Operating instructions

Universal Spreader

TSW 7340 S (Variosix + TSW A 21)

Series:	1-236 - ...
Type:	M25-W + M22-W
Document type:	Translation of the original operating instructions
Version:	201908 en
Document number:	BTA_M25-W+M22-W_7340_201908_en

en

1 General

1.1 Identification

☐ TSW 7340 S

☐ TSW A 21

☐ Variosix

Type: _____

Vehicle ID No. (VIN): _____

Date of delivery: _____

1.2 Manufacturer

Ludwig Bergmann GmbH	+49 (0)4444 - 2008-0
	+49 (0)4444 - 2008-88
	-
Hauptstraße 64-66 49424 Goldenstedt	info@l-bergmann.de
	www.Bergmann-Goldenstedt.de

1.3 Spare parts store

Spare parts store	+49 (0)4444 - 2008-16
	+49 (0)4444 - 2008-25
	-
Hauptstraße 64-66 49424 Goldenstedt	ersatzteil@l-bergmann.de
	www.Bergmann-Goldenstedt.de

1.4 Customer service line

Jörg Kammacher	+49 (0)4444 - 2008-15
	+49 (0)4444 - 2008-43
	-
Hauptstraße 64-66 49424 Goldenstedt	kundendienst@l-bergmann.de
	www.Bergmann-Goldenstedt.de

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.

Ludwig BERGMANN GmbH, 49424 Goldenstedt (Lower Saxony) – a medium sized family-run business in its third generation – has been successfully manufacturing agricultural machinery and transport equipment for over one hundred years. It is one of the major manufacturers and providers of adapted technology for professional farming operations and farm contractors.

The combination of long-standing experience and contemporary, innovative technology is one of our greatest strengths. Constant focus on the needs and desires of customers, adapting to changing technical requirements, the continual development and improvement of our products and not to forget the “feel” for the customer, have made BERGMANN a reliable worldwide farming partner.

With our wide range of products, consisting of manure spreaders, universal spreaders, forage transport trailers, silage trailers, grain transfer trailers and special bodies, we offer economical solutions that prove themselves in the field day after day.

Please check the vehicle for possible shipping damage upon receipt. Check the vehicle against the delivery note to ensure that no parts or optional features are missing. In order to reimburse you for damages, we need your complaint immediately. To do this, follow the “Product transfer instructions” in chapter “Notes for the operating company”.

Read these operating instructions and all other supplied operating instructions carefully before using the vehicle for the first time. Follow the instructions for proper operation, care and maintenance in order to ensure that your vehicle is always ready for use and has a long service life. Always observe the safety instructions listed in these operating instructions. All vehicle operators must have read these operating instructions prior to operation and must be familiar with the vehicle functions.

We wish you every success with your BERGMANN vehicle.

Ludwig Bergmann GmbH – Maschinenfabrik
Goldenstedt

1.6 Copyright

1.7 Table of Contents

1.8 Important information about the operating instructions

Operate the vehicle only after a briefing and under observation of these operating instructions. Always observe the safety instructions when working with or on the vehicle.

1.8.1 Requirements for the operating instructions

The operating instructions conform to the requirements of the following standards and regulations:

- ISO 3600:2015-07 — Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Operator's manuals – Content and format

1.8.2 Purpose and layout of the operating instructions

These operating instructions are part of the vehicle. In addition to a detailed technical description, they provide both general and specific information about the following topics:

- Safety
- Commissioning
- Function and operation
- Using the vehicle
- Care and maintenance
- Storage and disposal
- Rectifying operating faults

Operate the vehicle only after a briefing and under observation of these operating instructions. Always observe the safety instructions when working with or on the vehicle.

Should anything still be unclear, please contact your BERGMANN dealership or BERGMANN customer service.

BERGMANN contact information can be found in chapter "Contact details & contact persons".

1.8.3 Safekeeping of the operating instructions

Always keep these operating instructions with the vehicle or in the tractor, ready for use. If the customer transfers the vehicle to a third party, the operating instructions must also be passed on to the new owner.

1.8.4 Reordering operating instructions

Should these operating instructions have become wholly or partly unusable, you can request a replacement document from BERGMANN. To do this, specify the following data of your vehicle:

- Type
- Model
- Vehicle ID No. (VIN) / series:

You can find this data on the front page of your operating instructions or directly on the identification plate of your vehicle.

BERGMANN contact information can be found in chapter “Contact details & contact persons”.

1.8.5 Scope of the operating instructions

The components and vehicle functions listed in the operating instructions may differ from the vehicle standard equipment and are available as optional features in some cases. Since these operating instructions are general, various equipment options can be listed that are not available for your vehicle. This also applies to illustrations. Images, drawings and 3D illustrations in these operating instructions do not always represent the exact vehicle type. However, the information which refers to the illustrations always corresponds to the vehicle type in this document.

Depending on your vehicle’s equipment, you may have received further documents for special vehicle components (e.g. operating instructions “Machine control”) and third-party documents from other manufacturers (e.g. the operating instructions for drive shafts). The safety instructions, operating instructions and further information given in these documents must also be observed and have priority in case of doubt or discrepancies. If you do not have these documents, you can find them on the CD at the end of these operating instructions.

1.8.6 Target audience for these operating instructions

These operating instructions are intended for all people operating the vehicle, who must fulfil the minimum personnel qualifications.

When doing this, observe the information and instructions in chapter “Safety”, section “Obligations and qualification of operators”.

1.8.7 Assessing the document

Because our products are being continually developed to meet the latest technical standards, our operating instructions are also regularly updated. We therefore must reserve the right to make changes. All information, illustrations and technical details in these operating instructions correspond to the latest state at the time of publication.
We would welcome your help as readers and users of the vehicle to make these operating instructions even more user-friendly. Please send us your suggestions for improvements by fax or e-mail.

BERGMANN contact information can be found in chapter “Contact details & contact persons”.

1.9 Using These Operating Instructions

1.9.1 Indexes and References

Table of contents / Headings

The table of contents and the headings in these operating instructions provide for quick orientation in the chapters.

Table of Figures:

The table of figures in these operating instructions makes it possible to scroll directly to the desired images using the respective name

Index of Technical Terms:

In the index of technical terms it is possible to find specific topics in the operating instructions using keywords which are listed in alphabetical order. The index of technical terms can be found at the end of these operating instructions.

Cross References:

For further information on a topic in these operating instructions or another document, a cross-reference to the relevant section can be found at the end of the section. Chapters, subchapters and sections are enclosed in quotation marks.

Example:

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

The page number of the respective chapter, subchapter or section can be found in the table of contents or in the index of technical terms.

1.9.2 Depiction of Action Instructions and Listings

Action Step:

A dot (•) in front of the sentence defines an action step which must be carried out.

Example:

- Carry out action.

Action Sequences:

Multiple dots (•) in front of the sentence define an action sequence which must be carried out.

Example:

- Carry out action 1.
- Carry out action 2.
- Carry out action 3.

Listings:

Multiple dashes (-) before each sentence define listings.

Example:

- Listings 1
- Listings 2
- Listings 3.

1.9.3 Depiction of Action-Related Warning Symbols

1.9.3.1 Design of warning symbols

SIGNAL WORDS!

Type and source of danger

Possible result(s) of the danger

- Measures to avoid the danger

1.9.3.2 Signal words and colouring

DANGER!

The signal word "Danger" identifies a hazard with a high degree of risk. Failure to avoid the hazard will result in death or serious injury.

WARNING!

This signal word identifies a hazard with a moderate degree of risk. Failure to avoid the hazard can result in death or serious injury.

CAUTION!

This signal word identifies a hazard with a low degree of risk. Failure to avoid the hazard can result in minor or moderate injury.

1.9.4 Depiction of Important Notices

NOTICE

Indicates a requirement for particular behaviour or an action, as well as tips for use and particularly useful information for proper use of the machine.
This information will help you to make optimum use of all machine functions. Failure to observe these notices can lead to machine malfunctions or damage to the environment.

1.9.5 Definition of Terms

Term	Explanation
Machine	**UNIVERSAL SPREADER** is referred to using the term machine in this document.
Danger	Danger is a condition or situation in which the possibility of a health risk exists. The danger arises from a possible injury or disease-causing spatial and/or temporal coincidence from a source of danger.
Manufacturer	Ludwig Bergmann GmbH
Adjustment elements	Adjustment elements are parts of the controller that detect operator input signals, usually made by hand or foot. There are many different adjustment elements, such as buttons, levers, switches, knobs, slide controllers, joysticks, handwheels, pedals, keyboards, and tactile screens. Adjustment elements may be located on the machine itself or, as with remote controls, at a certain distance from the machine and connected to the machine for example by cable or by radio, optical or acoustic signals.
Third persons	Third persons are all other persons other than the operator themselves.

1.9.6 Directional References

Directional references such as

- front
- rear
- left
- right
- etc.

Are always indicated in the direction of travel. (see Image 1).

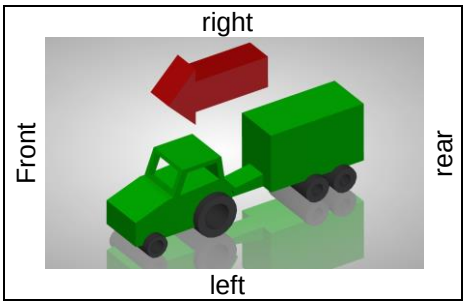


Image 1: Directional references

2 Notes for the operating company

Chapter “Notes for the operating company” provides information and instructions on the following topics:

- Product liability & information obligation
- Product handover instructions
- Warranty & liability

	**NOTE**
	Always carry out the points in chapter “Notes for the operating company” as soon as you have received the vehicle. Otherwise you cannot make any warranty claims against BERGMANN.

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 machine and the operating instructions were transferred properly, written confirmation is needed. Below you will find the forms "Product transfer instructions" and "Transfer declaration". If you did not receive these forms, copies of the forms can be found in the operating instructions for use as templates. After the transfer has been made, the forms must be completed, signed and returned to BERGMANN.

Ludwig Bergmann GmbH	+49 (0)4444 - 2008-0
	+49 (0)4444 - 2008-88
	-
Hauptstraße 64-66 49424 Goldenstedt	info@l-bergmann.de
	www.Bergmann-Goldenstedt.de

	**NOTICE**
	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.

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

2.1.1 Excerpt from the Product Liability Law

- 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.

2.1.2 Information on the Collection of Customer Data

The required customer information, which is recorded on BERGMANN forms and passed on to Ludwig Bergmann GmbH, is stored, processed and used for product monitoring by BERGMANN.

2.1.3 Product Transfer Instructions

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

Completed:	Please mark applicable boxes.

☐	Vehicle was checked against the delivery note. All safety equipment, PTO shafts and control elements are present.
☐	The operation, commissioning, instruction and maintenance of the machine were discussed with and explained to the customer based on the operating Instructions.
☐	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 checked for proper connection. Observe notices in the operating instructions!
☐	Adapted to tractor.
☐	PTO shaft shortened to proper length.
☐	Electrical system functions were checked and explained.
☐	Hydraulic connection to the tractor was made and 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

The above mentioned points were carried out correctly and documented in the form "Product transfer instructions".	
Signature of owner / authorized representative	Date
Signature of Customer service	Date

2.1.4 Transfer Declaration

1.

Machine

Model designation | Vehicle identification number (VIN):

2.

Customer / Owner

Name, First name | Owner no.

Street, house no.

Country | Post code | City/town

E-mail address (business)

Telephone (business) | Mobile (business)

3.

Record of transfer

I received the following documents during product transfer.

- ☐ The operating instructions
- ☐ The EU Declaration of Conformity

Day of transfer

Date

The machine mentioned in 1), supplied by BERGMANN under retention of title, was purchased by me with recognition of the warranty provisions and transferred completely in brand-new, operational condition. The operating, safety, commissioning and maintenance instructions for the machine were discussed with and explained to me based on the operating instructions. The "Product Transfer Instructions" form has been completed in accordance with product liability requirements.
I hereby undertake to strictly observe all instructions and information, to avoid the aforementioned sources of danger and, in the same way, I am obligated and inform all persons who work on the machine. I acknowledge that in the event of non-compliance with the operating and safety requirements, or in the event of damage due to a cause which is stated in the operating instructions, the manufacturer's liability is void.

Signature of owner / authorized representative | Date

4.

Sales partner / importer (clearing centre)

BERGMANN customer no.

Name, First name

Street, house no.

Country | Post code | City/town | Company stamp

Sales office

Name, First name

Street, house no.

Country | Post code | City/town | Company stamp

The machine mentioned in 1), supplied by BERGMANN under retention of title, was transferred to the customer with recognition of the warranty provisions and transferred completely in brand-new, operational condition. The transfer was carried out correctly and documented in the form "Product transfer instructions".

Signature of Customer service | Date

3 Vehicle description

Chapter “Vehicle description” contains information about the vehicle and comprehensive technical data about the vehicle.

Verweis: 20160627-093901-BTA (Umfang der Betriebsanleitung) / Textmarke: Umfang
The components and vehicle functions listed in the operating instructions may differ from the vehicle standard equipment and are available as optional features in some cases. Since these operating instructions are general, various equipment options can be listed that are not available for your vehicle. This also applies to illustrations. Images, drawings and 3D illustrations in these operating instructions do not always represent the exact vehicle type. However, the information which refers to the illustrations always corresponds to the vehicle type in this document.

To make yourself familiar with the vehicle, read this chapter at the vehicle if possible.

3.1 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.

3.1.1 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.

3.1.2 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 2: CE Symbol

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

3.1.3 Identification Plate - Vehicle

The following information can be found on the identification plate (Image 3):

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 3: Identification plate - vehicle

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

3.1.3.1 Position of the identification plate

The identification plate (Image 4 / Pos. 1) is located at the front right on the side member of the frame.

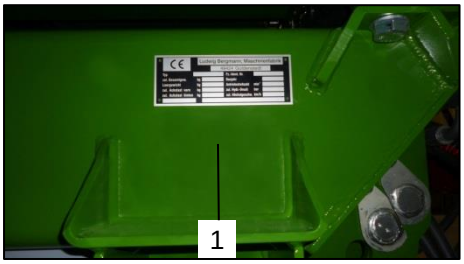


Image 4: Position of identification plate

3.1.4 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 5):

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 5: Identification plate - drawbar

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

3.2 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.

WARNING!

There is a danger of component failure if the vehicle's technical limit values are not observed.

The vehicle's technical limit values must be observed. If they are not observed,

- the vehicle can become damaged,
- accidents can result,
- people can sustain serious injuries or death.

The following limit values are especially important for safety:

- Permissible gross weight
- Maximum axle load
- Maximum payload
- Maximum nose weight
- Maximum total height
- Top speed

The limit values must be maintained. Non-observation of these values invalidates any warranty claims. If the weights are not known, the vehicle must be weighed before being taken on public roads.

These limit values must be complied with. Limit values can be found on the next page.

3.2.1 TSW 7340 S

3.2.1.1 Dimensions

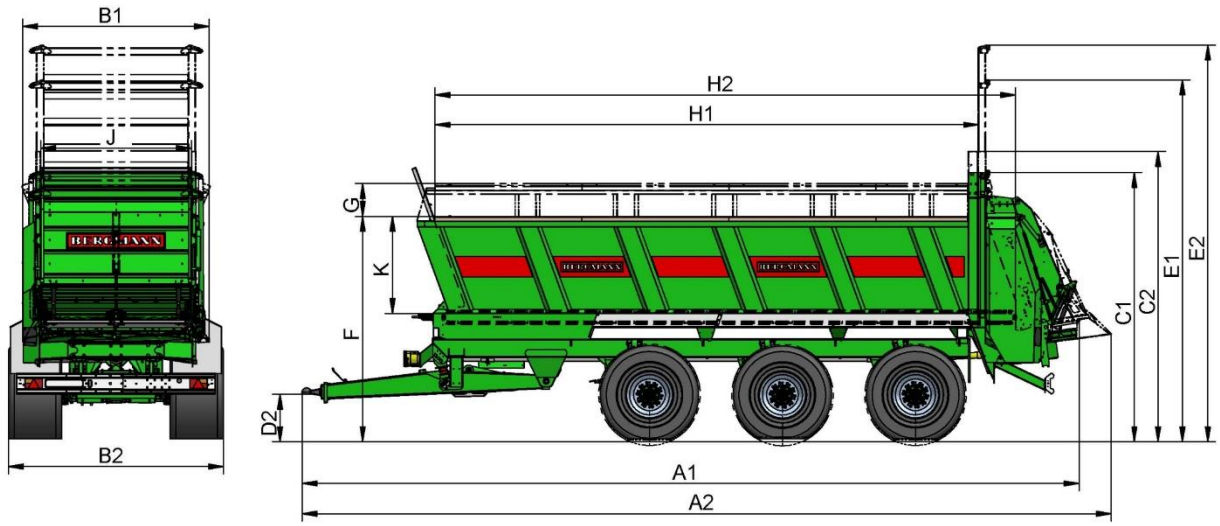


Image 6: Dimensions 13-25-0002-PLN_20190819-BTA

Model			TSW 7340 S
Vehicle dimensions			
Length (without spread pattern limiter)	A1	mm	10.580
Length (with spread pattern limiter)	A2	mm	11.020
Width (frame)	B1	mm	2.550
Width (tyres)	B2	mm	2.887
Height			
with two-beater spreader unit	C1	mm	3.665
with three-beater spreader unit	C2	mm	3.950
Height of top coupling	D1	mm	-
Height of bottom coupling	D2	mm	645
Height with extended dosing wall			
with two-beater spreader unit	E1	mm	4.925
with three-beater spreader unit	E2	mm	5.400
Transfer height (without extension)	F	mm	3.065
Extension height	G	mm	300 / 450 / 750
Bridge dimensions			
Length to dosing wall	H1	mm	7.400
Length without dosing wall	H2	mm	7.900
Width	J	mm	2.050
Height	K	mm	1.320
Cargo space design			Konisch
Spreader throughput			
with two-beater spreader unit		mm	1.500
with three-beater spreader unit		mm	1.800
Load volume (without dosing wall)			
up to side wall height (without extension)		m³	23,0
with 300mm extension wall		m³	27,6
with 450mm extension wall		m³	30,4
with 750mm extension wall		m³	35,0
Load volume (with dosing wall)			
up to side wall height (without extension)		m³	21,6
with 300mm extension wall		m³	26,2
with 450mm extension wall		m³	29,0
with 750mm extension wall		m³	33,6
Reference tyres			710/50 R 26.5 BKT

The data on the vehicle's identification plate and in the vehicle registration documents apply to your vehicle. All data is based on standard tyres. Technical data, weights and dimensions are not binding for delivery. Subject to technical changes.

3.2.1.2 Weights

Model		TSW 7340 S
Perm. gross weight		
With top coupling	kg	-
With bottom coupling	kg	33.000 - 34.000
Perm. axle load		
With top coupling	kg	-
With bottom coupling	kg	30.000
Perm. nose weight		
With top coupling	kg	-
With bottom coupling	kg	3.000 - 4.000
Unladen weight	kg	11.160
Payload		
With top coupling	kg	-
With bottom coupling	kg	21.840 - 22.840

The data on the vehicle's identification plate and in the vehicle registration documents apply to your vehicle. All data is based on standard tyres. Technical data, weights and dimensions are not binding for delivery. Subject to technical changes.

3.2.1.3 Chassis

Model		TSW 7340 S
Design		Tridem
Tyres min. / max.		See list of acceptable tyres
Wheel connection	Loch	10
Track width (offset 0)	mm	2.100
Perm. top speed	km/h	40
Brake		Two-circuit air brake system Operating pressure 7.3 bars

3.2.1.4 Supply

Model		TSW 7340 S
Max. hydraulic pressure	bar	210
Max. oil flow rate	l/min	100
Hydraulic connections		See chapter "Functions and settings" Section "Hydraulics"
Required power	KW (PS)	147-294 (200-400)
PTO speed		(clockwise looking at the free PTO stub)
Two-/ Three-beater spreader unit + TSW Without spread pattern limiter	min-1	1000
Two- / Three beater spreader unit + TSW With spread pattern limiter	min-1	600
Power supply	Volt	12 V DC
Lighting system		7-pole socket 12 V DC

3.2.1.5 Sound emission in air

Model		TSW 7340 S
Continuous sound pressure level	DB(A)	< 70

3.2.1.6 Ambient temperature

Model		TSW 7340 S
Vehicle operating temperature	°C	-5°C bis +45°C

3.3 Tyre acceptance and tyre pressure

Check the tyre pressure at least every two weeks with cold tyres. Caps must be fitted to the valves.

Tridem axle 30t – diagonal tyres

Size	Manufacturer	Type	Width	Height	EU type	Load index	40 km/h		max. km/h		
					164 A8 5,000 kg 40 km/h	(service description)	Payload	Tyre pressure	Max.	Payload	Tyre pressure
			mm	mm	bar	PL/PR	kg	bar	km/h	kg	bar
600/55 - 26.5	BKT	648	600	1,354	2.2	16 / 170A8 / 167B	6,000	2.6	50	5,450	2.6
700/50 - 26.5	BKT	648	700	1,354	1.4	16 / 174A8 / 170B	6,700	2.4	50	6,000	2.4
800/45 - 26.5	Alliance	328	800	1,393	1.6	16 / 177A8 / 167B	7,300	2.2	50	6,570	2.2
800/45 - 26.5	BKT	648	800	1,354	1.2	16 / 177A8 / 164B	7,300	2.2	50	6,500	2.2
700/50 - 30.5	Alliance	331	700	1,500	1.4	16 / 176A8 / 172B	7,100	2.2	50	6,390	2.2
800/45 - 30.5	Alliance	331	800	1,500	1.9	16 / 179A8 / 175B	7,750	2.2	50	5,450	2.2

Tridem 30t – radial tyres

Size	Manufacturer	Type	Width	Height	EU type	Load index	40 km/h		max. km/h		
					164 A8 5,000 kg 40 km/h	(service description)	Payload	Tyre pressure	Max.	Payload	Tyre pressure
			mm	mm	bar	PL/PR	kg	bar	km/h	kg	bar
600/55 R 26.5	Alliance	380	625	1,346	2.5	165E	7,740	4.0	70	5,150	4.0
600/55 R 26.5	Michelin	CARGO XBIB	626	1,348	2.4	165D	5300 / 7000	2.2 / 4.0	65	3900 / 5150	2.2 / 4.0
600/55 R 26.5	Michelin	VF-Cargo	626	1,341	2.6	170D			65	6,000	3.2
600/55 R 26.5	Mitas	Agriterra 02	625	1,335	2.4	165D	7,005	4.0	65	5,150	4.0
620/55 R 26.5	Vredestein	Flotation Pro	625	1,360	2.8	166D	7,210	4.0	65	5,300	4.0
620/60 R 26.5	Nokian	Country King	625	1,400	2.4	169D	7,900	4.0	65	5,800	4.0
650/55 R 26.5	Alliance	380	645	1,360	2.0	167E	7,900	4.0	70	5,450	4.0
650/55 R 26.5	Alliance	390	660	1,395	2.0	170D	8,160	4.0	65	6,000	4.0
650/55 R 26.5	BKT	FL 630	645	1,389	2.4	169D/180A8	8,000	4.0	65	5,800	4.0
650/55 R 26.5	Michelin	VF-Cargo	657	1,402	2.2	174D			65	6,700	3.2
650/55 R 26.5	Mitas	Agriterra 02	653	1,385	2.4	169D	7,890	4.0	65	5,800	4.0
650/60 R 26.5	Alliance	380	660	1,450	1.7	173D	8,840	4.0	65	6,500	4.0
650/65 R 26.5	Alliance	380	664	1,518	1.5	174D	9,110	4.0	65	6,700	4.0
650/65 R 26.5	Nokian	Country King	645	1,518	2.0	174D	9,150	4.0	65	6,700	4.0
710/50 R 26.5	Alliance	390	730	1,390	1.7	172D	8,570	4.0	65	6,300	4.0
710/50 R 26.5	BKT	FL 630	727	1,383	2.4	170D	8,250	4.0	65	6,000	4.0
710/50 R 26.5	BKT	FL 693 M	727	1,383	2.4	170D	8,160	4.0	65	6,000	4.0
710/50 R 26.5	Michelin	CARGO XBIB	732	1,405	1.8	170D	6180 / 8160	2.2 / 4.0	65	4550 / 6000	2.2 / 4.0
710/50 R 26.5	Michelin	VF-Cargo	729	1,380	2.1	176D			65	7,100	3.2
710/50 R 26.5	Nokian	Country King	727	1,405	2.4	170D	8,200	4.0	65	6,000	4.0
710/50 R 26.5	Vredestein	Flotation Pro	710	1,360	2.4	170D	8,160	4.0	65	6,000	4.0
710/50 R 26.5	Mitas	Agriterra 02	737	1,388	2.4	170D	8,160	4.0	65	6,000	4.0
750/45 R 26.5	Alliance	380	740	1,360	1.7	170E	8,700	4.0	70	6,000	4.0
750/45 R 26.5	BKT	FL 630 Super	754	1,349	2.4	170D	8,160	4.0	70	5,460	4.0
750/45 R 26.5	Vredestein	Flotation Trac	745	1,365	2.4	170D	8,160	4.0	70	5,460	4.0
800/45 R 26.5	BKT	FL 630 Ultra	788	1,393	2.0	174D/184A8	5220 / 9000	2.0 / 4.0	70	3540 / 6100	2.0 / 4.0
800/45 R 26.5	Michelin	CARGO XBIB	815	1,395	1.8	174D	6340 / 9110	2.2 / 4.0	65	4660 / 6700	2.2 / 4.0
800/45 R 26.5	Mitas	Agriterra 02	770/810	1,394	2.4	174D	6775 / 9110	2.4 / 4.0	65	4980 / 6700	2.4 / 4.0
800/45 R 26.5	Nokian	Country King	810	1,395	2.0	174D	9,150	4.0	65	6,700	4.0
800/45 R 26.5	Vredestein	Flotation Pro	800	1,370	2.0	174D	9,100	4.0	65	6,700	4.0
800/45 R 26.5	Vredestein	Flotation Trac	800	1,380	1.6	174D	9,110	4.0	70	6,095	4.0
500/70 R 24	BKT	Multimax MP 522	503	1,310	4.0	164 A8	5,000	4.0	40	5,000	4.0
710/50 R 30.5	Alliance	390	727	1,495	1.5	176D	9,660	4.0	65	7,100	4.0
710/50 R 30.5	BKT	RIDEMAX FL 693 M	727	1,485	2.0	173D	6015 / 8840	2.4 / 4.0	65	4420 / 6500	2.4 / 4.0
710/50 R 30.5	Michelin	CARGO XBIB	728	1,495	1.5	173D	6700 / 8840	2.2 / 4.0	65	4930 / 6500	2.2 / 4.0
710/50 R 30.5	Vredestein	Flotation Trac	730	1,485	2.0	173D	8,850	4.0	65	6,500	4.0
800/45 R 30.5	Alliance	885	790	1,495	1.5	176D	9,660	4.0	65	7,100	4.0
800/45 R 30.5	Michelin	CARGO XBIB	820	1,495	1.5	176D	6720 / 9660	2.2 / 4.0	65	4940 / 7100	2.4 / 4.0
800/45 R 30.5	Vredestein	Flotation Trac	798/810	1,510	1.6	176D	9,650	4.0	65	7,100	4.0

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

4 Safety

This chapter contains important information for the owner and the operator to ensure safe and trouble-free operation of the machine.

NOTICE

Observe all safety instructions in these operating instructions and in the supplementary documents!

Most accidents happen when the simplest safety regulations are not observed. By observing all safety instructions in these operating instructions, you will help to prevent accidents.

4.1 General safety information

4.1.1 Dangers when not observing safety instructions

Non-observation of the safety instructions can present a danger to persons, the environment and the vehicle. Even ignoring simple rules of safety can cause serious accidents. Non-observation of the safety instructions can result in the exclusion of any damage claims. By observing them, you contribute to preventing accidents.

In particular, non-observation can pose the following risks:

- Danger to persons through unsecured working areas.
- Failure of important vehicle functions.
- Failure of specified maintenance and repair methods.
- Danger to persons from mechanical parts and chemicals.
- Risk of environmental damage through leakage of hydraulic oil.

4.1.2 Obligations of the operating company

The vehicle’s operating company or its representative must do the following:

- Observe the applicable national, general health and safety, accident prevention and environmental protection regulations.
- Ensure that all persons working on and with the vehicle are familiar with the health and safety and accident prevention regulations.
- Brief the operator in the use and safe handling of the vehicle and ensure that they have read the operating instructions before using the vehicle for the first time.
- Instruct the operator on their special obligation in safely moving or driving the vehicle.
- Keep warnings on the vehicle in legible condition and replace them if damaged.
- Provide the required personal protective equipment (PPE).

4.1.3 Obligations and qualification of operators

This vehicle must be operated only by persons familiar with the handling and use of the vehicle (start-up, function and operating principle, usage, maintenance, etc.) and who have been instructed about the associated risks. The vehicle's operating company must ensure that the personnel has fully understood the contents of the operating instructions. If the personnel does not have the required knowledge, it must be trained and instructed by the operating company. A newly trained person must work on and with the vehicle only under supervision of an experienced person.

The vehicle must be operated only by persons with a valid driver's licence. In Europe, the class T driver's license is valid. The following permissible max. speeds apply:

- Age: 16 years and driver's license cat. T: max. 40 km/h.
- Age: 18 years and driver's license cat. T: max. 60 km/h.

Any work on the vehicle that requires specialist knowledge, qualified personnel and suitable equipment (e.g. lifting and support equipment) must be performed only by specialist garages. This applies to all work on the vehicle that is not described in these operating instructions or that is described as such in the operating instructions.

If any safety equipment is not in proper working condition, the operator must immediately eliminate this defect. If this does not lie within their area of responsibility, the operator must immediately notify their superior or the operating company of the defect. The defect must be remedied immediately.

4.1.4 Safety-conscious work practices

The vehicle fulfils the safety requirements according to the state of the art. Nevertheless, dangers to life and limb for the operator or others as well as a risk of damage to the vehicle itself and other material risks can occur.

To ensure safe operation, observe the following rules:

- The basic safety instructions detailed in these operating instructions, the operating and safety instructions relating to specific actions and the information regarding proper use.
- Warning symbols and safety stickers on the vehicle.
- Existing national health and safety, accident prevention, and environment protection regulations.
- Any internal work, operating and safety regulations.
- The health and safety and accident prevention regulations of the responsible employers' liability insurance associations.
- The applicable road and traffic regulations (in Germany the StVZO and StVO).

4.1.5 Safe vehicle operation

When the vehicle is running, the driver must be able to react quickly at any time. Otherwise, the vehicle can move out of control and cause serious injuries or death.

- Start the engine only from the driver's seat.
- Never leave the driver's seat while driving.
- Never enter or leave the vehicle while driving.

The vehicle must be operated by only one person from the driver's seat of the tractor when there are no people in the danger area.

Observe the notes and instructions in the operating instructions, chapter "Safety", section "Danger area".

Passengers can be seriously injured by the vehicle or fall off the vehicle and be run over. Objects flung up can hit and injure passengers.

- Never allow people to sit in or on the vehicle while driving.

4.1.6 Action in event of accidents

In the event of an accident with injuries, stop the vehicle immediately. Take all necessary first-aid measures, call medical help and contact the next available superior.

4.1.7 Personal protective equipment

When operating the vehicle, wear personal protective equipment. Missing or unsuitable protective equipment increases the likelihood of health risks and injuries. To avoid accidents, wear tight-fitting clothing. In particular, do not wear ties, scarves, rings, necklaces or bracelets, which can become caught on moving parts of the vehicle. If you have long hair, wear suitable head wear. Do not carry easily flammable objects, such as matches or lighters in your trouser pockets.

Always observe the following:

- For each use of the vehicle, specify and provide suitable protective equipment.
- Use only personal protective equipment that is in proper working condition and provides effective protection.
- Choose personal protective equipment suitable for the wearer, e.g. size.

All persons in the vehicle's operating range must wear the following personal protective equipment:

	**20160901-124801** **Wear eye protection!**

	**20160901-124901** **Wear hand protection!** • According to DIN EN 388

	**20160901-125001** **Use protective footwear!** such as safety boots with non-slip sole

	**20160901-125101** **Wear protective clothing!** Do not wear wide or loose-fitting clothing. Wide or loose-fitting clothing can catch in rotating parts. This can cause serious or fatal injuries. • Wear the protective and work clothing specified by the employers' liability insurance association.

	**20160901-125201** **Use skin protection!** If necessary, draw up a skin protection plan.

	**20160901-125301** **Wear ear protection!**

4.1.8 Unauthorised changes and conversions

Changes and conversions are permissible only after consultation with and approval by the manufacturer. Unauthorised changes and conversions void the manufacturer's liability and any warranty claims against the manufacturer for resulting damage.

Changes or conversions of the vehicle will invalidate the vehicle registration according to national and international regulations as well as the Declaration of Conformity and the CE marking.

4.1.9 Use of non-original spare parts and auxiliary materials

Original spare parts have been designed especially for your vehicle. They provide safety and ensure the proper functioning of the vehicle. Components and auxiliary materials that have not been approved by the manufacturer as well as unauthorised accessories must not be used. The use of other components, e.g. from other manufacturers, can invalidate the liability for any resulting damage. These components are not guaranteed to have the required strength or durability and provide the required safety.

4.2 Proper use

The vehicle
- is intended only for the usual use in agricultural work,
- is suitable for spreading organic fertilizers and chalk,
- must be operated only by one person from the driver's seat of the tractor (one-person operation).

Proper use also includes:
- observation of all notes and instructions in these operating instructions;
- observation of the manufacturer's operating, maintenance and repair instructions;
- exclusive use of original spare parts.

All other uses are not permitted and are therefore not regarded proper use.

In the event of damage resulting from improper use,
- the operating company has sole responsibility;
- the manufacturer does not accept liability.

4.3 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.

4.3.1 Definition of the Warning Symbols and Notice Stickers

4.3.1.1 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!

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

Cleaning instructions pressure washer use

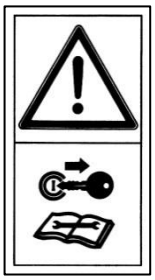
B06-0542
Be careful of moving parts! Never reach into the running machine! Do not open or remove safety equipment while motor is running!

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!

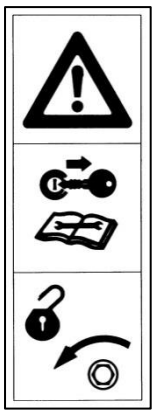
B06-0545
Riding on stepping areas or platforms is not authorized!

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.

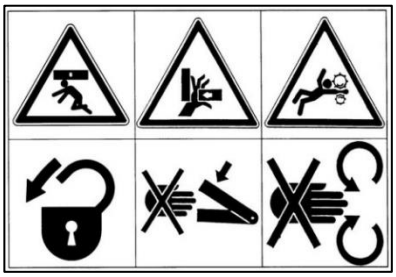


B06-0549
Switch off motor and remove ignition key before maintenance and repair work!



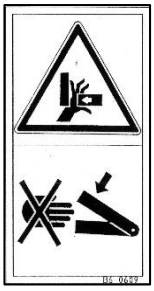
B06-0556
Switch off motor and remove ignition key before maintenance and repair work!

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!

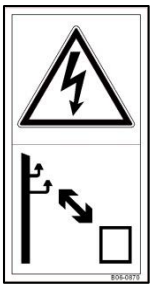
B06 0608
Do not stand in the movement range of the lift drawbar during operation.



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!

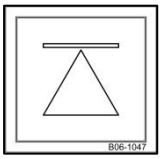


B06-0870
The height can exceed 4000 mm when Machine parts are moved out for work. Be careful of overhead lines and bridge crossings. Safety distance:

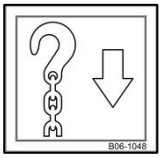
Nominal voltage	Overhead lines
Up to 1 KV	1 m
over 1 - 110 KV	3 m
over 110 - 220 KV	4 m
over 220 - 380 KV	5 m

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.

4.3.1.2 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:

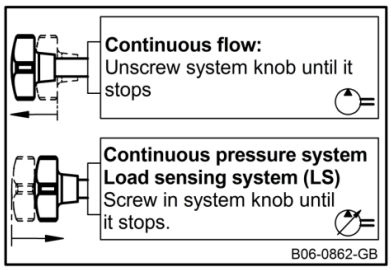
max. 1000 min-1!

(Depends on vehicle type, see ID plate)

B06-0550
Do not stand near the drive shaft. Danger of injury!

4.3.1.3 Hydraulic

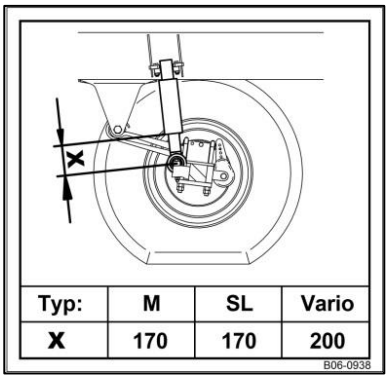
B06-0548
Be careful of high-pressure liquid leaks. Observe notice in technical handbook!



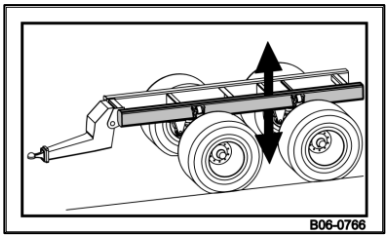
B06-0862
Constant current system:
Unscrew knob until it stops

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

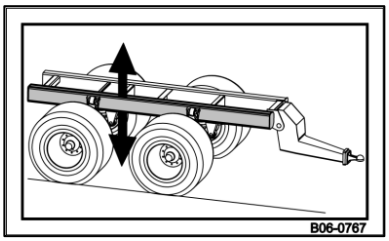
4.3.1.4 Chassis - with Hydraulic Axle Compensation



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.

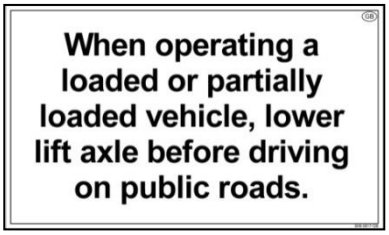


B06-0766
Raise / lower the chassis on the left.

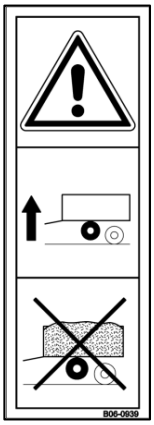


B06-0766
Raise / lower the chassis on the right.

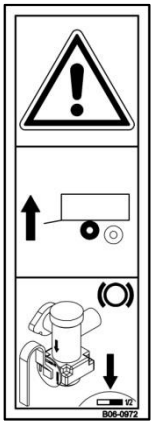
4.3.1.5 Lift axle



B06-0817
When operating a loaded or partially loaded vehicle, lower lift axle before driving on public roads.



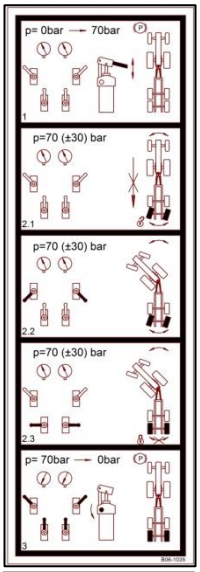
B06-0939
Lift axle only to be operated when the vehicle is completely empty.



B06-0972
With lifted lift axle set the manual control of the air brake system to "half-load".

4.3.1.6 Forced Steering

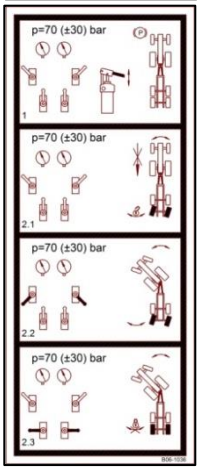
B06-0666
When coupling the hydraulic cylinder, no people are allowed or their limbs should be in the stroke range of the cylinder (risk of injury by sudden movement of piston rod)!



<u>Tandem</u>
B06-1035

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

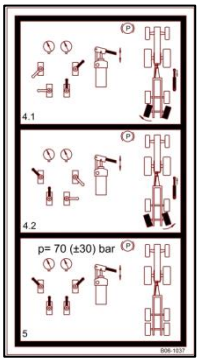
(Note instructions in the manual under „Initial Start-up and Functions / forced steering”!)



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”!)

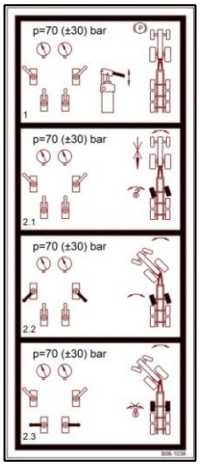


B06-1037

- 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”!)

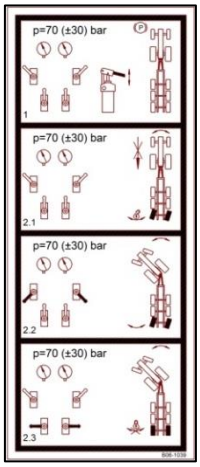
Tridem



B06-1038

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

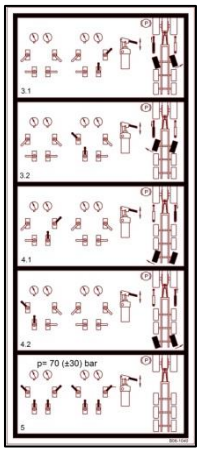
(Note instructions in the manual under „Initial Start-up and Functions / forced steering”!)



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”!)



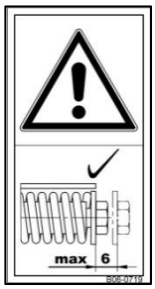
B06-1037

- 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”!)

