the brake effect regulator

With installed ALB regulator the values are to be checked in accordance with the ALB plate.

5.9.7 Check Brake Cylinder Stroke

The brake cylinder stroke must be checked every 3-4 months. If the stroke is larger than 30 mm during full braking, the brakes must be adjusted.

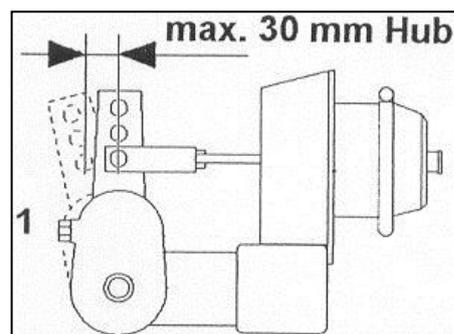


Image: Brake cylinder stroke

5.9.8 Adjusting the Brake Lever

- Unscrew the hexagonal nut from the brake lever clamping bolt and remove the bolt.
- Bend the slot in the brake lever open a bit and pull the brake lever off of the brake shaft.
- Rotate the brake shaft until the pads rub in the brake drum.
- Place the brake levers onto the brake shafts in the correct position.
- Screw bolts in and tighten
- Check settings.

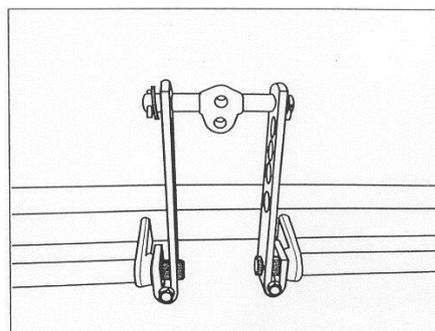


Image: Adjusting the Brake Lever

5.9.9 Adjusting the Linkage Control Element

- The adjustment is made on the adjustment screw of the linkage control element. Set free travel "a" to 10 – 12% of the brake lever length, e.g. 150mm lever length = 15 – 18 mm free travel. Rotate the adjustment screw until resistance is felt and then one half of a rotation back.
- Check wheels for free rotation unbraked.
- Check brake adjustment under full braking.



Maintenance of the axles and brakes may only be carried out by authorized workshops.

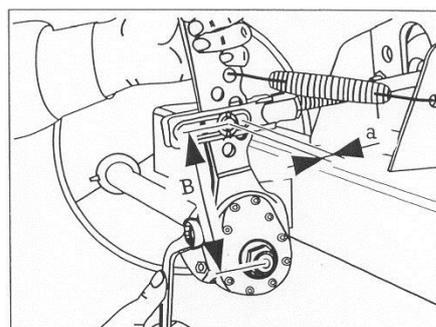


Image: Adjusting the Linkage Control Element

5.10 Parking brake

The parking brake (Image: The parking brake Pos. 1) should secure the vehicle against rolling when loaded to the maximum total weight on an incline of max. 18°.

The parking brake should be adjusted when

- 75% of the spindle length is needed to actuate the parking brake
- the brake pads have been renewed.

The brake cable should hang slightly when the brake is completely released.

Adjust the parking brake as follows:

- Release the three brake cable clamps on the end of the brake approx.
- Shorten the brake cable accordingly and replace the brake cable clamps. (Do not change the position of the brake cable in the cable clamp.).
- Check parking brake function.



Image: Parking brake

Check the brake cylinder every 3-4 months for damaged boot or bellow. Damaged parts must be replaced! All joints (brake valves, brake cylinder, brake linkage, etc.) must be checked for freedom of movement. Lightly oil or grease parts if necessary.

5.11 Drive

The universal spreader drive train consists of drive shafts and sealed oil-bath gearboxes. Only the pick-up is driven by a strong roller chain. On vehicles with dosing units the 2nd and 3rd dosing rollers (depending on vehicle type and equipment) are also driven by a strong roller chain

5.11.1 PTO shaft

5.11.1.1 General:

- Before coupling, check that the PTO shaft is free of defects and ensure the quick release couplings engage properly.
- Check the PTO shaft for proper operation before each use.
- Daily cleaning and lubrication of the sliding tubes and protective tubes is required when under constant stress.
- The PTO guard bearing should be lubricated with roller bearing grease and the sliding pin should be greased weekly.
- After the working season all PTO shaft components should be thoroughly cleaned and oiled or greased.



It is absolutely necessary that the "Safety and Accident Prevention Requirements" in the "User Notices" section and the PTO shaft manufacturer's operating instructions (delivered with the PTO shaft) are observed!

5.11.1.2 Lubrication of Walterscheid PTO shaft

Joins **1** and Protective Bearing **2**

- Push back protective cone.
- Lubricate universal joint and protective bearing Lubricate until the grease comes out of the joint seals.
- Push protective cone forward again

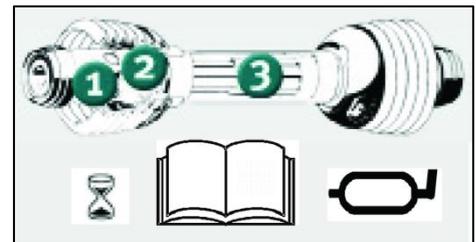


Image: Maintenance markings

Protective tube **3**

- Push cover back.
- Pull the PTO shaft apart and twist the PTO shaft and guard until the lubrication point is in the opening. On star sections lubricate both points. (offset 180°) Lubricate until the grease comes out of the joint seals.
- After lubrication, close opening with cover.
Notice: If no cover or lubrication point is available, pull PTO shaft apart, pull the shaft half with the insert tube out of the guard and lubricate the insert tube.

5.11.1.3 Lubrication Points and Grease Quantities

Type of grease: lithiumsaponified
 Consistency class: NL-GI2
 Grease quantity: 15g = approx. 5 presses

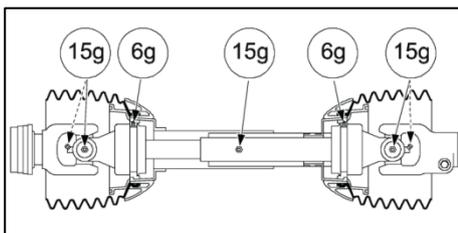


Image: Lubrication points without wide

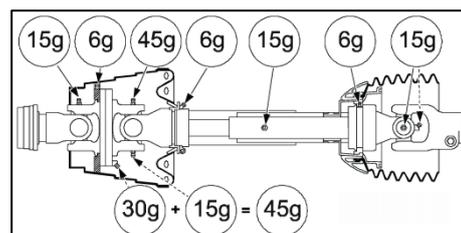


Image: Lubrication points with wide

5.11.1.4 Maintenance Intervals

Range of application	Model series														
	P-Line			PWE / PWZ			W			WWZ / WWE			E		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1 	250 h			60 h			100 h	100 h		8 h	60 h		8 h		
	250 h**														
2 	250 h			40 h			50 h			8 h	40 h		8 h		
	100 h*														
 ① joints ② Protection storage ③ Profile tubes															

*Extreme Dust or large flexion angle

**with P-seals

Image: Lubrication points with wide angles

Application-specific maintenance provides for a reduction in maintenance costs. It was for this purpose that GKN Walterscheid introduced maintenance classes. What maintenance is now required for GKN Walterscheid shafts is easily seen on an application-specific maintenance chart. (The new maintenance intervals were confirmed by GKN Walterscheid through an intensive, five-year testing program.)

There will be a difference in the maintenance classes depending on the application and design of the PTO shaft. Applications are divided into two classes.

- Maintenance class 1 stands for less maintenance intensive applications, such as grass or maize harvest.
- Maintenance class 2 includes maintenance intensive work, such as tillage and beat harvesting.

In the second class the PTO shaft design is evaluated. Wide-angle and standard shafts are differentiated depending on the technical design. This determines the maintenance intervals for joints, sliding sections and guards.

The design and production series can be found on the PTO shaft guard label (Image: PTO shaft label)

1 = Size

Example: P 400 → Series P

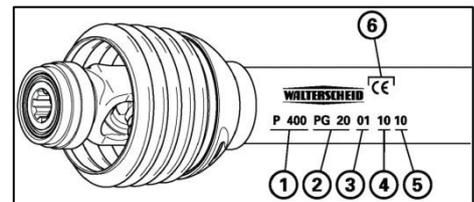


Image: PTO shaft label

5.11.2 Gearboxes

5.11.2.1 General:

The gearboxes are to be checked for leaks regularly and the oil level checked if necessary. Gearbox oil is to be refilled if necessary. In addition, an oil change should be carried out each year.

Gearbox oil:

- SAE 85W-90 or equivalent (z.B. ISO VG 320)
- ISO VG320 mineraloil (mobil 600 XP 320 or equivalent)
- ISO VG 460 Syntheticoil (mobil SHC 460 or equivalent)



Lubricants can pollute soil and water. Lubricants must be used correctly and disposed of properly. The regional requirements and laws concerning the disposal of lubricants must be observed.

5.11.2.2 Gearbox Allocation and Oil Fill Quantities

Main gearbox



B02-1221
Filling quantity 2.0 Litre

Conveyor gearbox



B02-0782
Filling quantity 1.0 Litre

Rotor- planetary gearbox



B02-1213
Filling quantity 2.7 Litre
Gearbox oil: ISO VG 460 Syntheticoil

Side gearbox



B02-1214
Filling quantity 2.0 Litre

Only for vehicles with dosing rollers:

Bevel gearbox



B02-1037
Filling quantity 1.1 Litre

Angle gearbox



B02-1319
Filling quantity 1.0 Litre

5.11.2.3 Rotor- planetary gearbox - Draining gearbox oil

To drain the gearbox oil out of the planetary gearbox for the rotor, proceed as follows:

1.) Raise pick-up

Before maintenance work, the pick-up must be raised and secured with chocks against unintentional lowering.



There is a danger of fingers or hands being crushed. Do not reach between the components when not secured!

Ensure that no persons are in range of the pick-up during raising and lowering.



Image: Support pick-up

2.) Removing the drain plug from the drain port:

First, the rotor has to be turned until the drain plug in the planetary gearbox (Image: Removing drain plug / front Pos. 2) is down can be reached with the tool from the side through the installation opening (Image: Removing drain plug / side Pos. 3).

Remove the drain plug from the gearbox drain port (Image: Removing drain plug 7 front Pos. 2) No oil will run out of the gearbox yet. First the drain tube with the integrated valve opener for the drain port must be mounted (see following points).

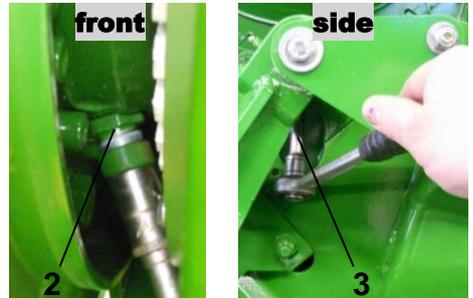


Image: Removing drain plug

Image "Front" View from the front of the gap between the rotor and the side wall.

Image "Side". View from the side of the installation opening in the side wall.

3.) Remove drain tube:

Remove drain tube from the mounting points on the frame (Image: Removing drain tube (Pos. 4). For this loosen the two screws (Pos. 5) in the bracket and pull the tube out to the side.