4.3.1.7 Scraper floor

B06-0540
Check the beater drive chain tensioning system regularly and correct if necessary!
Min.: 5 mm
Max.: 12 mm



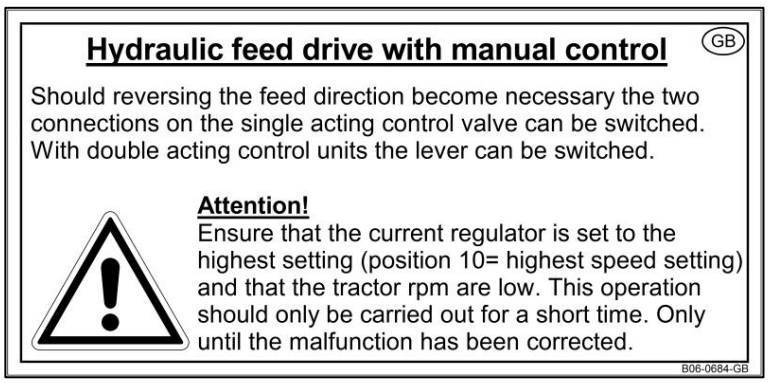
B06-0719
Check the scraper floor chain tensioning system regularly and correct if necessary!

Max.: 6 mm

B06-0845
Check the scraper floor chain tensioning system regularly and correct if necessary!

Max.: 6 mm

B06-0544
Never enter cargo area if drive is engaged and motor is running!



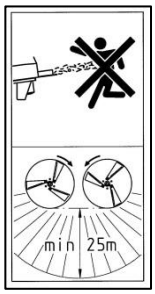
B06-0684

(Depending on vehicle design)

4.3.1.8 Vehicle Type TSW

Disk spreader

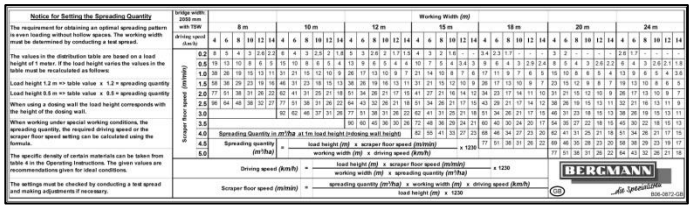
B06-0478
Check spreader disks on sheared off screws before each spreading process! Sheared off or loose screws have to be changed!



B06-0536
Danger of thrown particles!
Remove persons from the danger zone!

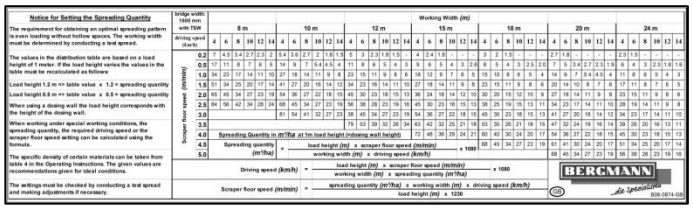
B06-0537
Check attachment of spreader blades after every use and repair if necessary!

B06-0738
Check the beater drive chain tensioning system regularly and correct if necessary!



B06-0872 Spread chart
Vehicle design: with TSW
Bridge width 2.050 mm

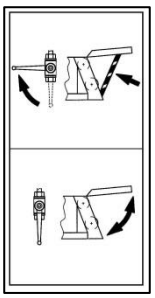
Observe notices in the operating instructions under "Application of vehicle"!



B06-0874 Spread chart
Vehicle design: with TSW
Bridge width 1.800 mm

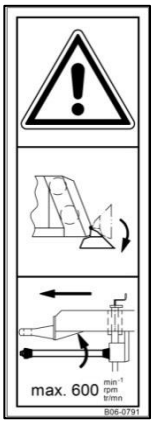
Observe notices in the operating instructions under "Application of vehicle"!

4.3.1.9 Tailgate

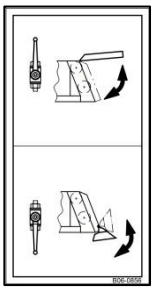


B06-0533
Secure open hood with the stop valve before standing under it!

4.3.1.10 Spread pattern limiter



B06-0791
Operation with spread pattern limiter max. 600 min [1]



B06-0856
Before using the universal spreader with the spread pattern limiter switch the hydraulic valve accordingly!

4.4 General safety and accident prevention regulations

4.4.1 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.
- The optional spread limiter must be moved to the lower most position before operation. Otherwise the lighting will be covered!
- Familiarize yourself with all equipment and operating elements as well as their functions before beginning operation. When work has begun it is too late!
- Prior to every use, make sure that no one is in the immediate area. (Especially children!) Ensure there is adequate visibility e.g. when reversing! (A ground guide may be 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 universal spreader operation, the continuous sound level is not higher than 70 dB(A). This continuous sound level was measured at a distance of 1 meter. The universal spreader was driven by an electric motor using the PTO shaft.

4.4.2 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 inclination of 10° across the slope. If this is exceeded, there is danger of tipping! Pay special attention to the risk of the vehicle tipping when it is unevenly loaded.

4.4.3 Road traffic regulations

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

- Authorization is required for driving on public roads and streets.
- 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.

4.4.4 Coupling, loading, transport

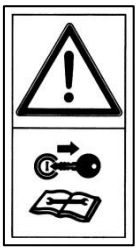
- Use only specified connections to couple the vehicle!
- Observe the allowable load of the trailer coupling on the tractor!
- Be especially careful when coupling the Universal spreader!

- 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 surface must not exceed a maximum incline of 10°. When uncoupling the parking brake must be applied and the wheel chocks are to be used properly.
- Caution tipping hazard!
  Maximum allowed angle of inclination perpendicular to the direction of travel is: 10°

4.4.5 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.

4.4.6 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.

4.4.7 Brakes and Tires

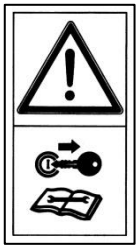
- Check the brakes prior to every use!
- A thorough brake system inspection is to be conducted on a regular basis!
- Adjustments and repairs to the brake system may only be carried out by a qualified workshop or an authorized brake service!
- When working on the tires the trailer must be safely parked 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.

4.4.8 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!

4.5 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 or jockey wheel and lock it in place prior to operation!
- When loading, ensure that the maximum weight and nose weight are not exceeded!
- 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 Tires)
- Also check that all major threaded connections are tight after the first hours of operation!
- Regularly check the drive chains and tighten if necessary (do not over-tighten!).
- 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!
- In the event of a thunderstorm, use of the vehicle must be stopped immediately.

4.6 Other Hazards

- There is a danger of being crushed when raising and lowering the jack stand /jockey wheel.
- 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.

4.7 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.

5 Functions and settings

Chapter “Functions and settings” contains information about the vehicle’s design. It describes the vehicle’s functions, handling and procedures for setting and operating the vehicle’s components and functions.

The components and vehicle functions listed in the operating instructions may differ from the vehicle standard equipment and are available as optional features in some cases. Since these operating instructions are general, various equipment options can be listed that are not available for your vehicle. This also applies to illustrations. Images, drawings and 3D illustrations in these operating instructions do not always represent the exact vehicle type. However, the information which refers to the illustrations always corresponds to the vehicle type in this document.

WARNING!

Failure to observe the safety instructions may result in serious injury or death.

- In order to prevent accidents, the operator of the vehicle must read and observe the safety instructions in the “Safety” chapter.

WARNING!

There is a danger of crushing, shearing, cutting, severing, trapping, entanglement, drawing in, catching and impact for people when reaching into or working on the vehicle.

These dangers can arise when

- the unsecured tractor and the vehicle roll away unintentionally,
- driven tools and drives are not switched off,
- hydraulic functions are unintentionally performed,
- tools or parts of the vehicle are driven,
- the tractor’s engine is unintentionally started,
- raised parts of the vehicle unintentionally lower,

These dangers exist during all work on the vehicle through unintentional contact with driven, unsecured tools and drives, which may run on after being switched off, and through raised, unsecured parts of the vehicle.

- Before any work on the vehicle, such as making adjustments or eliminating faults, the vehicle must be secured against unintentional rolling and starting.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

5.1 Vehicle functions

The cargo space of the vehicle is loaded from above, for example with a wheel loader, telescopic handler, tractor with front loader, mobile crane or similar. The cargo space has a scraper floor, which moves the spreading material to the back of the vehicle. The dosing wall makes fine spreading of free-flowing and semi-free-flowing materials possible.

Type M vehicles:

The spreader unit at the rear mills and spreads the material. On type M vehicles, it is equipped with vertical beaters.

Type TSW vehicles:

The spreader unit at the rear mills and spreads the material. On type TSW vehicles, it is equipped with horizontal beaters in combination with a disk spreader unit.

For detailed information about the vehicle elements mentioned in this section, their functions and associated handling, and instructions and notes for safe operation of the vehicle, see chapters “Functions and settings”, “Operation” and “Use”.

5.2 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 parked.
- 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 spread and loaded materials are removed from the rear cargo space.

The vehicle may never be placed on the jack stand or parking 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.

5.2.1 Hydraulic Jack Stand

5.2.1.1 Raising and Lowering the Jack Stand

The jack stand is moved hydraulically. For this proceed as described below depending on the machine equipment.

Manual control
(actuated by tractor control units)

- Connect the jack stand hydraulic line.
- Open the ball valve on the jack stand (Image: hydraulic jack stand Pos. 1) (valve lever in line with the hose).
- Extend or retract the jack stand by activating the respective control unit on the tractor.
- Close the ball valve (Pos. 1) on the jack stand after making adjustments and before driving.

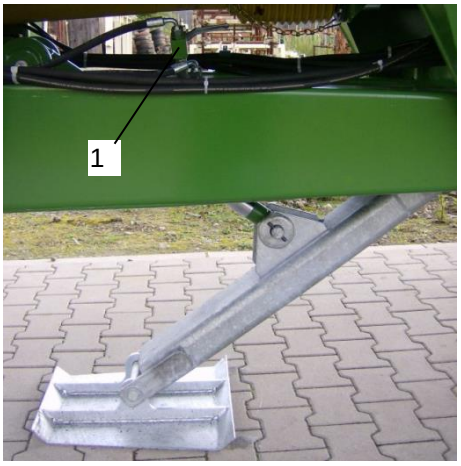


Image: Hydraulic Jack Stand

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Hydraulics".

E-control (actuated by terminal)

- Connect the pressure and return lines.
- Couple LS line (if applicable)
- Switch the terminal on.
- Open the ball valve on the jack stand (Image: hydraulic jack stand Pos. 1) (valve lever in line with the hose).
- Move the jack stand into the desired position by activating the "Jack Stand Raise/Lower" function on the terminal.
- Close the ball valve (Pos. 1) on the jack stand after making adjustments and before driving.

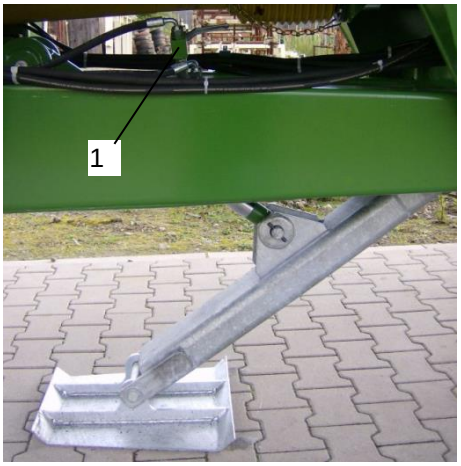


Image: Hydraulic Jack Stand

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Terminal".

5.3 Drawbar

The trailer is equipped with a height adjustable drawbar. In this way, the drawbar eye can be adjusted to the height of the tractor. The procedure for adjustment depends on the drawbar design and can be seen in the sections below.

5.3.1 Adjusting the Drawbar Eye

5.3.1.1 Mechanical Drawbar Suspension

Adapting the drawbar eye to the respective tractor is done by repositioning the upper support (Image: mechanical drawbar suspension Pos. 1) in the row of holes (Pos. 2)

This must be done as follows:

- Secure the trailer against rolling using wheel chocks and the parking brake.
- Coupling the trailer
- Support the front of the vehicle with appropriate equipment (for example, floor jack) so that the jack stand and drawbar are not under load.
- Raise the jack stand.
- Securely support the drawbar in the front area with appropriate equipment (e.g. car jack).
- To remove the retaining pin (Pos. 3), remove the screws (Pos. 4) on both sides.
- Remove the retaining pin (Pos. 3) from the row of holes (Pos. 2).
- Raise / lower the drawbar until the upper support (Pos. 1) can be mounted in the desired hole in the row of holes (Pos. 2) using the retaining pin (Pos. 3). Both cylinders must be mounted at the same height.
- Insert the retaining pin (Pos. 3) and tighten the screws (Pos. 4).
- Lower jack stand until there is no load on the support or drawbar.
- Remove the equipment used to support the drawbar (e.g. car jack).

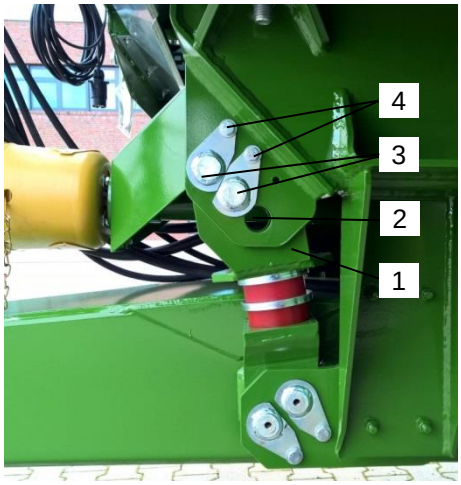


Image: Mechanical drawbar suspension

5.3.1.2 Hydraulic drawbar adjustment

Adapting the drawbar eye to the respective tractor is done by repositioning the cylinder (Image: Hydraulic drawbar adjustment Pos. 1) in the upper row of holes (Pos. 2) To further adapt the drawbar eye, the cylinder can be adjusted by moving it to the lower row of holes (Pos. 6).

This must be done as follows:

- Secure the trailer against rolling using wheel chocks and the parking brake.
- Coupling the trailer
- Support the front of the vehicle with appropriate equipment (for example, floor jack) so that the jack stand and drawbar are not under load.
- Raise the jack stand.
- Securely support the drawbar in the front area with appropriate equipment (e.g. car jack).
- To remove the pin (Pos. 3), remove the clamping pins (Pos. 4) on both sides.
- Remove the pin (Pos. 3) from the upper row of holes (Pos. 2).
- Raise / lower the drawbar until the cylinder (Pos. 1) can be mounted in the desired hole in the upper row of holes (Pos. 2) using the pin (Pos. 3). Both cylinders must be mounted at the same height.
- Install the pin (Pos. 3) and secure with clamping pins (Pos. 4).
- To adjust the cylinder (Pos. 1) to the lower row of holes (Pos. 6), remove the screws (Pos. 7) from both locking pins (Pos. 5),.
- Remove the retaining pin (Pos. 5) from the lower row of holes (Pos. 6).
- Raise / lower the drawbar until the cylinder (Pos. 1) can be mounted in the desired hole in the lower row of holes (Pos. 6) using the pin (Pos. 5). Both cylinders must be mounted at the same height.
- Insert the retaining pin (Pos. 5) and tighten the screws (Pos. 7).
- Lower jack stand until there is no load on the support or drawbar.
- Remove the equipment used to support the drawbar (e.g. car jack).

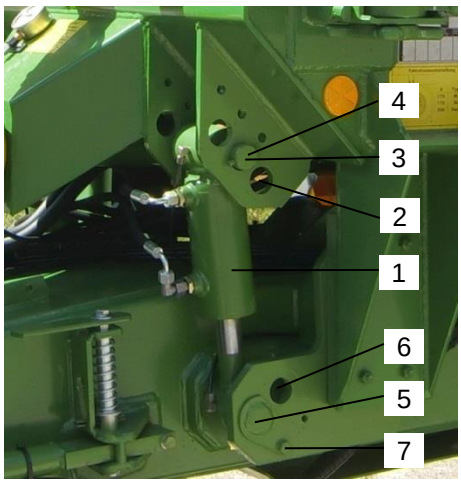


Image: Hydraulic drawbar adjustment

5.3.2 Hydraulic drawbar adjustment

For vehicles with hydraulic drawbar adjustment, the front height of the vehicle can be adjusted when coupled by adjusting the cylinder. Operation depends on vehicle configuration and can be seen in the following sections.

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

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

5.3.2.1 Raising and Lowering the Drawbar

The procedure depends on the trailer design is conducted as follows:

Manual control (actuated by tractor control units)

- Connect the axle adjustment hydraulic lines for the "raising / lowering" function.
- By operating the respective control unit on the tractor the drawbar hydraulic cylinder retracts or extends and thereby moves the vehicle to the desired height.

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Hydraulics".

5.3.3 Hydraulic Drawbar Adjustment including Hydropneumatic Drawbar Suspension

For vehicles with hydropneumatic drawbar suspension with adjustable drawbar, the front height of the vehicle can be adjusted when coupled by adjusting the cylinder. The hydraulic system is a closed system, which means that no tractor controls are needed. The drawbar's spring action is provided by the hydraulic accumulator and a generated counter-pressure.

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

Hydraulic reservoirs are under pressure (check gauge)! Depressurize the system before working on it. For this, open the hand wheel and release the pressure.

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.

5.3.3.1 Control box

A control box for controlling the drawbar is mounted to the chassis.

1	Control box
2	Pressure gauge P1
3	Pressure gauge P2
4	Ball valve (4 pcs)
5	Hand pump
6	knob
7	Hand pump lever
8	Lever seat
9	Oil filling port
10°	Cotter pin with chain

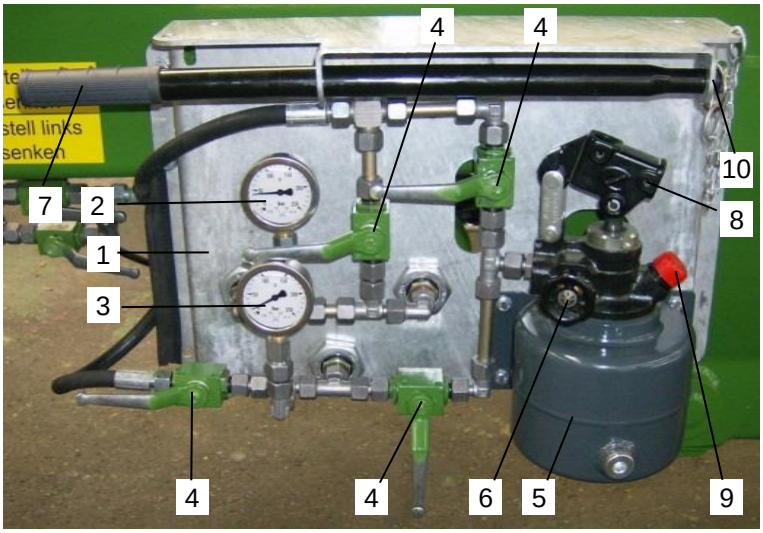
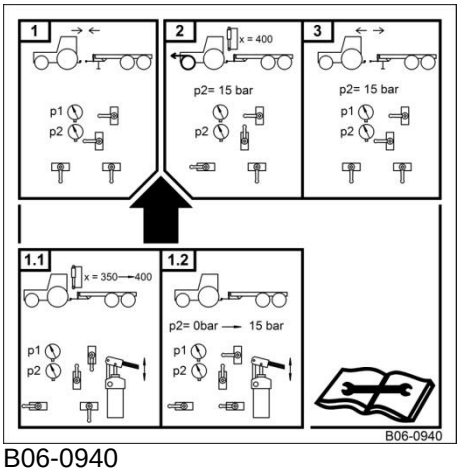


Image: Control box

The adjustment of the operating modes and adaptations made using ball valve positions. These are shown on the label on the machine. The operating instructions and notices are shown on the following pages.



B06-0940

5.3.3.2 Hand pump

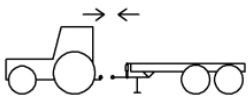
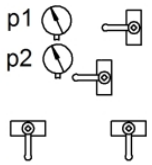
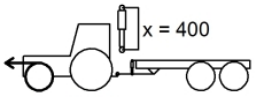
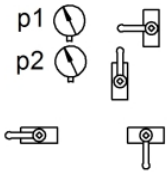
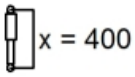
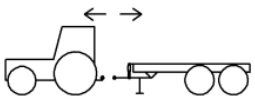
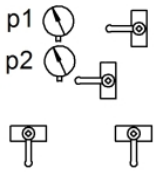
The hand pump (Image: control box Pos. 5) is equipped with a handwheel (Pos. 6). The handwheel setting must be selected as follows depending on the function:

Handwheel open	Handwheel closed
	
= Release pressure	= Increase pressure by pumping
= Retract cylinder	= Extent cylinder by pumping

Important! The instructions and notices in the operating instructions under "care and maintenance" in the "Hydropneumatic Drawbar Suspension" section are also to be observed.

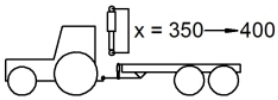
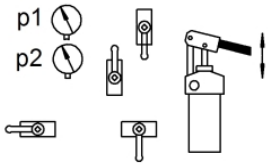
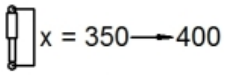
5.3.3.3 Operating status

Depending on the machine's operating status, the ball valve position must be adapted and indicate the respective set values on the drawbar suspension control box. The operating states with the ball valve positions with the respective set values are shown in the following table.

Operating status	Ball valve - position	Set value
1. Couple the Vehicle 		
2. Driving 		 p2 = 15 bar
3. Coupling the Vehicle 		p2 = 15 bar

Important! The setting is to be tested after coupling, and daily before operation and corrected if necessary. The procedure can be seen in the following sections.

5.3.3.4 Adapting drawbar height

Function:	Ball valve - position	Set value
1.1 Adapting drawbar height 		

Procedure:

- On the control box (Image: Hand pump operation Pos. 1) remove the lever (Pos. 2) from the holder (Pos.3). For this the cotter pin must be removed (Pos.4).
- Screw the lever (Pos. 2) in the hand pump lever receptacle (Pos 5).
- Set the ball valves (Pos. 7) on the control box (Pos. 1) in accordance with the table.
- To extend the cylinder the handwheel (Pos. 8) must be screwed in completely.
- Extend cylinder to the required setting by pumping the lever (Pos. 2).
- If the required cylinder setting is exceeded, the cylinder can be retracted again by opening the handwheel (Pos. 8). Then screw the handwheel (Pos. 8) in completely.
- If the required setting has been reached, unscrew the lever (Pos. 2) from the hand pump lever receptacle (Pos. 5).
- Place the lever (Pos. 2) in the holder (Pos. 3) on the control box (Pos. 4) and fix it with the cotter pin.

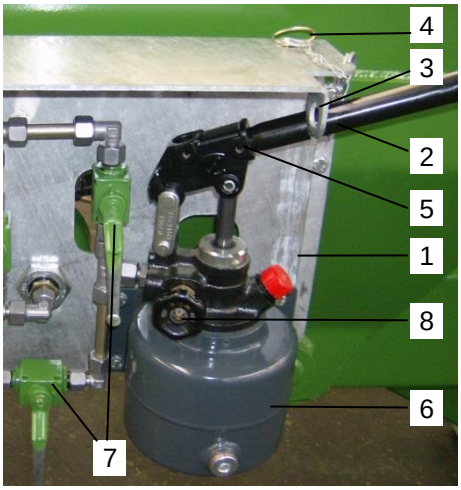
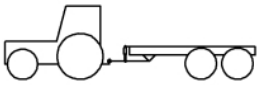
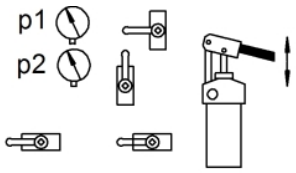


Image: Hand pump operation

5.3.3.5 Adapting counter-pressure

Function:	Ball valve - position	Set value
1.2 Adapting counter-pressure 		p2 = 0 bar → 15 bar

Procedure:

- On the control box (Image: Hand pump operation Pos. 1) remove the lever (Pos. 2) from the holder (Pos.3). For this the cotter pin must be removed (Pos.4).
- Screw the lever (Pos. 2) in the hand pump lever receptacle (Pos 5).
- Set the ball valves (Pos. 7) on the control box (Pos. 1) in accordance with the table.
- To increase the counter pressure the handwheel (Pos. 8) must be screwed in completely.
- Increase the counter-pressure to the required setting by pumping the lever (Pos. 2).
- If the required counter-pressure is exceeded, the cylinder can be retracted again by opening the handwheel (Pos. 8). Then screw the handwheel (Pos. 8) in completely.
- If the required setting has been reached, unscrew the lever (Pos. 2) from the hand pump lever receptacle (Pos. 5).
- Place the lever (Pos. 2) in the holder (Pos. 3) on the control box (Pos. 4) and fix it with the cotter pin.

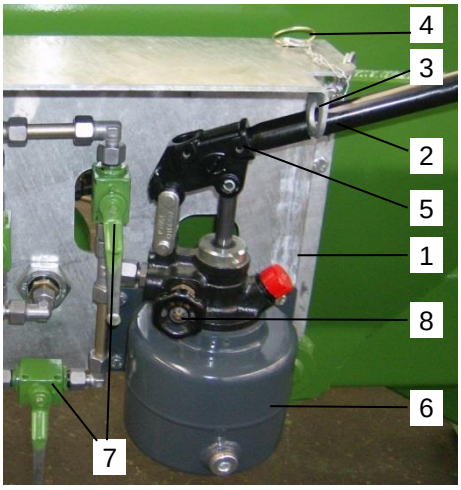


Image: Hand pump operation

5.4 Cargo space

DANGER!

Danger of drawing in or catching of the whole body on driven tools.

These dangers can cause severe and potentially fatal injuries.

If the cargo space must be entered for repairs, observe the following points:

- Never step onto the cargo space when the drive is switched on and the engine is running.
- Always switch off all drives first and the engine and pull the ignition key.
- Before performing any work 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!

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

5.4.1 Cargo space access

An access ladder is fitted to the vehicle’s body to allow operators to check the cargo space.

Observe the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Cargo space” / “Access ladder”.

The inside of the body is designed such as to minimize any rests remaining in the vehicle that must be removed by hand. The cargo space does not, therefore, have to be entered.

Should it nevertheless be necessary to enter the cargo space for repair work, use a ladder or scaffold that is secured against slipping or falling to safely enter the cargo space.

5.4.2 Access ladder

	NOTE
	Before driving, • and the ladder must be raised and secured.

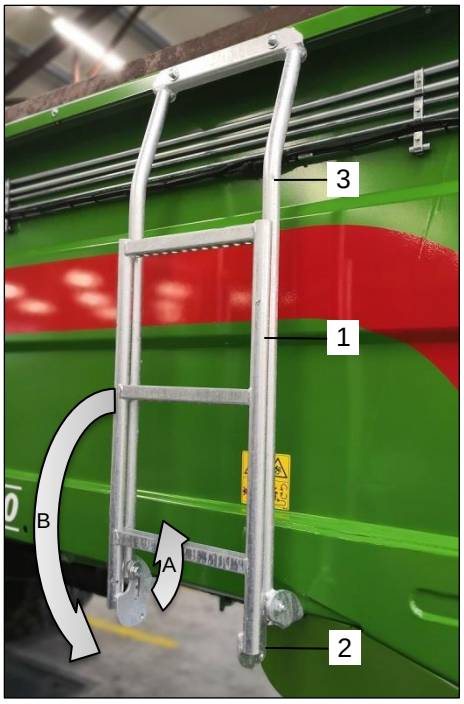


Image 7: Access ladder

Lowering the access ladder:

Lower the access ladder (Image 7 / pos. 1) as follows:

- A: With both hands, lift the lower section of the access ladder (Image 7 / pos. 1) and, while keeping it raised, guide it along the slots at the pivot point (Image 7 / pos. 2) up to the end of the slots.
- B: With both hands, lower the lower section of the ladder (Image 7 / pos. 1) all the way until it rests fully on the lower bracket on both sides.

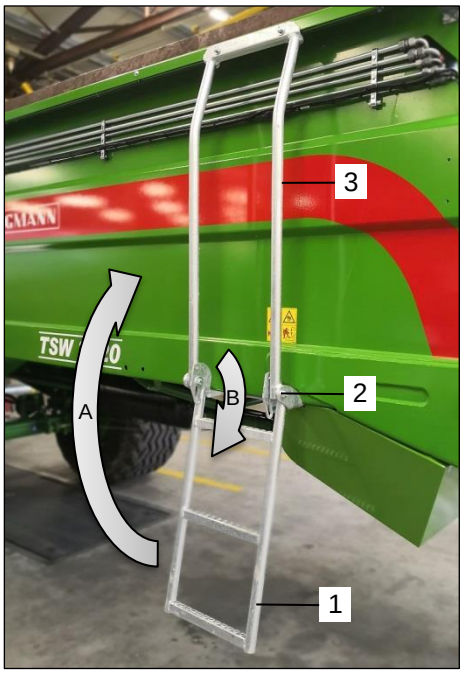


Image 8: Access ladder

Raising the access ladder:

Return the access ladder (Image 8 / pos. 1) to its raised position as follows:

- A: With both hands, raise the lower section of the ladder (Image 8 / pos. 1) all the way and, while keeping it raised, guide it along the slots at the pivot point (Image 7 / pos. 2) up to the end of the slots.
- B: The lower section of the access ladder (Image 8 / pos. 1) must now rest firmly against the fixed top section of the access ladder (Image 8 / pos. 3) and be at the end of the slots at the pivot point (Image 8 / pos. 2). Only then is the ladder secured against falling down again.

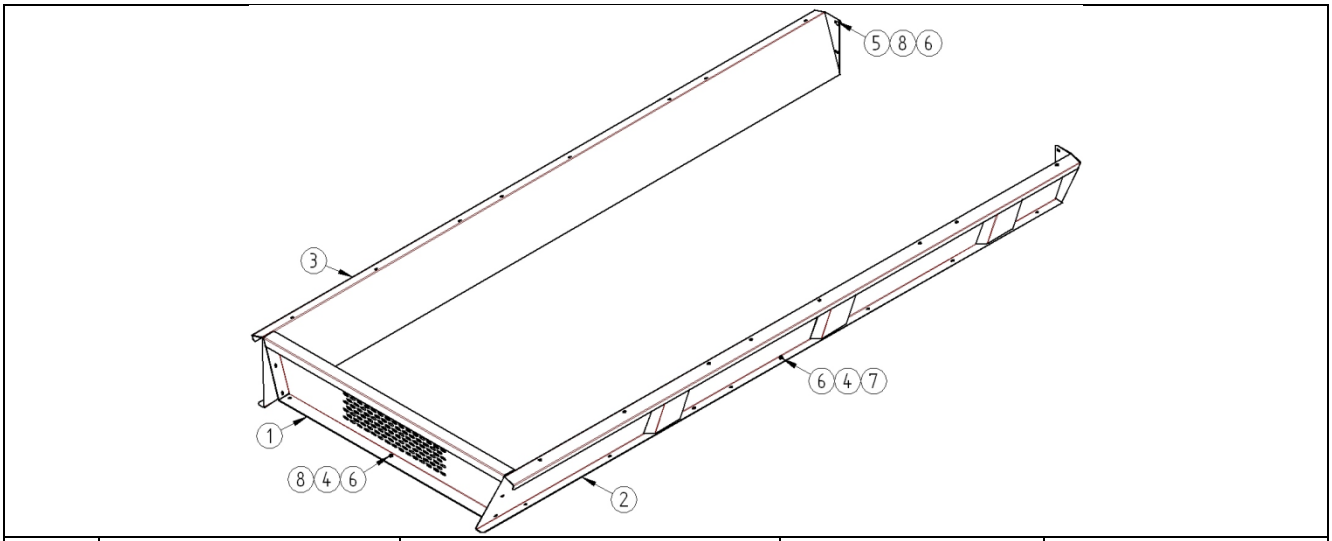
5.4.3 Extension Walls (optional)

If desired, the side walls can be extended to different heights using different attachment, depending on the vehicle type:

- 300 mm (straight)
- 450 mm (inclined)
- 750 mm (300 mm straight+ 450 mm inclined)

Image: Extension Walls 450mm (inclined)

When using extensions ensure that the vehicle maximum total weight is not exceeded.



Pos.	Description	Drawing no. No.	Raw dimensions	Standard
1	Front wall	(Depending on veh. type)		
2	Sidewall L. compl.	(Depending on veh. type)		
3	Sidewall R. compl.	(Depending on veh. type)		
4	Hexagon bolt	N102.007	M12x25-8.8	ISO 4017
5	Flat Head Screw	N103.040	M12x30-8.8	ISO 8677
6	Washer	N130.006	13x24x2.5 100HV	ISO 7091
7	Lock washer	N132.004	A12	DIN 128
8	Lock nut	N147.004	M12-8	ISO 7042

To assemble wall extensions with a height of 250 mm 300 mm or 450 mm proceed as follows:

1. Remove the plastic scraper rails from the side walls as well as the protective screen from the front wall.
2. Place the front wall extension (Pos. 1) on the existing front wall so that the folded U-profile faces up and the closed, smooth side faces the inside of the vehicle.
3. For mounting to the existing front wall of the spreader use hexagonal bolts M12x25-8.8 (Pos. 4), washers 13x24x2.5 (Pos. 6) and lock nuts. and M12-8 (Pos. 8).
4. Place the side wall extension (Pos. 2 or 3) on the side walls so that the folded U-profile faces up and the closed, smooth side faces the inside of the vehicle. When mounting the inclined extensions, the extensions must be inclined towards the outside.
5. For mounting to the existing side walls of the spreader and the already mounted front wall extension, use hexagonal bolts M12x25-8.8 (Pos. 4), washers 13x24x2.5 (Pos. 6) lock nuts and M12-8 (Pos. 8).
6. The rear connector plate on the side wall extensions must be connected to the guide frame of the dosing wall. For this purpose use flat-head screws M12x30-8.8 (Pos. 5), washers 13x24x2.5 (Pos. 6) lock nuts and M12x-8 (Pos. 8).
7. If both sides are to be extended, the other extension (Pos. 2 or 3) must be mounted in the same way as the previously mounted side wall extension (mounting instructions, points 4 to 6)
8. The scraper rails must be mounted on top of the mounted side wall extensions. For this use hexagonal bolts M12x85-8.8 with washers 3x13x4, and washers 2.8 x13, 5x24 with M12-8 lock nuts (not shown).

If only one side is mounted, an additional reinforcement must be mounted to the front wall to provide for stability in the front (not shown).

To assemble wall extensions with a height of 250 mm, 300 mm or 750 mm proceed as follows:

First, the straight extensions with a height of 300mm are mounted to the side wall (previous assembly instructions, points 1 - 7). Then the assembly of the inclined side walls with a height of 450mm follows (previous assembly instructions Item 2 - 7). The extensions must also be equipped with the separately supplied scrapers (previous assembly instructions Pos. 8).

5.5 Scraper Floor

5.5.1 Scraper Floor Chain

The scraper floor consists of four chain strands with transport bars made of U-steel bolted between them. This design ensures the load is transported safely to the spreader unit.

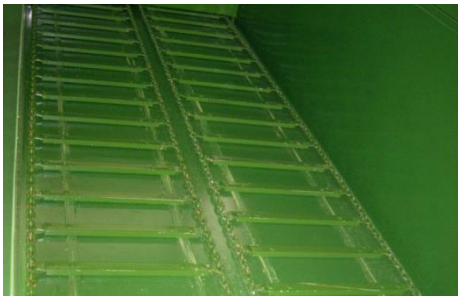


Image: Scraper Floor

5.5.2 Scraper Floor Chain Tensioning System

The scraper floor chains are tensioned from the front side of the vehicle. Each chain is kept taut by a strong compression spring. If a foreign object gets between the chain and the sprocket, the sprocket can retract by 5 to max 12 mm.

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

5.5.3 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.

Important! The speed adjustment of the scraper floor is shown in the following chapters.

Image: Scraper Floor Drive

5.5.3.1 Scraper floor drive, 2 stage

Depending on the vehicle type, the scraper floor can be equipped with a 2 stage drive. The speed of the scraper floor can be substantially increased for emptying purposes. This feature is only available in conjunction with the comfort controls. All scraper floor functions can be operated from the terminal in the tractor.

Important! The scraper floor speed adjustment can be found in the following sections. The instructions and notices under "care and maintenance" found in the "Scraper floor" section are also to be observed.

5.5.4 Scraper Floor Stop (Option)

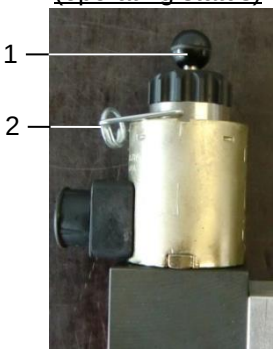
The vehicle is optionally available with a scraper floor stop. During operation, the rotation of the beaters as well as the rotation of the spreader disks (If applicable) are monitored. If the rotational speed drops below the limit (rpm loss from tractor or overload clutch engages), the scraper floor is stopped immediately.

To start the unit, the power cable and plug must be connected with the tractor's power supply (12 V DC). If the power supply is in order and the minimum rpm limit is exceeded, the scraper floor will start to run. If the power supply is not intact or the rpms go below the minimum limit, the scraper floor will stop immediately or will not start at all. It is always possible to reverse the scraper floor.

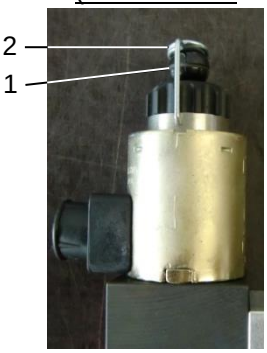
The hydraulic valve can be closed during maintenance and repair work using the proper equipment. For this, the ball (Pos. 1) on the valve is pushed down and fixed with the bracket (Pos. 2) and the valve is closed.

After work is completed it is imperative that the lock is removed. Otherwise there is danger of breakage!

Valve open (operating status)



Valve closed (maintenance



5.5.5 Hydraulic feed drive with manual control

For hydraulic feed drive with manual control all functions are controlled by way of the control unit in the tractor. The scraper floor speed is controlled by an adjustable volume control valve (standard) in the tractor, or by means of a current regulator with hand wheel (option).

5.5.5.1 Options for Coupling to the Tractor

To operate the following connections are required:

- 1 single action control valve

and

- 1 free return into the oil reservoir

or

- 1 double action control valve (see illustration)

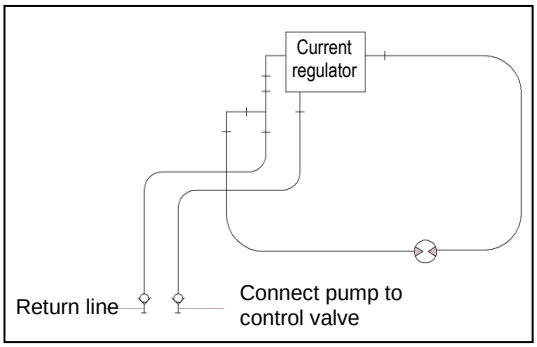


Image: Coupling to the Tractor

Important! For this purpose, the generally applicable information in the operating instructions (including safety tips, hydraulic system, etc.) must be observed.

5.5.5.2 Installation of the Flow Regulator with Knob

It is forbidden to mount the flow regulator in the tractor cab. Mounting hydraulic lines in the tractor cab is not allowed.

The flow regulator is mounted at the front end of the hydraulic arm on the drawbar as shown in the picture. Alternative mounting (such as the included mounting console) is possible, but is only allowed outside the tractor cab in the vicinity of the hydraulic couplings on the tractor.

Image: Flow regulator on the hydraulic arm

5.5.5.3 Operation of the Hydraulic Feed Drive During Manual Control

With the knob (Pos. 1 / Image: Flow regulator knob) the speed can be set from 0 - 10. Position 10 means max. speed.

The reversal of the scraper floor is made possible through the use of a double action control unit, or by switching the connector when using a single-acting control unit with free return.

Ensure that the flow regulator is set to the highest setting (position 10= highest speed setting) and that the tractor rpms are low. This operation should only be carried out for a short time, only until the malfunction has been corrected.

Image: Flow regulator knob

5.5.6 Feed drive with E control light

If desired, the vehicles with E control light can be equipped with an electromagnetic scraper floor adjustment.

Important! The vehicle controls are described in section "Function and Operation“ under "Terminal“.

5.5.7 Feed drive with E control

On request, vehicles equipped with E control can be equipped with various machine controls, such as the pilot box, the comfort controls, or the ISOBUS terminal. For this the vehicle runs with a hydraulic circuit.

Important! The operation of the individual vehicle controls is described in section "Function and Operation“ under "Terminal“.

5.6 Dosing Wall

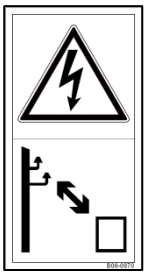
The dosing wall height can be adjusted by way of two hydraulic cylinders. This can be carried out directly from the control unit in the tractor or an electrical control unit (option).

When spreading free-flowing or semi-free-flowing materials the dosing wall height adjustment is used in conjunction with the scraper floor speed to control the quantity of material being spread. The dosing wall should always be completely open when spreading solid materials (e.g. manure).

There cannot be any space between the dosing wall and the load, otherwise foreign objects can be thrown forward. The dosing wall must be set to the respective height.
Lower the dosing wall completely when driving on roads.

A dosing wall height indicator, which shows the current dosing wall height, is located on the front wall of the universal spreader.

Image: Dosing Wall



B06-0870
The height can exceed 4000 mm when dosing wall is extended. Be careful of overhead lines and bridge crossings.


Image: Dosing wall height indicator

5.6.1 Installation of the Dosing Wall Extension

Mounting sequence:

- Raise the dosing wall approximately 150mm and brace it with a support frame or a large block of wood.
- Remove the upper bolt on the dosing wall cylinder and retract the hydraulic cylinders.
- Put on the lateral guides on the flange positions, align the guide frame and tighten the screws on the flange slightly.
- Bolt on cross-connection and tighten all bolts on the dosing wall extension using a torque wrench.
- Raise the dosing wall so that the bolts can be reinstalled.
- Install bolts
- Raise dosing wall and remove supports.

Image: Dosing wall extension

5.7 Spreader Unit

5.7.1 Disk spreader unit S XVIII

- two spreader disks (each 1.000 mm diameter, 8mm thick)
- four or six (depending on vehicle type) adjustable spreader blades per disk (8 mm thick)
- 2-speed main gearbox 1 ¾ in the disk spreader
- Spreaer disks indivdually protected
- Wear plate
- Spreader disk gearbox with it 50 mm hub
- Machines with bridge width 2,05m
- only in conjunction with two beater spreader unit SL (1,50m) or tree beater spreader unit ST (1,80m)

5.7.2 Two-beater spreader unit SL

- two horizontal beaters
- 1.500 mm Spreader unit throughput
- hydraulically operated milling unit hood with foreign object guard at base and plastic inner lining in hood
- beaters with bolted double steel tines
- beaters are driven by two drive chains (Series)
- optional with cardan drive (three gearboxes).
- drive speed: 1.000min-1 (without spread pattern limiter)
- Machines with bridge width 2,05m
- only in conjunction with Tellerstreuwerk S XVIII

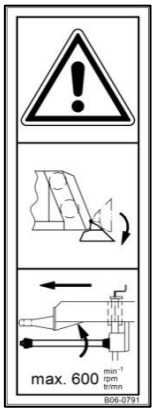
5.7.3 Three-beater spreader unit ST

- three two horizontal beaters
- 1.800 mm Spreader unit throughput
- hydraulically operated milling unit hood with foreign object guard at base and plastic inner lining in hood
- beaters with bolted double steel tines
- beaters are driven by two drive chains (Series)
- optional with cardan drive (three gearboxes).
- drive speed: 1.000min-1 (without spread pattern limiter)
- Machines with bridge width 2,05m
- only in conjunction with Tellerstreuwerk S XVIII

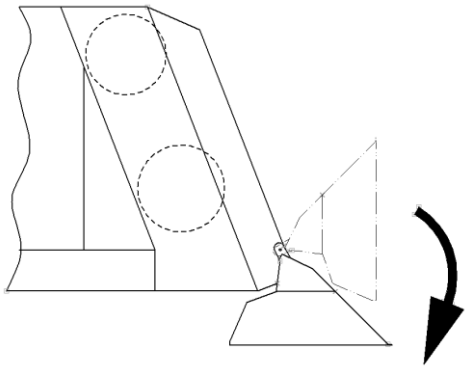
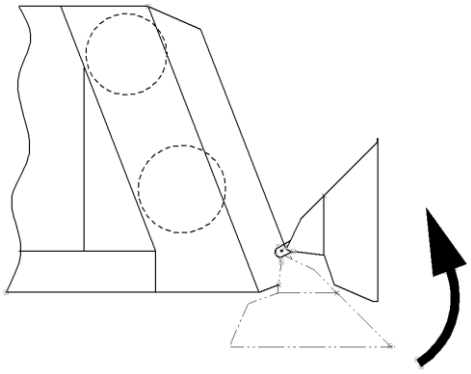
5.8 Spread pattern limiter

If the vehicle is equipped with a disk spreader unit, it can also optionally be equipped with a spread pattern limiter. With the spread pattern limiter, defined material spreading limits are possible. The spread pattern limiter is pivoted over the disk spreader unit.

	NOTE
	The spread pattern limiter is an agricultural implement. • Observe the “Data sheet for implements” and the national regulations in your country. • If the spread pattern limiter is not used for a longer period, remove it from the vehicle.

	**B06-0791** **Danger of damage to the vehicle through incorrectly set drive speed!** An incorrectly set drive speed can cause increased wear of components and serious damage to the vehicle. The speed of the drive shaft during operation with spread pattern limiter is: • Max. 600 rpm

5.8.1 Spread pattern limiter positions

Spread pattern limiter lowered (= driving position)	Spread pattern limiter raised
 Image 9: Spread pattern limiter lowered	 Image 10: Spread pattern limiter raised
Application This position prevents contamination or soiling of roads, paths, waterways etc. It allows exact, even spreading to the edge of the field.	Application This position allows spreading over a larger surface with a high spreading width.

	NOTE
	Before driving on public roads, the spread pattern limiter must be moved to its driving position (spread pattern limiter lowered), as it may otherwise obscure the vehicle lighting with some vehicle types and equipment.

5.8.2 Raising / lowering the spread pattern limiter

	WARNING!
	There is a danger of crushing fingers and hands when raising or lowering the spread pattern limiter! • When raising and lowering the spread pattern limiter, make sure that there are no people in the danger area. • Do not reach between the movable components!

	WARNING!
	Danger of drawing in or catching of the whole body on driven tools! This can cause severe and potentially fatal injuries. • Keep sufficient distance from rotating vehicle parts.

Operation depends on vehicle configuration and the hydraulic system. The procedure for raising and lowering the spread pattern limiter is described in the following sections.

Manual control (operation through tractor control units)

The spread pattern limiter is raised and lowered hydraulically from the tractor's control unit. Do this as follows:

- Couple the hydraulic supply lines for the "Raise/lower spread pattern limiter" functions to the corresponding control units of the tractor.

Observe the notes and instructions in the operating instructions, chapter "Functions and settings", section "Hydraulics" and "Coupling the hydraulic supply lines".

- Raise and lower the spread pattern limiter by operating the corresponding control unit on the tractor. The control unit must be operated until the desired position has been reached.
- Before driving on public roads, move the spread pattern limiter into its lowered position "Spread pattern limiter lowered".

E-control (operation using terminal)

The spread pattern limiter is raised and lowered hydraulically from the terminal. Do this as follows:

- Couple the hydraulic supply lines of the control block according to the respective supply system to the corresponding tractor connections.

Observe the notes and instructions in the operating instructions, chapter "Functions and settings", section "Hydraulics" and "Coupling the hydraulic supply lines".

- Operate the "Raise spread pattern limiter" or "Lower spread pattern limiter" function on the terminal to move the spread pattern limiter into the desired position.

Observe also the notes and instructions in the operating instructions, chapter "Operation".

- Before driving on public roads, move the spread pattern limiter into its lowered position "Spread pattern limiter lowered".

5.9 Lubrication

CAUTION!

Danger through escaping lubricants.

There is a risk of slipping and injury.

- During installation, operation, maintenance and repairs, watch out for escaping lubricant.
- Immediately seal any leaks.
- Avoid skin contact with oils, grease, cleaning agents and solvents.
- On injuries or burns through oils, cleaning agents or solvents immediately call a doctor.

CAUTION!

Lubricants can pollute waterways and the ground.

- Use and dispose of lubricants properly.
- Observe the regional laws and regulations on disposal.

5.9.1 Roller chain lubrication system (spreader unit)

An automatic roller chain lubrication system (Image 11 / pos. 1) is optionally available.

Observe also the notes and instructions in the manufacturer's operating instructions for the supplied lubrication system.

Image 11: Lubrication system

WARNING!

Danger through system pressure / hydraulic pressure.

Lubrication systems are under high pressure during operation.

- Before starting installation, maintenance or repair work and before making modifications or repairs on the vehicle, lubrication systems must be depressurized.

NOTE

The lubrication system works automatically. A visual check of the lubricant flow in the lubrication lines should nevertheless be performed regularly.

- Check all lubrication points for sufficient grease supply every day!
- Top up grease at the lubricating nipples of the drive shafts and other lubrication points on rotating components according to the lubrication schedule.

5.9.1.1 Lubrication pump

The lubrication pump (Image 12 / pos. 1) pumps the lubricant from the lubricant reservoir (Image 12 / pos. 2) to the downstream lubrication points or manifolds at a defined flow rate.

The lubricant reservoir (Image 12 / pos. 2) is made of transparent plastic and has fill level marks that allow a visual fill level check.

Image 12: Lubrication pump

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

5.9.1.2 Lubrication points

The lubricating oil is applied by a lubricating brush (Image 13 / pos. 2). The following lubrication points are supplied with lubricating oil:

- Roller chains of the spreader unit drive (Image 13 / pos. 1)

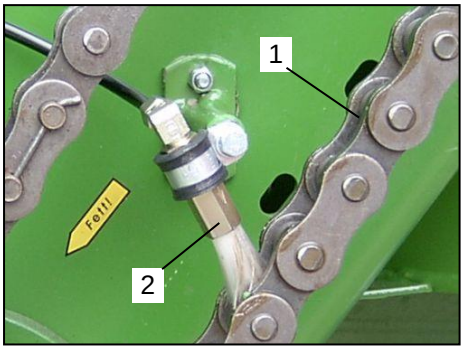


Image 13: Spreader unit drive

To ensure that the lubricating oil is correctly applied to the roller chains (Image 13 / pos. 1), the lubricating brushes (Image 13 / pos. 2) must be mounted in the correct position. They should touch the roller chains (Image 13 / pos. 1) lightly. If the lubricating brushes (Image 13 / pos. 2) rub too hard, they will wear quickly. Replace severely worn lubricating brushes (Image 13 / pos. 2) immediately.

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

5.9.2 Central lubrication system

An automatic central lubrication system (Image 14 / pos. 1) is optionally available. This automatically supplies all fixed lubrication points as well as the roller chains (if fitted) with grease during operation.

Observe also the notes and instructions in the manufacturer's operating instructions for the supplied lubrication system.

Image 14: Lubrication system

WARNING!

Danger through system pressure / hydraulic pressure.

Lubrication systems are under high pressure during operation.

- Before starting installation, maintenance or repair work and before making modifications or repairs on the vehicle, lubrication systems must be depressurized.

NOTE

The lubrication system works automatically. A visual check of the lubricant flow in the lubrication lines should nevertheless be performed regularly.

- Check all lubrication points for sufficient grease supply every day!
- Top up grease at the lubricating nipples of the drive shafts and other lubrication points on rotating components according to the lubrication schedule.

5.9.2.1 Lubrication pump

The lubrication pump (Image 15 + Image 16 / pos. 1) pumps the lubricant from the lubricant reservoir (Image 15 + Image 16 / pos. 2) to the downstream lubrication points or manifolds at a defined flow rate.

The lubricant reservoir (Image 15 + Image 16 / pos. 2) is made of transparent plastic and has fill level marks that allow a visual fill level check.

During operation, the stirrer blades in the lubricant reservoir (Image 15 + Image 16 / pos. 2) must rotate.

Pump without controller	Pump with controller

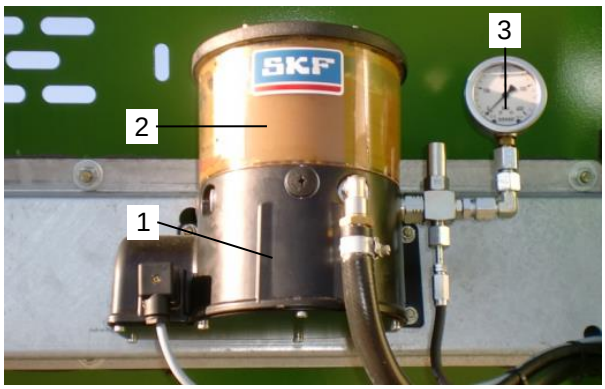
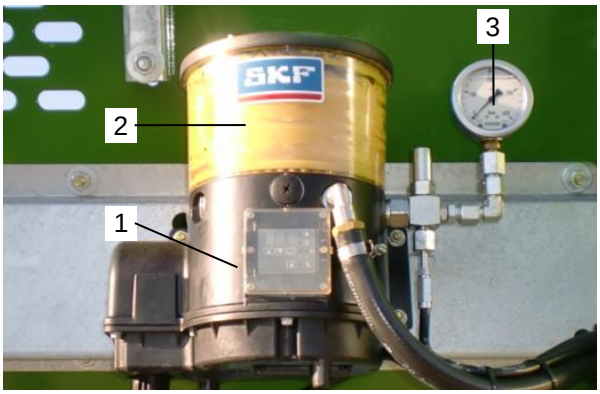

	

Image 15: Pump without controller	Image 16: Pump with controller

The operating pressure is indicated on the pressure gauge (Image 15 + Image 16 / pos. 3).

Operating pressure when pump is running:	10 – 280 bars
Pressure less than 10 bars:	• Fill the pump. • Vent the pump.
Pressure over 280 bars:	• Eliminate system blockage.

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

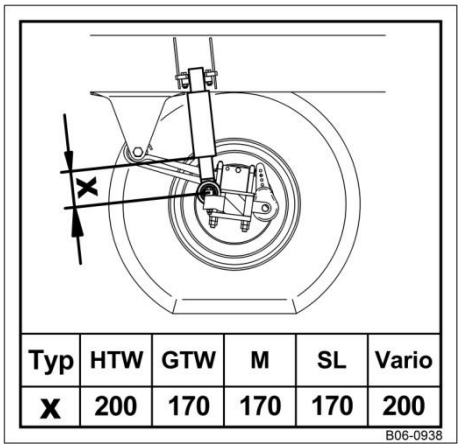
5.10 Chassis (Hydraulic Axle Balance)

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.

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)

5.10.1 Chassis Hydraulics Ball Valves

Position of the ball valves:

The ball valves for opening and closing the chassis hydraulics are located on the right hand chassis beam.

Assignment of ball valves

- Pos. 1: Ball valve for left side of trailer
- Pos. 2: Ball valve for right side of trailer

Adjusting the ball valves

- Ball valve closed:
  - Lever is not aligned with the hose.
    (as shown in the illustration on the right)
- Ball valve open:
  - Lever is aligned with the hose.

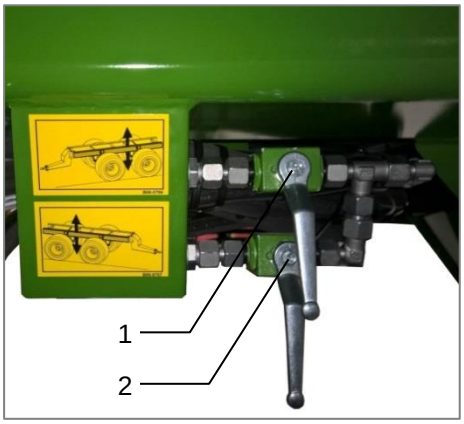


Image: Chassis ball valves

5.10.2 Setting

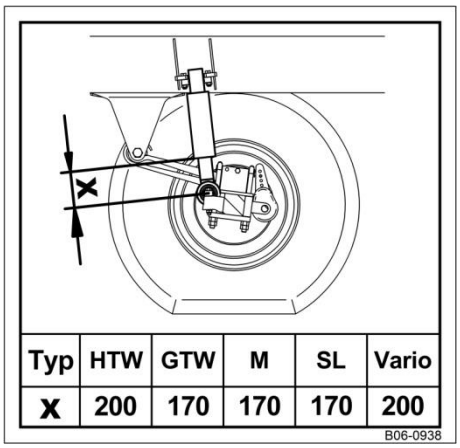
The setting of the clearance may not be done directly on the chassis using the ball valves! Danger of injury!
The vehicle must be the same height on both the left and right sides of the chassis!

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!

5.10.2.1 Manual control (actuated by tractor control units)

Procedure for "raising chassis":

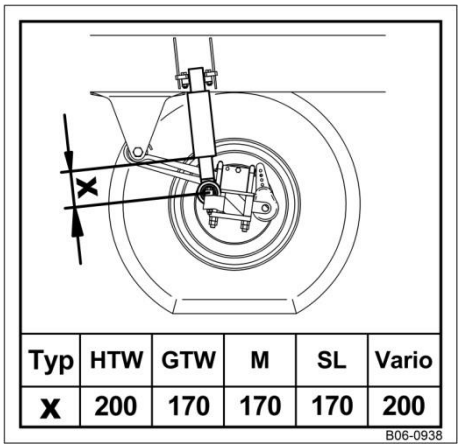
- Align completely empty vehicle on a flat, paved surface.
- Couple the free return hydraulic hose to the tractor.
- Couple the clearance hydraulic hose to the tractor.
- Place operating valve on tractor in the neutral position.
- Open both ball valves carefully.
- Pressurize the hydraulic line.
- Use 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.
- Open both ball valves carefully.
- 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.



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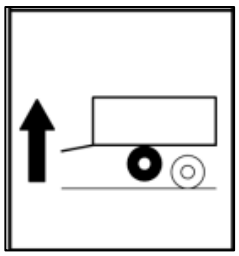
5.11 Lift axle

Depending on equipment version, the machine can be equipped with a hydraulically operated lift axle.

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

Before travelling on public roads or streets with a loaded or partially loaded vehicle the lift axle is to be lowered! When driving on slopes and under other unsafe driving conditions, the lift axle is also to be lowered!



The lift axle can only be raised when the trailer is completely empty .

Completely raising of the lift axle is not permitted if the trailer is partially loaded, since there is risk of breakage!

It is possible to relieve the first axis when in a field by briefly pressing the lift axle when the trailer is loaded or partially loaded. This increases the nose weight on the drawbar and the tractor traction is improved.

When the lift axle is lowered the first axle is lowered and assumes its part of the total weight again.

On machines with steering axles:

The steering axle must be locked prior to activating the lift axle, otherwise it is not possible to lift the axle. If the steering axle is operated when the lift axle is raised, the lift axle lowers automatically.

Setting the manual control on the air brake system:

When the axle is raised, the air brake manual controller must be set to half load, as can be seen in the picture.

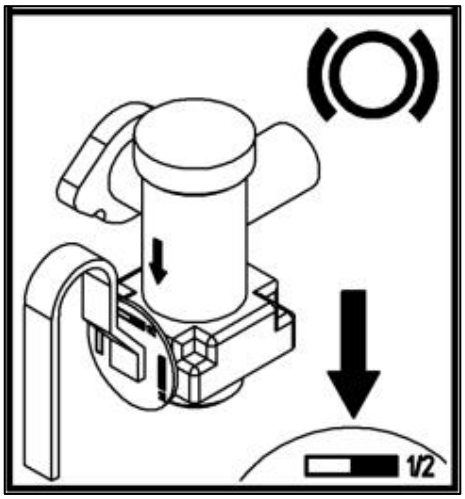


Image: Manual controller

5.11.1 Raising and Lowering the Lift Axle

The procedure depends on the trailer design is conducted as follows:

Manual control (actuated by tractor control units)

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

- Connect the lift axle hydraulic lines for the "raising / lowering" function.
- The tank line "T" must be connected to the free return line on the tractor (if this is not done, there is danger of breakage).
- The oil flow rate of the control unit should be set to max. 20 l/min.
- Partially or completely raise or lower the lift axle by activating the respective control unit on the tractor.

  Partially raise lift axle:
  The tractor control unit only has to be pressed briefly, so that the axle is not fully raised, but only relieved.

  Raise lift axle:
  When raising the lift axle, the tractor control unit must be operated until the lift axle hydraulic cylinders are fully retracted.

  Lower lift axle:
  The tractor control unit only needs to be activated briefly when lowering the lift axle. The lift axle is then lowered to the ground automatically.

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Hydraulics".

E-control (actuated by terminal)

- Connect the pressure and return lines.
- Couple LS line (if applicable)
- Switch the terminal on.
- Raise or lower the lift axle by activating the "Raise / lower lift axle" function on the terminal.

  Partially raise lift axle:
  Activate "Raise axle" briefly, so that the axle is not fully raised, but only relieved.

  Raise lift axle:
  The "Raise axle" function must be activated until the lift axle hydraulic cylinders are fully retracted.

  Lower lift axle:
  The "Raise axle" function must only be activated briefly. The lift axle is then lowered to the ground automatically.

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Terminal".

5.12 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 such an axle, the following points 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!

5.12.1.1 Driving forwards

The follow-up 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.

5.12.1.2 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.

5.12.2 Locking and Unlocking Follow-up Steering

The procedure depends on the trailer design is conducted as follows:

<u>Manual control (actuated by tractor control units)</u>

- Connect the follow-up axle hydraulic lines for the "Lock / Unlock" function.
- Lock or unlock the follow-up axle by activating the respective control unit on the tractor. When locking the follow-up axle, the tractor control unit must be operated until the axle is completely straight and locked. It may be helpful to drive slowly forward during alignment.

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Hydraulics".

E-control (actuated by terminal)

- Connect the pressure and return lines.
- Couple LS line (if applicable)
- Switch the terminal on.
- Lock or unlock the follow-up axle by pressing the function "Follow-up axle lock / unlock" on the terminal.

Unlock follow-up axle:
The indicator lights on the terminal when the follow-up axle is unlocked.

Follow-up axle locked:
When locking the follow-up axle, the tractor control unit must be operated until the axle is completely straight and locked. It may be helpful to drive slowly forward during alignment. The indicator light on the terminal goes out when the axle is locked.

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Terminal".

5.13 Forced Steering (hydraulical)

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 absorb 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.

5.13.1 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)!

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- 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

5.13.2 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 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 ø80 ISO 24347:2005 and / steering points (s) ø50 (Image: Master cylinder mount) must be parallel to the rear axle of the tractor. A tolerance of ± 5mm in the vertical and horizontal directions is permitted. The position of the steering point (s) must be 80ø 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.

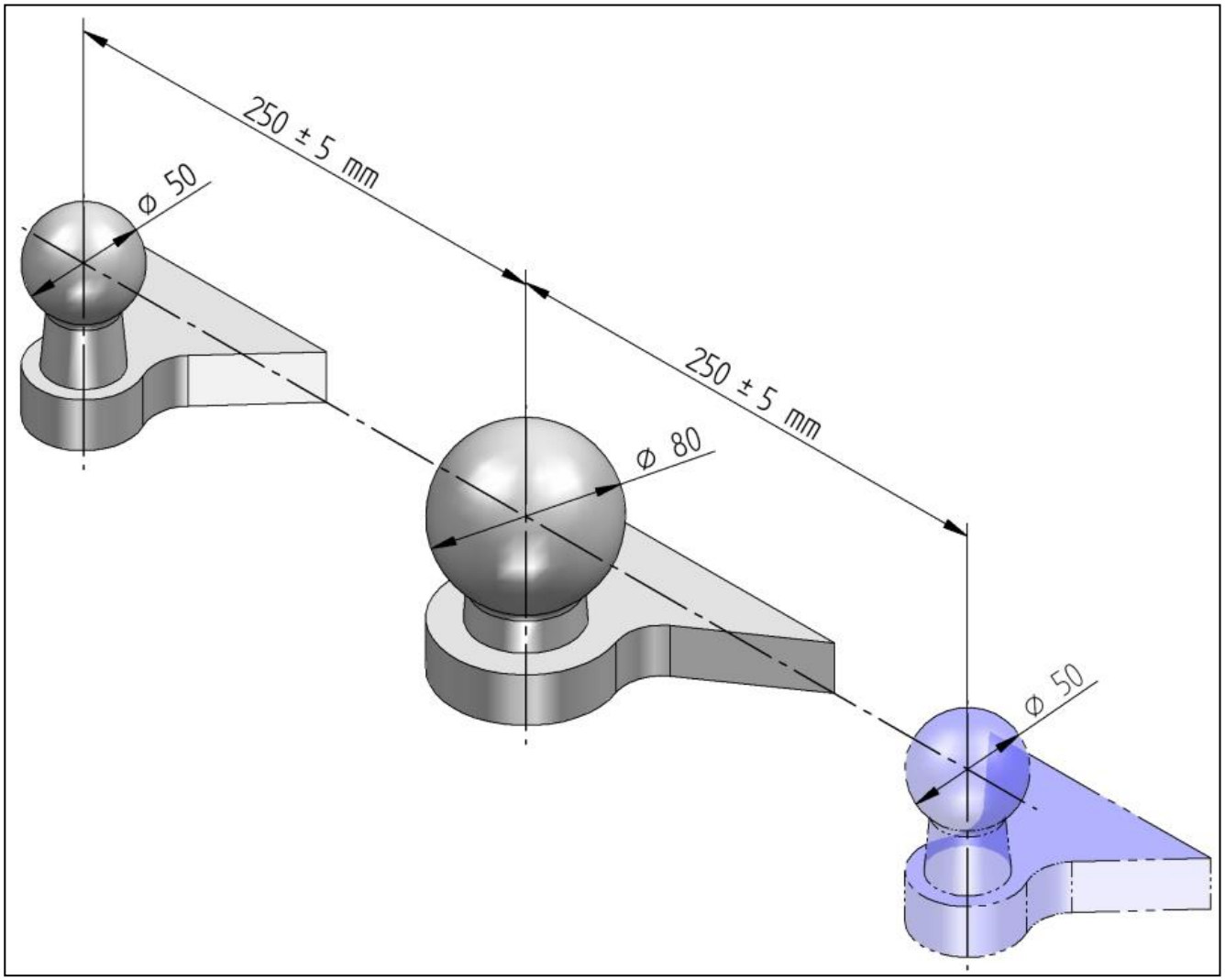


Image: Image of the master cylinder).

5.13.3 Coupling

- Couple the trailer as always.
- 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)

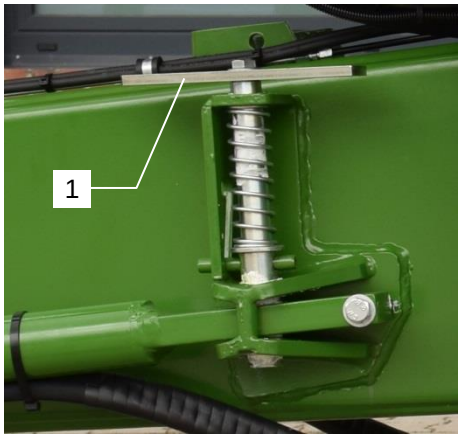


Image: Forced steering drawbar

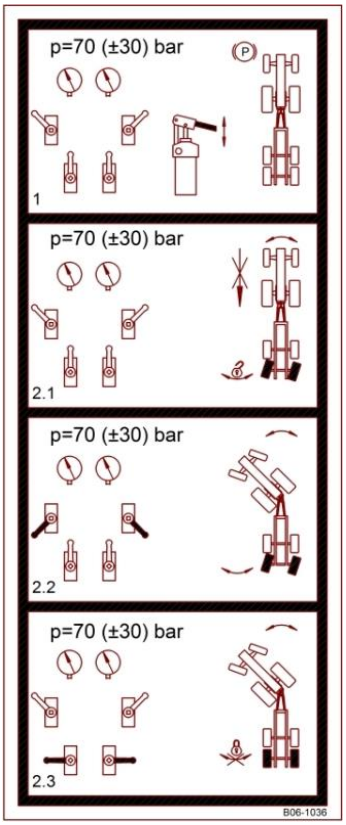
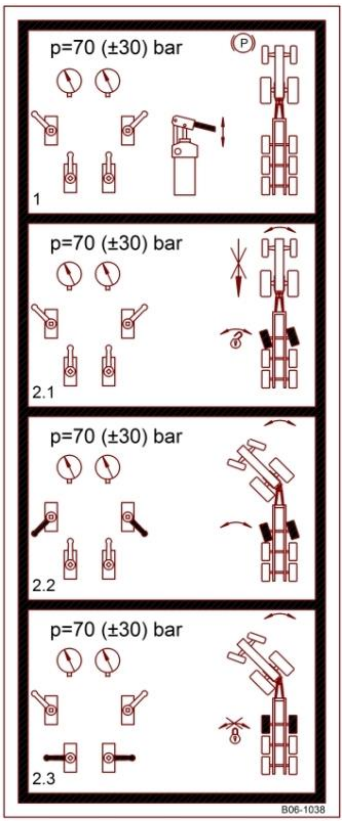
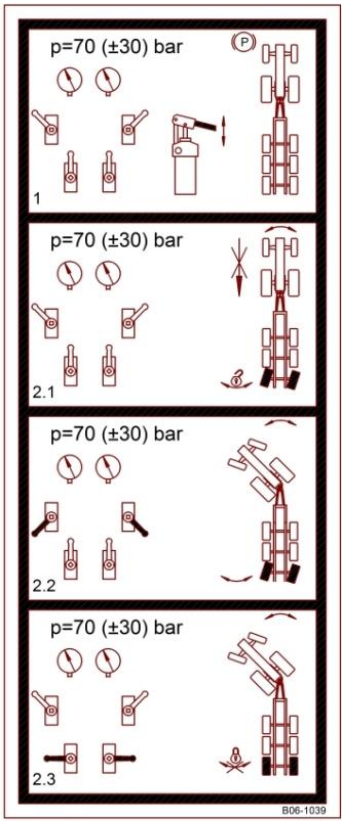
5.13.4 Uncoupling:

- 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.

5.13.5 Steering Variations

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

Tandem	Tridem		Function:
2. Steered axle	1. Steered axle	3. Steered axle	
			Pos.1: Setting Pos. 2.1: Follow-up axle Pos. 2.2: Forced steering axle Pos. 2.3: locked steering axle
B06-1036	B06-1038	B06-1039	
Image: Setting 2 Axle	Image: Setting 1 Axle	Image: Setting 3 Axle	

5.13.5.1 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.

5.13.5.2 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.

5.13.5.3 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.

5.13.6 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:

9. Park the tractor on a flat, level surface after moving straight forward.
10. 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.
11. 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.
12. Set the ball valves as shown in image: Settings 1.-3. axle pos. 2.2 and the forced steering is active.

5.14 Forced Steering (Electronic)

The electronic forced steering system is an electronic-hydraulic steering assist system which is designed for tandem and tridem trailers and features the following characteristics:

- Increases the manoeuvrability and the maximum possible steering angle by decoupling forces from the tension bolt and/or ball coupling.
- Full steering capabilities, even in reverse.
- Automatic axle centering at high speeds improves driving stability

Basically the system consists of a safe steering computer, a proportional hydraulic unit and redundant safe-angle sensors on the drawbar and the steered axles. The set point for the steering system is calculated based on the vehicle geometry depending on the steering angle to the tractor. This is detected by a safe-angle transmitter on the drawbar. Steering takes place via the ISO 26402 coupling device on the tractor, so that normally no mechanical adjustment is necessary on the tractor. The steering angle of the axle is measured via redundant angle sensors. A convenient terminal allows for selection of steering programs.

Important! Detailed operating instructions can be found in printed form as a separate document among your machine documents, or on the accompanying CD.

5.15 Tire pressure control system

5.15.1 RDS 1-Wire Technology (PTG)

The tire pressure control system RDS with 1-wire technology is a proven and reliable system for comfortable tire pressure adjustment while driving. The wiring is laid through the drilled axles. The compact 1-wire rotary feedthrough is then screwed into the axle hub, which is distinguished by a long-term grease filling (on annoying lubrication), quality seals and bearings. The axle funnel is sealed by a sealing system which basically consists of a clamping ring and a lip seal. A ball valve is mounted in the rim, which has to be closed by hand each time the machine switched off.

Due to the large volume tires, the use of separate air supply systems is generally required on trailers. If required the air supply systems can be switched on and off automatically.

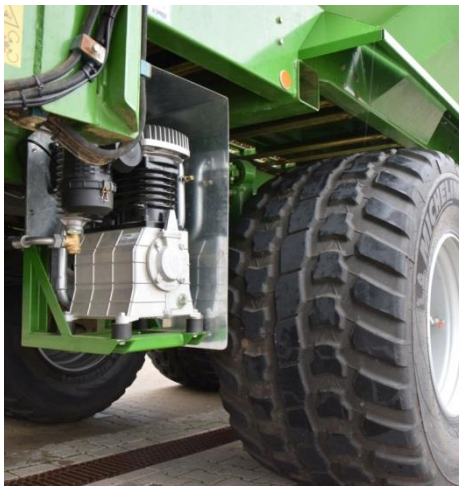


Image: Tire pressure control system

The system is controlled from the cab with the classic control panel (pneumatic control). The driver only needs to set the required air pressures for road and field on the pressure gauge console on the exterior of the vehicle. They are then saved in the system. The driver only needs to select the desired mode (road or field) on the control panel in the cab; the controller adjusts to the preset value in all tires and then switches itself off again. The system can also be switched off manually at any time. Since the system is continuously connected to the tires, the current tire pressure is displayed on the actual pressure gauge at all times.

Image: RDS Terminal

Important! Detailed operating instructions from the manufacturer can be found in printed form as a separate document among your machine documents, or on the accompanying CD.

5.16 Drive

The vehicle's drive system consists of several separate drives, which are described in the following sections.

Main drive

The vehicle's main drive is powered by the tractor's power take-off (PTO). This powers the drive of the spreader unit.

Image 17: Main drive

Scraper floor drive

The scraper floor is driven hydraulically through the tractor hydraulics. A hydraulic motor is driven by the controlled oil flow from the tractor and transmits its rotary motion to the scraper floor drive shaft at the rear of the vehicle via a gearbox.

Image 18: Scraper floor drive

Scraper floor drive, 2-speed

Depending on type and equipment level, the vehicle can be supplied with a 2-speed scraper floor drive. For emptying the residues, the scraper floor speed can be significantly increased.

Spreader unit drive

The spreader unit is powered by the tractor's PTO. The cam clutch in the PTO cardan shaft between tractor and vehicle (on the vehicle) protects the drive from excessive forces in the event of foreign objects and blockage.

Disk spreader unit (with separate protection)

The spreader disks are driven via gearboxes and are each protected with overrunning clutches.

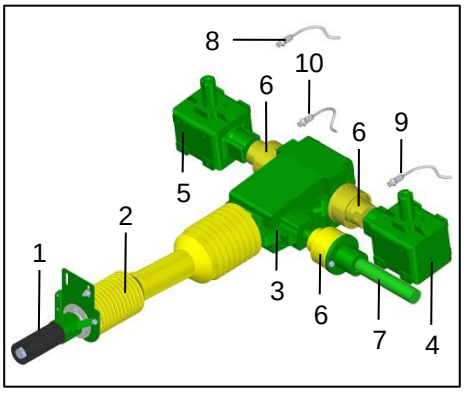


Image 19: Disk spreader unit drive

Pos.	Designation
1	One-piece drive shaft
2	PTO cardan shaft
3	Central gearbox
4	Spreader disk angle gearbox, left
5	Spreader disk angle gearbox, right
6	Cam clutch
7	Spreader unit drive
8	Speed monitor of upper beater
9	Spreader disk speed monitor, left
10	Spreader disk speed monitor, right

Two-beater spreader unit

Series	Optional
	
Two-beater spreader unit drive (chain)	Two-beater spreader unit drive (gearbox)
The beaters are normally driven via roller chains.	Optionally, a cardan drive is available for the beaters. In this case, the beaters are driven via gearboxes.

Three-beater spreader unit

Series	Optional
	
Three-beater spreader unit drive (chain)	Three-beater spreader unit drive (gearbox)
The beaters are normally driven via roller chains.	Optionally, a cardan drive is available for the beaters. In this case, the beaters are driven via gearboxes.

5.16.1 Drive shaft

WARNING!

Failure to observe the safety instructions may result in serious injury or death.

- In order to prevent accidents, the operator of the vehicle must read and observe the safety instructions in the “Safety” chapter.

WARNING!

Danger of trapping and entanglement for people can arise when the drive shaft guards are incomplete or damaged!

- Never use the drive shaft without guard, with a damaged guard or without correct use of the safety chain. Immediately have any damaged or missing parts of the drive shaft replaced by original parts from the drive shaft manufacturer.
- The unprotected parts of the drive shaft must always be protected by a guard shield on the tractor and a guard cup on the vehicle.
- Before each use, check whether all drive shaft guards are fitted and working properly.
- Before taking the vehicle into operation, make sure that the drive shaft in combination with the PTO guard shield on the tractor and the vehicle-side guard cup have sufficient free space in all operating states (e.g. driving round curves and over uneven ground). Contact of the drive shaft with the tractor or vehicle causes damage to the drive shaft.

NOTE

Always observe the following points:

- Correct use and maintenance of the drive shaft helps prevent serious accidents.
- Make sure that the drive shaft connections are firmly engaged. Before each use and at regular intervals, check the connections for tightness. Retighten screwed and bolted connections after the first 5 operating hours.
- On drive shafts between tractor and vehicle, overload and overrunning clutches must always be installed on the vehicle side.
- Make sure that the sliding sections have the specified overlap in both the working and the driving position.
- Observe the vehicle’s specified drive speed.
- Place the uncoupled drive shaft only in the provided mount.
- On attached and semi-mounted vehicles, secure towing couplings, lower links, supports, etc. in a suitable position to prevent damage to the drive shaft guard.

Observe also the notes and instructions in the drive shaft manufacturer’s operating instructions.

5.16.1.1 Adapting the drive shaft

The length of the drive shaft must be adapted to the tractor used when taking the vehicle into operation for the first time. Whenever you change the tractor, you must also adapt the shaft again.

Observe also the notes and instructions in the operating instructions in chapter “Commissioning”, section “Adapting to the tractor” / “Adapting the drive shaft”.

5.16.1.2 PTO cardan shaft joint deflection angle

Permissible joint deflection angle for standard PTO cardan shaft

	NOTE
	Observe the following points: - Exceeding the permissible joint deflection angles causes premature wear and damage. For larger joint deflection angles, please consult the manufacturer. - During vehicle operation, keep the joint deflection angle small and even (Image 20). - If the joint deflection angles are large or uneven, switch off the PTO. - A combination of Z- and W-deflection is not permissible (Image 20and Image 21).

Operating angle:	Max. 25°
Intermittently and at reduced power: Maximum angle at which contact of the PTO cardan shaft guard with a rotating part is avoided:	Max. 45°
At standstill:	Max. 90°

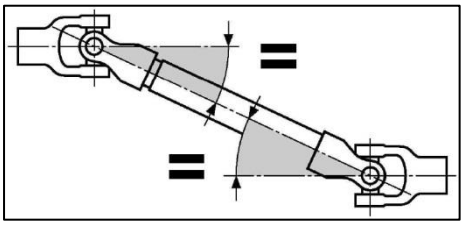


Image 20: Z-deflection

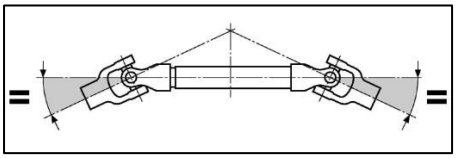


Image 21: W-deflection

Permissible joint deflection angles for wide angle PTO cardan shaft

	CAUTION!
	Danger of damage to the PTO cardan shaft if permissible joint deflection angles are not observed. An angle of more than 80° results in hinge failure! - The wide-angle joints must not be angled at more than 80° in operation or at standstill.

	NOTE
	Observe the following points: - Exceeding the permissible joint deflection angles causes premature wear and damage. For larger joint deflection angles, please consult the manufacturer. - On PTO cardan shafts with a wide-angle joint (Image 22 / pos. 1), the pivot point between tractor and vehicle must equal the pivot point of the wide-angle joint. - On PTO cardan shafts with a wide-angle joint, the simple joint (Image 22 / pos. 2) must run in a straight line.

Operating angle:	Max. 25°
Intermittently and at reduced power: Maximum angle at which contact of the PTO cardan shaft guard with a rotating part is avoided:	Max. 45°
At standstill:	Max. 80°

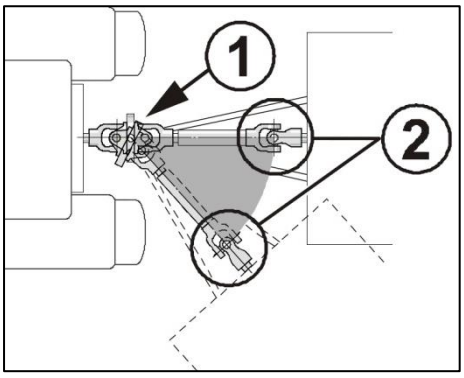


Image 22: Joint deflection angle for wide-angle PTO cardan shaft

5.16.1.3 Drive shaft coupling and connection

This section describes the procedure for installing and removing different types of drive shaft couplings:

Observe also the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Drive shaft” / “Installing the drive shaft” and “Removing the drive shaft”.

Push-pin coupling:

Installation:

- Press the sliding pin (Image 23 / pos. 1) and slide the drive shaft onto the PTO shaft until the sliding pin engages in the radial groove.

Removal:

- Press the sliding pin (Image 23 / pos. 1) and pull the drive shaft off the PTO shaft.

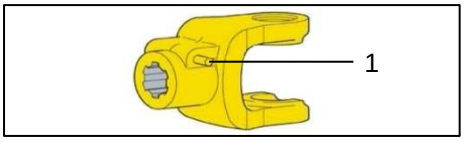


Image 23: Push-pin coupling

QS slide collar coupling:

Installation:

- Pull back the slide collar (Image 24 / pos. 2) until it remains in its opened position and push the drive shaft onto the PTO shaft until the coupling lock engages.

Removal:

- Pull back the slide collar (Image 24 / pos. 2) and pull the drive shaft off the PTO shaft.

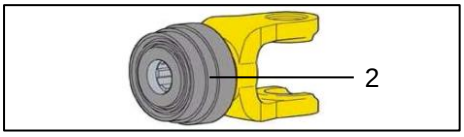


Image 24: QS slide collar coupling

AS slide collar coupling:

Installation:

- Pull back the slide collar (Image 25 / pos. 3) and push the drive shaft onto the PTO shaft until the coupling lock engages.

Removal:

- Pull back the slide collar (Image 25 / pos. 3) and pull the drive shaft off the PTO shaft.

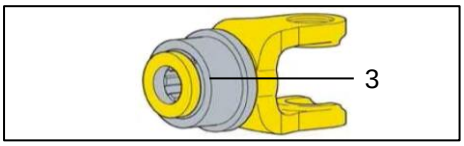


Image 25: AS slide collar coupling

Quick coupling:

Installation:

- Pull back the slide collar (Image 26 / pos. 4) and push the drive shaft onto the PTO shaft until the lock engages.

Removal:

- Pull back the slide collar (Image 26 / pos. 4) and pull the drive shaft off the PTO shaft.