Image: Remove drain tube

4.) Mount drain tube and drain oil out

Place the drain tube (Image: Mounting drain tube (Pos. 6 & 7) through the side wall opening and screw it onto the planetary gearbox drain port. The drain tube is equipped with the so called "Bochumer Connection" which opens the planetary gearbox drain port when it is screwed in place. The oil starts to flow out of the gearbox. If the oil only flows out irregularly and not completely, the gearbox needs to be vented. For this, the set screw must be removed from the drive stub. This procedure is shown on the next page.

When no more oil flows out of the drain tube, remove it from the planetary gearbox drain port and from the side opening.

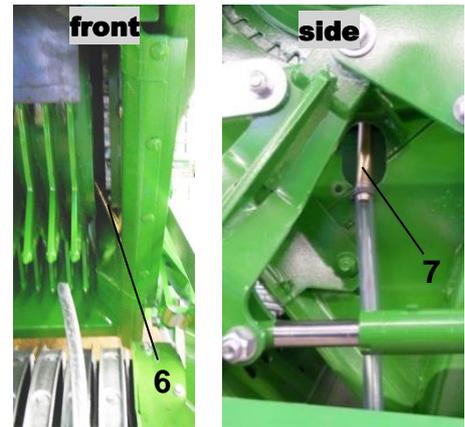


Image: Mount drain tube

Image "Front" View from the front of the gap between the rotor and the side wall.

Image "Side". View from the side of the installation opening in the side wall.

5. Replacing the drain plug in the drain port:

Replace the drain plug in the gearbox drain port (Image: Replacing drain plug Pos. 8 & 9)

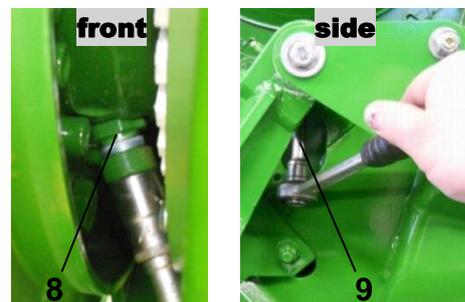


Image: Replacing drain plug

Image "Front" View from the front of the gap between the rotor and the side wall.

Image "Side". View from the side of the installation opening in the side wall.

6.) Replace drain tube:

In order to have the drain tube (Image: Replacing drain tube (Pos. 10) available on the vehicle at all times, it must always be returned to its original position after an oil change. For this, place the drain tube in the two brackets and tighten the 2 screws (Pos. 11)

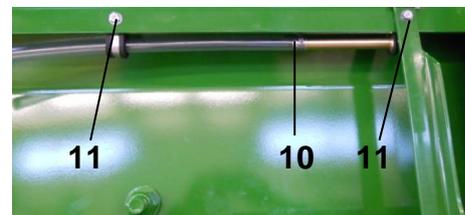


Image: Replace drain tube

5.11.2.4 Rotor- planetary gearbox - Adding gearbox oil

Add the new gear oil through the filling port in the drive stub of the gearbox (Image: Drive stub Pos. 1)
The filling port is also the level indicator.

- Gearbox oil: ISO VG 460 Synthetiköl
(mobil SHC 460 oder gleichwertig)
- Capacity: 3,2 l



Image: Drive stub

Add the gearbox oil as follows:

1.) Remove set screw:

Using an Allen key size 8 (Image: Set screw Pos. 2) remove the set screw (Pos. 3) from the drive stub.

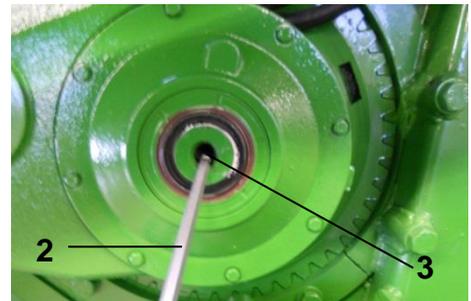


Image: Remove set screw:

2.) Add gearbox oil:

With the help of a funnel (Image: Adding gearbox oil Pos. 4) the gearbox oil is added into the port in the gearbox stub (Pos. 5).



Image: Add gearbox oil:

3.) Close filling port

After adding the gearbox oil, use an Allen key size 8 (Image: Closing filling port Pos. 6) to replace the set screw in the drive stub to close the filling port.

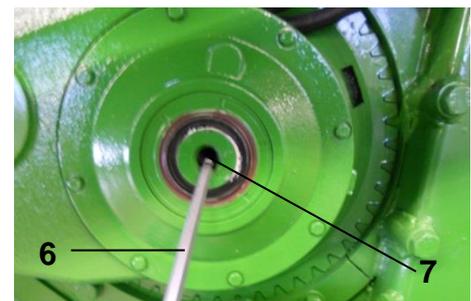


Image: Close filling port

5.11.3 Roller chains

	NOTE
	<ul style="list-style-type: none"> • Check the chain tension every day. • If the chain tension is insufficient, retension the chain. • If the tensioning range has reached its limit, you may have to replace the chains.

5.11.3.1 Pick-up - drive

The pick-up is driven by a robust roller chain (Image 57 / pos. 1). The roller chain is tensioned using a movable tensioning plate (Image 57 / pos. 2) with tensioning bolt (Image 57 / pos. 3).



Image 57: Pick-up drive

Retensioning the roller chain

Retension the roller chains (Image 58 / pos. 1) as follows:

- Remove the cover on the side.
- Release the 4 mounting screws (Image 58 / pos. 2).
- Tension the roller chain by moving the tensioning plate (Image 58 / pos. 3). To do this, turn out the tensioning bolt (Image 58 / pos 4).
- Secure the tensioning bolt (Image 58 / pos. 4) with the locknut (Image 58 / pos. 5).
- Firmly retighten the 4 mounting screws (Image 58 / pos. 2).
- Fit the cover on the side.

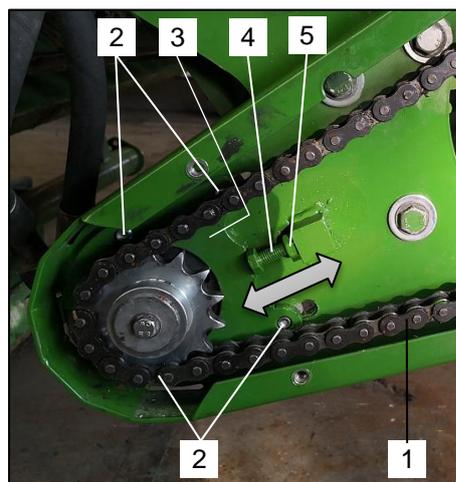


Image 58: Tensioning plate with tensioning bolt

5.11.3.2 Dosing unit - drive (depending on the vehicle's equipment)

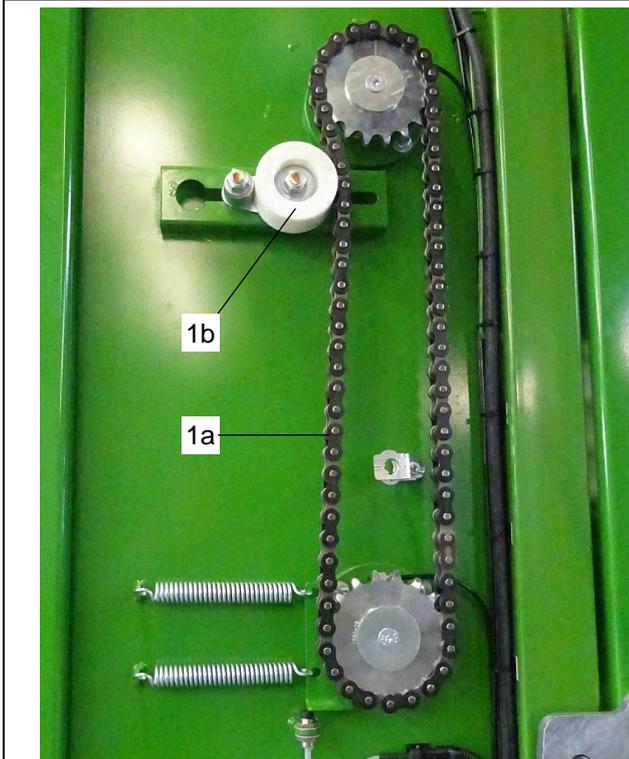


Image 59: Dosing unit – left drive



Image 60: Dosing unit – right drive

The metering roller is driven by two robust roller chains (Image 59 / pos. 1a + Image 60 / pos. 2a). The roller chains are tensioned with chain tensioning blocks (Image 59 / pos 1b + Image 60 / pos. 2b).

Retensioning the roller chains

Retension the roller chains (Image 61 / pos. 1) as follows:

- Open the cover.
- Release the two nuts (Image 61 / pos. 3).
- Tension the roller chain (Image 61 / pos. 1) by moving the chain tensioning block (Image 61 / pos. 2).
- After the adjustment, retighten the two nuts (Image 61 / pos. 3).
- Close the cover.

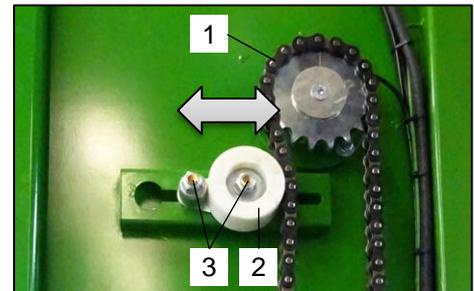


Image 61: Chain tensioning block

5.11.3.3 Lubricating roller chains

The roller chains are lubricated manually using engine oil.



Observe also the notes and instructions in the operating instructions, chapter “Care and maintenance”, section “Lubrication” / “Lubrication schedule”.

Optionally, the roller chains can be lubricated with a lubrication system.



Observe also the notes and instructions in the operating instructions, chapter “Care and maintenance”, section “Lubrication” / “Lubrication system”.

5.11.4 Clutches

When the tailgate is opened the rotor and the pick-up switch off and the dosing unit switches on. If the tailgate is closed, the jaw couplings switch again.

Dosing Unit Clutch

When the tailgate is closed there should be set a distance of approximately 25 mm between the coupling elements of the dosing unit.

The optimum distance is set by adjusting the shifting console (Image: Clutch open Pos. 1) with retracted cylinder.

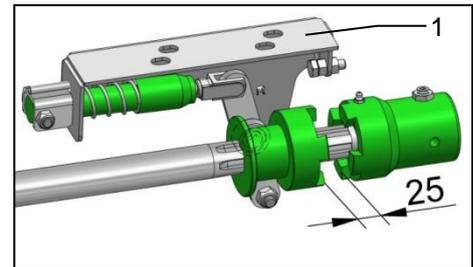


Image: Clutch open

Adjusting Clutch

The clutch is adjusted correctly when the bearing rotates freely when the clutch is engaged. If the setting is to be changed, proceed as follows.

- First loosen one of the nuts (Image: Clutch closed Pos. 1).
- Adjust the screw (Pos. 2) accordingly.
- Retighten the nut (Pos. 3).

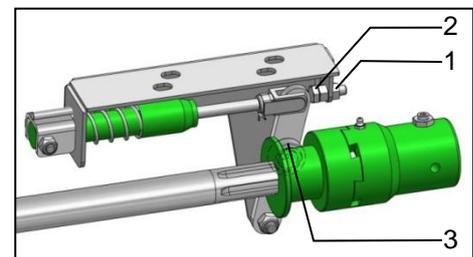


Image: Clutch closed



The bearing must turn freely in the on and off positions.