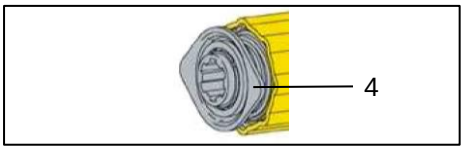


Image 26: Quick coupling

Conical clamp screw coupling:

Installation:

- Unscrew the conical clamp screw (Image 27 / pos. 5). Push the drive shaft on until the hole in the yoke or coupling is aligned with the radial groove.
- Screw in the conical clamp screw and tighten to a torque of 100 Nm.

Removal:

- Unscrew the conical clamp screw (Image 27 / pos. 5). If this is not possible by hand, you can also knock out the conical clamp screw from the other side (Image 27).
- Then pull the drive shaft off the PTO shaft.

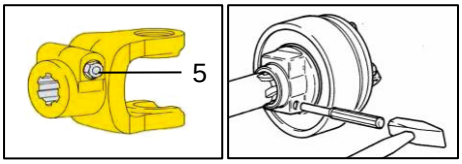


Image 27: Conical clamp screw coupling

Clamp screw coupling:

Installation:

- Extract clamp screw (Image 28 / pos. 6). Push the drive shaft on until the hole in the yoke is aligned with the radial groove.
- Fit and tighten the clamp screw(s).
  Tightening torque: M12 = 80 Nm
  M14 = 130 Nm
  M16 = 200 Nm

Removal:

- Unscrew the conical clamp screw (Image 28 / pos. 6). If this is not possible by hand, you can also knock out the conical clamp screw from the other side (Image 28).
- Then pull the drive shaft off the PTO shaft.

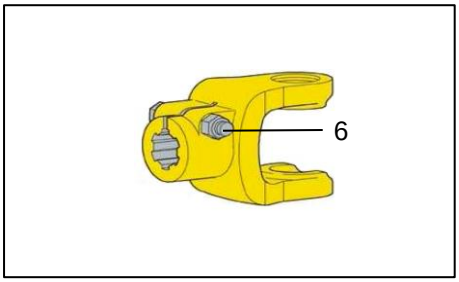


Image 28: Clamp screw coupling

Tube clamp coupling:

Installation:

- Release both screws and remove the tube clamp (Image 29 / pos. 7).
- Push the drive shaft on until the hole in the yoke is aligned with the radial groove.
- Align the drive shaft with the tractor's PTO shaft and support it such that it cannot get wedged when fitting the tube clamp.
- Fit the tube clamp jaws with screws. Tighten the screws alternately.
  Tightening torque: M16 = 150 Nm

Removal:

- Remove the tube clamp (Image 29 / pos. 7).
- Then pull the drive shaft off the PTO shaft.

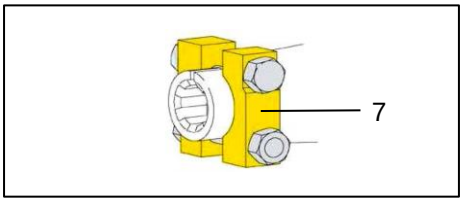


Image 29: Tube clamp coupling

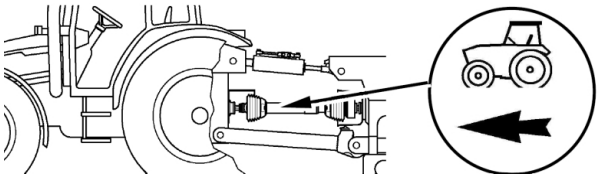
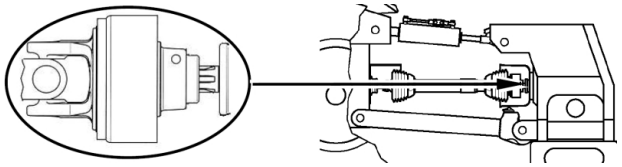
5.16.1.4 Installing the drive shaft

WARNING!

Risk of injury through movements of tractor and vehicle or of vehicle parts!

- Before performing any work 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!

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

Tractor	Vehicle
 Image 30: Drive shaft tractor side	 Image 31: Drive shaft vehicle side
The tractor symbol on the drive shaft guard tube indicates the tractor-side connection of the drive shaft.	Overload clutches and overrunning clutches must always be fitted on the vehicle side.

Connect the drive shaft as follows:

- Correctly couple the vehicle to the tractor.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Coupling to the tractor”.

- Secure the vehicle against rolling and unintentional starting.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

- Clean and grease the PTO shaft on the tractor and on the vehicle.
- Before use, check the length of the drive shaft in all operating conditions to prevent compression and insufficient sliding section overlap.
- Release and pull back the drive shaft guard cone.
- Fit the drive shaft, observing the mounting direction (Image 30 & Image 31) and the mounting instructions for the respective connection / coupling type.

Observe the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Drive shaft” “Drive shaft coupling and connection”.

- Refit the drive shaft guard cone properly.
- Engage the drive shaft safety chain (Image 32 / pos. 1) such that the drive shaft can swivel sufficiently in all directions in all operating states. Fit as near as possible at right angles to the drive shaft.
- Make sure that the safety chain cannot catch on components of the tractor or vehicle.

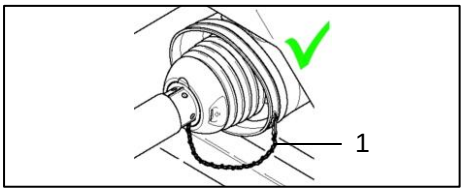


Image 32: Safety chain

5.16.1.5 Removing the drive shaft

WARNING!

Risk of injury through movements of tractor and vehicle or of vehicle parts!

- Before performing any work 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!

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

CAUTION!

Danger of burns on contact with hot components of the drive shaft!

- Do not touch hot components of the drive shaft, in particular clutches.

Disconnect the drive shaft as follows:

- Correctly uncouple the vehicle from the tractor.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Uncoupling from the tractor”.

- Secure the vehicle against rolling and unintentional starting.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

- Pull the drive shaft off the tractor’s PTO shaft, observing the connection instructions for the respective connection / coupling type.

Observe the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Drive shaft” “Drive shaft coupling and connection”.

- Set down the drive shaft correctly as described below.

Top coupling

- When parking the vehicle, secure the drive shaft with the chain. The drive shaft must be held in the front third of its length (Image 33).
- The safety chain on the drive shaft prevents the guard from turning out of position and must not be used for suspending the drive shaft!

Image 33: Top coupling

Image 34: Bottom coupling

Bottom coupling

- When parking the vehicle, set down the drive shaft correctly. The drive shaft must be held in the front third of its length (Image 34).
- Before an extended standstill, clean and lubricate the drive shaft.

Observe the notes and instructions in the operating instructions, chapter “Care and maintenance”, section “Drive” / “Drive shaft”.

5.16.1.6 Drive shafts with overload clutch or overrunning clutch

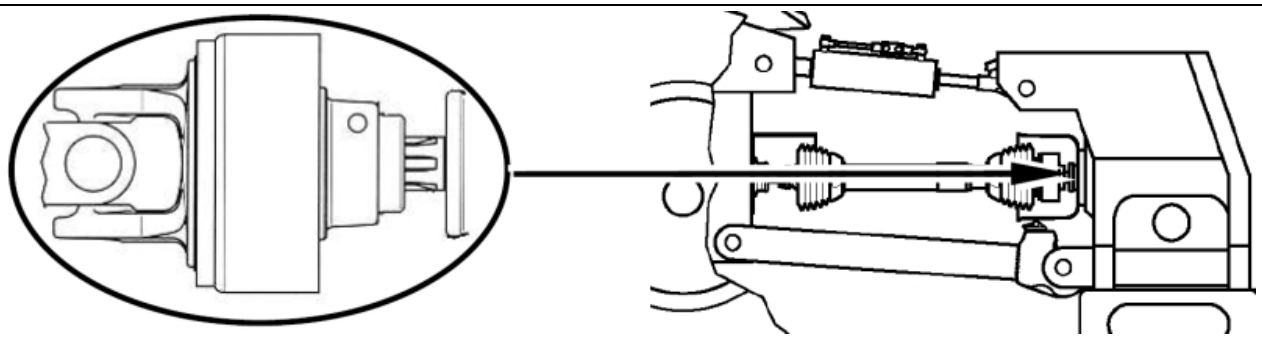


Image 35: Drive shaft vehicle side 20161017-083305-BTA

	NOTE
	Overload clutches and overrunning clutches must always be fitted on the vehicle side.

Radial pin clutch

Interrupting power transmission when the set torque is exceeded.

- When the radial pin clutch slips (ratchet sound), immediately stop the PTO.

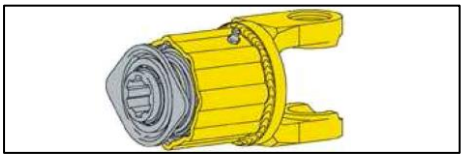


Image 36: Radial pin clutch

Shear bolt coupling

An overload will break the shear bolt (Image 37 / pos. 20) and interrupt the power transmission.

- Replace shear bolts only with shear bolts of the same dimensions (observe the threaded length) and strength class.

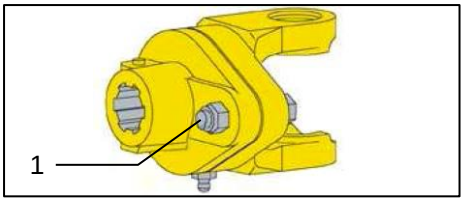


Image 37: Shear bolt coupling

Cam clutch / key type clutch

If the set torque is exceeded because of an overload, the power transmission is interrupted.

- Automatic restarting (torque build-up) through switching off the PTO.

  Attention: Restarting is also possible by lowering the PTO speed.
- Avoid switch-off times of more than 10 seconds!
  At 1000 rpm, the clutch or vehicle can become damaged!

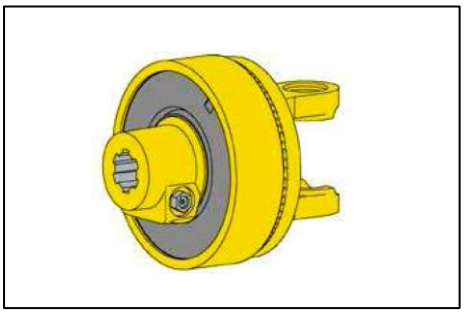


Image 38: Cam clutch / key type clutch

Friction clutch

In cases of overload and intermittent torque peaks, the torque is limited and evenly transmitted during the slip time.

- To ensure their correct function, friction clutches must be disengaged before their first use and after a longer standstill. To do this, release the friction linings and turn the clutch by hand.

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

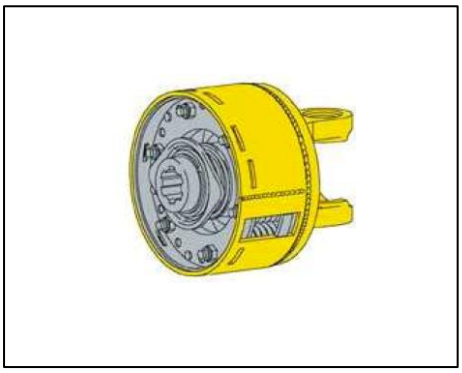


Image 39: Friction clutch

Overrunning clutch

Protects the drive from vehicle components that continue to run on when the drive stops (e.g. when the PTO is switched off).

- Enter the vehicle area only when the rotating parts have come to a complete standstill!

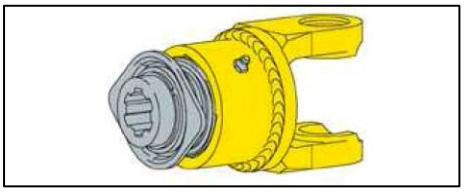


Image 40: Overrunning clutch

Friction overrunning clutch

Friction overrunning clutches are a combination of friction clutch and overrunning clutch.

- Enter the vehicle area only when the rotating parts have come to a complete standstill!

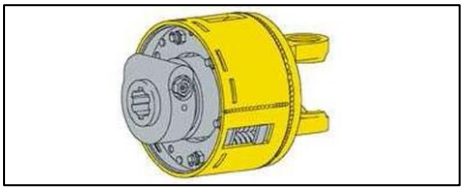


Image 41: Friction overrunning clutch

5.17 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!

5.17.1 Storing the supply lines

Disconnected hydraulic supply lines (as well as brake system supply lines and power and control system cables) must be hung on the supply line rack (Image 42 / pos. 1) in the corresponding park position at the front of the vehicle.

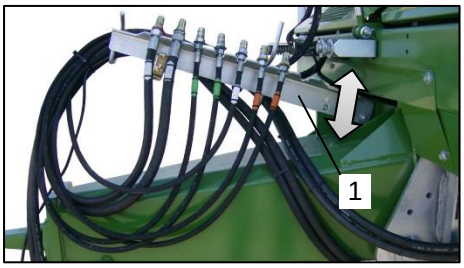


Image 42: Rack

The supply line rack is height-adjustable. Do this as follows:

- Release the rack mounting screws.
- Move the rack into the desired position such that there is sufficient distance between supply lines and drawbar or adjacent parts when the vehicle is coupled. The hoses must be routed through the two bars towards the tractor.
- After the adjustment, tighten the screws again.

5.17.2 Hydraulic Supply Line Markings

WARNING!

Danger due to incorrect supply line connection

Incorrect connection of the supply lines can lead to considerable hazards for persons due to machine malfunctions.

- 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

- 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 43 section.

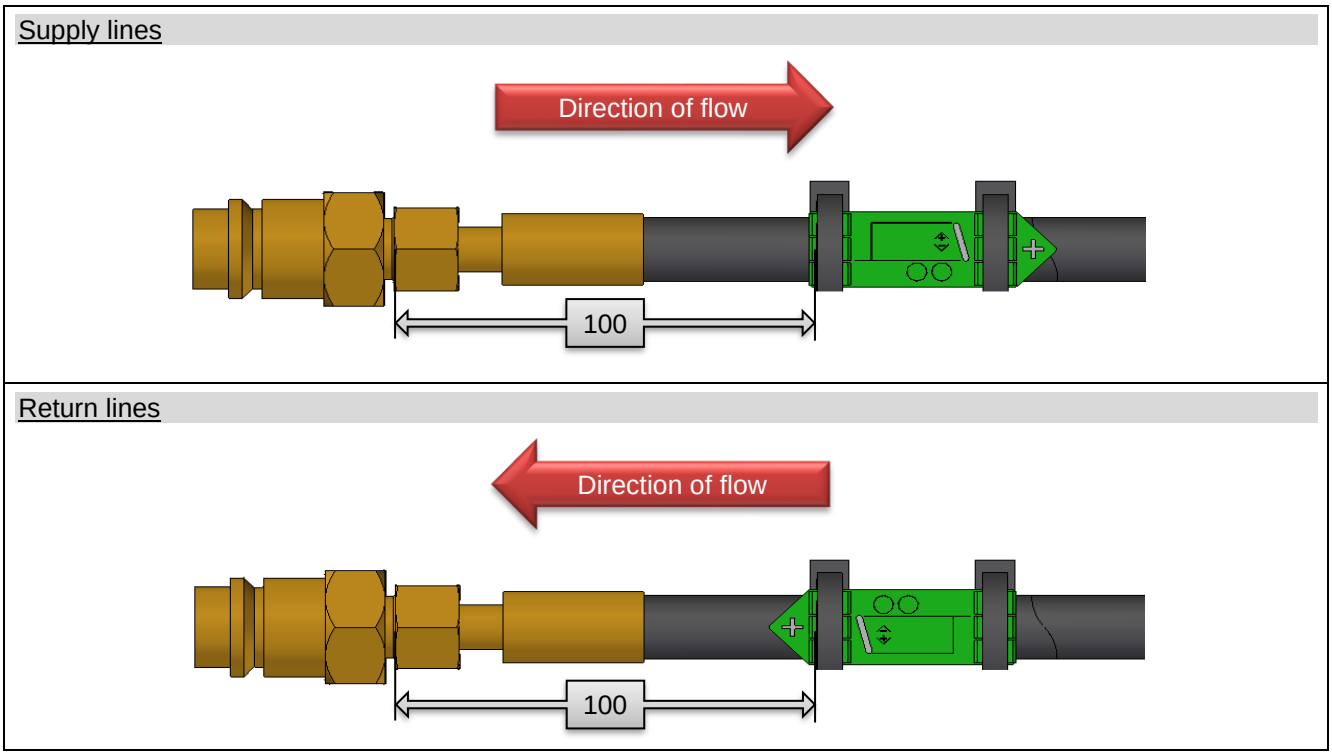


Image 43: Position of markings

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.

5.17.3 Couplings of hydraulic supply lines

Image 44: Plug size 2

Image 45: Plug size 3

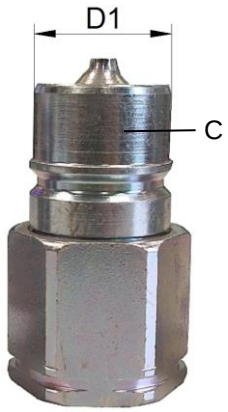


Image 46: Plug size 4

Image 47: Sleeve size 4

Use:

Size	Image	Position	Manual control	e-control
2	Image 44	Pos. A	-	LS line of the control block
3	Image 45	Pos. B	Supply lines for the vehicle functions	Supply lines for additional vehicle functions without control block connection
				Supply lines of the control block without LS line
4	Image 46 Image 47	Pos. C Pos. D	-	Supply lines of the control block in combination with LS line

Versions:

Size	Image	Position	Number	Design	Line	Nominal width NW	Diameter D1	Connection
2	Image 44	Pos. A	B09-1706	Plug	12L	10	17.3mm	M18x1.5
3	Image 45	Pos. B	B09-0116	Plug	12L	10	20.6mm	M18x1.5
3	Image 45	Pos. B	B09-0469	Plug	15L	12	20.6mm	M22x1.5
3	Image 45	Pos. B	B09-0533	Plug	18 l	16	20.6mm	M26x1.5
3	Image 45	Pos. B	B09-1438	Plug	22L	19	20.6mm	M30x2.0
4	Image 46	Pos. C	B09-2012	Plug	18 l	19	29mm	G 3/4-14
4	Image 47	Pos. D	B09-2018	Sleeve	22L	19	29mm	G 3/4-14

5.17.4 Manual control hydraulic system

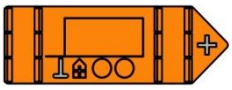
Depending on its equipment, the vehicle's hydraulic functions can be controlled directly with the tractor's control units once the hydraulic supply lines between vehicle and tractor control units have been connected.

The speed of operation depends on the tractor's hydraulic system. Depending on the tractor type, the set operating speeds may have to be adjusted on the tractor's control unit.

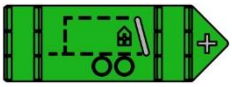
Below, the hydraulic supply lines that can be used with the vehicle type are listed together with the markings of the manual control hydraulic system. The vehicle's hydraulic supply lines may vary depending on its equipment.

Observe also the notes and instructions in the operating instructions, chapter "Functions and settings", section "Hydraulics" / "Hydraulic supply line markings".

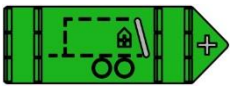
5.17.4.1 Supply line of the hydraulic system "manual control"



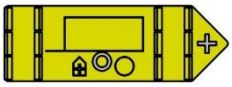
Jack stand (raising / lowering)	18-13-0202
Hose:	12L
Tractor connection:	1 single acting control unit
Colour:	Orange



Tailgate (raising / lowering)	18-13-0203
Hose:	12L
Tractor connection:	1 single acting control unit
Colour:	Green



Tailgate (raising / lowering)	18-13-0203
Hose:	12L
Tractor connection:	1 double acting control unit
Colour:	Green

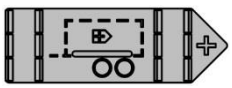


Lift axle (raising / lowering)	18-13-0205
Hose:	12L
Tractor connection:	1 double acting control unit
Colour:	Yellow

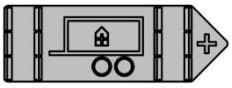
For this purpose, the following connection cable is also always required:

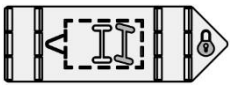
Return line (tank)	18-13-0210
Hose:	22L
Tractor connection:	1 return line
Colour:	Red

Always first connect the supply line "Return line" to the corresponding connection on the tractor!



Scraper floor (reverse / forward)	18-13-0204
Hose:	15L
Tractor connection:	1 double acting control unit
Colour:	Grey

	**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!		

	**Follow-up steering (locking / unlocking)**	18-13-0208
	Hose:	12L
	Tractor connection:	1 single acting control unit
	Colour:	White
For this purpose, the following connection cable is also always required:		
	**Return line (tank)**	18-13-0210
	Hose:	22L
	Tractor connection:	1 return line
	Colour:	Red
Always first connect the supply line “Return line” to the corresponding connection on the tractor!		

	**Dosing wall (raising / lowering)**	18-13-0212
	Hose:	12L
	Tractor connection:	1 double acting control unit
	Colour:	Yellow

	**Spread pattern limiter (raising / lowering)**	18-13-0213
	Hose:	12L
	Tractor connection:	1 double acting control unit
	Colour:	Blue

	**Drawbar (raising / lowering)**	18-13-0222
	Hose:	12L
	Tractor connection:	1 double acting control unit
	Colour:	White

5.17.4.2 Coupling the hydraulic supply lines with “manual control”

NOTE

Ensure that:

- When coupling the hydraulic supply lines the hydraulic system is without pressure 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 connected.
- The hydraulic connectors are pushed into the sockets until they audibly engage and lock.
- That hydraulic lines do not rub against other objects or become tensioned or kinked during vehicle movements (e.g. in curves).

When coupling, proceed as follows:

- Move the relevant control element on the control unit in the tractor into float position.
- Secure both tractor and vehicle against unintentional rolling and starting.
- Before coupling the elements, clean the plugs and sockets to prevent malfunctions in the hydraulic system.
- Couple the hydraulic supply lines required for the functions to be carried out to the respective tractor control units.

Which connections are needed can be found in the operating instructions, chapter “Functions and settings”, section “Hydraulics” / “Supply lines for manual control”.

5.17.4.3 Uncoupling the hydraulic supply lines with “manual control”

NOTE

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.

To uncouple, do the following:

- Move the relevant control element on the control unit in the tractor into float position.
- Secure both tractor and vehicle against unintentional rolling and starting.
- First, uncouple the hydraulic connectors of the supply lines from the tractor’s hydraulic sockets. Then uncouple the return and tank lines from the tractor’s hydraulic sockets.
- Use dust caps to protect the hydraulic connectors and sockets from dirt.
- Place the hydraulic supply lines in their park position on the supply line rack.

Observe also the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Hydraulics” / “Storing the supply lines”.

5.17.4.4 Installing the flow regulator

Hydraulic scraper floor version: Manual control with flow regulator

WARNING!

Danger of serious injuries and infection through hydraulic oil escaping under high pressure and penetrating the skin!

- It is forbidden to mount the flow regulator in the tractor cab.
- It is forbidden to route hydraulic lines in the tractor cab.

Tractor-side installation

	NOTE
	Ensure that: • Hydraulic lines do not rub against other objects or become tensioned or kinked during vehicle movements (e.g. in curves).

Do this as follows:

- Fit the supplied bracket (Image 48 / pos. 1) outside the cab in the area of the hydraulic couplings of the tractor.
- Slide the flow regulator with its holder into the bracket (Image 48 / pos. 1) and secure the flow regulator with the eyebolt (Image 48 / pos. 2).

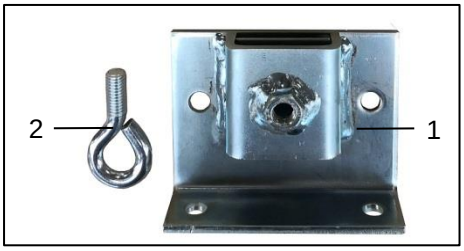


Image 48: Flow regulator accessories

5.17.5 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.

5.17.5.1 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.

5.17.5.1.1 Control block emergency operation

	WARNING!
	Danger due to moving components during emergency actuation! • 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.

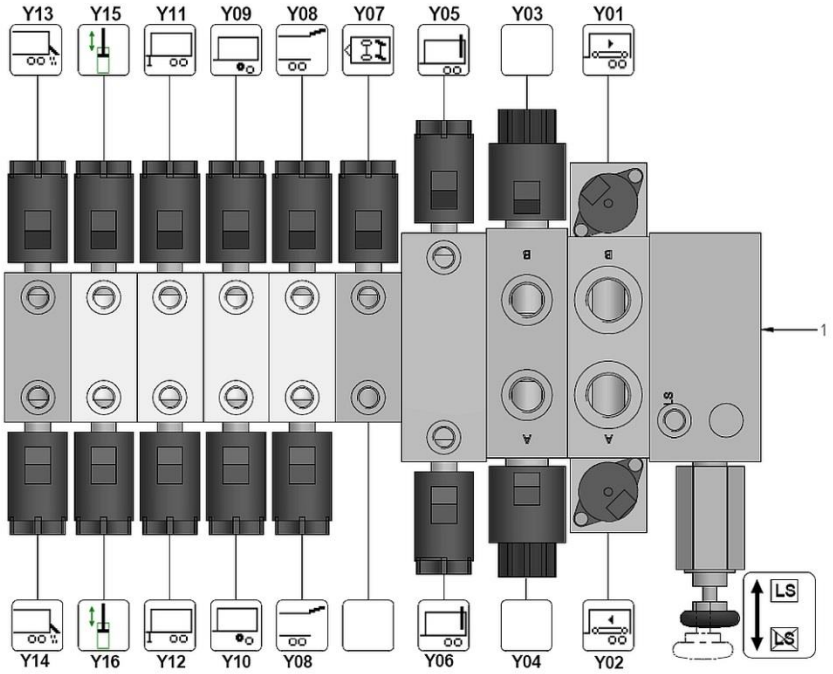


Image 49: Control block B09-2026-PLN_20100106-BTA

			Y01	Y02	Y03	Y04	Y05	Y06	Y07	Y08	Y09	Y10	Y11	Y12	Y13	Y14	Y15	Y16	
Scraper floor		→	X																
		←		X															
Steering Axle									X										
					X				X										
Lift Axle		↑			X						X	X							
		↓				X					X	X							
Dosing wall		↑			X		X	X											
		↓				X	X	X											
Tailgate		↑				X				X									
		↓			X					X									
Jack stand		↑				X							X	X					
		↓			X								X	X					
Universal function		↑				X											X	X	
		↓			X												X	X	
Spread pattern limiter		↑				X									X	X			
		↓			X										X	X			

5.17.5.2 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:

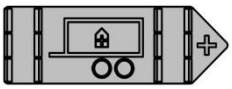
The control block hydraulic supply lines must be connected to the appropriate tractor connections depending on the supply system settings.

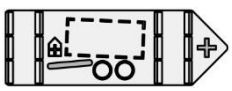
Which control block hydraulic supply lines must be coupled with the appropriate tractor connections depends on the respective supply system and the associated control block hand wheel adjustment.

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!

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!		

	**Drawbar (raising / lowering)**	18-13-0222
	Hose:	12L
	Tractor connection:	1 double acting control unit
	Colour:	White

5.17.5.3 Supply System with “E-control”

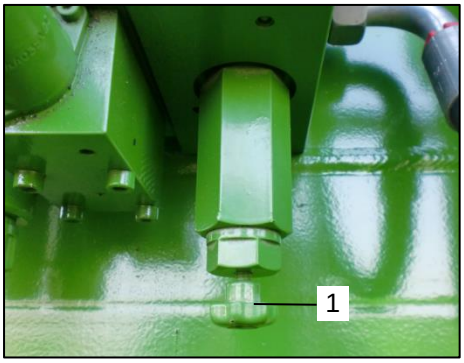


Image 50: knob

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 50 / Pos. 1).

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)

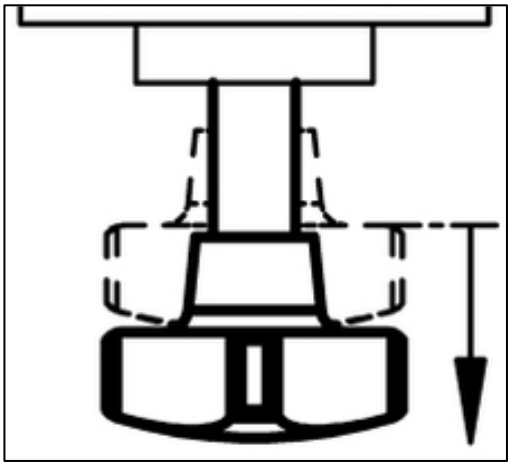


Image 51: Hand wheel turned out

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.

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.

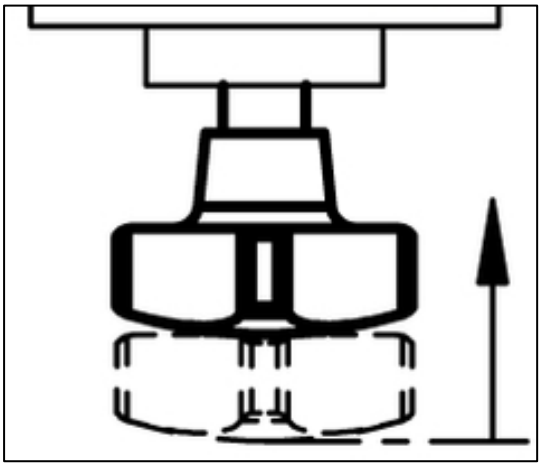


Image 52: Hand wheel in

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.

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

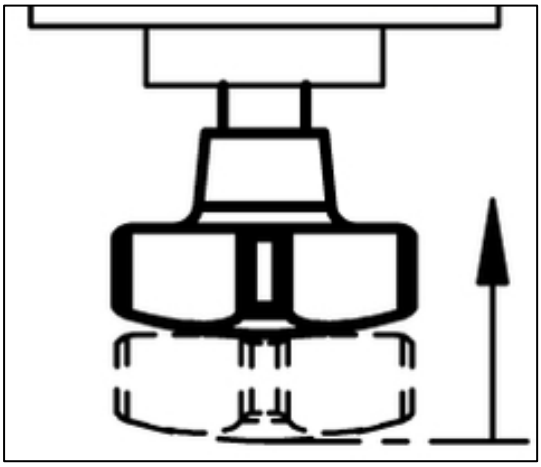


Image 53: Hand wheel in

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!			

	**Flow (power)**		18-13-0209
	Hose:	18 l	
	Tractor connection:	1 pressure connection (flow)	
	Colour:	Red	

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

5.17.5.4 Coupling the hydraulic supply lines with “E-control”

	NOTICE
	Ensure that: • 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.

5.17.5.5 Uncoupling the hydraulic supply lines with “E-control”

	NOTICE
	Ensure that: • When uncoupling the hydraulic supply lines the hydraulic system is without pressure 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.
- First, uncouple the hydraulic connectors of the supply lines from the tractor’s hydraulic sockets. Then uncouple the return and tank lines from the tractor’s hydraulic sockets.
- 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.

5.18 Brake system

DANGER!

Risk of death if brakes are defective!

These dangers can cause severe and potentially fatal injuries.

- Check the brakes before every use.
- A thorough brake system inspection is to be conducted on a regular basis.
- Adjustment and repair work on the brakes must only be carried out by qualified specialists.

WARNING!

Danger through non-observation of the basic safety instructions.

This can cause serious injuries.

When doing this, always observe the safety instructions in the operating instructions, chapter “Safety”, section “Basic safety instructions”, in particular section “Brake system”.

NOTE

The drum brake linings require a few hours of operation to adapt to the drum brake. and achieve their full braking performance.

- Test the function of the brake system before using or towing the vehicle.

5.18.1 Parking brake with hand crank

WARNING!

Danger of unintentional rolling away of the vehicle!

If the parking brake is not engaged when parking the vehicle, the vehicle may unintentionally start to move. This can cause serious injuries or death.

- Always engage the parking brake when you leave the tractor or park the vehicle.
- Before performing any work on the vehicle, secure the tractor and the vehicle against unintentional rolling and starting!

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

The engaged parking brake (Image 54 / pos. 1) prevents the vehicle from rolling away at its maximum permissible gross weight at an inclination of max. 18%.

To operate the parking brake (Image 54 / pos. 1), turn the hand crank (Image 54 / pos. 2), which operates the spindle (Image 54 / pos. 3) and steel cables (Image 54 / pos. 4).

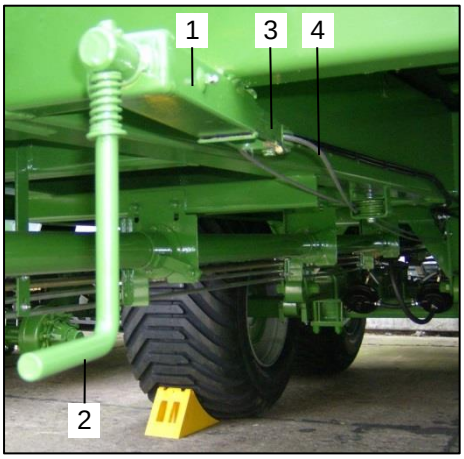


Image 54: Parking brake

NOTE

Make sure that the cable pull (Image 54 / pos. 4) does not rest or chafe on other vehicle parts. When the parking brake is fully released, the brake cable (Image 54 / pos. 4) should sag slightly.

5.18.1.1 Hand crank in rest position and in operating position

To move the hand crank (Image 55 + Image 56 / pos. 2) from its rest position into its operating position or vice versa, turn the handle through 180°.

Rest position	Operating position

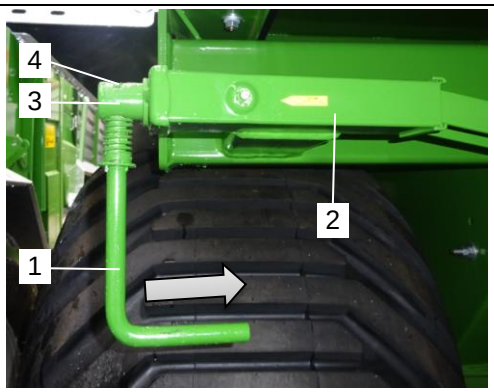
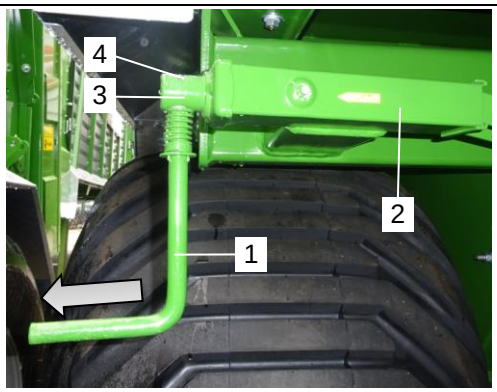

	

Image 55: Hand crank in rest position	Image 56: Hand crank in operating position
Handle of hand crank points towards the parking brake.	Handle of hand crank points away from the parking brake.

Pivot the hand crank (Image 55 + Image 56 / pos. 2) into its park or operating position as follows:

- Press the hand crank (Image 55 + Image 56 / pos. 2) towards the crank's pivot point (Image 55 + Image 56 / pos. 3) and move it into the desired position.
- After turning, make sure that the cotter pin (Image 55 + Image 56 / pos. 4) at the crank's pivot point (Image 55 + Image 56 / pos. 3) engages in the recess.

5.18.1.2 Releasing parking brake with hand crank

To release the parking brake, do the following:

- Move the hand crank (Image 55 / pos. 1) from its rest position into its operating position (Image 56 / pos. 1).
- Turn the hand crank (Image 56 / pos. 1) anticlockwise until the cable pull (Image 54 / pos. 4) is slack and the brake is released.
- Return the hand crank (Image 56 / pos. 1) from its operating position to its rest position (Image 55 / pos. 1).

5.18.1.3 Engaging parking brake with hand crank

To engage the parking brake, do the following:

- Move the hand crank (Image 55 / pos. 1) from its rest position into its operating position (Image 56 / pos. 1).
- Turn the hand crank (Image 56 / pos. 1) clockwise until the resistance noticeable increases and the brake is engaged through the cable pull (Image 54 / pos. 4).
- Return the hand crank (Image 56 / pos. 1) from its operating position to its rest position.

5.18.2 Spring actuated parking brake

WARNING!

Danger of unintentional rolling away of the vehicle!

If the parking brake is not engaged when parking the vehicle, the vehicle may unintentionally start to move. This can cause serious injuries or death.

- Always engage the parking brake when you leave the tractor or park the vehicle.
- Before performing any work on the vehicle, secure the tractor and the vehicle against unintentional rolling and starting!

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

Double release valve:

If the vehicle is equipped with a spring actuated parking brake, the parking brake with hand crank is not installed. In that case, movement of the parked vehicle is prevented by the double release valve.

The double release valve has a flanged release valve and a parking valve for the spring actuated brake.

- Image 61 / pos. 1: Release valve → Black button
- Image 61 / pos. 2: Parking valve → Red knob

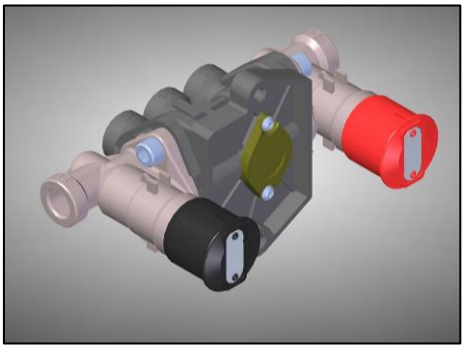
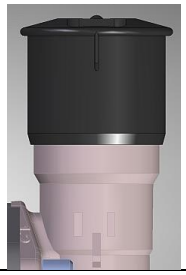
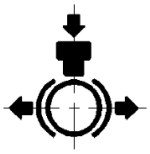
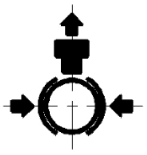
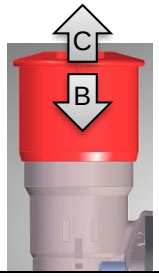
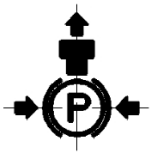
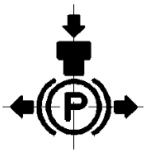


Image 61: Double release valve

Function of the double release valve

Release valve (black) 		Position A: Released position Black knob pushed in = air brake is not active
		Position B: Driving position Black knob pulled out = air brake is active
Parking valve (red) 		Position C: Parking position Red knob pulled out = spring actuated brake is engaged
		Position B: Driving position Red knob pushed in = spring actuated brake is released

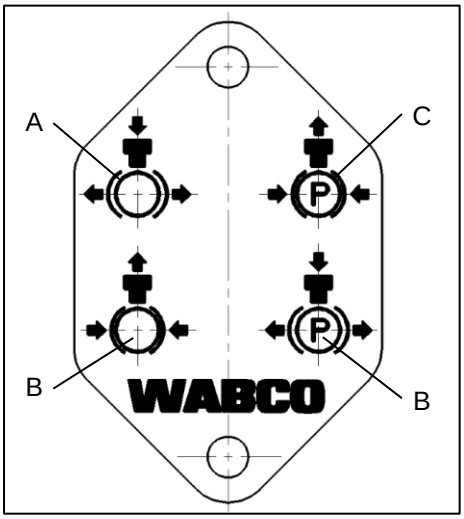


Image 57: Function label

5.18.2.1 Releasing spring actuated parking brake

To release the parking brake, do the following:

- Press the red parking valve knob in all the way.

5.18.2.2 Engaging spring actuated parking brake

To engage the parking brake, do the following:

- Pull the red parking valve knob out all the way.

5.18.3 Air brake

DANGER!

If a warning symbol appears on the tractor's display indicating problems with the brake system or problems with the brake system are identified, there is a severe risk of death for the driver as well as any people in the vicinity and other road users.

These dangers can cause severe and potentially fatal injuries.

- Immediately stop the vehicle and its operation.
- Park the vehicle such that it does not present a danger or obstacle.
- Secure both tractor and vehicle against unintentional rolling and starting.
- Move the vehicle again only when the cause of the brake malfunction has been eliminated by a specialist and the vehicle has been released for use by the specialist.

NOTE

- Before the first trip of the day, drain the water from the compressed air tank of the air brake.
- Before each trip, set the brake effect regulator according to the vehicle's load with the manual adjuster. (depends on the vehicle's equipment)

On this version, the air brake supply lines are connected to the tractor's air brake couplings. When the tractor's brake pedal is operated, the vehicle's brake is applied by pneumatic cylinders (Image 58 / pos. 1) on the axles.

Image 58: Air brake

Connection diagrams of the air brake are included in the operating instructions in chapter "Care and maintenance", section "Connection diagram" / "Air brake".

5.18.3.1 Air brake supply lines

The air brake supply lines are marked with coupling heads of different colours as follows:

	**“Reservoir” coupling head**	B09-2491
	Line:	Reservoir
	Colour:	Red

	**“Brake” coupling head**	B09-2492
	Line:	Brake
	Colour:	Yellow

When connecting the air brake supply lines, observe the instructions and notes in the following sections “Connecting the air brake supply lines” and “Disconnecting the air brake supply lines”.

5.18.3.2 Air brake supply line rack

Disconnected air brake supply lines (as well as hydraulic system supply lines and power and control system cables must be hung on the supply line rack) in the corresponding park position at the front of the vehicle. This depends in the vehicle’s rack.

Observe also the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Hydraulic system” / “Storing the supply lines”.

5.18.3.3 Connecting the air brake supply lines

WARNING!

Danger through incorrect connection of supply lines.

An incorrect connection of the supply lines can present a severe risk of injuries through malfunction of the vehicle.

- Always connect the yellow “brake” coupling head and then the red “reservoir” coupling head of the air brake supply lines. If you do not observe this order, the brake releases as soon as the red coupling head is connected and the vehicle can unintentionally move.
- When connecting the supply lines, always double-check that they are connected correctly.
- When connecting the supply lines, make sure that the coupling head seal rings are clean and provide a firm seal. Immediately replace any damaged seal rings.
- The supply lines must not rub against other objects or become tensioned, trapped or kinked during vehicle movements (e.g. in curves).

Procedure:

- Open the coupling cover on the tractor.
- Take the “brake” supply line with the yellow coupling head out of the supply line rack and open the coupling head cover.
- Connect the “brake” supply line with the yellow coupling head with the yellow coupling on the tractor.
- Take the “reservoir” supply line with the red coupling head out of the supply line rack and take off the coupling head cap.
- Connect the “reservoir” supply line with the red coupling head with the red coupling on the tractor.
- Release the parking brake and remove the wheel wedges.

5.18.3.4 Disconnecting the air brake supply lines

WARNING!

Danger through incorrect disconnection of the supply lines.

Incorrectly disconnecting the supply lines can present a severe risk of injuries through malfunction of the vehicle.

- Always disconnect the red “reservoir” coupling head first and then the yellow “brake” coupling head of the air brake supply lines. If you do not observe this order, the brake does not immediately engage and the vehicle can unintentionally move.

Procedure:

- Secure the vehicle against unintentional rolling and starting.
- Disconnect the “reservoir” supply line with the red coupling head from the coupling on the tractor and close the coupling head with the cap.
- Disconnect the “brake” supply line with the yellow coupling head from the coupling of the tractor and close the coupling head with the cap.
- Place the “brake” and “reservoir” supply lines into the supply line rack in the correct positions.
- Close the coupling cover on the tractor.

5.18.3.5 Brake effect regulator with manual adjustment

WARNING!

Danger through incorrect setting of the brake effect regulator.

An incorrect brake pressure setting can cause increased brake and tyre wear and result in dangerous driving conditions.

- Before each trip, set the brake effect regulator according to the vehicle's load with the manual adjuster.
- Do not set the brake pressure too high to avoid blocking of the wheel brakes.
- Do not set the brake pressure too low to prevent an insufficient brake effect resulting in dangerous driving conditions.

Depending on the vehicle's equipment level, the air brake can be equipped with a brake effect regulator with manual adjustment (Image 59 / pos. 1). When operating the vehicle, the brake pressure must be adapted to the vehicle load. To do this, set the lever (Image 59 / pos. 2) on the brake effect regulator (Image 59 / pos. 1) towards the arrow (Image 59 / pos. 3) by hand according to the vehicle load.

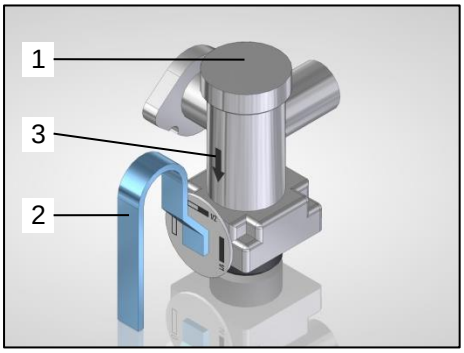


Image 59: Brake effect regulator

Procedure:

The brake effect regulator can be set to full load, half load or unladen. Set the lever (Image 59 / pos. 2) as follows:

Lever position		Vehicle	Brake
■	= Full load	Hitched vehicle has the permissible gross weight.	Full brake effect
▬	= Half load	The hitched vehicle carries half of its payload.	Medium brake effect
□	= Unladen	Trailer is unladen.	Low brake effect

The vehicle can be moved without brake effect with the release valve (if fitted).

Observe the notes and instructions in the operating instructions, chapter "Functions and settings", section "Air brake" /"Moving the vehicle without supply lines using the release valve".

5.18.3.6 Moving the vehicle without supply lines using the release valve

WARNING!

Danger of ineffective brakes for people when moving the vehicle without connected air brake supply lines.

If a vehicle's air brake supply lines are not connected, its brakes do not work. This can cause serious injuries or death.

- Moving the vehicle on public roads without connected air brake supply lines is prohibited.

WARNING!

Risk of injury through movements of tractor and vehicle or of vehicle parts!

- Before performing any work 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!

Observe the notes and instructions in the operating instructions, chapter "Commissioning", section "Securing the vehicle against unintentional rolling and starting".

Simple release valve:

The air brake is fitted with a release valve. This is used to activate and deactivate the air brake.

- Image 60 / pos. 1: Release valve → Black button

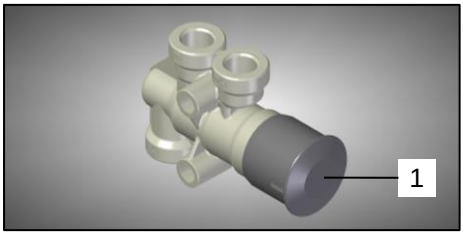


Image 60: Release valve

Double release valve:

If the vehicle is equipped with a spring actuated parking brake, the parking brake with hand crank is not installed. In that case, movement of the parked vehicle is prevented by the double release valve.

The double release valve has a flanged release valve and a parking valve for the spring actuated brake.

- Image 61 / pos. 1: Release valve → Black button
- Image 61 / pos. 2: Parking valve → Red knob

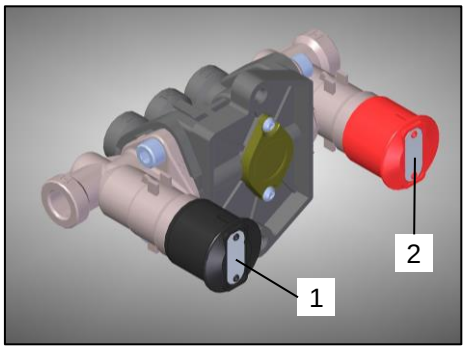
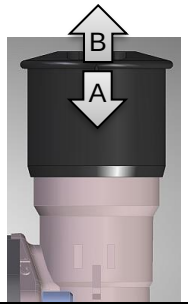
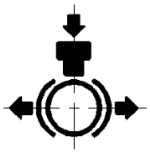
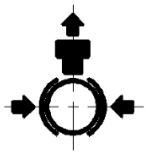


Image 61: Double release valve

If the vehicle is equipped with a spring-actuated parking brake, observe the notes and instructions in the operating instructions, chapter "Functions and settings", section "Brake system" / "Spring actuated parking brake".

Function of the release valve

Release valve (black) 		Position A: Released position Black knob pushed in = air brake is not active
		Position B: Driving position Black knob pulled out = air brake is active

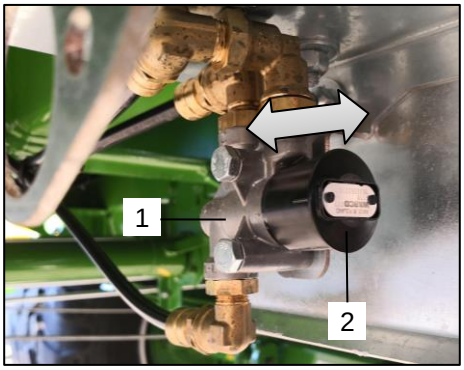


Image 62: Function of the release valve

Moving procedure:

To move the vehicle without connected supply lines, do the following:

- Secure the vehicle against unintentional rolling and starting.
- Deactivate the air brake by pressing in the black knob (Image 62 / pos. 2) of the release valve (Image 62 / pos. 1).
- The vehicle can now be moved.
- To activate the air brake, pull the black knob (Image 62 / pos. 2) of the release valve (Image 62 / pos. 1) out again. If the air brake supply lines are connected when the black knob (Image 62 / pos. 2) is pressed in, the black knob (Image 62 / pos. 2) of the release valve (Image 62 / pos. 1) automatically returns to its initial position.

5.19 Weighing System

The optionally available weighing device enables detection of the loaded material weight. The following is to be observed:

The weighing elements used are designed for a maximum load of 35 tons. Exceeding this tonnage may result in irreparable damage to the system and to breakage.

The maximum allowable weight must be adhered to (see technical data / identification plate)

The weighing elements are mounted on the side of the chassis. Damage caused by improper handling, e.g. fixing a lashing strap to them, must be avoided. Otherwise, proper functioning of the system cannot be guaranteed.

Image: Weighing element

Before the system is put into operation, all cables must be connected and the display must be mounted on the tractor cabin. The weighing system is preset at the factory and requires no adjustment by the user.

Important! Detailed operating instructions from the manufacturer digi Star, can be found in the Appendix.

6 Operation

Chapter “Operation” contains information on the possible machine controls. It describes the individual functions, the handling and the procedure for operating the vehicle using a terminal.

The components and vehicle functions listed in the operating instructions may differ from the vehicle standard equipment and are available as optional equipment in some cases. Since these operating instructions are general, various equipment options can be listed that are not available for your trailer. This also applies to the images. Images, drawings and 3D illustrations in these operating instructions do not always represent the exact vehicle type. However, the information which refers to the illustrations always corresponds to the vehicle type in this document.

WARNING!

Failure to observe the safety instructions may result in serious injury or death.

- In order to prevent accidents, the operator of the vehicle must read and observe the safety instructions in the "Safety" chapter.

WARNING!

Reaching into the vehicle can cause crushing, shearing, cutting, severing, being caught, entangled, pulled in and struck in the vehicle.

These hazards may arise when

- the unsecured tractor and the trailer unintentionally roll,
- driven tools and drives are not switched off,
- hydraulic functions are activated unintentionally,
- tools or vehicle components are in operation,
- the tractor engine is switched on inadvertently,
- raised vehicle components are lowered inadvertently.

These dangers exist during all work on the vehicle through unintentional contact with driven, unsecured tools and drives, which may run on after being switched off, and through raised, unsecured parts of the vehicle.

- Therefore the vehicle must be secured against unintentional rolling and starting before any work is done on the machine, e.g. making adjustments or correcting malfunctions.

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

Observe also the notes and instructions in the additional operating instructions for the machine control units. The operating instructions are supplied as separate, printed documents with your vehicle documents. If you do not have these documents, you can find them on the CD at the end of these operating instructions.

6.1 Terminal for electromagnetic scraper floor adjustment (E-control light)

The hydraulic functions for adjusting the scraper floor are controlled with the terminal for electromagnetic scraper floor adjustment (E-control light). This terminal has the following elements:

- Terminal ON–OFF
- Continuous scraper floor speed adjustment

Image 63: Terminal for electromagnetic scraper floor adjustment (E-control light)

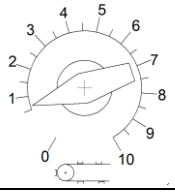
All other hydraulic functions have no terminal functionality. Such functions can be operated directly from the tractor's control units for the manually controlled hydraulic system after coupling the supply lines to the tractor.

Observe the notes and instructions in the operating instructions, chapter "Functions and settings", section "Hydraulics".

	NOTE
	• Protect the terminal from water. • Store the terminal in a dry room or otherwise protected from moisture if it is not used for an extended period (e.g. in winter). • Disconnect the power supply during installation and repair work. Remove all electronic components (terminal, etc.) during welding work. Overvoltage can damage the terminal's electronics.

6.1.1 User interface of the terminal for electromagnetic scraper floor adjustment (E-control light)

Image 64: User interface of the terminal for electromagnetic scraper floor adjustment 20180710-105001-BTA

1	Main switch	O	Terminal Off (indicator lamp pos. 2 off)
		I	Terminal On (indicator lamp pos. 2 lit)
2	Indicator lamp (ON)	○	Not lit: Control Off
		☀	Lit: Control On
3	Scraper floor speed		Setting the scraper floor speed Setting value: 0 - 10

6.2 Pilotbox Spreader terminal

The hydraulic functions are operated using the Pilotbox Spreader terminal. This terminal has the following elements:

- Terminal ON–OFF
- Continuous scraper floor speed adjustment
- Scraper floor reversing
- Raise / lower spreader hood
- Raise / lower dosing wall
- Lock / release follow-up steering axle (optional)
- Raise / lower lift axle (optional)
- Raise / lower jack stand (optional)
- Raise / lower spread pattern limiter (optional).

Image 65: Pilotbox Spreader terminal

Additional hydraulic functions without control block connection have no terminal functionality. Such functions can be operated directly from the tractor's control units for the manually controlled hydraulic system after coupling the supply lines to the tractor.

Observe the notes and instructions in the operating instructions, chapter "Functions and settings", section "Hydraulics".

	NOTE
	• Protect the terminal from water. • Store the terminal in a dry room if it is not used for an extended period (e.g. in winter). • Disconnect the power supply during installation and repair work. Remove all electronic components (terminal, etc.) during welding work. Overvoltage can damage the terminal's electronics.

6.2.1 User interface of the Pilotbox Spreader terminal

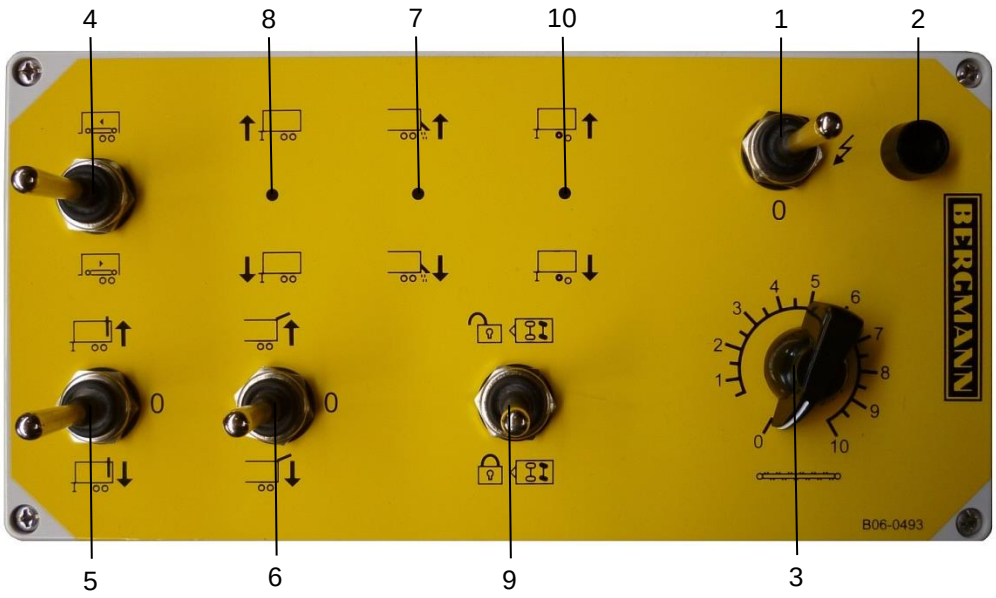
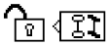


Image 66: User interface of Pilotbox Spreader 20180709-114501-BTA

1	Main switch	O	Terminal Off (indicator lamp pos. 2 off)
			Terminal On (indicator lamp pos. 2 lit)
2	Indicator lamp (ON)	○	Not lit: Control Off
			Lit: Control On
3	Scraper floor speed		Setting the scraper floor speed Setting value: 0 - 10
4	Scraper floor conveying direction		Starting up (towards spreader unit)
			Reversing (towards front wall)
5	Dosing wall		Raise
			Lower
6	Tailgate		Raise (open)
			Lower (close)
7	Spread pattern limiter		Raise
			Lower
8	Jack stand		Raise
			Lower

9	Steering axle		Unlock
			Lock
10	Lift axle		Raise
			Lower

6.3 Terminal BCT20

The hydraulic functions are operated using the BCT20 terminal. The terminal is characterized by

- ON/OFF for terminal,
- rotary / push button,
- ergonomically arranged keys,
- back-lit membrane keypad,
- backlit display,
- freely programmable sequence control of individual functions,
- trip counter,
- a variety of functions.

Fig. 67: Terminal BCT20

Additional hydraulic functions without control block connection have no terminal functionality. Such functions can be operated directly by the tractor control units according to the hydraulic system manual control after coupling the supply lines to the tractor.

For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the “Hydraulics” section.

	NOTICE
	• Protect the terminal from water. • Store the terminal in a dry room if it is not used for a long period (e.g. in winter). • Disconnect the power supply during installation and repair work. Remove all electronic components (terminal, BSG, ISO-Gate, etc.) during welding work. Overvoltage can damage the terminal's electronics.

6.3.1 BCT20 Terminal User Surface

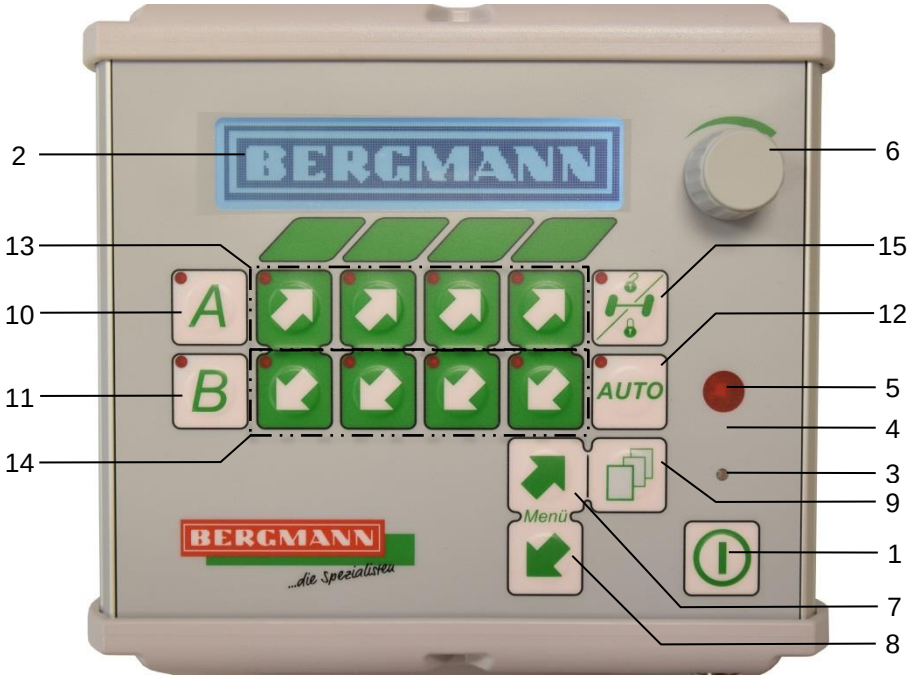


Fig. 68: BCT20 user surface B10-0233-BTA_20170329

1	Main switch		Switching the terminal On / Off
2	Display		Menu display with the respective functions
3	Light sensor		Controls the back lighting.
4	Signal horn		Signals e.g. “FULL“ or “Scraper floor stop“ (In combination with the light)
5	Indicator light		Signals e.g. “FULL“ or “Scraper floor stop“ (In combination with the signal horn)
6	Rotary / push button		For changing and confirming settings such as the transport floor speed.
7	Next menu		For changing the menu.
8	Previous menu		For changing the menu.
9	Shift key		For calling up further functions within a menu.

10	Function memory "A"		Programmable sequence of different functions - Press and hold the key: Functions are called up. - Release the key: Stop function sequence. - Pressing and holding the key again within 2 seconds: Function continues. - Pressing and holding the key again after 2 seconds: Restarts functions from the beginning. <u>Setting Mode:</u> - Press briefly: Setting mode opens. - Press briefly: The setting mode is closed and settings are saved.
11	Function memory "B"		
12	Auto key		To activate automatic functions, e.g. permanent activation of the transport floor or automatic filling system (depending on machine type and menu level)
13	Function keys forward / up		Operating the functions shown in the display
14	Function key back / down		Operating the functions shown in the display
15	Steering axle Lock / Unlock:		Operating the steering axle function  Unlock: Press key once briefly (Unlocked: red LED lights up)  Lock: Press key once briefly (Blinking LED: Controller closes steering axle Locked: red LED off,)

Other machine functions (e.g. work light, tailgate, jack stand, etc.) can be called up by pressing the shift key (Fig. 68 / Pos.9) and can be operated using the function keys (Fig. 68 / Pos.13+14).

6.3.2 Quick Start with BCT20 Terminal

1.	Switch the terminal on.	Press main switch
2.	Select menu	- 2/3: Unloading
3	Switch PTO shaft on	Observe the speed depending on equipment and type!
4.	Switch oil supply on.	Not necessary with load sensing
5.	Select function	e.g. Raise dosing unit etc.
6.	Switch scraper floor on	Press the Auto key
7.	Set scraper floor speed	Turn only: - Changes the current scraper floor speed Turn and press once: - Changes the saved scraper floor start speed

6.3.3 BCT20 Terminal Menu Structure

The individual menus are structured as follows:

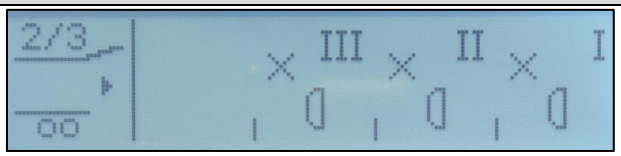
1/3		Driving on Roads
2/3		Unloading
3/3		Trip counter

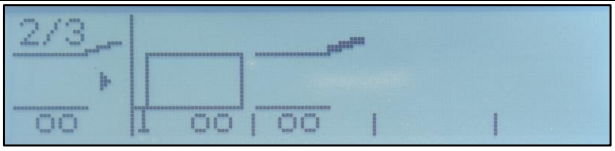
6.3.3.1 Menu 1/3: Driving on roads

Menu 1/3 / Function block 1:				
				
-	-	-		
-	-	-		
	Work light III / All-round lighting		On	
			Off	
	Lift axle		Raise	
			Lower	

6.3.3.2 Menu 2/3: Unloading

Menu 2/3 / Function block 1:			
			
	Spread pattern limiter		Raise
			Lower
	Dosing Wall		Raise
			Lower
	Scraper Floor		Switch scraper floor on permanently The LED lights when the scraper floor is switched on. With spreader unit speed monitoring, the scraper floor only starts when the speed is reached.
			Adjust scraper floor speed The set speed is displayed above the transport floor pictogram.
			Back
			Forward (reverse)
	Lift axle		Raise
			Lower

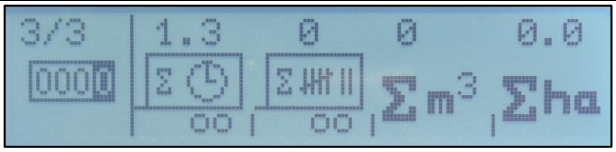
Menu 2/3 / Function block 2:				
				
-	-	-		
	Light lll		On	
			Off	
	Light ll		On	
			Off	
	Light l		On	
			Off	

Menu 2/3 / Function block 3:			
			
	Jack stand		Raise
			Lower
	Tailgate		Raise
			Lower
-		-	
-	-	-	

6.3.3.3 Menu 3/3: Trip counter

Menu 3/3 / Function block 1:			
			
	Memory 1 - 10		Trip counter up
			Trip counter down
	= Trip counter off		Activate / Deactivate
AUTO	= Trip counter on		Activate / Deactivate
	Time		-
			Activate / Deactivate: timed Press and hold for 2 seconds and release again to delete the value.
Example: 8.4 h = 8 hours and 24 min. (4 x 6 min = 24 min)			
	Number of trips		Increase value step by step
			Decrease value step by step Press and hold for 2 seconds and release again to delete the value.
1 trip = 0.5 min. transport floor on + 4 min. transport floor paused			

Menu 3/3 / Function block 2:			
			
0000	Memory 1 - 10		Trip counter up
			Trip counter down
m³ oo	Load capacity		Increase load capacity
			Decrease load capacity
m³	Delivered volume		Increase value step by step
			Decrease value step by step Press and hold for 2 seconds and release again to delete the value.
ha	Processed area		Increase value step by step
			Decrease value step by step Press and hold for 2 seconds and release again to delete the value.

Menu 3/3 / Function block 3:	
	
Σ oo	Total time
Σ oo	Total trips
Σ m³	Total delivered volume
Σha	Total area

6.4 ISOBUS terminal CCI50 / CCI200

The hydraulic functions are operated using the CCI50 / CCI200 terminal. The terminals are characterised by

- ISOBUS UT function (certified), for operating existing ISOBUS machines,
- ISOBUS AUX-N function (certified), for assigning machine functions to a joystick,
- Large, clear displays
  (CCI50 - 5.6” diagonal, CCI200 - 8.3" diagonal)
- Illuminated display with membrane keypad,
- Touch screen for intuitive operation,
- Ergonomically arranged keys, with the possibility to mirror them from left to right,
- ISB switch for stopping machine functions (depending on the machine),
- Interfaces incl. USB, video and more.
- Up to eight video cameras possible,
- Optional wide range of apps: CCI.CONTROL, CCI.COMMAND, CCI.CAM, CCI.TECU etc.,

Fig. 69: CCI terminal

For this, the instructions and notices in the separate operating instructions for the “CCI 50 / CCI 200 terminal" machine controls must also be observed!

Additional hydraulic functions without control block connection have no terminal functionality. Such functions can be operated directly by the tractor control units according to the hydraulic system manual control after coupling the supply lines to the tractor.

For this, observe the notices and instructions in the operating instructions in chapter "Functions and Settings" in the “Hydraulics” section.

	NOTICE
	• Protect the terminal from water. • Store the terminal in a dry room if it is not used for a long period (e.g. in winter). • Disconnect the power supply during installation and repair work. Remove all electronic components (terminal, BSG, ISO-Gate, etc.) during welding work. Overvoltage can damage the terminal's electronics.

6.4.1 CCI50 / CCI200 Terminal Operating Panel

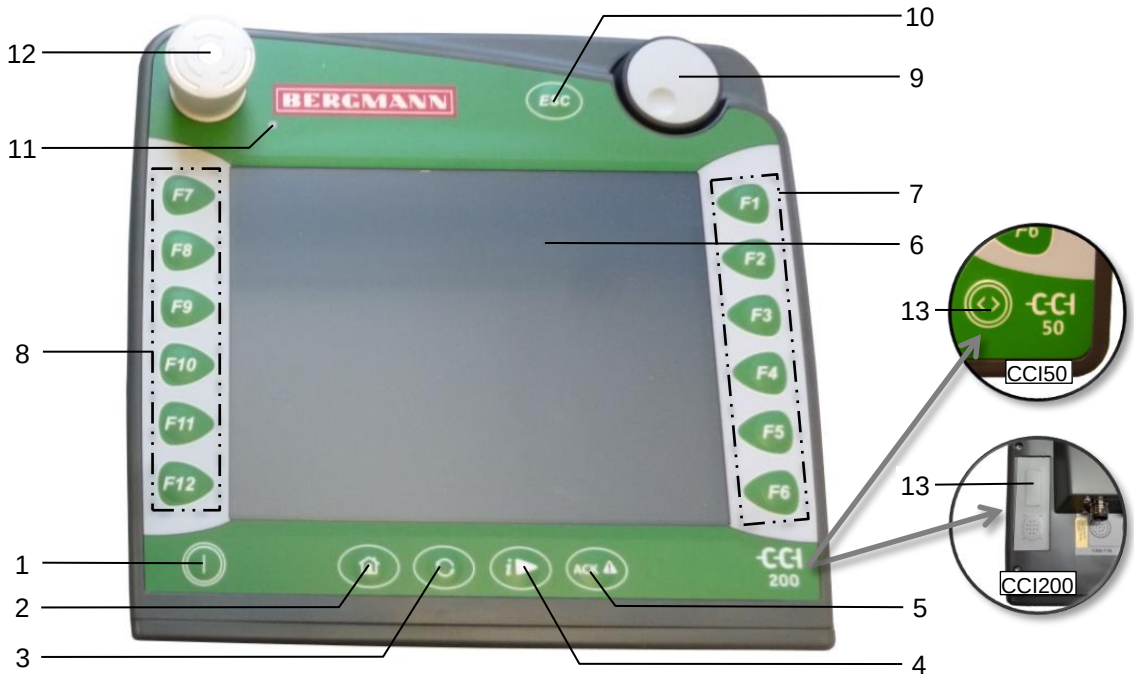


Image 70: CCI50 / CCI200 Operating panel

1	Main switch		Switching the terminal On / Off
2	Home key		Pressing the home button will take you directly to the main menu. Apps that are active at the time of the switch will remain active in the background. Notice When switching from an active machine function, some running machine functions may switch off automatically. More detailed information can be found in the machine operating instructions.
3	Switch key		Pressing the switch key repeatedly and shortly, switches sequentially between the machine operations and the individual apps, which are selected in the user settings under "Switch Apps", for example from machine operation to CCI.Control. Notice When switching from an active machine function, some running machine functions may switch off automatically. More detailed information can be found in the machine operating instructions.

4	i - key		The i key can be configured as desired. It allows direct access to an app or machine operation which is selected in the user settings under "Configuring unassigned keys".
5	Acknowledge key (ACK)		The acknowledgement key (ACK) is used to confirm error messages.
6	Touch screen		The terminal is equipped with a high-quality touch screen for menu navigation and convenient input of values and texts. By touching the screen, functions can be directly called up and values can be changed.
7	Function keys F1 – F6		Six function keys (F1-F12) are arranged to the right and left of the display. By pressing a function key, the function shown in the display next to the function key is executed.
8	Function keys F7 – F12		
9	Scroll wheel		The scroll wheel is used for direct, fast input of set points and for navigation through list elements: <u>Turning the scroll wheel to the right</u> - The value is increased in an input dialogue for numeric values. - The system switches to the next element in a list. <u>Turning the scroll wheel to the left</u> - The value is decreased in an input dialogue for numeric values. - The system switches to the previous element in a list. <u>Pressing the scroll wheel</u> - The changed value is confirmed. - A marked listed element is selected.
10	ESC key		Pressing the ESC key cancels inputs and functions. Changes which were made are not accepted and the previously valid value is retained. <u>Notice</u> The ESC key can only be used if there is an ESC key on the control panel display which can be operated via the touch screen. The key and touch screen functions are identical.
11	Day light sensor		The daylight sensor provides the value for the display illumination on/off switch point. The display illumination can be set in the terminal menu.

12	ISB switch (Stop switch)		A stop command (ISO stop) is sent to the ISOBUS when the terminal's ISB emergency stop button is pressed. This command can be evaluated using a connected ISOBUS machine in order to initiate appropriate automatic measures or to deactivate functions in a hazardous situation.

WARNING!

Risk of injury from running machines!

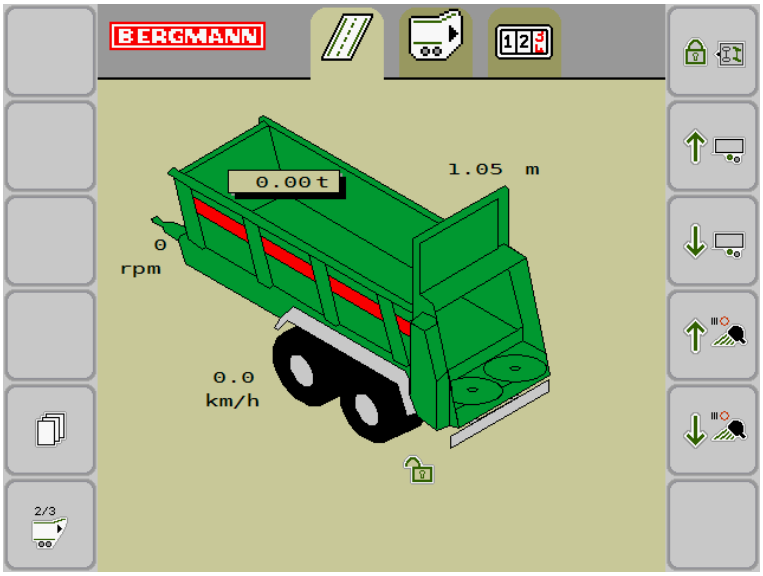
Not all ISOBUS machines support the stop function. This means that a machine can continue to run even after the stop switch has been pressed. This can lead to injury.
Under no circumstances does the stop switch affect tractor functions, meaning neither PTO shaft nor hydraulics are affected.

13	Soft key switcher		CCI50: Key located in front CCI200: Key located in rear By pressing the soft key switcher, the two soft-key rows on the left and right edge of the screen are switched. This makes one handed terminal operation possible. Notice The soft-key row positions can only be changed under machine operation.

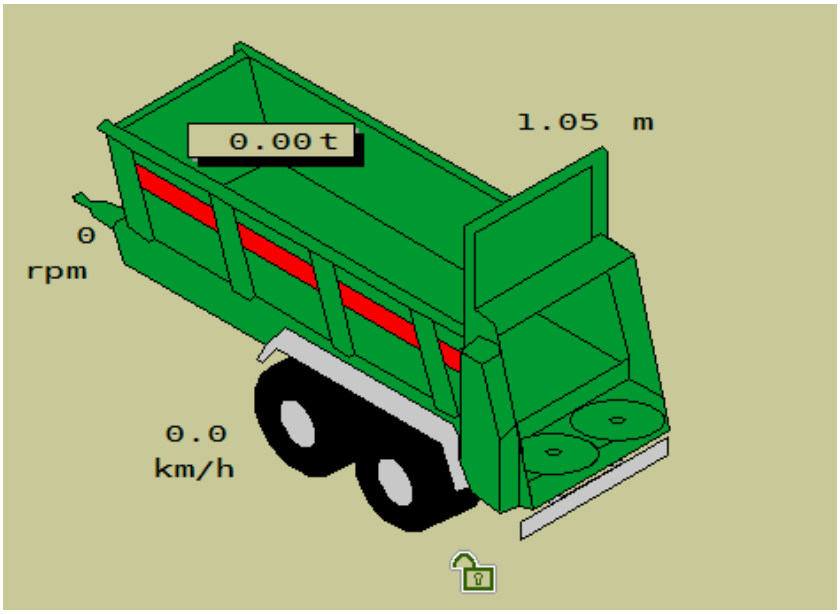
6.4.2 CCI50 / CCI200 Terminal Menu Design

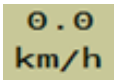
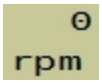
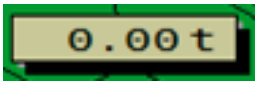
1/3		Driving on Roads
2/3		Spreading
3/3		Trip counter

6.4.2.1 Menu 1/3: Driving on roads

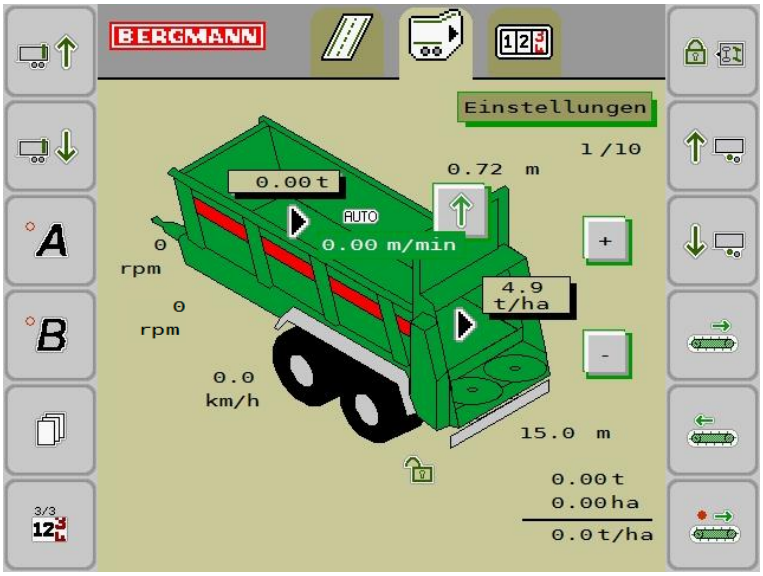


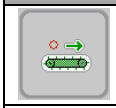
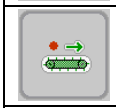
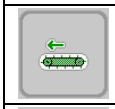
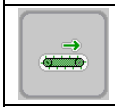
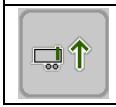
Menu	
	Active menu 1/3 "Driving on Streets" – can be selected directly via touch or scroll wheel
	Inactive menu 2/3 "Spreading" – can be selected directly via touch or scroll wheel
	Inactive menu 3/3 "Trip Counter" – can be selected directly via touch or scroll wheel
Soft keys	
	Paging through further functions not possible in this menu
	Change to menu 2/3 "Spreading" Press and hold: Service Access
	Open steering axle
	Close steering axle
	Raise lift axle
	Lower lift axle
	Switch work light 3 / surrounding lights on (Display shows that work light is off)
	Switch work light 3 / surrounding lights off (Display shows that work light is on)

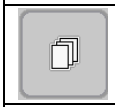


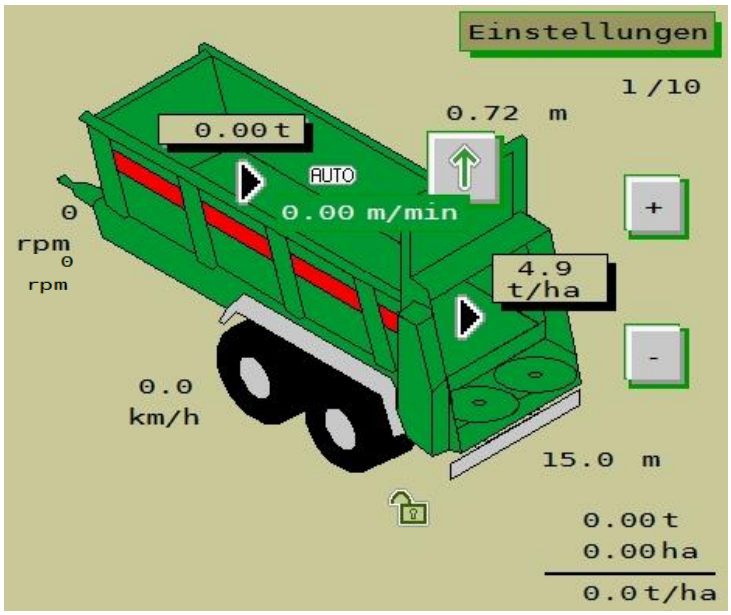
Data mask	
	Steering axle open
	Steering axle closed; blinks in display: Controller closes steering axle
	Driving speed indicator
	PTO speed in RPM
	Current payload in tons – weight in body, press key for approx. 2 seconds: Set indicator to zero
	Dosing wall height Depending on equipment: - Without measuring system in cylinder: Set height - With measuring system in cylinder: Actual height

6.4.2.2 Menu 2/3: Spreading

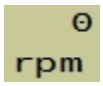
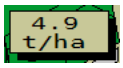
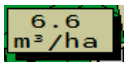
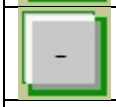
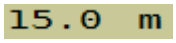
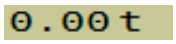
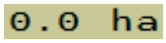
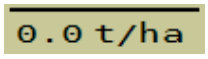


Menu	
	Inactive menu 1/3 "Driving on Street" – can be selected directly via touch or scroll wheel
	Inactive menu 2/3 "Spreading" – can be selected directly via touch or scroll wheel
	Inactive menu 3/3 "Trip Counter" – can be selected directly via touch or scroll wheel
Soft keys	
	Switch scraper floor on Automatic: Controlling the speed and monitoring the rotational speed of rollers and spreading disks. In this display, the scraper floor is switched off.
	Scraper floor off (automatic); In this display of the scraper floor is switched on.
	Reverse scraper floor
	Scraper floor manually towards unloading, control mode % and without monitoring the speed of of rollers and spreader disks,
	Raise lift axle
	Lower lift axle
	Open steering axle
	Close steering axle
	Raise dosing wall

	Lower dosing wall
	Browse for more functions
	Change to menu 3/3 "Trip Counter" Press and hold: Service Access
	Switch spotlight I on (Display shows that work light is off)
	Switch spotlight I off (Display shows that work light is on)
	Switch spotlight II on (Display shows that work light is off)
	Switch spotlight II off (Display shows that work light is on)
	Switch work light III / surrounding lights on (Display shows that work light is off)
	Switch work light 3 / surrounding lights off (Display shows that work light is on)
	Raise spread pattern limiter
	Lower spread pattern limiter
	Raise jack stand
	Lower jack stand
	Raise tailgate
	Lower tailgate



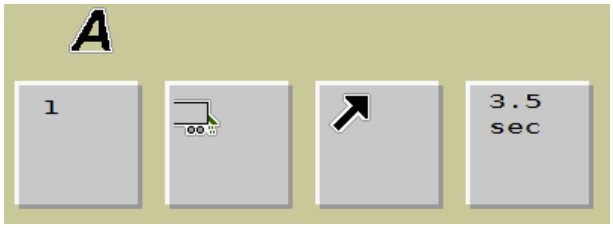
Data mask	
Einstellungen	Go to submenu "Settings"
1/10	Active trip counter memory
	Scraper floor 1. Gear
	Scraper floor 2. Gear (overdrive for emptying)
AUTO	Scraper floor automatically on
0.00 m/min	Indicator, scraper floor actual speed in meters per minute (m/min)
	Steering axle open
	Steering axle closed; blinks in display: Controls try to close steering axle
0.72 m	Dosing wall height Depending on equipment: - Without measuring system in cylinder: Set height - With measuring system in cylinder: Actual height
	Key for opening the dosing wall automatically; optional in measuring systems in dosing wall cylinder
	Information: Dosing wall must be opened more to reach the set value. Only with measuring systems in dosing wall cylinder
	Information: Dosing wall must be closed more to reach the set value. Only with measuring systems in dosing wall cylinder
0.00t	Current payload in tons – weight in body, press key for approx. 2 seconds: Set indicator to zero

	PTO speed in RPM
	Driving speed indicator
	Set spread quantity in t/ha, entry window opens when pressed
	Set spread quantity in m3/ha, entry window opens when pressed
	Increase scraper floor speed or set value in steps
	Decrease scraper floor speed or set value in steps
	Indicator for working width
	Indicator for volume spread
	Indicator for covered surface
	Indicator for actual spread rate

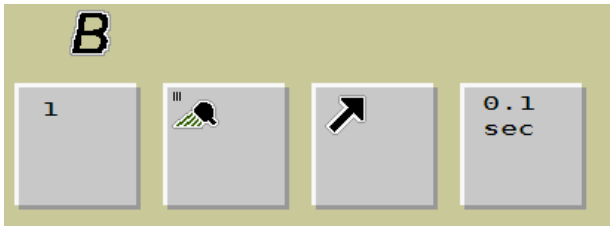
6.4.2.2.1 Function sequences A and B

Function sequence A:	
 inactive	Hold key: Stored functions run in sequence. Release key: Function stops.
 active	Press key briefly "Settings A" screen opens, briefly pressing the key again closes the "Settings A" screen and saves the settings.
Function sequence B:	
 inactive	Hold key: Stored functions run in sequence. Release key: Function stops.
 active	Press key briefly: "Settings B" screen opens, briefly pressing the key again closes the "Settings B" screen and saves the settings.