5.12 Scraper Floor Chains

The chains are to be adjusted so that they sag slightly. If the chain sags too much the chain can skip during reversing. If the chains are too tight, they wear much faster.



Check the scraper floor bar bolts occasionally and tighten if necessary!

5.12.1 Tensioning Scraper Floor Chains

Tension the scraper floor chain as follows:

- First loosen the counter nut (Image: Tensioning unit Pos. 1).
- Then adjust the adjustment bolts (Pos. 2). The adjustment lengths of all bolts should be the same.
- Retighten the lock nut.

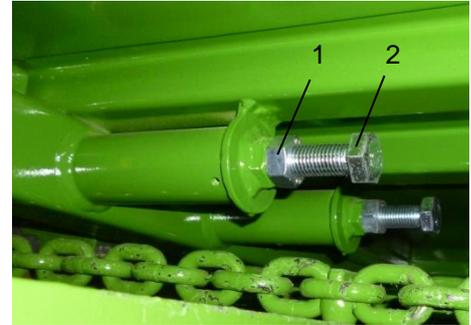


Image: Tensioning system

5.12.2 Shortening the Scraper Floor Chain

When the sprocket adjustment capacity has been exhausted the scraper floor chains must each be shortened by removing two links. This is done as follows:

- First loosen the counter nut (Image: Tensioning unit Pos. 1).
- Then loosen the adjustment bolts (Pos. 2) until the sprockets can be pushed back to the stop.
- Now open the chain locks.
- Remove two links from the chain. It is necessary that this be done with all chains to maintain uniform lengths.
- The chain locks must now be remounted.
- Then adjust the adjustment bolts (Pos. 2) to set the necessary chain tension. The adjustment lengths of all bolts should be the same.
- Retighten the lock nut.

5.12.3 Shorten scraper floor chain if chains are different lengths

Should the scraper floor chains be different lengths, please contact BERGMANN customer service to obtain the respective information for the chain shortening procedure.

Customer Service:

Tel.: +49 (0) 44 44 - 20 08 15

Fax: +49 (0) 44 44 - 20 08 43

kundendienst@l-bergmann.de

5.13 Cutting Unit

5.13.1 Knife Adjustment

In order to achieve an optimal material cut length the distance between the cutting knives (Image: Knife adjustment Pos. 1) and the rotor (Pos. 2) must be approx. 10 - 20 mm. The knives must not come into contact with the rotor drum.



Resharpener the knives will not change the distance to the rotor drum.

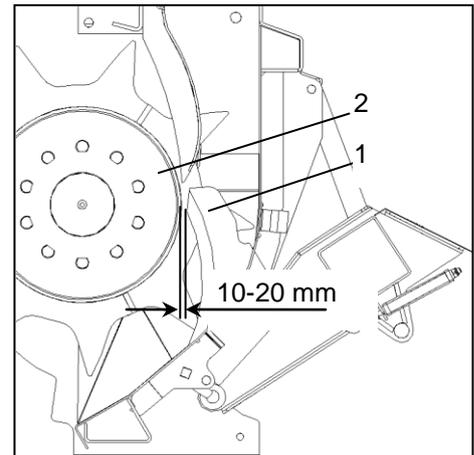


Image: Knife Adjustment

5.13.2 Cutting Unit Adjustment

The cutting unit is optimally set in the factory.

If the cutting unit is to be adjusted, proceed as follows.

- Loosen the (Image: Cutting unit adjustment Pos. 1) counter nut.
- Adjust the bolt (Pos. 2).
- Retighten the lock nut (Pos. 1).

Ensure that when adjusting the adjustment bolt, the distance (Image: Knife adjustment Pos.1) to the rotor (Image: Knife adjustment Pos.2) is the same on the right and left.



Image: Cutting Unit Adjustment

5.13.3 Sensor Adjustments

5.13.3.1 Top Sensor: Indicator "Cutting unit off"

To adjust the "Cutting unit off" indicator proceed as follows:

- Extend the cutting unit (Image: Top sensor Pos. 1) completely. So that it rests on the adjustment bolts (Pos. 2).
- Loosen the nuts on the sensor bracket (Pos. 4).
- Move the sensor (Pos. 3) to a distance of approx. 4 mm from the frame of the cutting unit (arrow), until the diode on the sensor (Pos. 3) goes out.
- Retighten the nuts (Pos. 4) on the sensor bracket.

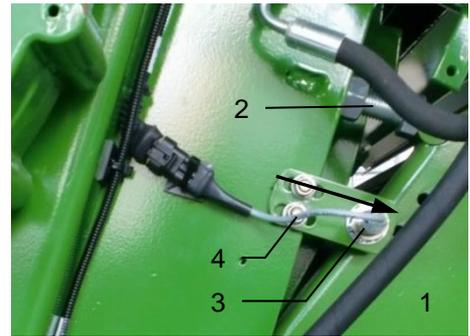


Image: Top Sensor:

If the cutting unit (Pos. 1) is extended and the adjustment bolt (Pos. 2) moves away, the sensor (Pos. 3) is triggered. The diode on the sensor (Pos. 3) lights and the terminal display signals cutting unit extended.

5.13.3.2 Bottom Sensor: Knife Position

The bottom sensor (Image: Bottom sensor Pos.2) determines how far the knives move out of the conveyor channel when the function is activated from the terminal. This is necessary e.g. to eliminate blockages in the conveyor channel.

To adjust this, proceed as follows:

- Extend the cutting unit (Image: Bottom sensor Pos.1) until the knives are approx. 10 mm in the conveyor channel.
- Loosen the nuts on the sensor bracket (Pos. 3).
- Move the sensor (Pos. 2) to a distance of approx. 4 mm from the frame of the cutting unit (arrow), until the diode on the sensor (Pos. 2) goes out.
- Retighten the nuts (Pos. 3) on the sensor bracket (Pos. 2).



Image: Bottom Sensor

5.14 Conveyor Unit

5.14.1 Scraper

In order to ensure proper scraper function, the distance between the scraper and (Image: Scraper Pos. 3) the rotor (Pos. 1) must be approx. 10 mm.

Adjust the scraper as follows:

- First loosen the bolts (Pos. 4) on the scraper bar (Pos. 3).
- As an adjustment aid, the eccentric bolt (item 2) is rotated until the optimum distance between the rotor (Pos. 1) and the scraper (Pos. 3) is reached.
- Then retighten the bolts.

Ensure that the scraper is set to the same distance on the left and right. The scraper must not come into contact with the rotor drum.

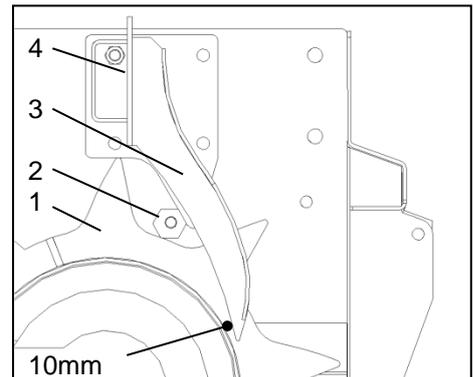


Image: Scraper

5.15 Hydraulics

5.15.1 Hydraulic Oil Filter (Pilot box / Comfort Control)

To protect the hydraulic block against contamination, the hydraulic system is equipped with a pressure filter (Image: Hydraulic filter Pos. 1).

The filter cartridge is to be replaced once a year as follows:

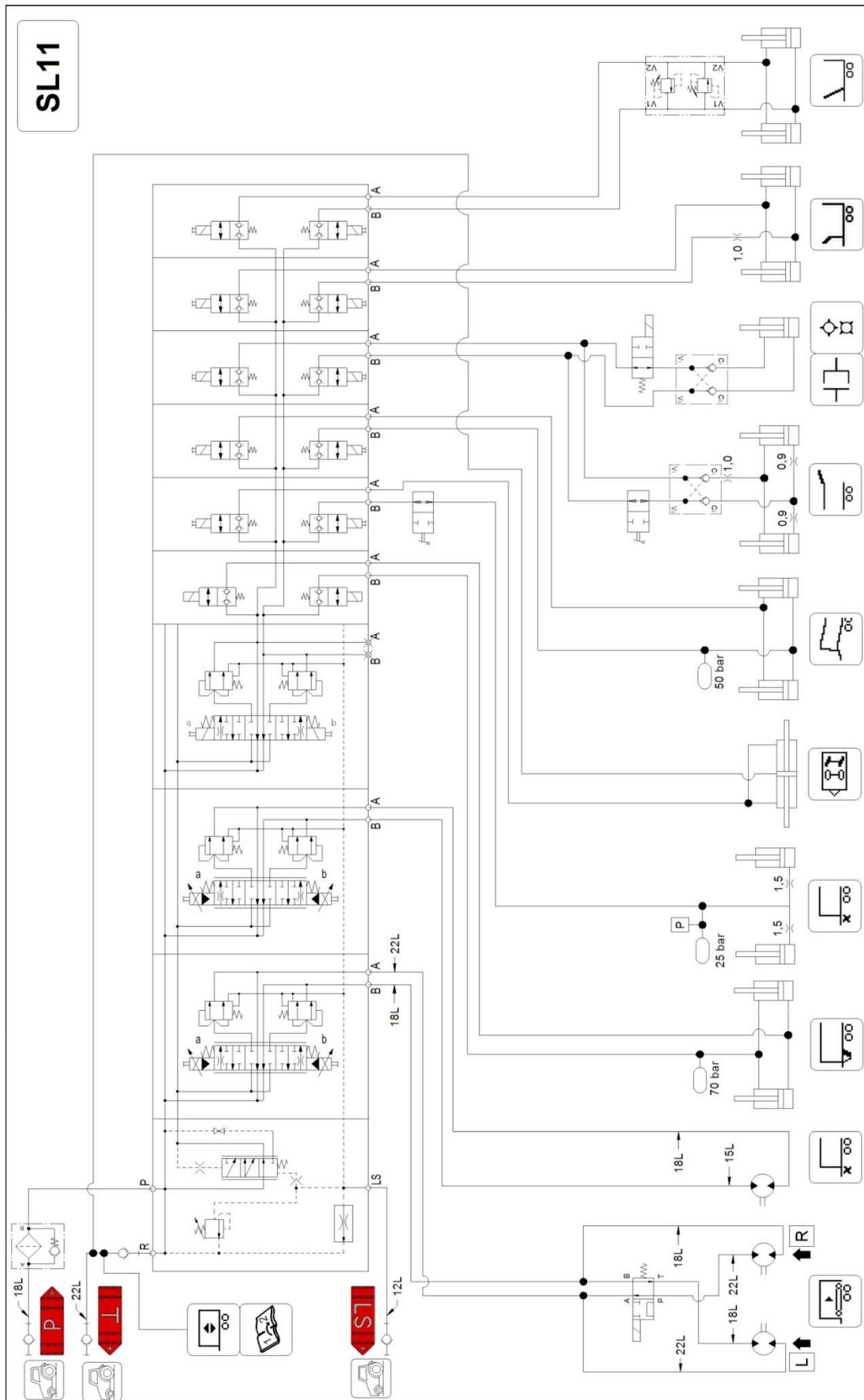
- Depressurize hydraulic system
- Unscrew the filter bowl
- Remove soiled cartridge
- Clean filter bowl
- Oil the seal on the new cartridge slide it in to the stop
- Grease the bowl thread
- Screw in the bowl to the stop (torque 150 Nm).



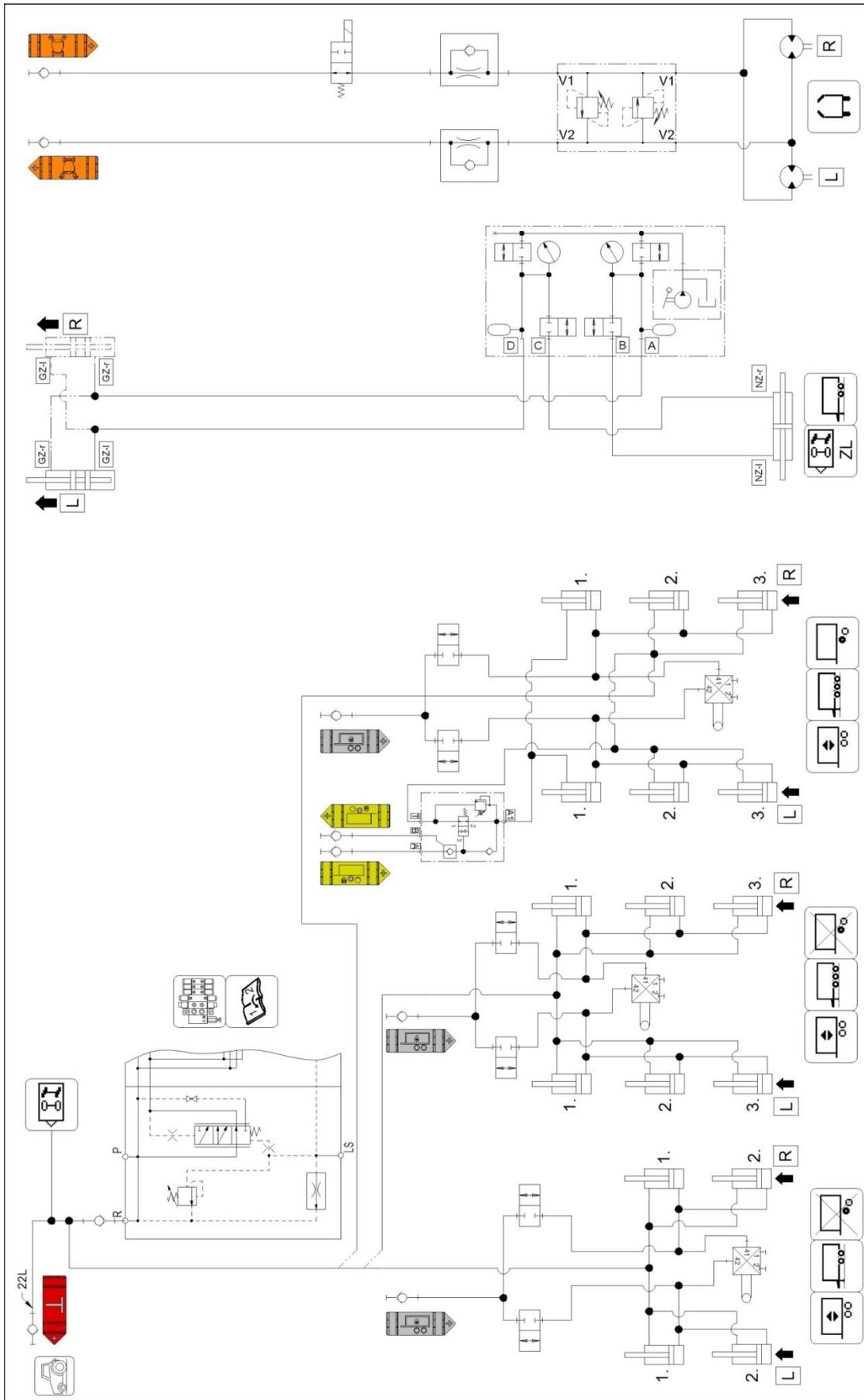
Image: Hydraulic oil filter

5.16 Circuit Diagrams

5.16.1 Hydraulics



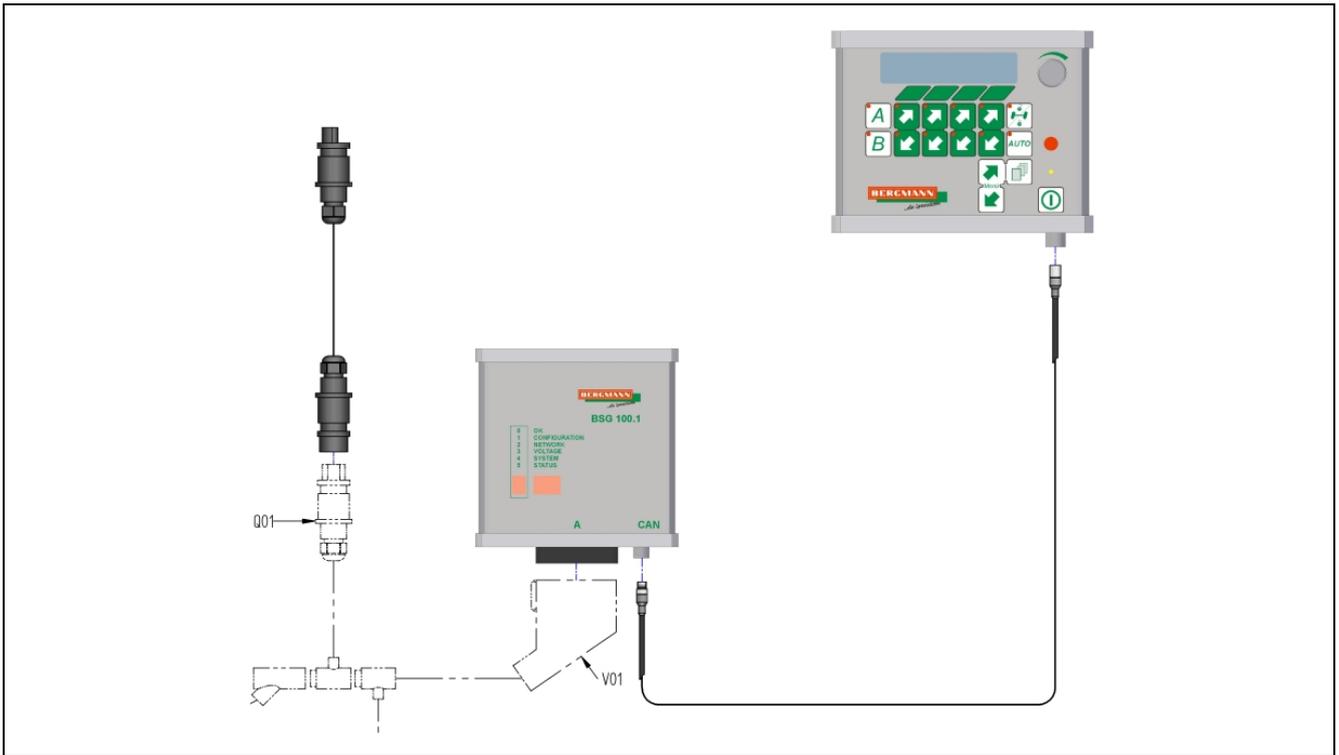
26-13-0129-PLN (Blatt1)



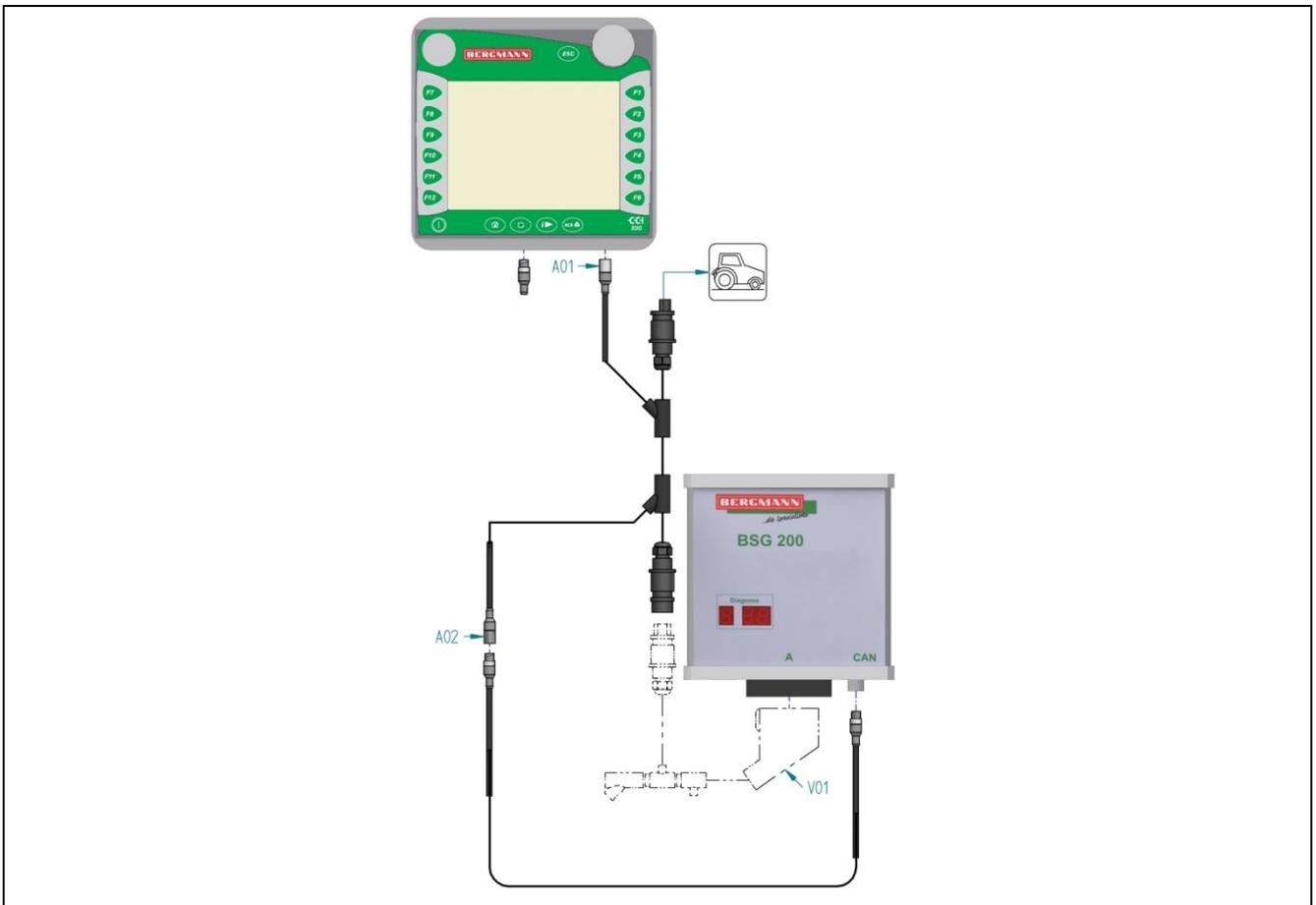
26-13-0129-PLN (Blatt2)