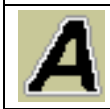
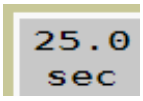
Notice on Function sequences



A: Step 1: Raise spread pattern limiter for 3.5 seconds.



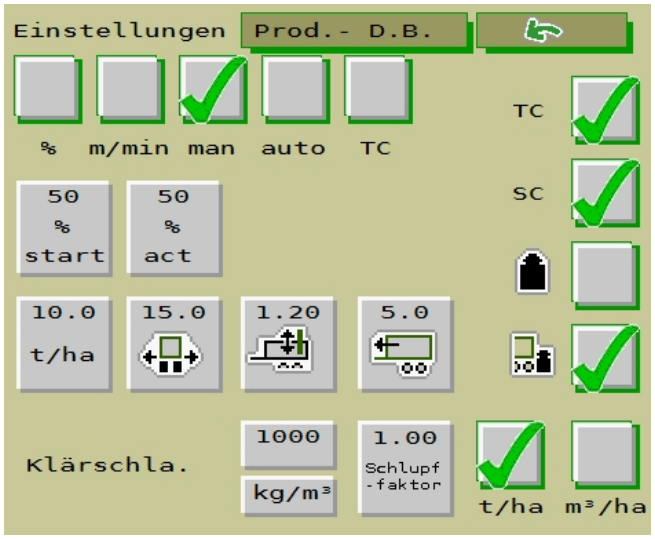
B: Step 1: Switch work light lll on; a 0.1 second impulse in sufficient

	Settings for function sequence A
	Settings for function sequence B
	Step number: Up to eight functions can be stored Step 1 is the first function and step 8 is the last function It is possible to select via touch or scroll wheel
	Function selection field All displayed functions can be selected It is possible to select via touch or scroll wheel
	Selecting the direction or mode Up/back, down/forward, off (X) or on (Auto) It is possible to select via touch or scroll wheel
	Duration for this step Settings from 0 to 25 seconds in 0.1 second steps It is possible to select via touch or scroll wheel

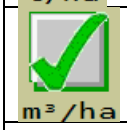
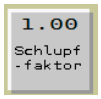
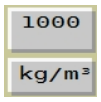
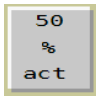
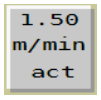
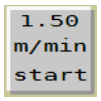
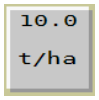
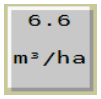
Special functions

	Scraper floor (Automatic) on
	Scraper floor (Automatic) off
	Open steering axle
	Close steering axle
	Work light on
	Work light off

6.4.2.2.2 Settings



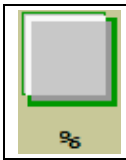
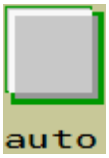
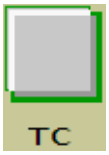
Data mask	
Einstellungen	Indicator: Submenu "Settings"
Prod.- D.B.	Go to submenu "Product data base"
	Return to main menu "Spreading"
%	Scraper floor mode “%” For this, also observe the instructions and notices in the operating instructions in the “Scraper Floor Mode“ section!
m/min	Scraper floor mode “m per minute” For this, also observe the instructions and notices in the operating instructions in the “Scraper Floor Mode“ section!
man	Scraper floor mode “Spread Rate”, fixed driving speed A green tick means that this mode is activated For this, also observe the instructions and notices in the operating instructions in the “Scraper Floor Mode“ section!
auto	Scraper floor mode “Spread Rate”, variable driving speed For this, also observe the instructions and notices in the operating instructions in the “Scraper Floor Mode“ section!
TC	Scraper floor mode “TaskController” For this, also observe the instructions and notices in the operating instructions in the “Scraper Floor Mode“ section!
TC	Task-Controller client Bergmann active After setting the tick mark, restart the complete Bergmann controller!
TC	Task-Controller client Bergmann inactive

	SectionControl activated
	SectionControl inactive
	Weight compensation activated
	Weight compensation deactivated
	Weight summation activated
	Weight summation deactivated
	Set quantity per hectare – t/ha A green tick means that this mode is activated
	Set quantity per cubic meter per hectare – t/ha A green tick means that this mode is activated
	Slip factor setting Standard value 1.00 Factor 2.00: Feed at double speed Factor 0.50: Feed at half speed
	Density setting Key for setting the density For determining the material density using the currently loaded weight, the corresponding volume is inquired using the input mask.
	Indicator: Selected product
	Scraper floor speed in %: current value, or set value
	Scraper floor speed in %: Start value - the current value of the scraper floor is replaced by the starting value when the scraper floor is switched off.
	Scraper floor speed in m/min: current value, or set value
	Scraper floor speed in m/min: Start value - the current value of the scraper floor is replaced by the starting value when the scraper floor is switched off.
	Set spread rate in t/ha
	Set spread rate in m³/ha
	Working width
	Dosing wall height: Set point

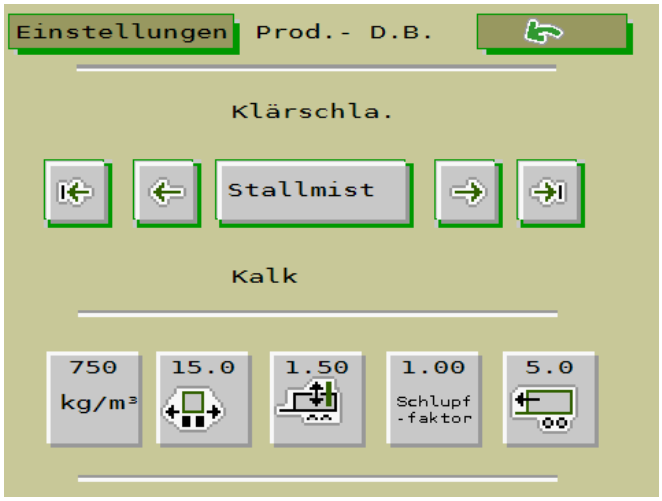
	Driving speed

6.4.2.2.3 Scraper floor mode

Switching is carried out via touch or scroll wheel by directly selecting the icons

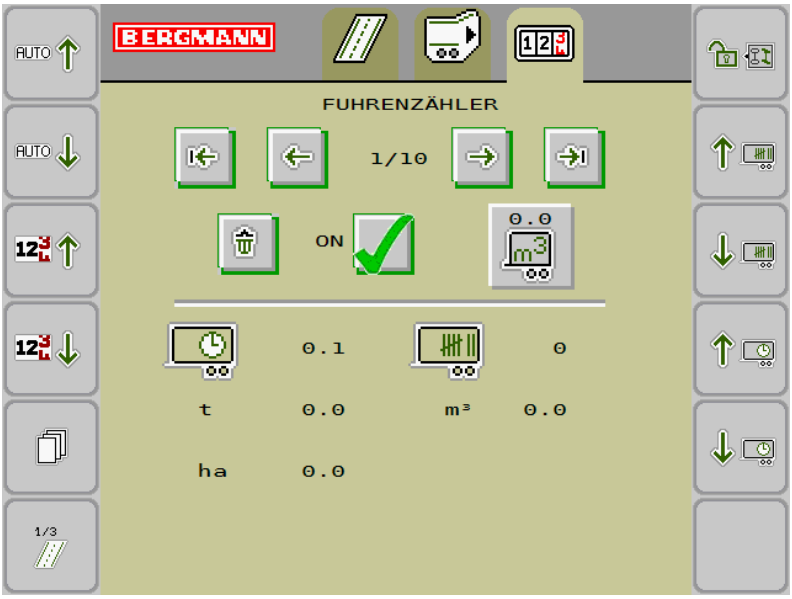
	Manual settings
	Control in % of the maximum possible scraper floor speed; at 70% overdrive is switched on (if available)
	Scraper floor speed control
	Controlling scraper floor speed in meters per minute Example: 1.25 m/min means that the scraper floor moves exactly 1.25 m towards the back in one minute. Overdrive switches on automatically when a factory-preset speed is reached.
	Spread rate control, fixed driving speed:
	According to entered values: Depending on spread rate (m³/ha or t/ha), working width, dosing unit height, driving speed, density and slip factor the controller sets the scraper floor to the speed necessary for the desired spread rate. Overdrive switches on automatically when a factory-preset speed is reached.
	Spread rate control, variable driving speed:
	According to entered values: Depending on spread rate (m³/ha or t/ha), working width, dosing unit height, driving speed, density and slip factor the controller sets the scraper floor to the speed necessary for the desired spread rate. The driving speed is automatically taken from a wheel sensor or from the tractor (analogue or ISOBUS) and can not be entered directly. Overdrive switches on automatically when a factory-preset speed is reached.
	Controlling the spread rate variable according to Task-Controller, variable driving speed; VRC - "variable rate control"
	According to entered values: Working width, dosing unit height the controller sets the scraper floor to the speed necessary for the desired spread rate. The driving speed is automatically taken from a wheel sensor or from the tractor (analogue or ISOBUS) and does not need to be entered directly. The Spread quantity is taken from a task controller order in t/ha (weight per area) and can not be entered directly. Overdrive switches on automatically when a factory-preset speed is reached.

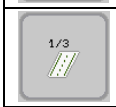
6.4.2.2.4 Product data bank



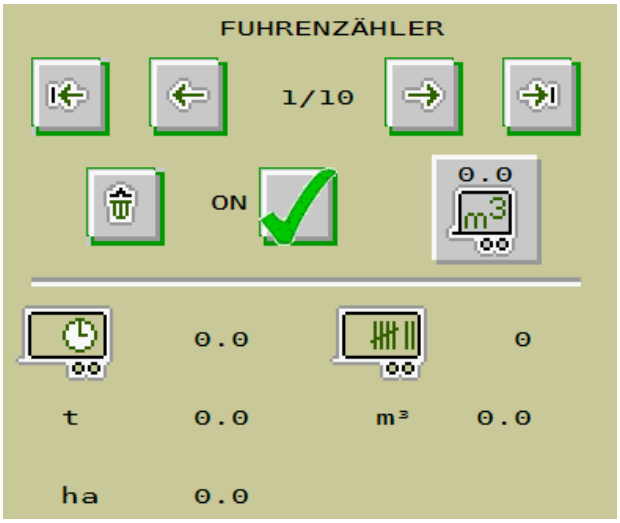
Data mask	
Einstellungen	Go to submenu "Settings"
Prod.- D.B.	Indicator for submenu "Product Data Base"
	Return to submenu "Settings"
	Return to first product
	Return one product
Klärschla.	Previous product
Stallmist	Name of selected product Selecting accepts product data in "Settings" and stores changes made to the product information
Kalk	Next product
	Forward one product
	Forward to last product
750 kg/m³	Density (suggestion) for selected product
15.0	Working width (suggestion) for selected product
1.50	Dosing wall height (suggestion) for selected product
1.00 Schlupf -faktor	Slip factor (suggestion) for selected product
5.0	Driving speed (suggestion) for selected product

6.4.2.3 Menu 3/3: Trip counter



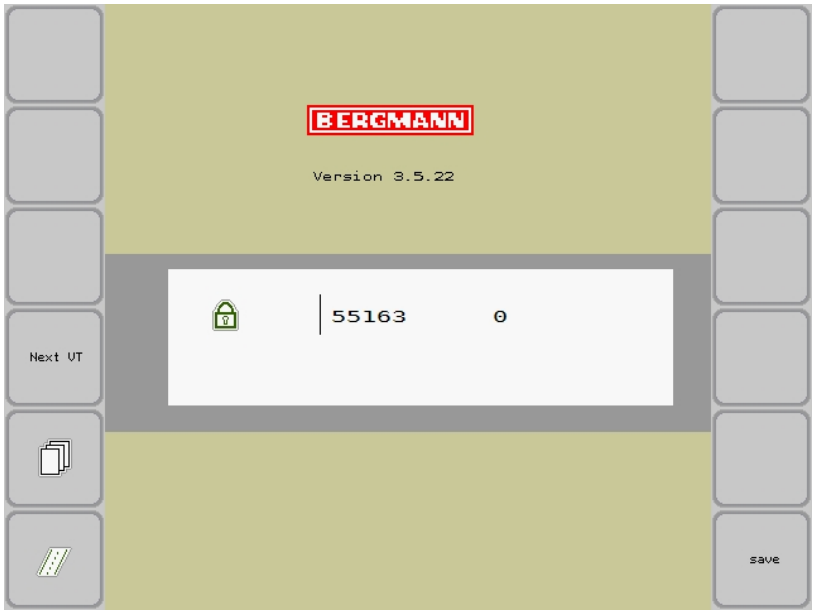
Menu	
	Inactive menu 1/3 "Driving on Street" – can be selected directly via touch or scroll wheel
	Inactive menu 2/3 "Spreading" – can be selected directly via touch or scroll wheel
	Active menu 3/3 "Trip Counter" – can be selected directly via touch or scroll wheel
Soft keys	
	Deactivate trip counter memory
	Deactivate trip counter memory
	Activate trip counter memory
	Activate trip counter memory
	Increase trip counter memory
	Decrease trip counter memory
	Browse for more functions
	Change to menu 1/3 "Driving on streets" Press and hold: Service Access

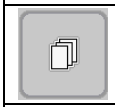
	Open steering axle
	Close steering axle
	Increase the number of trips step by step.
	Decrease the number of trips step by step. Press and hold: When released the number of trips in this memory location will be deleted
	No function
	Press and hold: When released the time in this memory location will be deleted
	Increase load capacity
	Decrease load capacity
	Indicator for increasing processed area in steps
	Indicator for decreasing processed area in steps Press and hold: When released the processed area indicator in this memory location will be deleted
	Indicator for increasing spread volumes in steps
	Indicator for decreasing spread volumes in steps Press and hold: When released the spread volumes indicator in this memory location will be deleted



Data mask	
FUHRENZÄHLER	Notice: Trip counter indicator information
	Return to first memory location
	Back one memory location
1/10	Trip counter memory, 1/10 to 10/10
Σ	Total (= ∑)
TC	TC – memory: Information that is sent to Task-Controller.
	One memory location forward
	Forward to last memory location
	Delete all counters in current memory location
ON	The displayed memory location is active; Memory location deactivates when pressed
ON	The displayed memory location is inactive; Memory location activates when pressed
0.0	Bin volume display and entry
0.0	Display total time for current memory: Example: 8.4 h = 8 hours and 24 min. (4 x 6 min = 24 min)
0	Display trips for current memory location: 1 trip = 0.5 min. transport floor on + 4 min. transport floor paused
m³ 0.0	Display spread volume for current memory location:
t 0.0	Display spread mass for current memory location:
ha 0.0	Display processed surface for current memory location:

6.4.2.4 Menu: Service Access



Soft keys	
	Change to next ISOBUS terminal, if more are available
	Paging through further functions not possible in this menu
	Change to menu 1/3 "Driving on streets"
	Save entered changes, not necessary here
Data mask	
Version 3.5.22	Software version
65241 0	"65241" random number - please give this number to Bergmann Service
"0"	Select input field for the access code via touch/Poti
! New MType !	Display when connecting a new Bergmann control unit (BSG) or when changing a control unit (BSG) to another machine type, e.g. from spreader to loading trailer and vice versa.
! No MType !	Display when no clearly allocation of the machine type. Also appears if the control unit supply voltage is too low (e.g. below 10 volts)

6.5 Speed Monitoring Display

The machine is optionally available with electronic speed monitoring. A visual and audible indicator signals the overload of driven machine components.

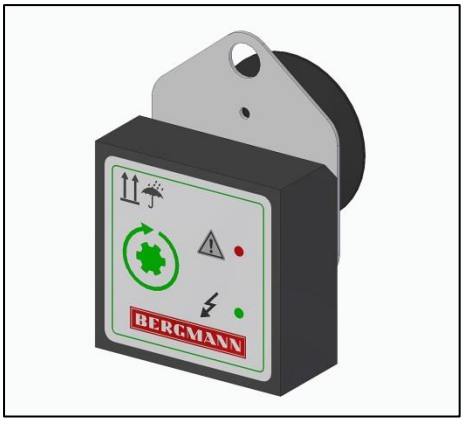


Image 71: Speed monitoring display

	NOTICE
	• Protect the terminal from water and observe the storage instructions. For this, also observe the instructions and notices in the operating instructions in the “Storing the Display“ section! • Disconnect the power supply during installation and repair work. Remove all electronic components (terminal, etc.) during welding work. Overvoltage can damage the terminal's electronics.

6.5.1 Speed Monitoring Display User Interface

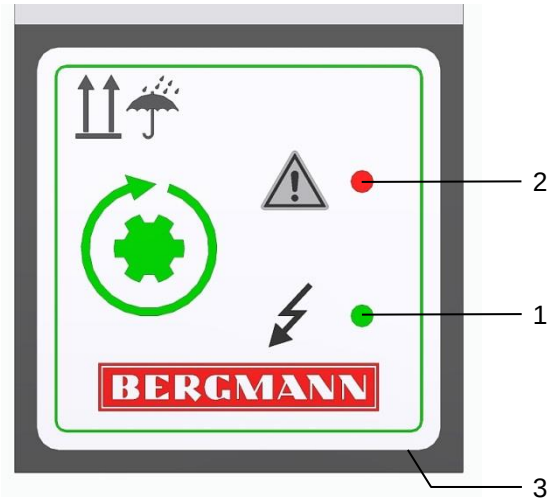


Image 72: Speed monitoring display user interface 20180731-095901-BTA

1	Indicator light (ON)		○	Not lit:	Controls off
				Lit (green)	Controls on
2	Warning light (Attention)		○	Not lit:	Speed monitoring okay
				Lit (red)	In combination with the horn, indicates an overload of the spreading unit.
3	Signal horn			No horn	Speed monitoring okay
				Horn	In combination with the warning light, indicates an overload of the spreading unit.

7 Commissioning

Chapter “Commissioning” provides information about the initial start-up as well as any further start-up of the vehicle.

WARNING!

Failure to observe the safety instructions may result in serious injury or death.

- In order to prevent accidents, the operator of the vehicle must read and observe the safety instructions in the “Safety” chapter.

CAUTION!

Risk of accidents or vehicle damage through incorrect commissioning!

- Have the initial start-up performed only by an authorized specialist.
- Make any adjustment work only with the drive switched off and the engine not running.
- Bring the vehicle to a standstill.
- Switch off the engine, pull the ignition key and take it with you.
- Secure the vehicle and tractor against rolling.

7.1 Securing the vehicle against unintentional rolling and starting

For all work on the vehicle (e.g. maintenance or adjustment), secure the vehicle against unintentional rolling and starting.

WARNING!

There is a danger of crushing, shearing, cutting, severing, trapping, entanglement, drawing in, catching and impact for people when reaching into or working on the vehicle.

These dangers can arise when

- the unsecured tractor and the vehicle roll away unintentionally,
- driven tools and drives are not switched off,
- hydraulic functions are unintentionally performed,
- tools or parts of the vehicle are driven,
- the tractor's engine is unintentionally started,
- raised parts of the vehicle unintentionally lower,

These dangers exist during all work on the vehicle through unintentional contact with driven, unsecured tools and drives, which may run on after being switched off, and through raised, unsecured parts of the vehicle.

- Before any work on the vehicle, such as making adjustments or eliminating faults, the vehicle must be secured against unintentional rolling and starting.

Observe the notes and instructions in the vehicle's operating instructions, chapter "Commissioning", section "Securing the vehicle against unintentional rolling and starting".

Observe the following instructions to secure the vehicle against rolling and unintentional starting:

- Position the vehicle on a firm, level ground.
- Secure all movable parts against unintentional lowering by either lowering the parts into a safe end position or securing them with suitable supports or the stopcock.
- Switch the drives off and wait until any parts that are still moving have come to a complete standstill.
- Depressurize the tractor's hydraulic system.
- Switch off the electronic systems.
- Switch off the tractor's engine.
- Pull the ignition key and keep it with you.
- Secure the vehicle and the tractor against rolling with the parking brake and wheel chocks.

For a description of the individual vehicle functions, refer to the instructions and notes in the operating instructions, chapter "Functions and settings".

7.2 After delivery

When you receive your vehicle, do the following:

- Remove all wiring and transportation aids.
- If the vehicle has come into contact with de-icing salt during transport, it must be thoroughly washed with water to prevent possible corrosion damage.
- Before start-up, grease all lubrication points.

7.2.1 Fitting the protective screen

Before taking the vehicle into operation, fit the protective screen to the front wall of the vehicle. It protects the tractor driver from particles flung out by the spreader unit.

To fit the protective screen (Image 73 / pos. 1) to the vehicle, the following attachment parts are required:

Pos.	Designation	Description	Quantity
1	Protective screen		1
2	Hexagon bolt	M12x025-8.8	3
3	Locking washer	A12	6
4	Locking nut	M12-8	3
5	Hexagon bolt	M12x065-8.8	4
6	Washer	12	4
7	Locking washer	A12	4
8	Locking nut	M12-8	4

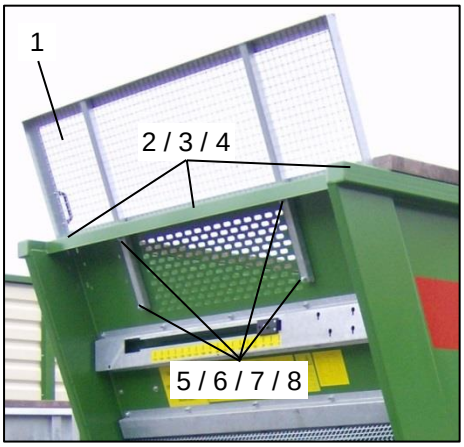


Image 73: Protective screen

Install the protective screen (Image 73 / pos. 1) as follows:

- Position the protective screen (Image 73 / pos. 1) on the front wall of the cargo space as shown in Image 73.
- Fit the protective screen (Image 73 / pos. 1) at the provided holes with the attachment parts (Image 73 / pos. 2+3+4).
- Fit the protective screen (Image 73 / pos. 1) at the provided holes with the attachment parts (Image 73 / pos. 5+6+7+8).
- Firmly tighten the nuts (Image 73 / pos. 4+8).

7.3 Adapting to the tractor

To optimize the utilization and safety of your vehicle, it must be matched to the tractor with which it is to be used.

To do this, observe the instructions and notes in the following sections.

	**NOTE**
	Whenever you change the tractor with which you operate the vehicle, recheck the following points and adapt the vehicle to the new tractor.

7.3.1 Changing the drawbar

When adapting to the tractor and during maintenance of the vehicle, the drawbar may have to be changed.

	**NOTE**
	Should the new drawbar have a different type approval number than the originals, the vehicle registration may no longer be valid.

The possible drawbars depend on the vehicle type and equipment. For further information, see the notes and instructions in the operating instructions, chapter “Commissioning”, sections “Suitability of the tractor” and “Drawbar of the vehicle”.

Preparations

- Secure the vehicle against rolling and unintentional starting.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

- Correctly uncouple the vehicle from the tractor.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Uncoupling from the tractor”.

7.3.1.1 Coupling unit with flange

Change the coupling unit as follows:

- Remove the coupling unit by loosening and removing the bolts.
- Position the new coupling unit over the corresponding holes and fasten it with the lock washers and bolts. If the previously removed bolts are worn, replace with new quality grade 10.9 bolts.

The bolts to be used can be found in the spare parts list. Always use quality grade 10.9 bolts!

- Tighten the screws to the appropriate torque.

Torques to be used can be found in the "Maintenance and Care" chapter in the "Tightening torques" /"Tightening torques for bolts with flanged coupling units" section in the operating manual.

- Lubricate the coupling unit at the lubrication points and on the contact surfaces on the coupling point.

7.3.2 Adapting the drive shaft

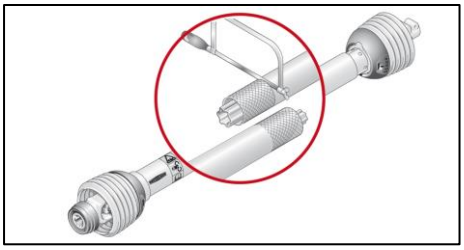


Image 74: Adapting the drive shaft

The length of the drive shaft must be adapted to the tractor used when taking the vehicle into operation for the first time. Whenever you change the tractor, you must also adapt the shaft again.

The procedure for shortening the drive shaft and the drive shaft guards is described in the following sections.

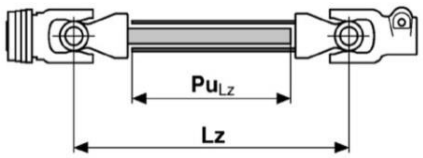
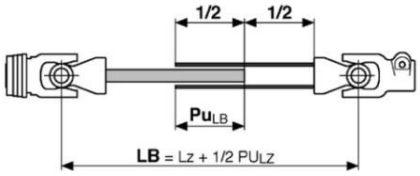
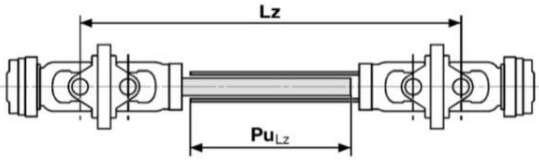
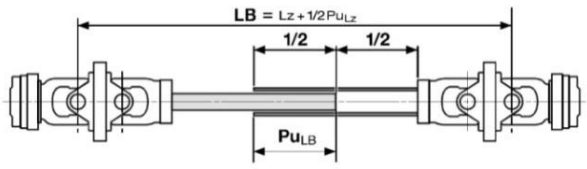
WARNING!

There is a risk of injury through drawing in and catching, as well as from ejected objects when the drive shaft is assembled or connected incorrectly or if unauthorized structural changes are made.

- Only authorized people must make approved structural changes to the drive shaft.
- The length of the drive shaft must be checked in all operating states, e.g. at full-lock turns to the right and left or when operating the hydraulic drawbar adjuster (if fitted); the drive shaft must not be compressed. If necessary, adjust the drive shaft before coupling it to your tractor for the first time.
- Changing the length of the drive shaft taking into account the required greatest possible sliding section overlap (see Image 75) is permissible.
- Not permissible are any structural changes to the drive shaft that are not described in the following sections and in the supplied operating instructions for the drive shaft.

Observe also the notes and instructions in the drive shaft manufacturer's operating instructions.

Greatest possible sliding section overlap

	Drive shaft length, retracted	Drive shaft length in operation
P / W / ECO		
PW / WW		

LZ = drive shaft length, retracted
LB = drive shaft length in operation
Pu = sliding section overlap 1/2 PuLZ for shafts <1010 mm, otherwise PuLZ ≥ 300 mm

Image 75: Greatest possible sliding section overlap

7.3.2.1 Shortening the drive shaft

Shorten the drive shaft as described below:

- Couple the vehicle correctly to the tractor without connecting the drive shaft.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Coupling to the tractor”.

- Secure the vehicle against rolling and unintentional starting.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

- Carry out the following steps (Image 76).

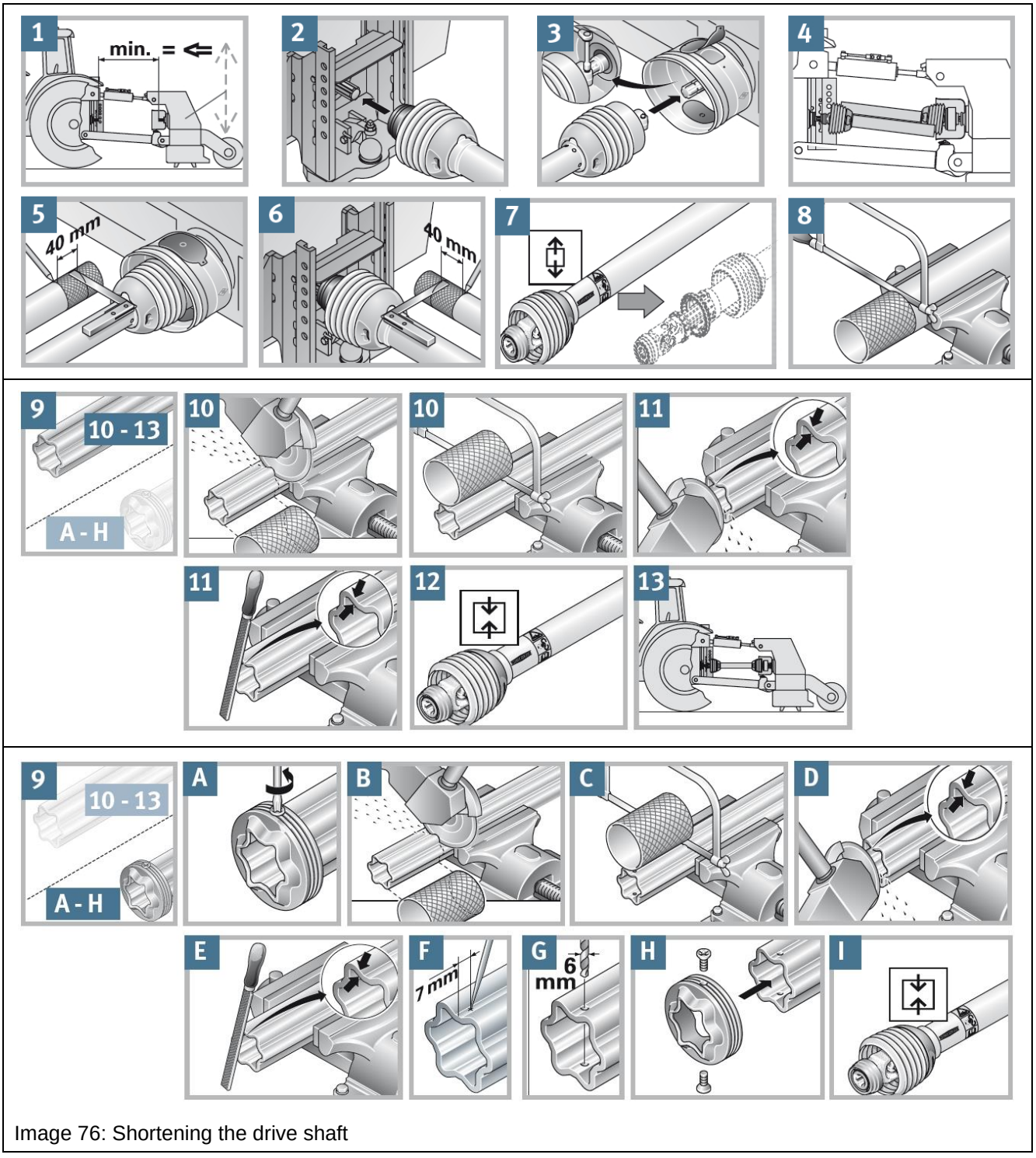


Image 76: Shortening the drive shaft

7.3.2.2 Shortening the drive shaft guard

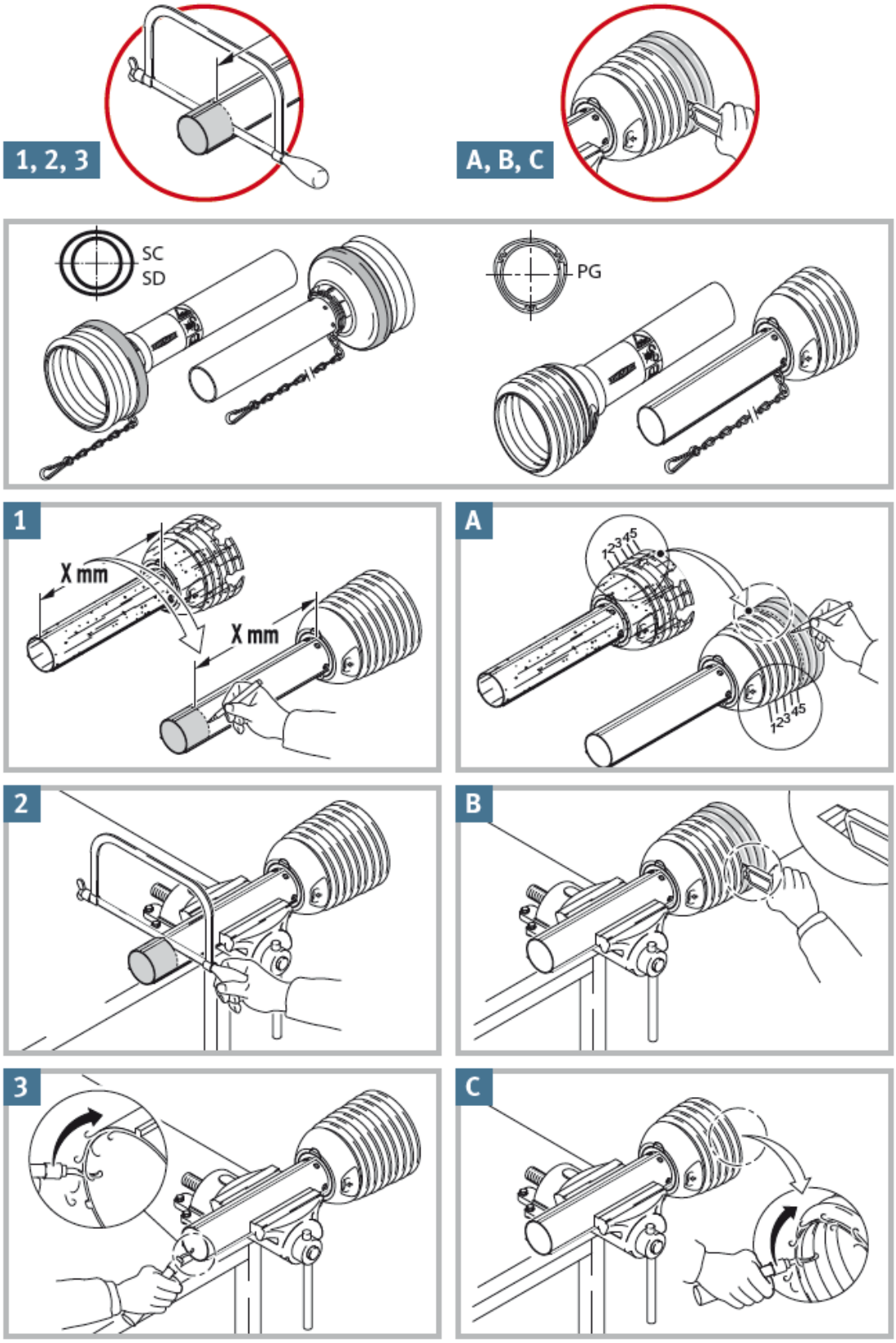


Image 77: Shortening the drive shaft guard 20161012-163007-BTA

7.4 Coupling to the tractor

Section “Coupling to the tractor” provides a brief description of the procedure for coupling the vehicles to a tractor. To do this, read the following sections in order.

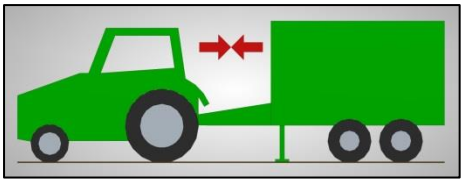


Image 78: Coupling to the tractor

For detailed information about the vehicle elements mentioned in this section, their functions and associated handling, and instructions and notes for safe operation of the vehicle, see chapters “Functions and settings” and “Operation”.

WARNING!

Danger through non-observation of the basic safety instructions.

This can cause serious injuries.

When doing this, always observe the safety instructions in the operating instructions, chapter “Safety”, section “Basic safety instructions”, in particular section “Coupling and uncoupling the vehicle”.

WARNING!

Danger of crushing and impact for people that are between tractor and vehicle when coupling and uncoupling the vehicle.

- There must be no people in the danger area between tractor and vehicle when the tractor is driven towards the vehicle.
- Ground guides must stand only next to the vehicle and move between tractor and vehicle only when the tractor has come to a standstill.

WARNING!

Danger through improper use of the tractor occurs when component failure results in insufficient stability and insufficient steering and braking capability of the tractor.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Suitability of the tractor”.

7.4.1 Preparations

- Set the coupling on the tractor such that there is sufficient space for the drive shaft (also when moving the drawbar).
- Drive the tractor up against the vehicle.

7.4.2 Connecting the hydraulics

Manual control (operation using tractor control units):

- Depressurize the control unit on the tractor.
- Connect the return line.
- Connect hydraulic lines for the required hydraulic functions to the respective tractor control units.

E-control (operation using terminal)

- Depressurize the control unit on the tractor.
- Connect the return line (larger cross section).
- Connect the control block pressure line (E-control).
- Connect the LS line (if applicable)

7.4.3 Connecting the terminal (with E-control)

- Attach the terminal on the tractor.
- Connect the terminal's 2-pin power cable to the socket on the tractor.
- Plug the control unit's connection cable into the socket on the vehicle.

7.4.4 Coupling the vehicle

- With mechanical jack stand/winding jack stand:
    - Using the hand crank of the jack stand, move the drawbar to the height of the trailer hitch on the tractor by adjusting the jack stand.
    - Move the tractor up against the vehicle and engage and securely lock the coupling.
    - Fully raise the jack stand.
- With hydraulic jack stand:
    - Connect the hydraulic line of the jack stand.
    - Open the ball valve on the jack stand (lever in direction of hose).
    - From the control unit, move the drawbar to the height of the trailer hitch on the tractor by adjusting the jack stand.
    - Move the tractor up against the vehicle and engage and securely lock the coupling.
    - Fully raise the jack stand.
    - After adjustment, close the ball valve on the jack stand.
    - Raise the jack stand.
- Connect the drive shaft, hydraulic system, brake system and lighting system to the tractor.
- Release the parking brake and place the wheel chocks in the wheel chock holders and secure them.
- Check brake action before operation. In case of brake malfunction, stop operation immediately and have the brakes repaired.

Important! Detailed descriptions of the individual functions and the respective instructions and notes can be found the operating instructions in chapter "Commissioning and functions".

7.5 Uncoupling from the tractor

Section “Uncoupling from the tractor” provides a brief description of the procedure for uncoupling the vehicles from a tractor. To do this, read the following sections in order.

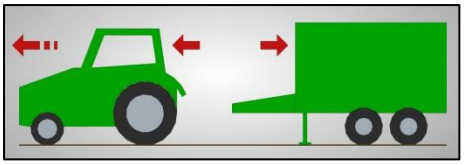


Image 79: Uncoupling from the tractor

For detailed information about the vehicle elements mentioned in this section, their functions and associated handling, and instructions and notes for safe operation of the vehicle, see chapters “Functions and settings” and “Operation”.

WARNING!

Danger through non-observation of the basic safety instructions.

This can cause serious injuries.

When doing this, always observe the safety instructions in the operating instructions, chapter “Safety”, section “Basic safety instructions”, in particular section “Coupling and uncoupling the vehicle”.

WARNING!

Danger of crushing and impact for people that are between tractor and vehicle when coupling and uncoupling the vehicle.

- There must be no people in the danger area between tractor and vehicle when the tractor is driven towards the vehicle.
- Ground guides must stand only next to the vehicle and move between tractor and vehicle only when the tractor has come to a standstill.

WARNING!

Danger through improper use of the tractor occurs when component failure results in insufficient stability and insufficient steering and braking capability of the tractor.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Suitability of the tractor”.

7.5.1 Uncoupling the vehicle

- Place the empty vehicle on a firm, even surface and secure it against rolling (parking brake, wheel chocks).
- With mechanical jack stand:
    - With the hand crank, lower the jack stand until it holds the vehicle's weight and the drawbar eye is relieved.
- With hydraulic jack stand:
    - Lower the jack stand.
    - Connect the hydraulic line of the jack stand.
    - Open the ball valve on the jack stand (lever in direction of hose).
    - Using the control unit, lower the jack stand until it holds the vehicle's weight and the drawbar eye is relieved.
    - After adjustment, close the ball valve on the jack stand.
- Depressurize the complete hydraulic system of the vehicle.
- Disconnect the drive shaft, hydraulic system, brake system and lighting system from the tractor.
- Uncouple the vehicle.

Important! Detailed descriptions of the individual functions and the respective instructions and notes can be found the operating instructions in chapter "Commissioning and functions".

8 Use

Chapter “Use” contains information for operating the vehicle. It describes the handling of the vehicle and the procedure when using it.

WARNING!

Failure to observe the safety instructions may result in serious injury or death.

- In order to prevent accidents, the operator of the vehicle must read and observe the safety instructions in chapter “Safety”.

WARNING!

There is a danger of crushing, shearing, cutting, severing, trapping, entanglement, drawing in, catching and impact for people when reaching into or working on the vehicle.

These dangers can arise when

- the unsecured tractor and the vehicle roll away unintentionally,
- driven tools and drives are not switched off,
- hydraulic functions are unintentionally performed,
- tools or parts of the vehicle are driven,
- the tractor’s engine is unintentionally started,
- raised parts of the vehicle unintentionally lower,

These dangers exist during all work on the vehicle through unintentional contact with driven, unsecured tools and drives, which may run on after being switched off, and through raised, unsecured parts of the vehicle.

- Before any work on the vehicle, such as making adjustments or eliminating faults, the vehicle must be secured against unintentional rolling and starting.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

WARNING!

Danger of crushing, shearing, cutting, severing, trapping, entanglement, drawing in and catching of body parts when driven drive elements are not protected!