5.16.2 Electric

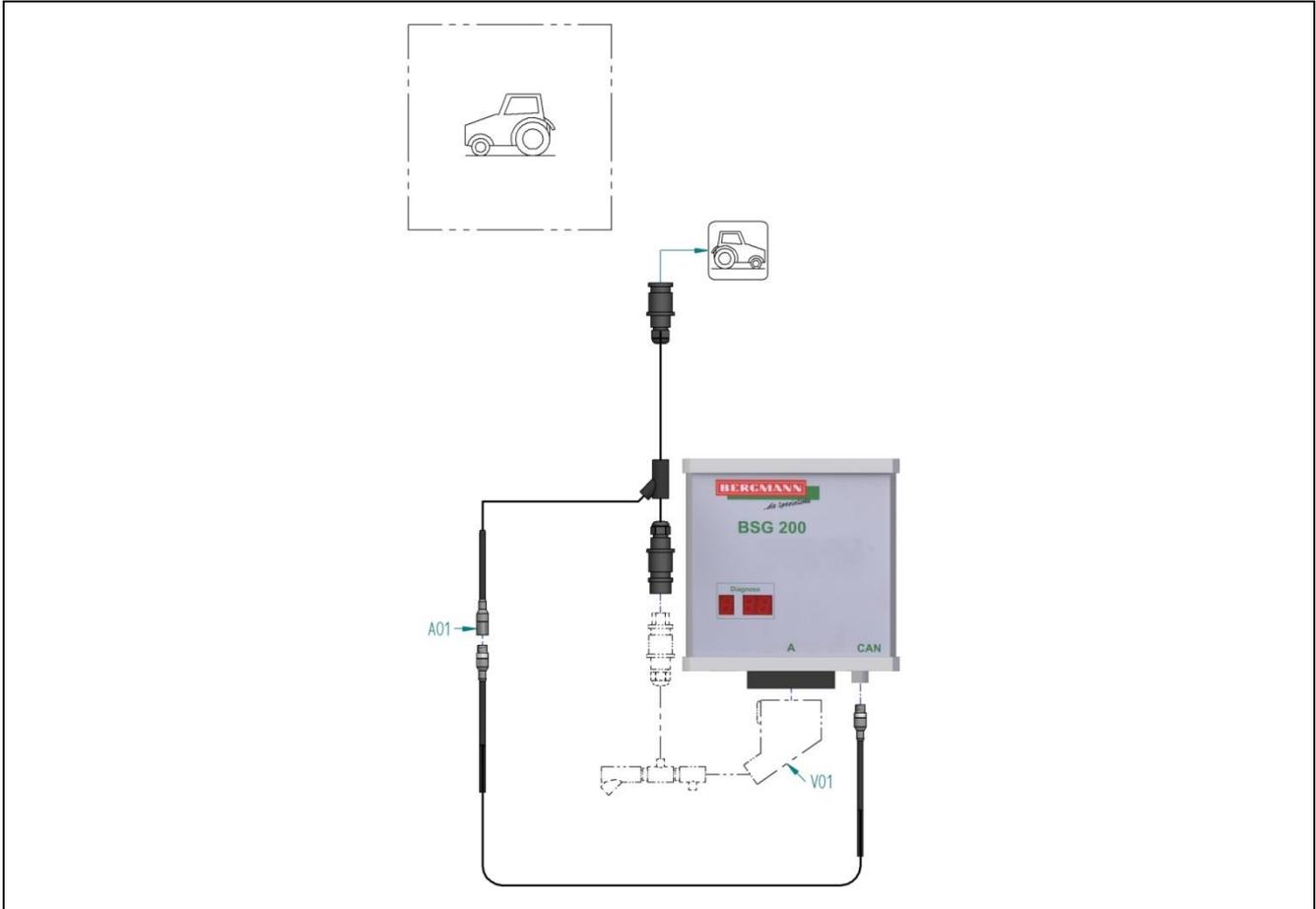
5.16.2.1 Terminal – BCT 20



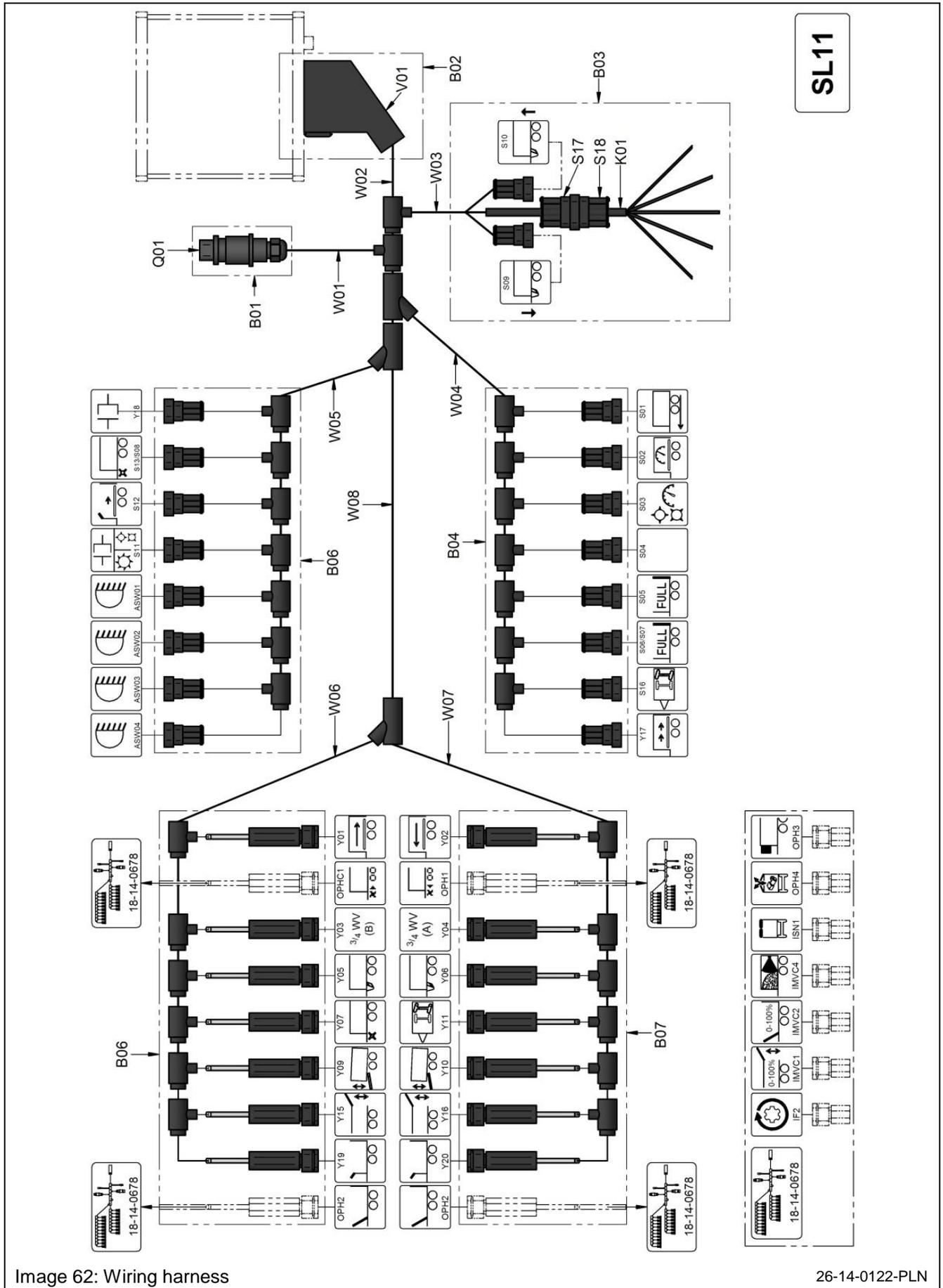
5.16.2.2 Terminal – CCI 200



5.16.2.3 Terminal – ISOBUS



5.16.2.4 Wiring harness BCT / CCI / ISOBUS



5.16.2.4.1 Wiring harness legend

ASW ...	Work spotlight plug
B ...	Block no.
K ...	Cable end no.
S ...	Sensor plug
Q ...	Plug source
V ...	Plug distributor
W ...	Conduit no.
Y ...	Plug valve
O...	Output
I...	Input

ASW...: Work spotlight plug

ASW01	Spotlight	
ASW02	Spotlight	
ASW03	Spotlight	
ASW04	Spotlight	

S ...: Sensor plug

S01	Driving speed	ABS sensor
S02	Scraper floor speed	Inductive sensor (Closer)
S03	(Spreader drum speed)	Hall sensor
S04	-	Inductive sensor (Opener)
S05	FULL signal tailgate, left (type K)	Inductive sensor (Opener)
S06	FULL signal dosing rollers (type S) / FULL signal tailgate, right (type K)	Pressure switch
S07	FULL signal tailgate	Pressure switch
S08	Pick-up relief	Pressure switch
S09	Cutting unit down	Inductive sensor (Opener)
S10	Cutting unit up	Inductive sensor (Opener)
S11	Switching	Inductive sensor (Opener)
S12	Auto-Filling	Inductive sensor (Closer)
S13	Pick-up pressure sensor	Analogue current
S14	-	-
S15	-	-
S16	steering axle	Pressure switch

Y ...: Plug valve

Y01	Scraper floor rear (Prop.)	
Y02	Scraper floor reverse	
Y03	Pilot control valve	
Y04	Pilot control valve	
Y05	Cutting Unit	
Y06	Cutting Unit	
Y07	Raising / lowering the pick-up	
Y08		
Y09	High-lift drawbar	
Y10	High-lift drawbar	
Y11	steering axle	
Y12		

Y13		
Y14		
Y15	Tailgate	
Y16	Tailgate	
Y17	Scraper floor overdrive	
Y18	Switching / clutch	
Y19	Front wall flap	
Y20	Front wall flap	

O ...: Output

OPHC1	Pick-up under load	
OPH1	Pick-up reverse	
OPH2	Front wall	
OPH3	Silage additive application system	
OPH4	Cargo space cover - 2/2-way poppet valve	

I ...: Input

IF2	PTO shaft speed	Gearbox sensor
IMVC1	Tailgate position	Angle sensor
IMVC2	Cargo space fill level	Ultrasonic sensor
IMVC4	Front wall position	Angle sensor
ISN1	Cargo space cover signal - open	Inductive sensor (Opener)

5.16.2.5 Wiring harness BCT / CCI / ISOBUS - expansion unit

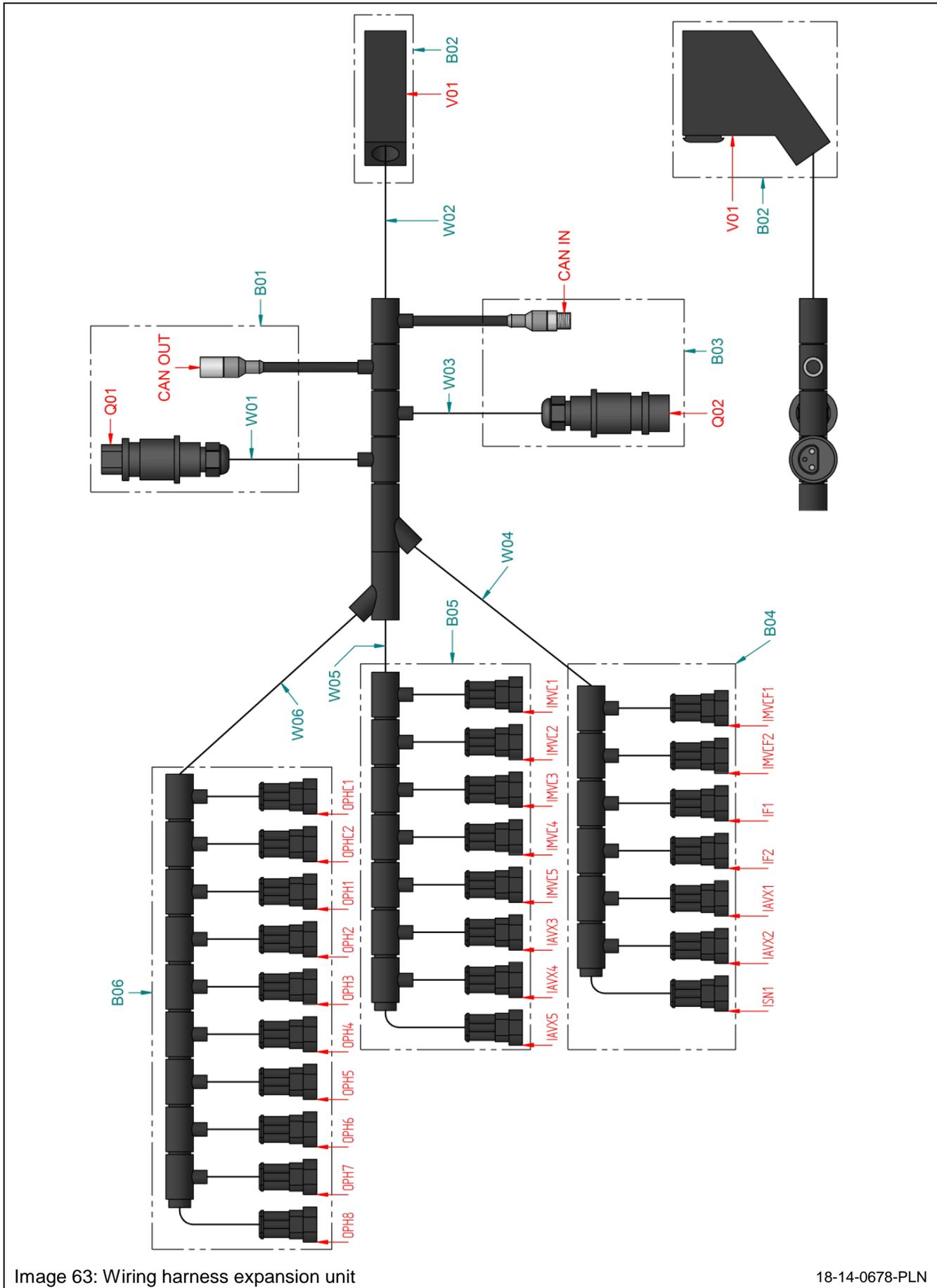


Image 63: Wiring harness expansion unit

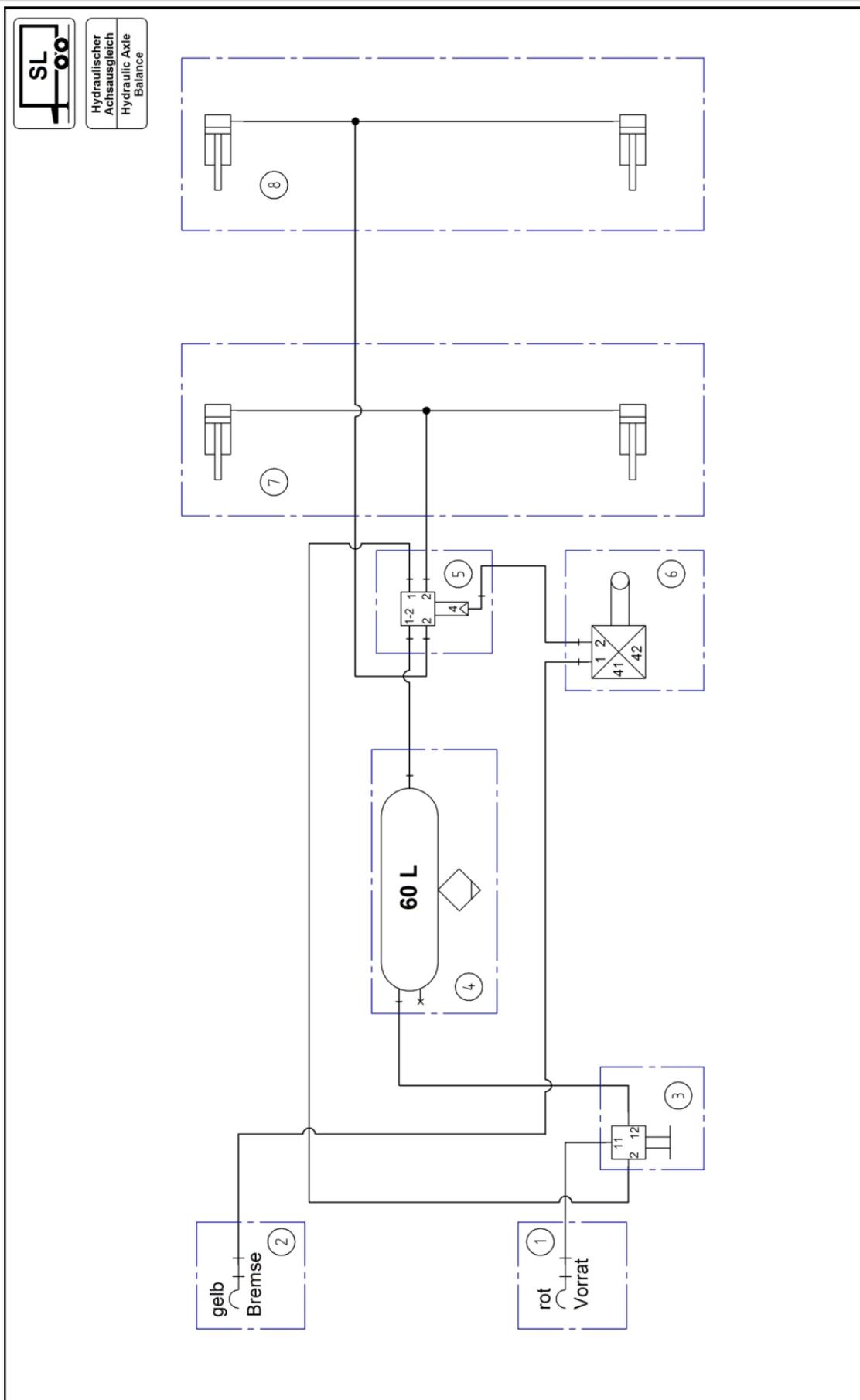
18-14-0678-PLN

5.16.2.5.1 Wiring harness legend

B ...	Block no.
Q ...	Plug source
V ...	Plug distributor
W ...	Conduit no.

5.16.3 Brake System

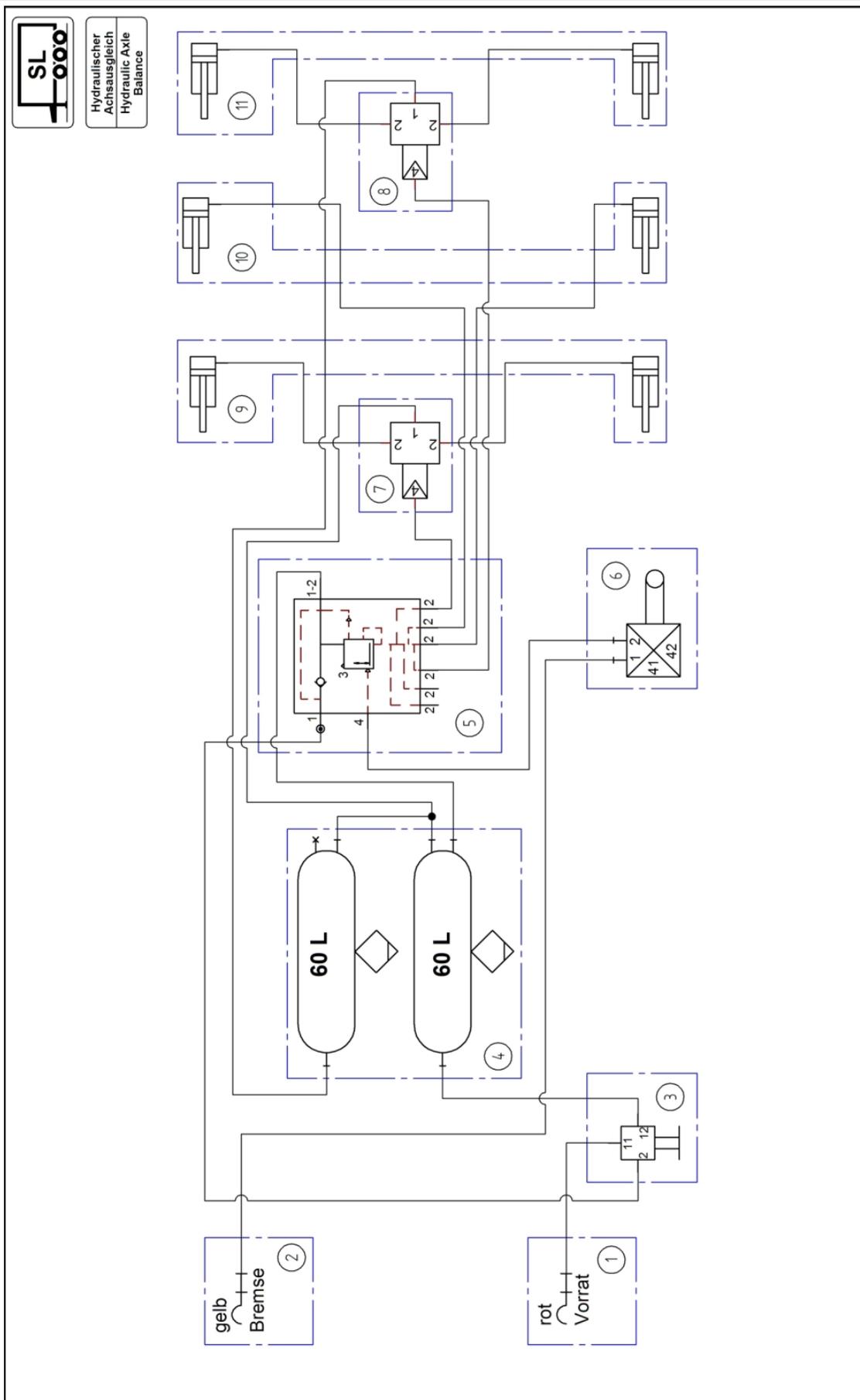
5.16.3.1 Air Brake - Tandem



18-16-0103-PLN

Pos.	Denomination	Description
1	Clutch - Storage	red
2	Clutch - Brake	yellow
3	Release Valve	
4	Compressed Air Tank	
5	Trailer Brake Valve	
6	Brake Effect Regulator - ALB	
7	Membrane Cylinder	1st axle
8	Membrane Cylinder	2nd axle

5.16.3.2 Air Brake - Tridem



18-16-0104-PLN

Pos.	Denomination	Description
1	Clutch - Storage	red
2	Clutch - Brake	yellow
3	Release Valve	
4	Compressed Air Tank	
5	Trailer Brake Valve	
6	Brake Effect Regulator - ALB	
7	Relay Valve	1st axle
8	Relay Valve	3rd axle
9	Membrane Cylinder	1st axle
10	Membrane Cylinder	2nd axle
11	Membrane Cylinder	3rd axle

5.17 Lubrication

Important! Where lubricants can get into feed or the ground, environmentally friendly, biodegradable oils and greases should be used. (Except in automatic lubrication systems, where biodegradable greases are not allowed.) Only use oils approved by Bergmann. Ensure that lubricants are properly disposed of.