- Never use the drive shaft without guard, with a damaged guard or without correct use of the safety chain. Immediately have any damaged or missing parts of the drive shaft replaced by original parts from the drive shaft manufacturer.
- The unprotected parts of the drive shaft must always be protected by a guard shield on the tractor and a guard cup on the vehicle.
- Before each use, check whether all drive shaft guards are fitted and working properly.
- Close or fit opened or removed guards before starting vehicle operation.
- Immediately replace any missing or faulty guards.

8.1 Before use

The following sections contain important points to be taken into account without fail when preparing your vehicle for use.

8.1.1 General

NOTE

The vehicle must be used only after a correctly performed commissioning of the vehicle. This ensures the correct functioning of your vehicle when driving and in operation.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”.

8.1.2 Setting the driving height

WARNING!

Risk of damage to the vehicle and accident risk if the total height with extended tools is not observed!

This can cause accidents and severe damage to the vehicle.

- When driving on public roads, make sure that the vehicle does not exceed the maximum height of 4.00 metres.

NOTE

The driving height, and therefore the total height of the vehicle, must be checked once a day. The chassis cylinders should each have a defined set dimension when the vehicle is horizontal (depending on the vehicle type). If it deviates from this value, the driving height must be corrected.

Observe also the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Chassis” / “Chassis with hydraulic axle balance”.

8.1.3 Setting the follow-up steering

NOTE

The steering axle must not be run as follow-up steering; when driving, the steering axle must be locked,

- when driving on public roads.
- when driving on bumpy or otherwise uneven surfaces.
- when driving over bunker silos.
- when driving on inclines.
- if the lateral guide of the rigid axles alone cannot ensure safe vehicle operation.
- before reversing.

Observe also the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Chassis” / “Follow-up steering”.

8.1.4 Setting the forced steering

	**NOTE** The steering axle must not be run as follow-up steering; when driving, the steering axle must be locked, or run as forced steering - when driving on public roads. - when driving on bumpy or otherwise uneven surfaces. - when driving over bunker silos. - when driving on inclines. - if the lateral guide of the rigid axles alone cannot ensure safe vehicle operation. - before reversing.

Observe also the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Chassis” / “Forced steering”.

8.1.5 Setting the lift axle

	**WARNING!** **Danger of unsafe driving conditions and accident risk if operating the lift axle incorrectly.** • Raise the lift axle only when the vehicle is fully emptied. • Before driving on public roads with laden or part-laden vehicle, lower the lift axle! • Also lower the lift axle when driving on slopes and in other precarious driving conditions!

	**WARNING!** **Risk of damage to the vehicle and accident risk if the setting instructions for the steering are not observed!** This can cause accidents and severe damage to the vehicle. <u>On vehicles with steering axle:</u> • Before operating the lift axle, the steering axle must be locked as the axle cannot otherwise be raised. If you operate the steering axle with the lift axle raised, the lift axle automatically lowers.

Observe also the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Chassis” / “Lift axle”.

8.1.6 Setting the brake system

	**NOTE**
	The drum brake linings require a few hours of operation to adapt to the drum brake. and achieve their full braking performance. • Test the function of the brake system before using or towing the vehicle.

Air brake

	**NOTE**
	• Before the first trip of the day, drain the water from the compressed air tank of the air brake. • Before each trip, set the brake effect regulator according to the vehicle's load with the manual adjuster (depends on the vehicle's equipment).

8.1.7 Adjusting the dosing wall

	**NOTE**
	Before driving and before loading, do the following: • Fully lower the dosing wall.

Observe also the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Dosing wall” / “Raising / lowering the dosing wall”.

8.2 Loading

WARNING!

There is a danger of component failure if the vehicle's technical limit values are not observed.

The vehicle's technical limit values must be observed. If they are not observed,

- the vehicle can become damaged,
- accidents can result,
- people can sustain serious injuries or death.

The following limit values are especially important for safety:

- Permissible gross weight
- Maximum axle load
- Maximum payload
- Maximum nose weight
- Maximum total height
- Top speed

The limit values must be maintained. Non-observation of these values invalidates any warranty claims. If the weights are not known, the vehicle must be weighed before being taken on public roads.

Observe also the information in these operating instructions in chapter "Vehicle description", section "Technical data" / "Weights".
The values given in the table may differ depending on the vehicle's equipment. The values in the vehicle's operating licence / registration documents are binding.

NOTE

When loading the vehicle, observe the different specific weights of the various load materials. The higher the weight of the load, the lower is the permissible load volume.

Observe the notes and instructions in the following sections.

8.2.1 Determining payload and permissible load volume

To avoid overloading the vehicle, do the following:

Formulas:

Max. permissible load = Permissible gross weight (kg) - Net weight (kg) = … kg

$$\text{Max. permissible load volume} = \frac{\text{Max. permissible load (kg)}}{\text{Specific weight of the load (kg/m}^3\text{)}} = \ldots \text{ m}^3$$

The following table lists the specific weights of common load materials.

NOTE

For the permissible gross weight and net weight values, see the identification plate of your vehicle.

These values are also given in these operating instructions in chapter “Vehicle description”, section “Technical data”.

NOTE

Once you have determined the max. permissible load volume, load the vehicle only up to this load volume.

Products	Density [kg/m³]	DS content [%]	Nitrogen (N) [kg/t]	Phosphate (P) [kg/t]	Potassium (K) [kg/t]
Duck manure	Approx. 400	Approx. 30	8	7	7
Dry poultry manure	Approx. 1150	Approx. 50	32	27.7	22.8
Chick manure	Approx. 500	Approx. 50	24	21	30
Chalk	Approx. 1500	-	-	-	-
Sewage sludge, dewatered	Approx. 1450	Approx. 24	12	20	0.8
Compost	Approx. 700	Approx. 64	9.8	5.1	8
Horse manure	Approx. 500	Approx. 30	4	3	11
Turkey manure	Approx. 500	Approx. 60	22	23	23
Cattle manure	Approx. 833	Approx. 23	5.6	2.9	9.6
Pig manure	Approx. 909	Approx. 25	7.4	6.5	7.4
DS= dry content of the spreading material					

Table 1: Specific weights of the spreading material and nutrient contents

Note: The values given in the table are guide values and may deviate significantly.

8.2.2 Loading procedure

	NOTE
	• Do not load material containing larger solids or foreign objects, such as stones or pieces of wood. These materials can damage the spreader unit and disk spreader unit and will invalidate any warranty. • Do not load material containing twine or wrapping material. These materials can wind around the beaters and must be removed by hand.

The cargo space of the vehicle is loaded from above, for example with a wheel loader, telescopic handler, tractor with front loader, mobile crane or similar. Observe the following points:

- Load the vehicle evenly. Cavities in the material reduce the spreading range.
- For parallel tracking, reload the vehicle before it has been emptied completely during the unloading procedure.
- Do not load the vehicle beyond the permissible loading height above the scraper floor. The load height must not exceed the throughput height of the spreader unit.
- Load the vehicle only up to the permissible technical limit values. The limit values must be maintained.

8.3 Unloading

	**WARNING!** **Materials or foreign objects being flung out of the vehicle can present a danger for people in the danger area of the vehicle.** • Before starting up the vehicle, make sure there are no people in the vehicle danger area or near moving vehicle parts. • When distributing the load near the edge of fields and near roads, make sure that you do not create a hazard for people or objects. Keep a sufficient safety distance.

8.3.1 Spreading pattern

To achieve an optimum spreading pattern, the vehicle must be loaded correctly.

Observe the notes and instructions in the operating instructions, chapter “Use”, section “Loading” / “Loading procedure”.

In addition, the vehicle must be adapted to yield an ideal spreading pattern for the current conditions with the following settings:

Basic settings

- the unloading setting (working width, spread rate, driving speed, scraper floor speed)

Observe the notes and instructions in the operating instructions, chapter “Use”, section “Unloading” / “Spreader settings”.

- the dosing wall setting (if fitted)

Observe the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Dosing wall”.

Additional settings on type TSW vehicles (with disk spreader unit + two-/three-beater spreader unit)

- the setting of the spreader blades

Observe the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Spreader unit”.

- the setting of the lower tailgate

Observe the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Tailgate”.

8.3.2 Determining spreader settings

	NOTE
	The spread rate depends on - the throughput height of the spreader unit / dosing wall (depending on vehicle equipment) - the scraper floor speed - the working width - the tractor driving speed

Regarding the settings, the following generally applies:

Low spread rate	High spread rate
- low dosing wall throughput height - lower scraper floor speed - high tractor driving speed	- high dosing wall throughput height - high scraper floor speed - low tractor driving speed

8.3.2.1 Determining spreader settings using spreader setting chart app

With the BERGMANN spreader setting chart app, which includes an NPK display and scraper floor calibration tool, the ideal scraper floor speed or driving speed can be determined from the specified application quantity (t/ha) and the vehicle parameters. The model selection contains all common BERGMANN stable manure and universal spreaders.

The app is free and is available for Android and Apple smartphones.

- Click on the corresponding button.
- Scan the QR code with your smartphone.

JETZT BEI Google Play	Laden im App Store
Image 80: Google Play QR	Image 81: Apple App Store QR

8.3.2.2 Determining spreader settings from the spreader setting chart

With the help of the spreader setting chart, you can quickly determine the spreader settings for the vehicle.

For the spreader setting charts, see the following pages.

The following preconditions should be fulfilled:

- Determine the working with a test spread and then measure the working width (e.g. 15 m for broiler chicken manure).
- Determine the spread rate in m³ per hectare (e.g. 12 m³/ha).

Example

Specified values:

A	Working width:	15 m
B	Spread rate:	12 m³/ha

The values in “Table 2: Example spreader setting chart” are given only for illustration and can deviate from the spreader setting chart for your vehicle. Use the appropriate spreader setting chart on the next pages, or the spreader setting chart attached to your vehicle.

Working width (m)	8 m						10 m						12 m						15 m					
Driving speed (km/h)	4	6	8	10	12	14	4	6	8	10	12	14	4	6	8	10	12	14	4	6	8	10	12	14
Scraper floor-speed (m/min) 0,2	8	5	4	3	2,6	2,2	6	4	3	3	2	2	5	3	2,6	2	1,7	1,5	4	3	2	1,6	-	-
0,5	19	13	10	8	6	5	15	10	8	6	5	4	13	9	6	5	4	4	[illegible]	[illegible]	5	4	3,4	3
1,0	38	26	19	15	13	11	31	21	15	12	10	9	26	17	13	10	9	7	21	14	10	8	7	6
1,5	58	38	29	23	19	16	46	31	23	18	15	13	38	26	19	16	13	11	31	21	15	12	10	9
2,0	77	51	38	31	26	22	62	41	31	25	21	18	51	34	26	21	17	15	41	27	21	16	14	12
2,5	96	[illegible]	48	38	32	27	77	51	38	31	26	22	64	43	32	26	21	18	[illegible]	34	26	21	17	15
3,0							92	62	46	37	31	26	77	51	38	31	26	22	62	41	31	25	21	18
3,5													90	60	45	36	30	26	72	48	36	29	24	21
4,0																			82	55	41	33	27	23

Spread rate (m³/ha)

Table 2: Example spreader setting chart

Values determined using the spreader setting chart:

C	Driving speed:	10 km/h
D	Scraper floor speed:	1.5 m/min

Load height

The spread rates given on the spreader setting chart apply for a load height of 1 m. If the actual load height is different, adjust the value given in the table accordingly. Do this as follows:

Formula:

Load height 1.2 m	=	Value from table x 1.2	=	Spread rate
Load height 0.5 m	=	Value from table x 0.5	=	Spread rate

When using a dosing wall, the load height corresponds to the set dosing wall height.

8.3.2.2.1 Spreader setting chart (type TSW / 2050 mm)

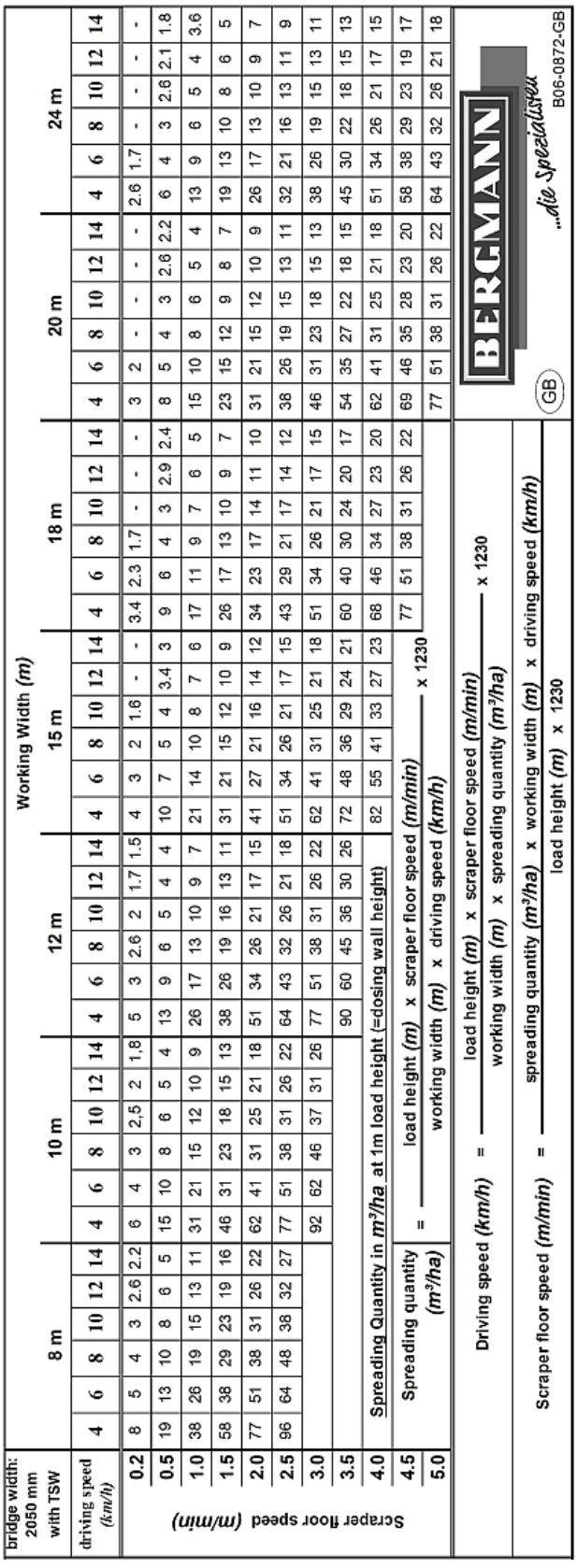


Image 82: Spreader setting chart (with TSW / 2050 mm) B06-0872-sym_EN

8.3.2.3 Calculating spreader settings

8.3.2.3.1 Calculating spread rate

Calculate the spread rate as follows:

Formula:

$$\text{Spread rate} = \frac{\text{Maximum load (kg)}}{\text{Specific density of the spreading material (kg/m}^3\text{)}} = \ldots \text{ m}^3$$

The specific density of some spreading materials is given in the table below. The listed values are recommended values for ideal circumstances. The setting must be checked with a test spread and corrected if necessary.

When determining the maximum load, observe the instructions and notes in the operating instructions, chapter “Use”, section “Loading” / “Determining payload and permissible load volume”.

Example:

Maximum load: 8500 kg
Specific density of compost: 700 kg/m³
Spread rate: … m³

$$\text{Spread rate} = \frac{8500 \text{ kg}}{700 \text{ kg/m}^3} = 12.1 \text{ m}^3$$

To spread, for example, 8.5 t/ha of compost, the calculation yields a spread rate of 12.1 m³/ha.

Products	Density [kg/m³]	DS content [%]	Nitrogen (N) [kg/t]	Phosphate (P) [kg/t]	Potassium (K) [kg/t]
Duck manure	Approx. 400	Approx. 30	8	7	7
Dry poultry manure	Approx. 1150	Approx. 50	32	27.7	22.8
Chick manure	Approx. 500	Approx. 50	24	21	30
Chalk	Approx. 1500	-	-	-	-
Sewage sludge, dewatered	Approx. 1450	Approx. 24	12	20	0.8
Compost	Approx. 700	Approx. 64	9.8	5.1	8
Horse manure	Approx. 500	Approx. 30	4	3	11
Turkey manure	Approx. 500	Approx. 60	22	23	23
Cattle manure	Approx. 833	Approx. 23	5.6	2.9	9.6
Pig manure	Approx. 909	Approx. 25	7.4	6.5	7.4
DS= dry content of the spreading material					

Table 1: Specific weights of the spreading material and nutrient contents

Note: The values given in the table are guide values and may deviate significantly.

8.3.2.3.2 Calculating driving speed

For special operating conditions, the required driving speed can be calculated using the formulas. Do this as follows:

Formula:

$$\text{Driving speed} = \frac{\text{Load height (m) x scraper floor speed (m/min)}}{\text{Working width (m) x distribution quantity (m³/ha)}} \times 1230 = \ldots \text{ km/h}$$

8.3.2.3.3 Calculating the scraper floor speed

For special operating conditions, the required scraper floor speed can be calculated using the formulas. Do this as follows:

Formula:

$$\text{Scraper floor speed} = \frac{\text{Distribution quantity (m³/ha) x working width (m) x driving speed (km/h)}}{\text{Load height (m) x 1230}} = \ldots \text{ m/min}$$

8.3.3 Unloading type TSW vehicles (disk spreader unit + two-/three-beater spreader unit)

WARNING!

Danger of drawing in and trapping of the whole body on driven tools (spreader unit)!

These dangers can cause severe and potentially fatal injuries.

- Never reach into the area of the spreader unit while the tractor is running with the PTO connected.
- Keep people out of the danger area behind the vehicle and away from moving vehicle parts!

WARNING!

There is a danger from parts being flung out of the spreader unit if you do not replace worn components on time!

This can cause severe and potentially fatal injuries.

- Keep people out of the vehicle's danger area and away from moving vehicle parts!
- Before beginning and after completing the unloading procedure, check all components of the spreader unit for obvious defects and damage.

Fehler! Verweisquelle konnte nicht gefunden werden.

8.3.3.1 Preparing the unloading procedure

- Set the spreader blades to the required position.
- Set the height of the lower tailgate to the required position.
- Set the material feed point at the tailgate to the required position.
- Machine control with E-control light / Pilotbox terminal:
  - Switch on the terminal.
- For machine control with BCT, CCI, or ISOBUS terminal:
  - Switch on the terminal.
  - On the terminal, select the "unloading" menu.
- On vehicles with E-control hydraulic system:
  - On vehicles without load sensing, switch on the oil supply of the vehicle's control block.
- On vehicles with dosing wall:
  - Raise the dosing wall to the required throughput height.
- Set the required scraper floor speed.

For detailed information about the vehicle elements mentioned in this section, their functions and associated handling, and instructions and notes for safe operation of the vehicle, see chapters "Functions and settings" and "Operation".

8.3.3.1.1 Unloading procedure

- Start up the spreader unit by starting up the PTO at the specified speed.
- Start up the scraper floor.
- Start driving as soon as there is enough material at the beaters.
- Drive at a constant speed that matches the unloading speed.
- On vehicles with dosing wall:
    - As soon as the upper beater throws material towards the tractor, lower the dosing wall bit by bit by a small amount each time.
- Stop the scraper floor at the headland.
- For emptying the residues, increase the scraper floor speed.

For detailed information about the vehicle elements mentioned in this section, their functions and associated handling, and instructions and notes for safe operation of the vehicle, see chapters “Functions and settings” and “Operation”.

8.3.3.2 Completing the unloading procedure

- As soon as the vehicle is empty, switch off the scraper floor.
- Stop the spreader unit by stopping the PTO.
- On vehicles with dosing wall:
    - Lower the dosing wall all the way.
- For machine control with BCT, CCI, or ISOBUS terminal:
    - On the terminal, select the “Driving on roads” menu.

For detailed information about the vehicle elements mentioned in this section, their functions and associated handling, and instructions and notes for safe operation of the vehicle, see chapters “Functions and settings” and “Operation”.

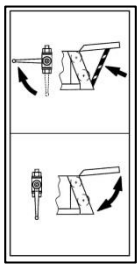
8.4 Spreader Unit Operation

Operating the Universal spreader without a spreader unit is not authorized.

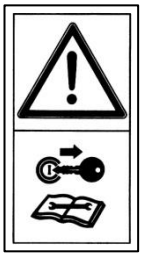
The spreader unit is equipped with an overload clutch to protect against overloading in case of clogging by foreign objects. The overload clutch is preserved when its use is avoided. The clutch serves as an overload protection and should not be used as a throughput limiter. When the clutch engages the PTO on the tractor must be switched off immediately and the tractor rpms reduced.

Should the spreader unit become clogged by too much material or a foreign object, the following procedure must be followed:

- Switch off spreader unit.
- Reverse scraper floor until spreader unit is free.
- Remove foreign object if found and check spreader unit for damage



- Lift hood and close hydraulic line with shut-off valve.



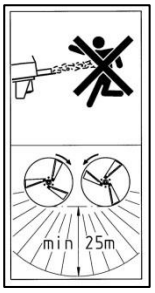
- Switch off motor and PTO shaft, remove ignition key.

- Check spreader unit for damage and repair if necessary.
- Switch spreader unit back on and let it run until it runs freely.
- Switch feed, back on.

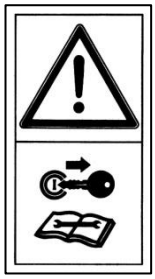
8.5 Operating Instructions – Disk Spreader Unit (TSW)

It is imperative that the following points are observed:

- Prior to engaging the spreader unit, ensure that no persons are in the immediate area of the disk spreader unit.



- A safety distance of at least 25 meters must be maintained around the disk spreader unit during operation.



- Only when the drive has been turned off, may the disk spreader unit be worked on! (Turn off motor! Remove ignition key)!

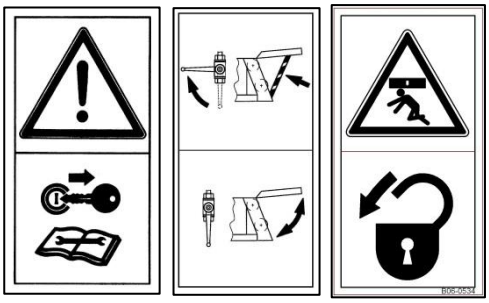
- The disk spreader unit is equipped with a free-wheel clutch. This means that even after the drive is disengaged, the disks continue to rotate. Always wait until the disks have stopped before approaching them!

- Universal spreaders with disk spreader units are always driven at 1000 rpms via the PTO shaft drive; Exception: when using a spreading limiter max. 600 rpms.

- After every spreader use the spreader disks must be checked for sheared off or loose blades. In this case, new shear bolts (Hexagonal bolts M 10x30 8.8 ISO 4017 with hexagonal nuts M 10 8 ISO 7042) are to be used. Replacement shear bolts can be found on the right, bottom side of the disk spreader unit frame.

- The spreader blades can become loose and can fly off of the disk when these instructions are not followed. A spreader blade can become a dangerous projectile.

- Stones, large pieces of wood or any other foreign objects in the material to be spread, can damage the spreader unit and its disks, which in turn nullifies any guarantee claims. For this reason, there should be no foreign objects in the spreading material.



- Open the spreader hood only for maintenance and repair work.
- When working under the spreader unit's hood, the drive must be disengaged (turn off motor, remove ignition key) and the hydraulic lines that lead to the cylinders should be closed using the shut-off valve which is found on the right side of the spreader unit.

The disk spreader unit is equipped with an overload clutch to protect against overloading in case of clogging by foreign objects. The overload clutch is preserved when its use is avoided. The clutch serves as an overload protection and should not be used as a throughput limiter. When the clutch engages the PTO on the tractor must be switched off immediately and the tractor rpm reduced.
Spreading materials have different spreading properties. For this reason it is imperative that a test spread is made prior to spreading, so optimal distribution is achieved.
In order to adjust the blades to find the best position for the manure being used, there are five holes in the disk (Image 4): Adjusting the spreader blades).
Depending on the kind of material being used, varied positioning of the blades may be useful.
Next to the spreader blade setting, the spreader unit hood setting also has an effect on the spreading pattern.

8.5.1 Adjusting the Spreader Blades

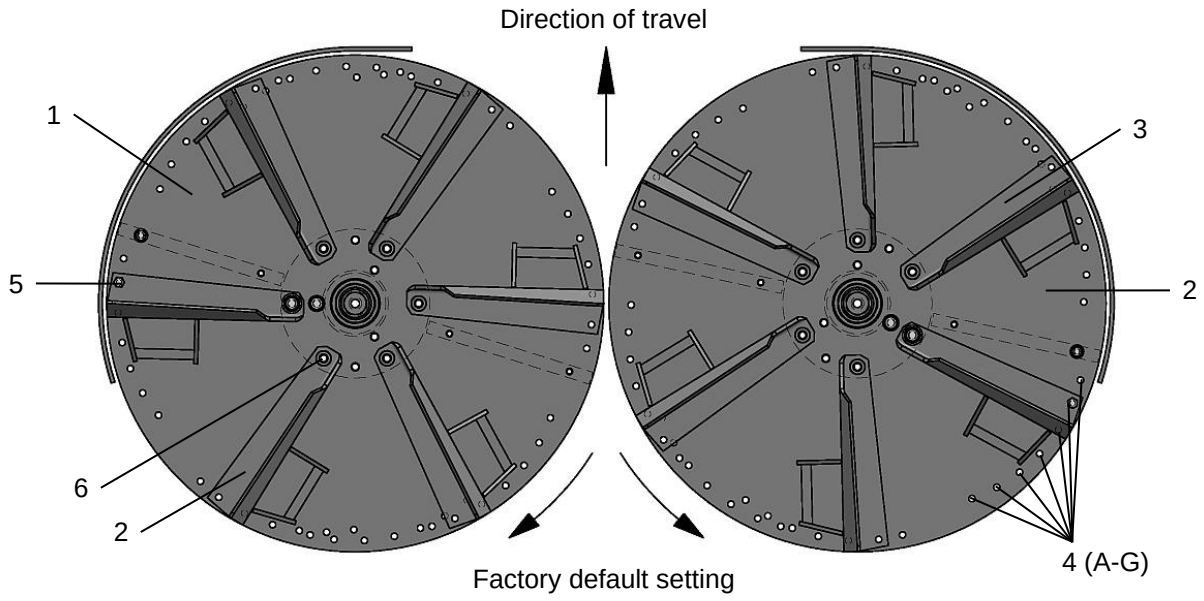


Bild 83: Tellerstreuwerk Einstellung (Verstärkt) 10-65-0260-PLN_20180329

Pos.	Designation	Design
1	Left spreader disk	Standard & reinforced
2	Right spreader disk	Standard & reinforced
3	Spreader blades	6 pce.
4	Adjustment holes in the spreader blades	7 per spreader blade (A – E)
5	Shear bolts	
6	Flange bolts	

Adjusting the spreader blades has an effect on the spread pattern. To do this only the shear bolts need to be removed and the blade can be adjusted. The shear bolts must be subsequently retightened!

Notice: The flange bolts and lock nuts must be checked for tightness from time to time.

Regarding the settings, the following generally applies:

Spreading behaviour	Cause	Remedy
There is too much manure in the outer areas and not enough in the middle.	The spreader blades are set too far forward (in the direction of rotation). The material is ejected too late.	Set the spreader blades further against the direction of rotation. For fine adjustment, you can also adjust only two opposite spreader blades on each spreader disk.
There is not enough manure in the outer areas and too much in the middle.	The spreader blades are set too far back (in the direction of rotation). The material is ejected too soon.	Move the spreader blades further forward (in the direction of rotation). For fine adjustment, you can also adjust only two opposite spreader blades on each spreader disk.

Loose spreader blades (sheared bolts) also affect the spreading pattern. New shear bolts must be installed immediately! Check wear plate on the spreader disk frame and spreader blades regularly for wear and replace if necessary.

Replacement shear bolts can be found on the right, bottom side of the disk spreader unit frame. Only the following fasteners may be used for this:

Designation	Standard	Dimensions	Strength class,
Hexagon bolt	ISO 4017	M12x30	10.9
Hexagon nut	ISO 7042	M12	8

8.6 Adjusting the Spreader Unit Hood

The position of the lower tailgate on the spreader unit hood also affects the spreading pattern. Adjusting the spreader unit hood can increase the mass that is spread by the disk spreader unit system. The smaller the distance between the lower tailgate and the spreader blades, the closer the material is dropped to the centre of the disks, and the finer the milling of the material being spread and the spreading veil. Should it be necessary to spread large amounts of heavy, straw-like manure it could be necessary to set the lower tailgate higher.

The minimum distance between the bottom edge of the lower tailgate and the spreader blades may not fall below 20 mm.

Important! After adjusting the spreader hood, it may be necessary to adjust the spreader blades.

8.6.1.1 Procedure for Adjusting Spreader Hood with a 1.5 m, 1.8 m Throughput

Design Stepless height adjustment using adjustment spindle

8.6.1.2 Tailgate adjustment

Adjust the lower tailgate (Pos.1) to the proper height as follows:

- Loosen the 4 bolts (Pos. 2).
- Adjust the lower tailgate (Pos. 1) by turning the adjustment spindle (Pos. 3).
- The hood must be set to the same height on both sides. (See following sections).
- Retighten the 4 bolts (Pos. 2).

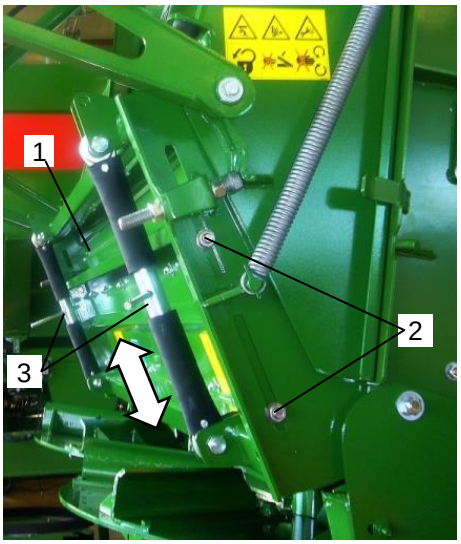


Image: Spreader unit hood

To ensure that the lower tailgate is set to the same height on both sides, there is a height scale on either side of the tailgate guide (Pos. 4). The scale (Pos. 4) and indicator (Pos. 5) make it possible to see the height of the lower tailgate on either side. If the height is not the same on both sides, one side must be readjusted.

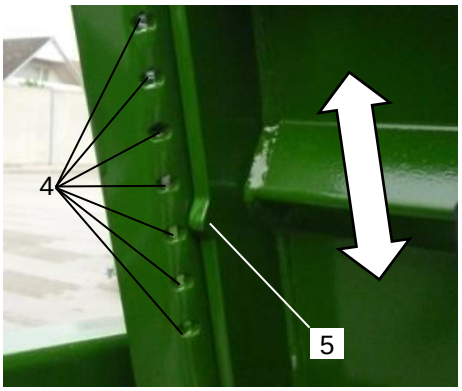


Image: Lower tailgate scale

8.6.1.3 Adjusting the material feed point

The material feed point is adjusted using the adjustment bolts (Pos. 7) on each side of the adjustable lower tailgate (Pos. 8). To adjust, loosen the counter nut (Pos. 6) and turn the bolts (Pos. 7) in or out. Retighten the nut (Pos. 6).

- Screw bolt in:
  → Feed point is moved forward

- Turn bolt out
  → feed point is moved back

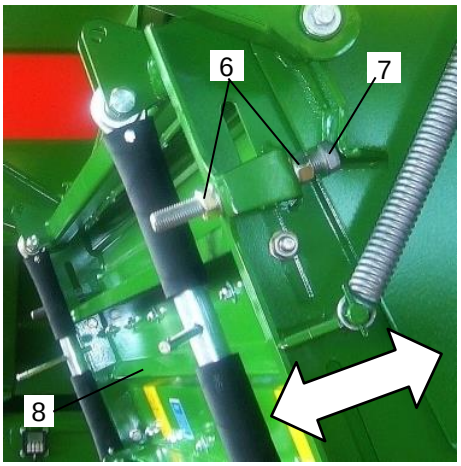


Image: Adjustment bolt

8.7 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.

8.7.1 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 dosing wall must be completely retracted.
- The spread pattern limiter must be folded down.
- The lift axle must be lowered.
- 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.

Important! For this, the notices and instructions in the operating instructions in section "Commissioning and Functions" are to be observed.

8.7.2 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.

Important! For this, the notices and instructions in the operating instructions in section "Commissioning and Functions" are to be observed.

8.7.3 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.

8.8 Weights and performance specifications

WARNING!

There is a danger of component failure if the vehicle's technical limit values are not observed.

The vehicle's technical limit values must be observed. If they are not observed,

- the vehicle can become damaged,
- accidents can result,
- people can sustain serious injuries or death.

The following limit values are especially important for safety:

- Permissible gross weight
- Maximum axle load
- Maximum payload
- Maximum nose weight
- Maximum total height
- Top speed

The limit values must be maintained. Non-observation of these values invalidates any warranty claims. If the weights are not known, the vehicle must be weighed before being taken on public roads.

Observe also the information in these operating instructions in chapter "Vehicle description", section "Technical data" / "Weights".
The values given in the table may differ depending on the vehicle's equipment. The values in the vehicle's operating licence / registration documents are binding.

9 Care and maintenance

Chapter “Care and maintenance” provides information about maintaining the vehicle. It describes the handling and procedures during maintenance and care of the vehicle. Regular and correct maintenance and care ensure a long service life, reliable operation and correct function of the vehicle. They also help reduce downtimes and the need for repairs.

The components and vehicle functions listed in the operating instructions may differ from the vehicle standard equipment and are available as optional features in some cases. Since these operating instructions are general, various equipment options can be listed that are not available for your vehicle. This also applies to illustrations. Images, drawings and 3D illustrations in these operating instructions do not always represent the exact vehicle type. However, the information which refers to the illustrations always corresponds to the vehicle type in this document.

WARNING!

Failure to observe the safety instructions may result in serious injury or death.

- In order to prevent accidents, the operator of the vehicle must read and observe the safety instructions in chapter “Safety”.

WARNING!

There is a danger of crushing, shearing, cutting, severing, trapping, entanglement, drawing in, catching and impact for people when reaching into or working on the vehicle.

These dangers can arise when

- the unsecured tractor and the vehicle roll away unintentionally,
- driven tools and drives are not switched off,
- hydraulic functions are unintentionally performed,
- tools or parts of the vehicle are driven,
- the tractor’s engine is unintentionally started,
- raised parts of the vehicle unintentionally lower,

These dangers exist during all work on the vehicle through unintentional contact with driven, unsecured tools and drives, which may run on after being switched off, and through raised, unsecured parts of the vehicle.

- Before any work on the vehicle, such as making adjustments or eliminating faults, the vehicle must be secured against unintentional rolling and starting.

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

9.1 Cleaning and maintenance work in the cargo space

DANGER!

Danger of drawing in or catching of the whole body on driven tools.

These dangers can cause severe and potentially fatal injuries.

Never step onto the cargo space when the drive is switched on and the engine is running.

- Always switch off all drives, stop the engine and remove the ignition key before working in the cargo space.
- Before performing any work 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!

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

9.1.1 Cargo space access

An access ladder is fitted to the vehicle’s body to allow operators to check the cargo space.

Observe the notes and instructions in the operating instructions, chapter “Functions and settings”, section “Cargo space” / “Access ladder”.

The inside of the body is designed such as to minimize any rests remaining in the vehicle that must be removed by hand. The cargo space does not, therefore, have to be entered.

Should it nevertheless be necessary to enter the cargo space for repair work, use a ladder or scaffold that is secured against slipping or falling to safely enter the cargo space.

9.2 Access to high points

If access to high points is necessary for maintenance, care and repair purposes, use climbing aids that are secured against sliding away and falling over (e.g. ladder or scaffold).

9.3 Maintenance schedule

	**WARNING!**
	Danger of component failure when the vehicle is not maintained correctly. • An improperly maintained vehicle must not be taken into operation.

	**NOTE**
	Observe the following points: • The time intervals, mileage and maintenance intervals listed in the supplied third-party documents have priority and must be observed. • The maintenance intervals assume normal working conditions. Under harsher working conditions, especially for the brakes, maintenance and/or repair intervals must be shortened. • Lubricate as specified in the lubrication schedule.  Observe the notes and instructions in the operating instructions, chapter “Care and maintenance”, section “Lubrication”.

9.3.1.1 First use / after a long time:

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

9.3.1.2 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.

9.3.1.3 Daily:

- Check light functions.
- Check brake functions.
- Drain water from compressed air tank.
- Check driving level
- Check oil level
- Check lubrication system (if available) / chain oiler (if available) level and functions
- Visually check the following vehicle components for damage:
  - Lubrication lines
  - Hydraulic lines

9.3.1.4 After 20 trips

- Lubricate according to lubrication chart
- Check scraper floor tension, adjust or shorten if necessary
- Check chain tension in spreader drive / dosing unit drive
- Lubricate roller chains (if present)
- Visually check the following vehicle components for damage and defects:
  - Lubrication lines
  - Universal Joints
  - Spreader tines
  - Beater scrapers
  - Remove twine from beaters
  - Spreader blades and wear plates
  - Shear bolts and spreader blades

9.3.1.5 Every 40 trips:

- All checks as „Every 20 trips“
- Lubricate points with a lubrication interval of "grease after 40 trips" (see lubrication plan)
- Drive chains with a lubrication interval of "grease after 40 trips" with chain grease (see lubrication plan)

9.3.1.6 Every 100 trips:

- All checks as „Every 40 trips“
- Lubricate points with a lubrication interval of "grease after 100 trips" (see lubrication plan)
- Drive chains with a lubrication interval of "grease after 100 trips" with chain grease (see lubrication plan)
- Check brake setting and adjust if necessary.
- If applicable, check wear plates and replace other wear parts.
- Check condition of dosing rollers
- Check condition of spreader unit hood lining
- Check the condition and mounting of scraper floor bars
- If necessary replace beater scrapers, spreader blades, wear plates or other parts

9.3.1.7 Every 500 trips:

- All checks as „Every 100 trips“
- Check brake setting and adjust if necessary.
- 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 cables for damage
- Check all bearings
- Check all bolted connections for tightness
- Check vehicle for cracks
- Check brake system for leaks

9.3.1.8 Every 1000 trips (at least annually):

- Change grease in the wheel hub bearing check the tapered roller bearing for wear.
- Check hydraulic system return filter in the on board hydraulics for contamination and replace if necessary.

9.4 Screw torques

Table of standard torque values for bolts

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**	dry*	lubricated**	dry*	lubricated**	dry*	lubricated**	dry*	lubricated**	dry*	lubricated**	dry*	lubricated**	dry*	lubricated**	dry*	lubricated**	dry*	lubricated**	dry*	lubricated**	dry*	lubricated**
Torque m (Nm) with Screws of the following strength class	**8,8**	11	9	27	22	54	43	93	73	148	117	130	180	329	259	464	363	634	495	798	625	1176	915	1597	1246
	10,9	16	13	40	32	79	63	137	108	218	172	338	264	469	369	661	517	904	704	1136	890	1674	1304	2274	1775
	12,9	19	15	47	37	93	73	160	126	255	201	395	309	549	432	773	605	1057	824	1329	1041	1959	1526	2662	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.

9.5 Cleaning the vehicle

To ensure correct maintenance and ease of operation, regularly and thoroughly clean the vehicle. Cleaning the vehicle after use and subsequent lubrication ensure that the vehicle is ready for use again immediately and prevents drying and hardening of the load.

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

WARNING!

Risk of injury through movements of tractor and vehicle or of vehicle parts!

- Before performing any work 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!

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

WARNING!

Risk of injury through unintentional movement of components!

If raised components are not secured, they can move inadvertently. This can cause serious injuries.

- Always secure raised components against unintentional lowering or operating before working on or under them.
- Keep people out of the vehicle’s danger area and away from moving vehicle parts!

9.5.1 Cleaning the vehicle with a high-pressure cleaner

When using a high-pressure cleaner, observe the following points:

- Use a high-pressure cleaner no earlier than 8 weeks after delivery (to allow the paint to fully cure).
- Minimum nozzle distance 50 cm
- Maximum pressure 50 bars
- Max. water temperature 50 °C
- Spray jet angle 25°
- Do not use cleaning agents
- Do not direct the water jet at seals on bearings, gear units and hydraulic components
- Do not direct the water jet at electrical components, such as terminals, terminal boxes, load cells and sensors.

NOTE

After cleaning, observe the following points:

- Thoroughly lubricate all bearings. Pay special attention to areas that are not specifically mentioned in the lubrication schedule, such as hinges or pivot points, which must be lubricated separately.
- Check the vehicle for corrosion damage. Avoid corrosion damage by repairing paint damage on time.

9.5.2 Cleaning the mudguards

NOTE

Soiling, load residues etc. on and under the mudguards that have not been removed can cause soiling on public roads when driving.

- Regularly clean the mudguards.
- When cleaning the vehicle, thoroughly clean the mudguards, also removing dirt from under the mudguards.

9.6 Chassis

9.6.1 Tyres

WARNING!

Failure to observe the safety instructions may result in serious injury or death.

- In order to prevent accidents, the operator of the vehicle must read and observe the safety instructions in the chapter “Safety” / “Basic safety instructions”.

WARNING!

Risk of injury through movements of tractor and vehicle or of vehicle parts!

- Before performing any work 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!

Observe also the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

WARNING!

Danger to people through incorrectly performed repairs on tyres.

Incorrectly fitted tyres can suddenly burst during inflation. This can cause serious injuries.

- Tyres and wheels must be fitted and repaired only by suitably qualified persons with sufficient expertise and suitable tools.
- Do not use or repair damaged wheel rims.
- Do not fit unapproved tyres. Do not fit tyres with the wrong offset or oversized tyres and wheels.

Observe also the notes and instructions in the operating instructions, chapter “Vehicle description”, section “Tyre acceptance and tyre pressure”.

NOTE

- To prevent damage to the rubber, the tyres must not come into contact with oil or grease.
- Store removed tyres in a dark place, away from oil and chemicals.