To ensure smooth operation of the vehicle for a long time, a long-term high-quality grease must be used. The dirt must be removed from grease nipples before lubricating.



Lubricants can pollute soil and water. Lubricants must be used correctly and disposed of properly. The regional requirements and laws concerning the disposal of lubricants must be observed.

This grease is characterized by the following:

- exceptional adhesion
- resistance to water
- high pressure resistance
- high resistance to aging
- good working stability

The initial lubrication of the vehicle was carried out with this fat. For continued care, this grease is commercially available.

Important! Warranty claims related to the lubrication can only be accepted if it can be proven that the grease mentioned above was used.

For the lubrication of drive components, such as:

- PTO shaft
- Gearboxes
- Drive chains / Roller chains
- etc.

the instructions and notices in the operating instructions under "care and maintenance" found in the "drive" section are also to be followed.

	<p>B06-0084</p>
	<p>Lubrication points</p> <p>This identification sticker marks lubrication points on the vehicle.</p> <ul style="list-style-type: none"> • The lubrication points must be lubricated according to the lubrication schedule (see "Maintenance & Care" section).

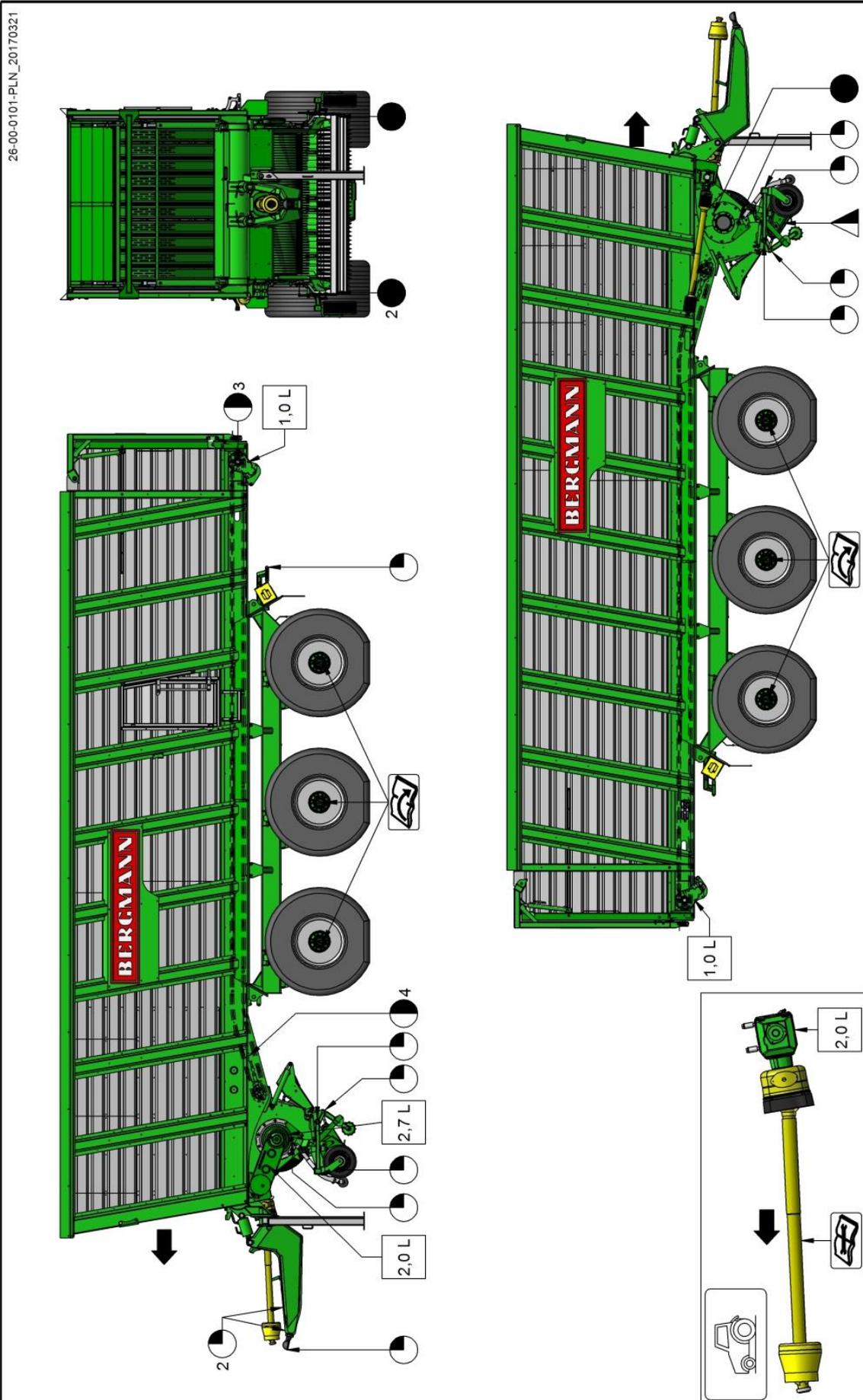
5.17.1 Lubrication diagram

The lubrication points are shown in the lubrication diagram with the appropriate maintenance intervals (see the following pages).

Legend

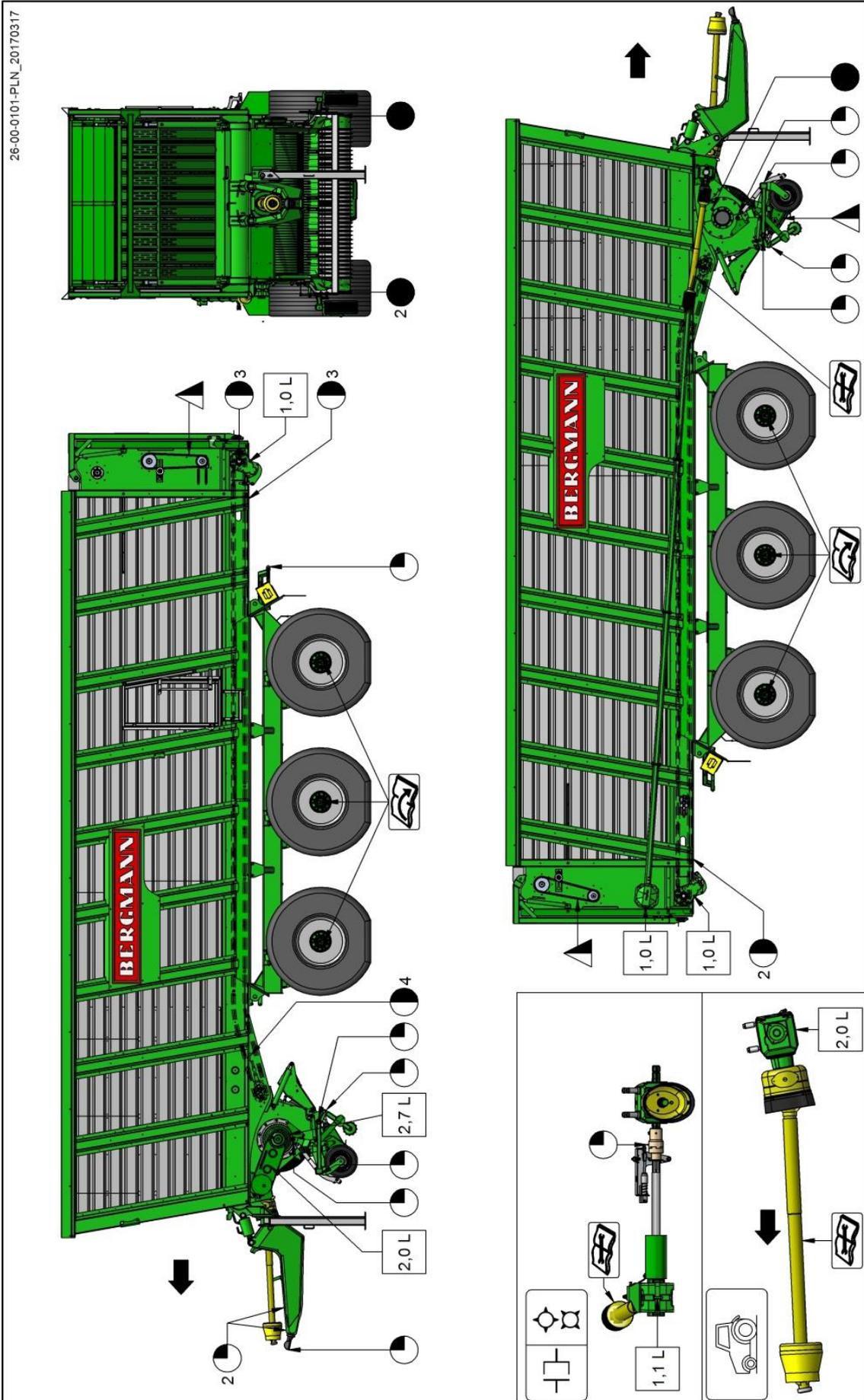
	Grease after 20 trips
	Grease after 40 trips
	Grease after 100 trips
4 	4 lubrication points
	Lubricating oil
	Gearbox oil 1.3 liter capacity, change each year (Oil, see section gearbox)
	Grease chains with chain grease after 40 trips
	Grease chains with chain grease after 100 trips
	Refers to the following pages
	Refer to other sections in e.g. the Maintenance and Maintenance chapter. - PTO section
	Direction of travel

5.17.1.1 Lubrication diagram vehicle type "S"



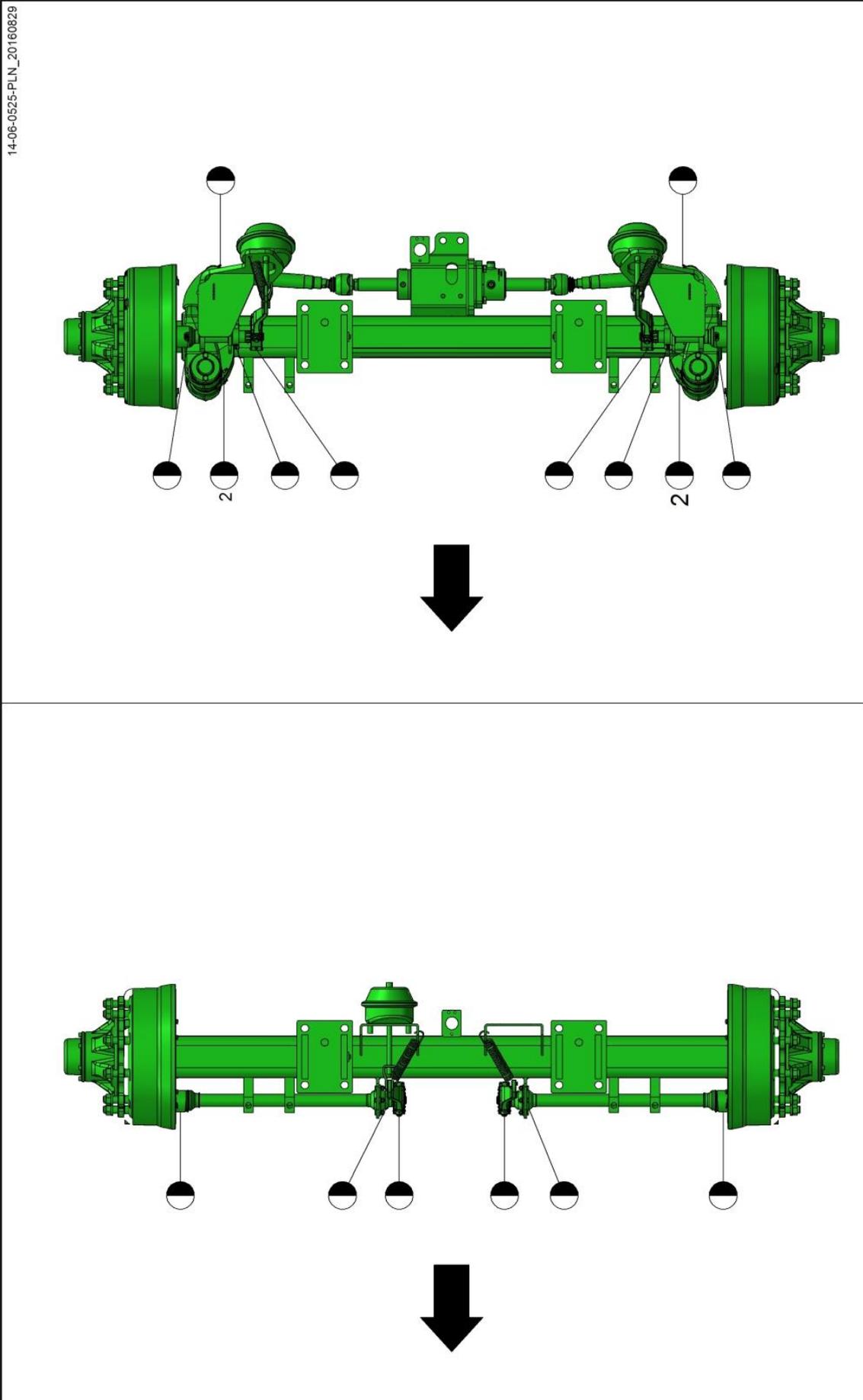
26-00-0101-PLN_20170321

5.17.1.2 Lubrication diagram vehicle type "S"



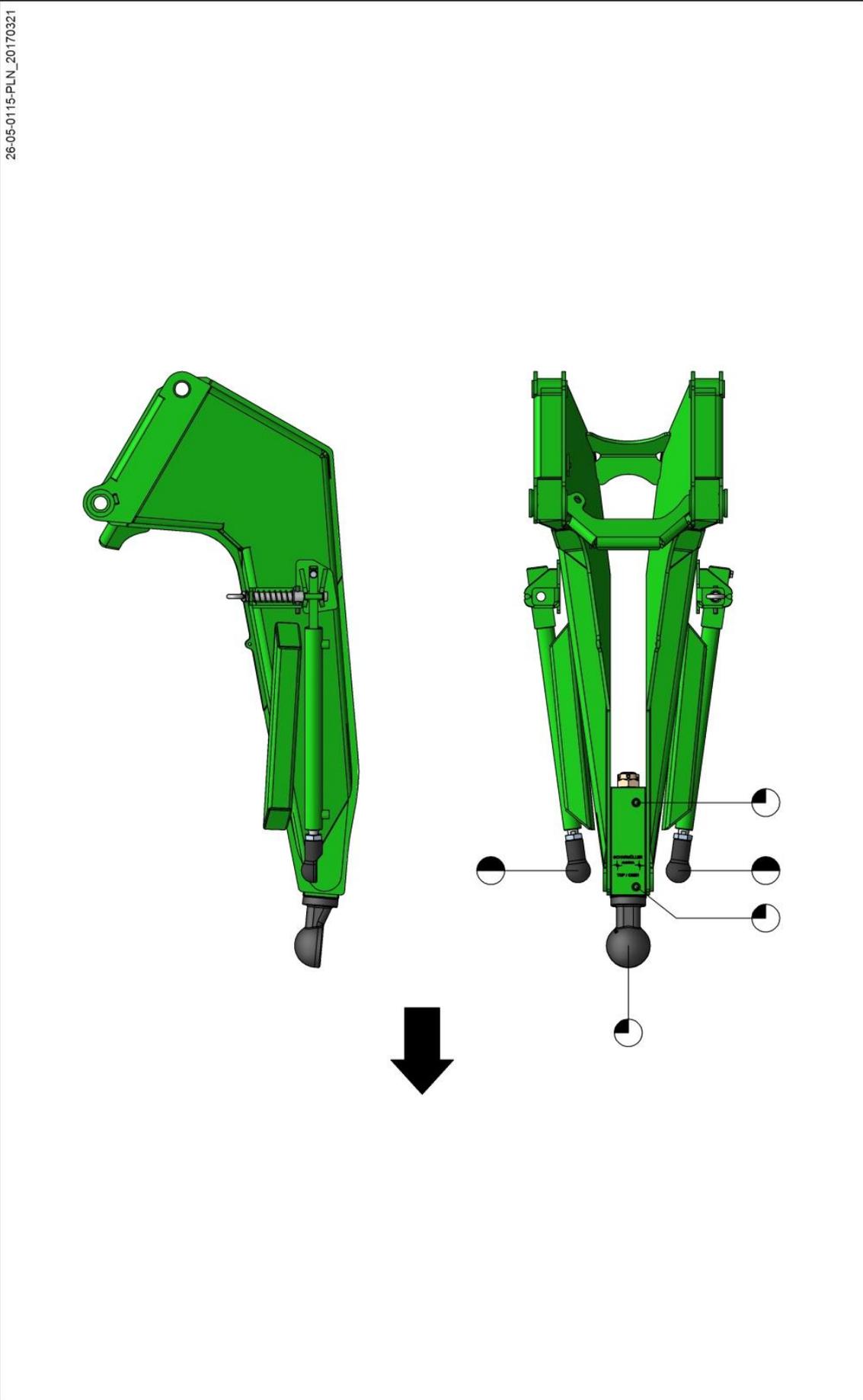
26-00-0101-PLN_20170317

5.17.1.3 Lubrication diagram axle



14-06-0525-PLN_20160829

5.17.1.4 Lubrication diagram drawbar (Forced steering hydraulic / normal)



26-05-0115-PLN_20170321

5.18 Malfunctions

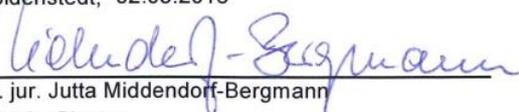
The following information should help to eliminate malfunctions.

Malfunction	Cause	Solution
PTO shaft slip clutch responds	Too much fodder, foreign objects, dull knife or excessive material column above the conveyor channel	Reduce vehicle speed, remove foreign object, grind knives or turn feed on earlier.
Poor cutting quality	Dull knives or not enough fodder in the conveyor unit	Sharpen knives earlier, operate at a slower rotational speed Pick up the swath, not the ground
Harvested material is soiled	Guide wheels set too deep	Check guide wheel setting
Pick-up guide wheels don't touch the ground	Pick-up poorly adjusted	Check guide wheel setting, or trailer hitch height adjustment
Pick-up runs irregularly	Pick-up guide wheels not evenly adjusted	Check that guide wheel settings are the same
Material around dosing rollers	Knives are dull or set incorrectly (too much uncut material, or blockage in tailgate area.	Sharpen knives, drive forward faster during unloading
Dosing unit clutch does not engage	PTO shaft running	Only switch on when not moving
Dosing rollers continue to run when tailgate is closed.	Clutch on main drive does not engage	Check switching function.
Pressing unit (Rotor) does not run smoothly	dull knives	Sharpen knives
Noised from drive chain	Chain not properly tensioned	Check chain tension, retention if necessary
Scraper floor chain makes loud noises in neutral	Scraper floor chain too tense	Relieve tension equally on both chains
Dosing rollers blocked	Material pressed to tightly in roller Fill indicator not observed	Reverse feed

Chart: Malfunctions

6 Declaration of Conformity

6.1 CAREX

	<p>EC-Declaration of Conformity</p> <p>according to 2006/42/EX, Annex II, No. 1 A</p>	<p>Translation en</p>										
<p>Manufacturer:</p> <p>Ludwig Bergmann GmbH Maschinenfabrik Hauptstraße 64 - 66 49424 Goldenstedt / Germany</p>												
<p>Person established in the Community / authorised to compile technical data</p> <p>Ludwig Bergmann GmbH Maschinenfabrik Hauptstraße 64 - 66 49424 Goldenstedt / Germany</p>												
<p>Description and identification of the machinery</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Designation:</td> <td>Silage trailer</td> </tr> <tr> <td>Function:</td> <td>Loading, cutting, transport and unloading of agricultural harvest</td> </tr> <tr> <td>Type / model:</td> <td>SL11</td> </tr> <tr> <td>Commercial designation:</td> <td>CAREX 370 S / 390 K / 410 S / 430 K / 450 S / 470 K / 490 S / 510 K</td> </tr> <tr> <td>Vehicle identification no.:</td> <td>2 S</td> </tr> </table>			Designation:	Silage trailer	Function:	Loading, cutting, transport and unloading of agricultural harvest	Type / model:	SL11	Commercial designation:	CAREX 370 S / 390 K / 410 S / 430 K / 450 S / 470 K / 490 S / 510 K	Vehicle identification no.:	2 S
Designation:	Silage trailer											
Function:	Loading, cutting, transport and unloading of agricultural harvest											
Type / model:	SL11											
Commercial designation:	CAREX 370 S / 390 K / 410 S / 430 K / 450 S / 470 K / 490 S / 510 K											
Vehicle identification no.:	2 S											
<p>We herewith declare that the machine designated above corresponds to all relevant provisions of the following directive:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; border-bottom: 1px solid black;">2006/42/EC:2006-05-17</td> <td style="border-bottom: 1px solid black;">Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast) (Text with EEA relevance)</td> </tr> <tr> <td style="border-bottom: 1px solid black;">2004/108/EC:2004-12-15</td> <td style="border-bottom: 1px solid black;">Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC</td> </tr> </table>			2006/42/EC:2006-05-17	Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast) (Text with EEA relevance)	2004/108/EC:2004-12-15	Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC						
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<p>References of the harmonised standards used, as referred to in Article 7 (2).</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>												
<p>Goldenstedt, 02.05.2016</p>  <p>Dr. jur. Jutta Middendorf-Bergmann Managing Director</p>	 <p>Dipl.-Ing. (FH) Martin Kallage Head of Development and Design Department</p>											

7 Contact Details & Contact Persons

In the following sections you can find contact and contact the company Ludwig Bergmann GmbH, as well as their partners.

If your operating instructions be older, you can find the current data on the company website www.Bergmann-Goldenstedt.de.

7.1 Manufacturer

Ludwig Bergmann GmbH Maschinenfabrik	Telefon:	+49 (0)4444 - 2008-0
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7.2 Authorized officer / Sale

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7.3 Sales management Export West

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	E-Mail:	kastler@l-bergmann.de

7.4 Sales management Export East

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7.5 Spare parts warehouse

Ersatzteillager	Telefon:	+49 (0)4444 - 2008-16
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7.6 Customer service management

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	E-Mail:	kundendienst@l-bergmann.de

7.7 Emergency service

Monteur-Notdienst	Mobil:	+49 (0)175 - 58 88 82 0
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7.8 Worldwide Sales Partners

Find our worldwide sales partners on our website www.bergmann-goldenstedt.de.