9.6.1.1 Checking tyres

NOTE

- Check the tyre pressure at least every two weeks with cold tyres. After a longer standstill, check the tyre pressure when taking the vehicle into operation again. Make sure that the tyre pressure corresponds to the usage of the vehicle.
- Fit caps to the valves.
- Regularly check the tyres for damage, folds and other abnormal deformations.
- Remove any foreign bodies on or in the tyres immediately. These can work their way into the tyres and damage them.
- Immediately have any cuts repaired.

Observe also the notes and instructions in the operating instructions, chapter “Vehicle description”, section “Tyre acceptance and tyre pressure”.

9.6.1.2 Changing tyres

DANGER!

Danger of injuries or death through crushing and knocks when the raised vehicle drops unintentionally.

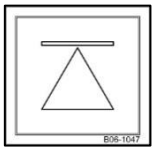
- Position the vehicle on a firm, level ground.
- Before performing any work on the vehicle, secure the tractor and the vehicle against unintentional rolling and starting!
- When tyres are defective and to change the tyres, raise the vehicle only when it is empty.
- Use an approved lifting device with sufficient weight-bearing capacity for the weight of the vehicle.
- Place the lifting device only at the marked jacking points of the vehicle.
- Never stand under a raised vehicle.

NOTE

- When replacing the tires, make sure that the mudguards do not protrude beyond the tires.
- Use only original wheel fixing elements.
- Replace any damaged, stiff or rusted wheel nuts and bolts.
- Oil the thread only lightly.

9.6.1.2.1 Jacking points for lifting devices

Jacking points for lifting devices are marked on the vehicle with a notice sticker as follows:



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Jacking point for lifting devices

These stickers indicate the jacking points on the vehicle’s axles at which the vehicle can be raised.

9.6.1.2.2 Procedure

Change the tyres as follows:

- Place the lifting device at the marked jacking points.
- When releasing and tightening the wheel nuts, observe the order shown in the illustration (Image 84).
- Tighten the wheel nuts to the specified torque.

Observe also the notes and instructions in the operating instructions, chapter “Care and maintenance”, section “Tightening torques”.

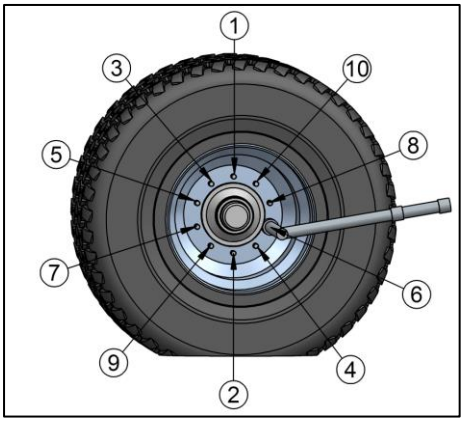

Image 84: Wheel nuts

	NOTE
	After changing tyres, always observe the following notes and instructions:

	**B06-0968** **Note: Retighten wheel nuts** Attention! Retighten wheel nuts: → after 50 km of driving → after further 150 km of driving → after further 400 km 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.

9.6.1.3 Tyre pressure

	NOTE
	• Check the tyre pressure at least every two weeks with cold tyres. After a longer standstill, check the tyre pressure before taking the vehicle into operation again. Make sure that the tyre pressure corresponds to the usage of the vehicle. • Fit caps to the valves. • When driving on slopes and difficult terrain, the tyre pressure can be increased by 25%. The maximum permissible tyre pressure may not be exceeded! • When pumping up the tyres and when tyre pressure is too high there is a risk of bursting.

Observe the notes and instructions in the operating instructions, chapter “Vehicle description”, section “Tyre acceptance and tyre pressure”.

9.7 Axles (General)

Axles must never be overloaded!

- Do not illegally overload 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 notes in the chapter "Care and maintenance" in section "air brake system".
- 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 axles the trailer must be safely parked and secured against rolling (use wheel chocks)!

9.7.1 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.

9.7.2 Wheel Hubs - Adjust Bearing Play

Check wheel bearing play as follows:

- Raise axles until the tires are off of the ground.
- Release brake.
- Check for play in bearings.

If play is found in the bearings, 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.

9.7.3 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.

9.8 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.

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Follow-up steering".

Important! The instructions and notices in the operating instructions under "Care and Maintenance" in the "Axles (General)" section are also to be observed.

9.8.1.1 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.

9.9 Forced Steering (Hydraulic)

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Follow-up steering".

Important! The instructions and notices in the operating instructions under "Care and Maintenance" in the "Axles (General)" section are also to be observed.

9.9.1.1 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.

9.10 Forced Steering (Electronic)

Important! For this, observe the notices and instructions in the operating instructions in section "Initial Start-up and Functions" under "Follow-up steering".

Important! The instructions and notices in the operating instructions under "Care and Maintenance" in the "Axles (General)" section are also to be observed.

Important! Detailed operating instructions can be found in printed form as a separate document among your machine documents, or on the accompanying CD.

9.10.1.1 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.

9.11 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.

9.12 Scraper Floor Chains

The scraper floor chains are tensioned from the front side of the vehicle. Each chain is kept taut by a strong compression spring. If a foreign object gets between the chain and the sprocket, the sprocket can retract. The draw bolt must be set as shown in images Adjustment Scraper floor chains (outside/middle) and the symbol next to it.

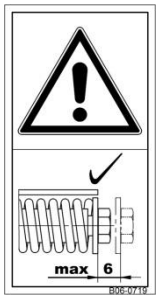

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Image: Adjustment of scraper floor chain (outside)


Image: Adjustment of scraper floorchain (middle)

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

If the scraper floor tensioning range is exhausted, the chain must be shortened by removing two links. This is done as follows:

- Loosen the hexagonal head screws on the scraper floor tensioning unit until the sprockets can be pushed back to the stop.
- Open the chain connecting link.
- Shorten the chain by 2 links (must be carried out on all 4 chains).
- Remount chain connecting links.
- Tension scraper floor chains.
- Check the scraper floor bar bolts occasionally and tighten if necessary!

9.13 Lubrication

WARNING!

Risk of injury through movements of tractor and vehicle or of vehicle parts!

- Before performing any work 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!

Observe the notes and instructions in the operating instructions, chapter “Commissioning”, section “Securing the vehicle against unintentional rolling and starting”.

WARNING!

Risk of injury through unintentional movement of components!

If raised components are not secured, they can move inadvertently. This can cause serious injuries.

- Always secure raised components against unintentional lowering or operating before working on or under them.
- Keep people out of the vehicle’s danger area and away from moving vehicle parts!

CAUTION!

Danger through escaping lubricants.

There is a risk of slipping and injury.

- During installation, operation, maintenance and repairs, watch out for escaping lubricant.
- Immediately seal any leaks.
- Avoid skin contact with oils, grease, cleaning agents and solvents.
- On injuries or burns through oils, cleaning agents or solvents immediately call a doctor.

CAUTION!

Lubricants can pollute waterways and the ground.

- Use and dispose of lubricants properly.
- Observe the regional laws and regulations on disposal.

Lubricant

To ensure trouble-free operation of the vehicle over a long time, a high-quality long-life grease must be used. This grease has the following properties:

- Unusually high adhesion
- Resistance against water
- High pressure-absorption capacity
- High resistance to ageing
- High work resistance

Initial greasing of the vehicle has been performed with this grease. This grease is commercially available.

Where lubricants can enter fodder or the ground, use environment-friendly biodegradable oils and greases.

NOTE

Biodegradable oils are NOT authorized for use in lubrication systems for roller chains and must NOT be used.

Grease with solids, such as graphite, are NOT approved for central lubrication systems and must NOT be used.

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

- Use only oils and greases approved by the manufacturer.
- Ensure correct disposal of lubricants.

Lubrication points

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

B06-0084

Lubrication points

This identification sticker marks lubrication points on the vehicle.

- The lubrication points must be lubricated according to the lubrication schedule (see "Maintenance & Care” section).

When lubricating the drive components, such as

- drive shafts,
- gearboxes,
- drive chains / roller chains,
- etc.,

observe also the notes and instructions in the operating instructions, chapter “Maintenance and care”, section “Drive”.

NOTE

Before lubricating, remove any dirt from the lubrication points.

9.13.1 Lubrication schedule

The lubrication schedules list the lubrication points with their respective lubrication intervals. The given intervals assume an average utilization of the vehicle. In case of a higher utilization and extreme operating conditions, reduce the intervals.

Legend

In the lubrication schedule, the lubrication points and intervals are indicated with symbols. The symbols have the following meanings:

Symbol	Lubrication points	Action	Interval	Remark
	Lubrication point	Apply grease	Every 25 trips	- Approx. two strokes from the grease gun - Remove any excess grease on the lubrication point.
	Lubrication point	Apply grease	Every 50 trips	
	Lubrication point	Apply grease	Every 100 trips	
	Lubrication point	Apply grease	Every 250 trips	
	Lubrication point	Apply grease	Every 500 trips	
	Lubrication point	Apply grease	Every 1000 trips	
4 	4 lubrication points	Apply grease	Depending on symbol	
	Roller chain	Lubricate / oil with plant-based oil	Every 50 trips	- Apply a thin, even layer with a brush or spray can. - Remove any old and excess oil.
	Roller chain	Lubricate / oil with plant-based oil	Every 100 trips	
4 	4 roller chains	Lubricate / oil with plant-based oil	Depending on symbol	
	Sliding surfaces	Lubricate / oil with plant-based oil	Every 25 trips	
1.3 l	Gearbox oil	Replace	Annually	
Observe the notes and instructions in the operating instructions, chapter “Care and maintenance”, section “Drive” / “Gearbox”.				

Symbol	Description
	Cross-reference to subsequent pages
	Cross-reference to another section in chapter “Care and maintenance”, e.g. - subsection “Drive shafts” in section “Drive”, - subsection “Axles” in section “Chassis”, - etc.
	Direction of travel

9.13.1.1 Lubrication schedule TSW 7340 S

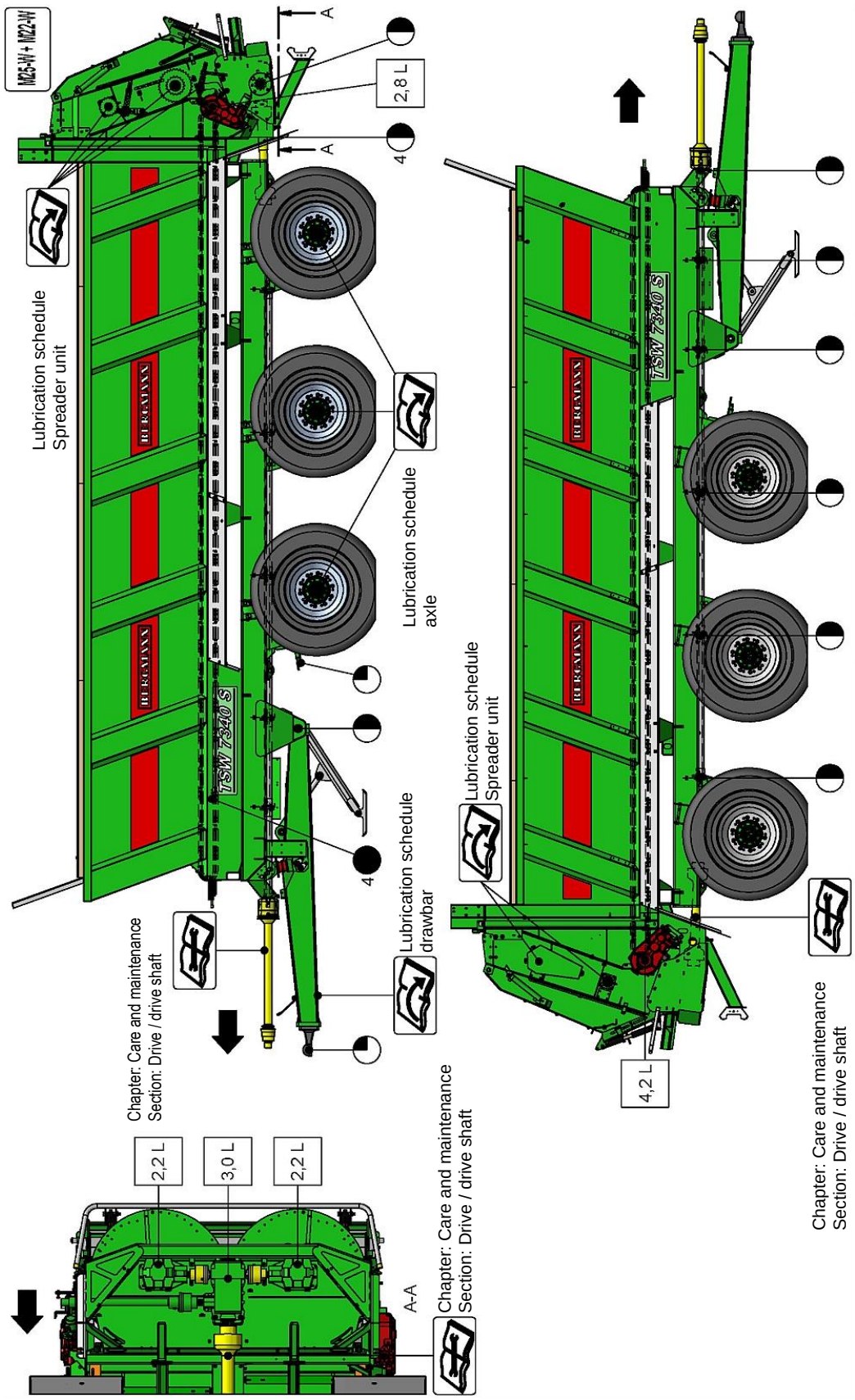
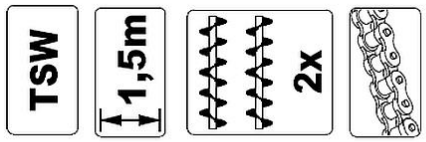


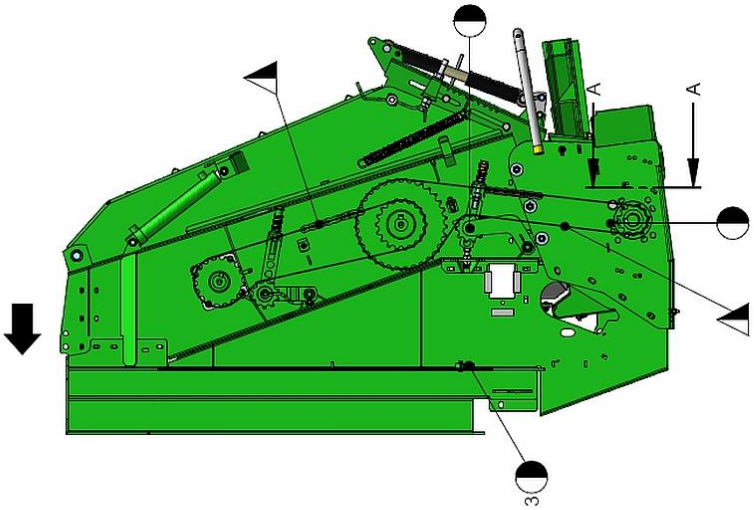
Image 85: Lubrication schedule TSW 7340 S

13-25-0002-PLN_20190429-BTA

9.13.1.2 Lubrication schedule for spreader unit

Version: Two-beater spreader unit + TSW, 1500 mm, drive with chain





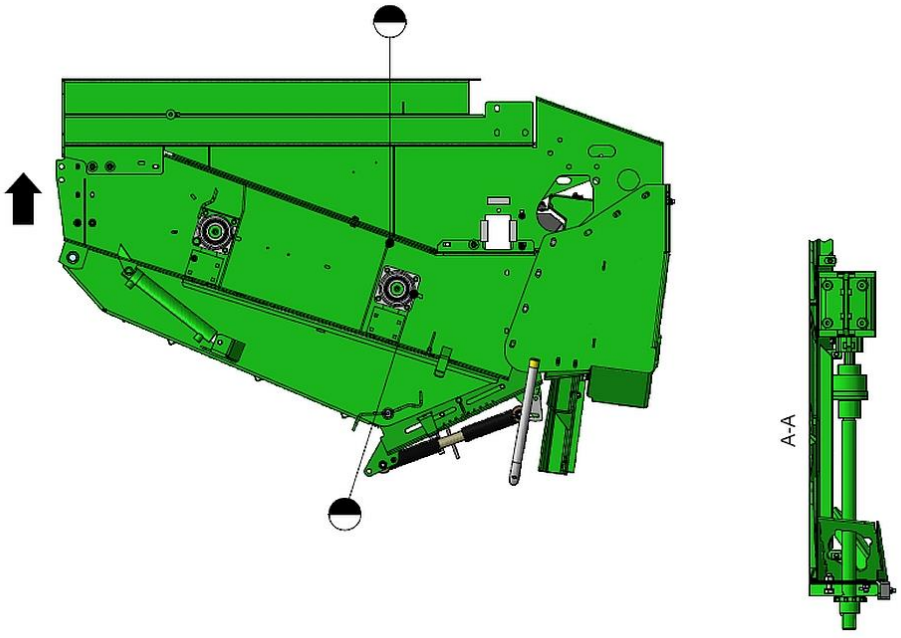


Image 86: Two-beater spreader unit + TSW, 1500 mm, drive with chain 10-44-0150-PLN_20160509-BTA

9.13.1.3 Lubrication schedule for spreader unit

Version: Two-beater spreader unit + TSW, 1500 mm, drive without chain

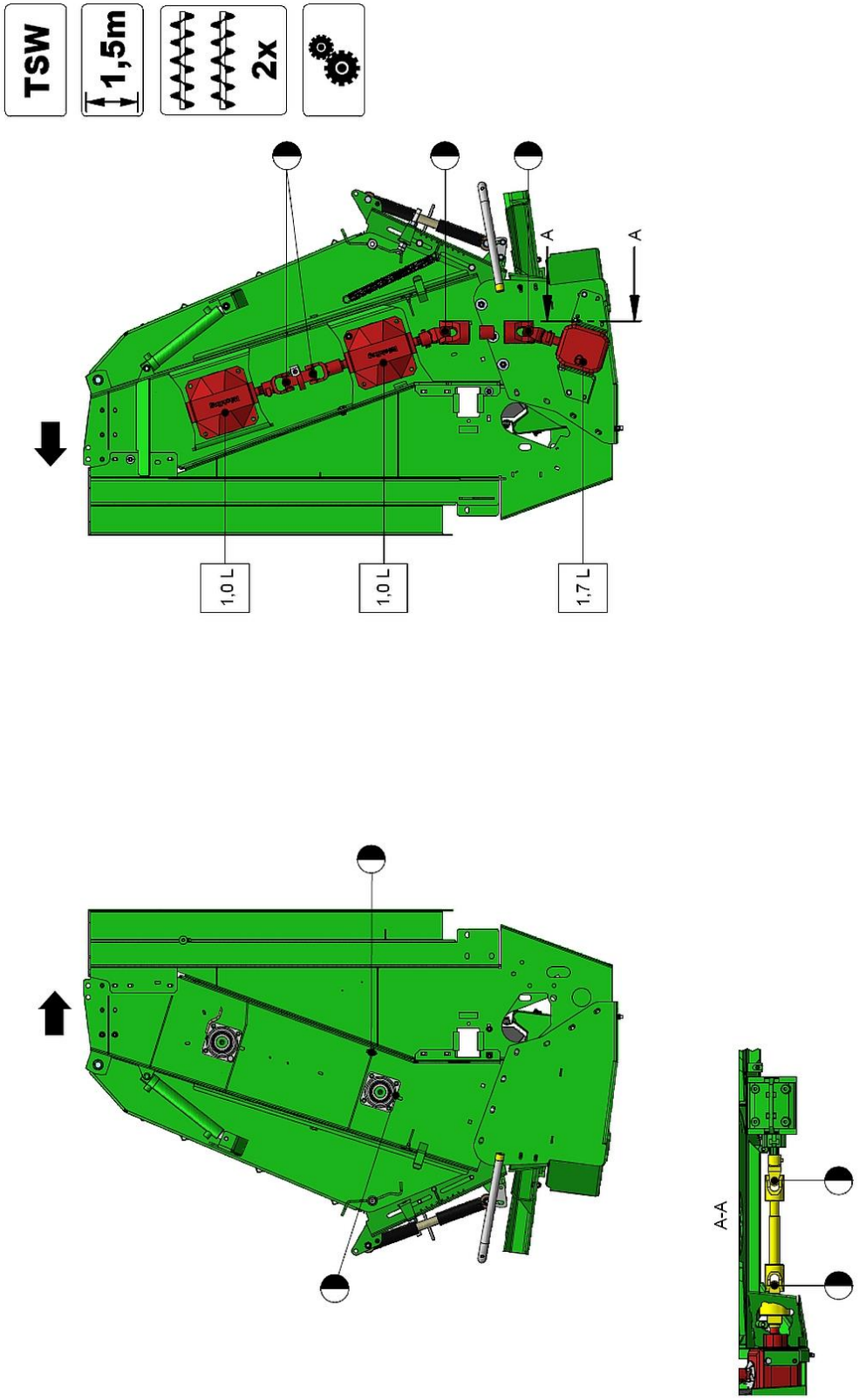
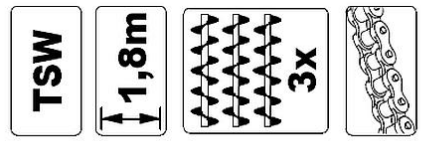
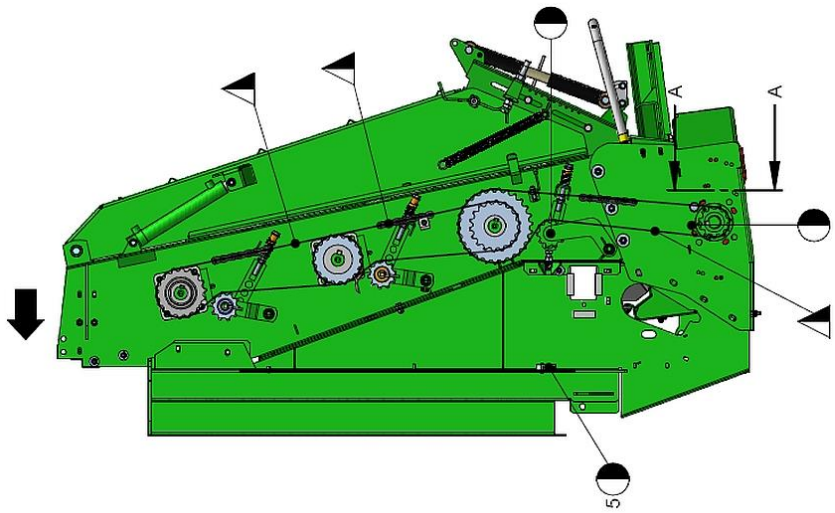


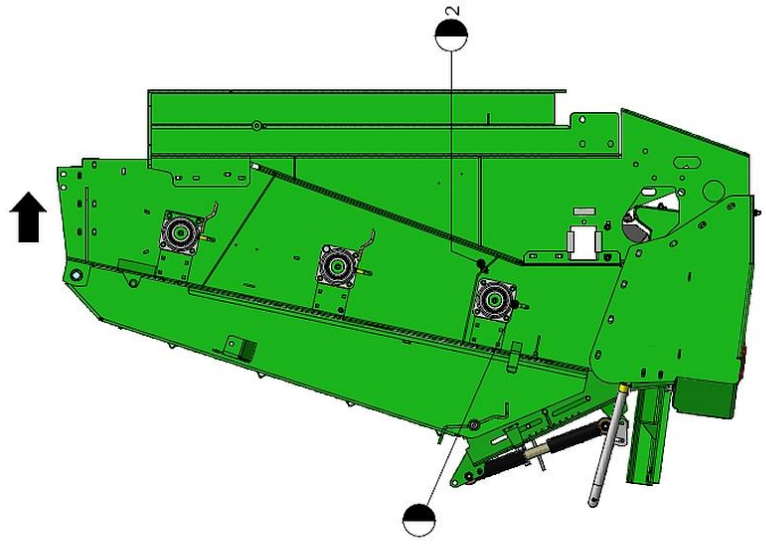
Image 87: Two-beater spreader unit + TSW, 1500 mm, drive without chain 10-70-0050-PLN_20160509-BTA

9.13.1.4 Lubrication schedule for spreader unit

Version: Three-beater spreader unit + TSW, 1800 mm, drive with chain







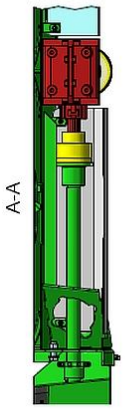


Image 88: Three-beater spreader unit + TSW, 1800 mm, drive with chain 09-54-0151-PLN_20160509-BTA

9.13.1.5 Lubrication schedule for spreader unit

Version: Three-beater spreader unit + TSW, 1800 mm, drive without chain

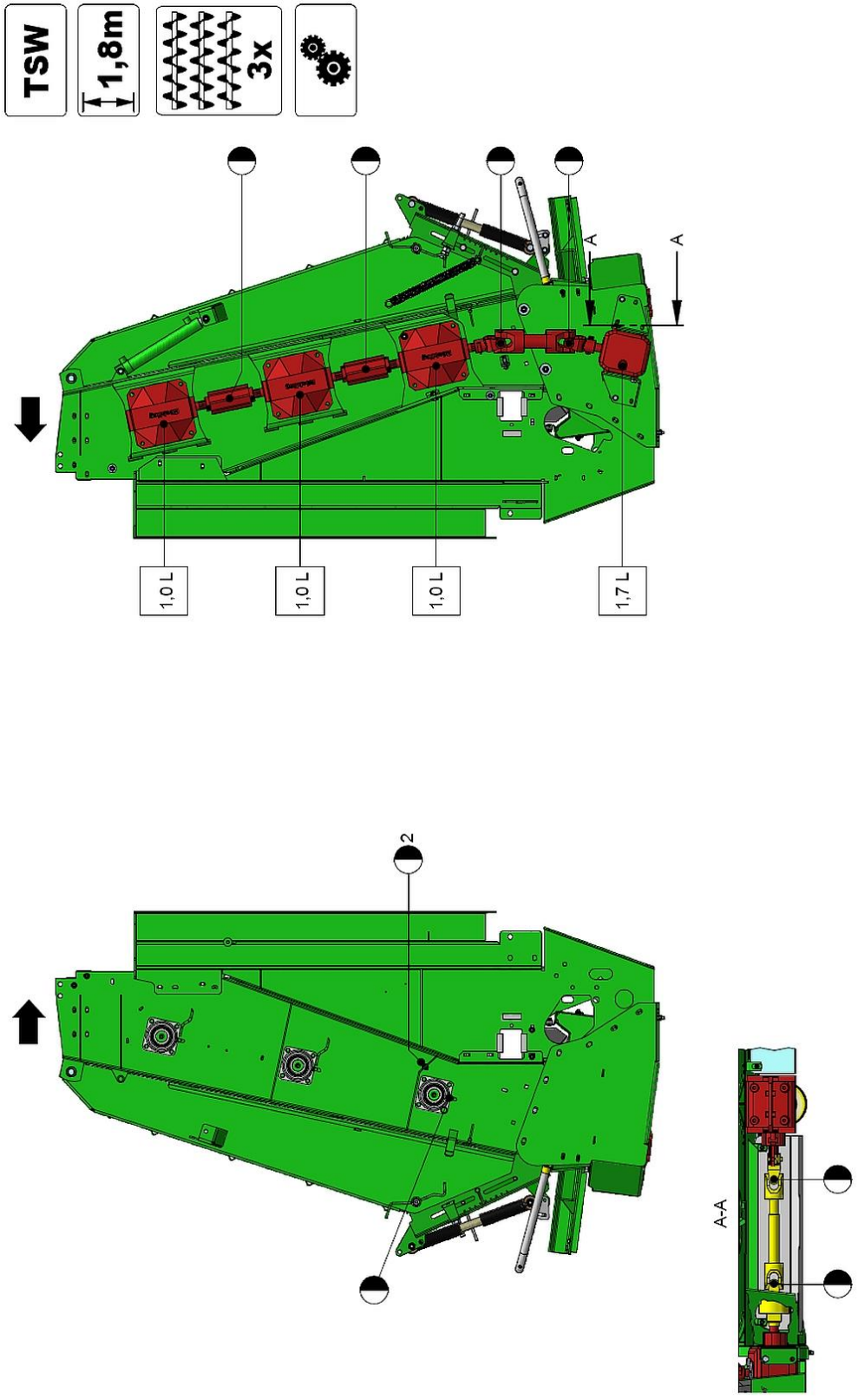


Image 89: Three-beater spreader unit + TSW, 1800 mm, drive without chain 10-69-0092-PLN_20160509-BTA

9.13.1.6 Lubrication schedule, axle

Version: ADR rigid braking axle

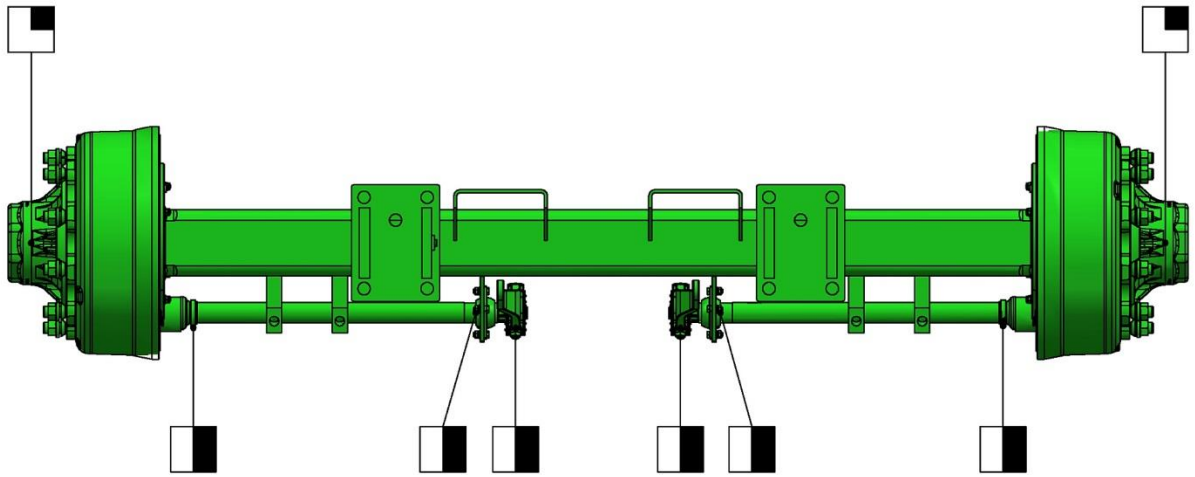


Image 90: ADR rigid braking axle 14-06-0538-PLN_20181127-BTA

9.13.1.7 Lubrication schedule, axle

Version: BPW rigid braking axle

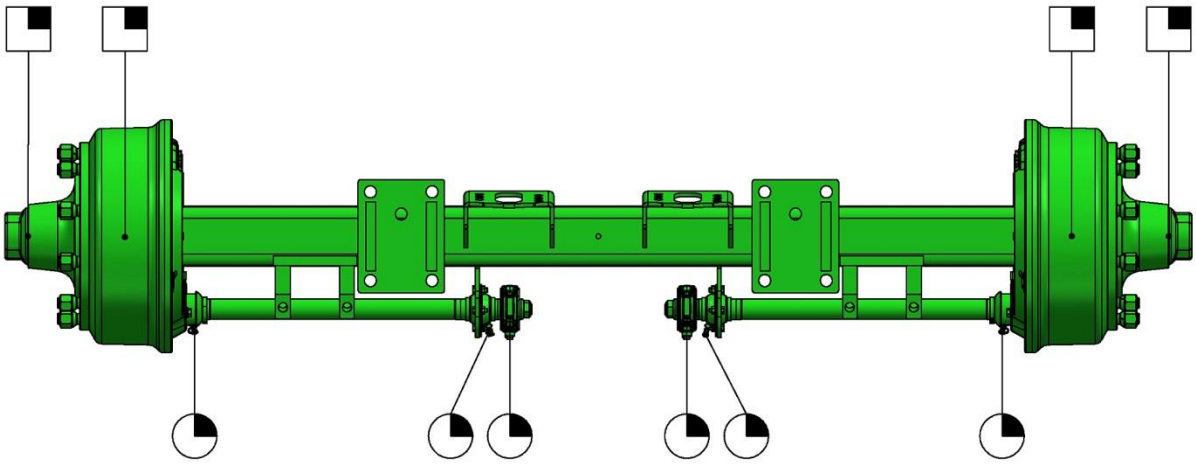


Image 91: BPW rigid braking axle 18-06-0132-PLN_20181127-BTA

9.13.1.8 Lubrication schedule, axle

Version: ADR steering axle

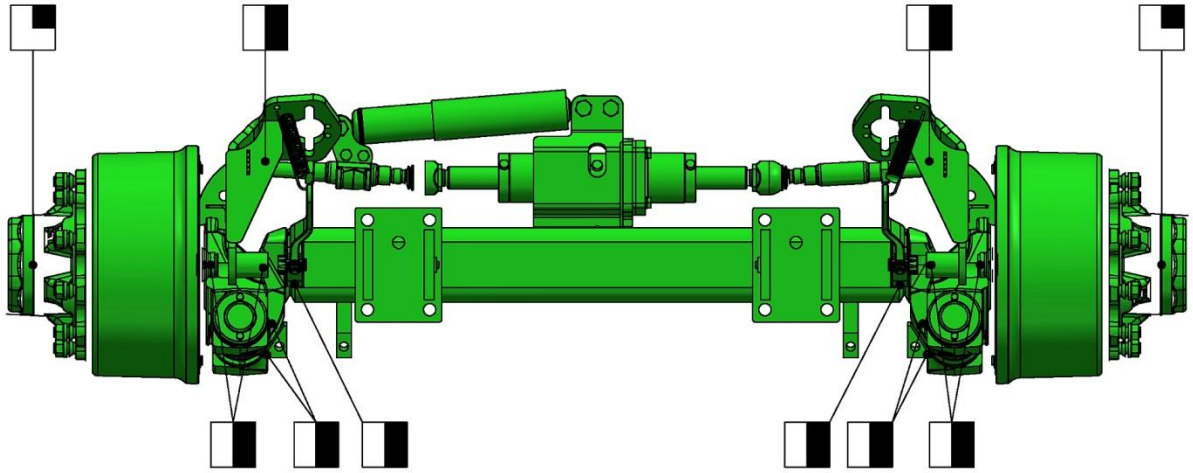


Image 92: ADR steering axle 14-06-0532-PLN_20181127-BTA

9.13.1.9 Lubrication schedule, axle

Version: BPW steering axle

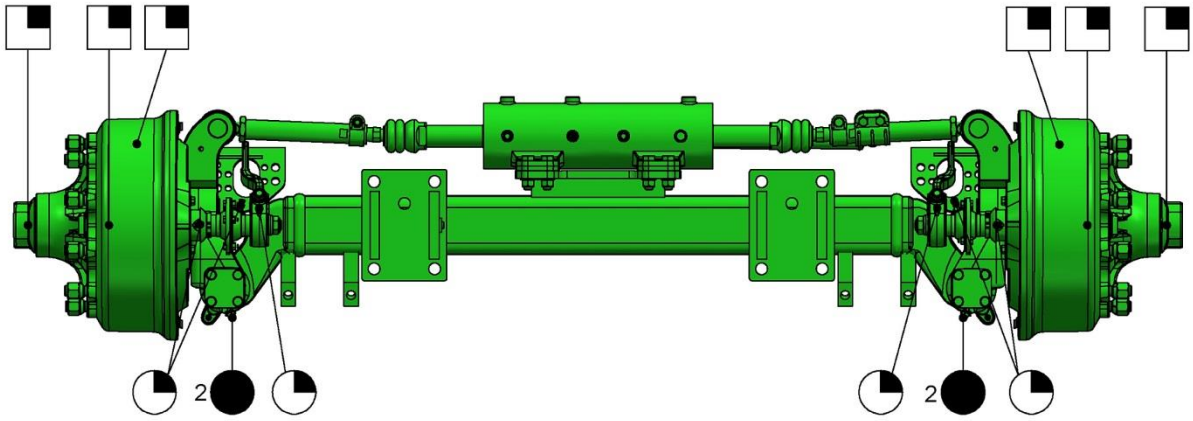


Image 93: BPW steering axle 18-06-0327-PLN_20181127-BTA

9.13.1.10 Lubrication schedule, drawbar (bottom coupling)

Version: Forced Steering, hydraulic left + right

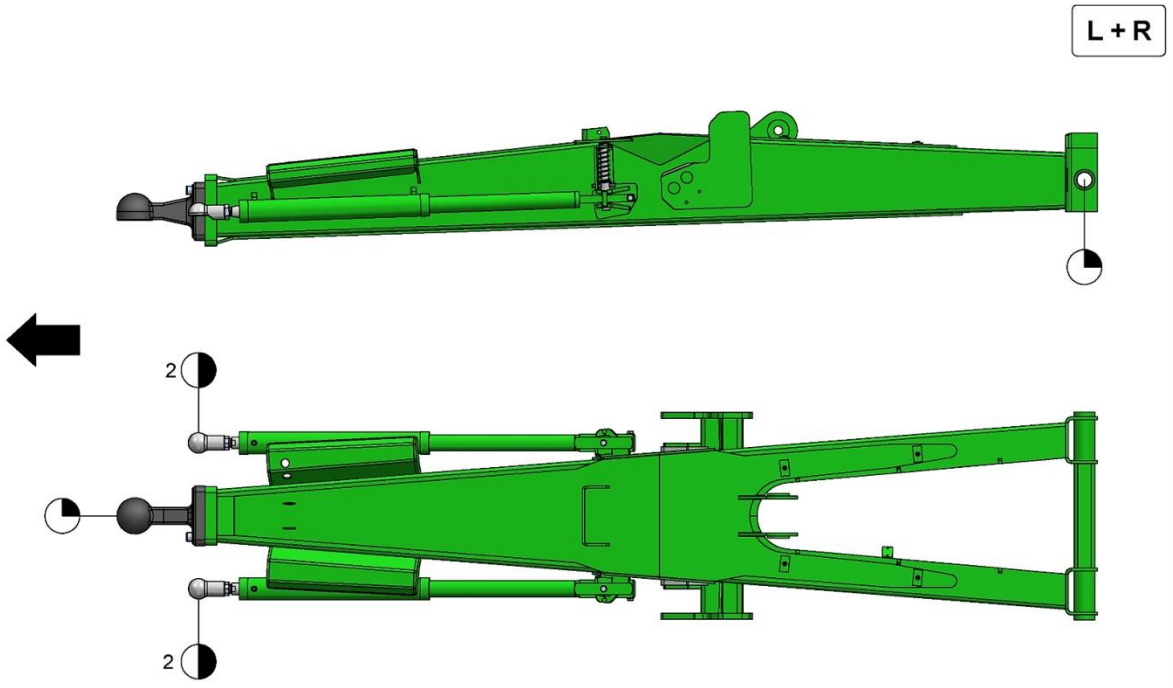


Image 94: Forced Steering, hydraulic left + right 10-66-0272-PLN_20151109-BTA

9.13.2 Lubrication system

	**WARNING!**
	Danger through system pressure / hydraulic pressure. Lubrication systems are under high pressure during operation. • Before starting installation, maintenance or repair work and before making modifications or repairs on the vehicle, lubrication systems must be depressurized.

	**NOTE**
	The lubrication system works automatically. A visual check of the lubricant flow in the lubrication lines should nevertheless be performed regularly. • Check all lubrication points for sufficient grease supply every day! • Top up grease at the lubricating nipples of the drive shafts and other lubrication points on rotating components according to the lubrication schedule.

Observe also the notes and instructions in the manufacturer's operating instructions for the supplied lubrication system.

9.13.2.1 Cleaning the lubrication system

If necessary, the lubrication system can be cleaned with mild, compatible (not alkaline, no soap) cleaning agents. For safety, the product should be disconnected from electrical power and the hydraulic and/or compressed air supply. During the cleaning, make sure that no cleaning agent gets inside the product. Internal cleaning of the product is not necessary under normal operation and when using lubricants that are compatible with each other. If wrong or a contaminated lubricant has inadvertently been filled, the product must be cleaned internally. To do this, contact the manufacturer of the lubrication system.

9.13.2.2 Maintenance of the lubrication system

- Check the lubricant reservoir fill level every day. If necessary, top up lubricant.
- To ensure correct function and prevent dangerous situations, regularly check all connections for tightness. Every time after refilling the lubricant reservoir and after long operating pauses, check the system's components (lubricant lines, connections, seals, etc.) for leaks before taking the vehicle into operation again. If you find any leaks, replace the faulty component.
- When refilling the lubricant reservoir, visually check the lubricant at the lubrication points (such as bearings). The probable cause of insufficient lubrication is a fault in the lubrication system or a faulty system configuration.
- After long standstill times, check the electrical cables for damage before taking the vehicle into operation again. Replace any damaged cables.
- Check the electrical connections and contacts for tightness and corrosion twice a year. Tighten any loose contacts. Clean any corroded electrical contacts with a wire brush and, after connecting them, lightly grease them with contact grease.

9.13.2.3 Filling lubricant on roller chain lubrication system

	NOTE
	Always observe the following points: • Use only lubricants approved for the product. Unsuitable lubricants can cause product failure and material damage. • Fill only clean lubricant with a suitable device. Contaminated lubricants can cause serious system malfunctions. Fill the lubricant reservoir without bubbles. • Do not mix different lubricants, as this can cause damage and require complicated cleaning of the lubrication system. To avoid inadvertent mixing of lubricants, we recommend applying a label with the used lubricant to the lubricant reservoir.

Lubricant:

Oils in accordance with ISO VG > 25 mm²/s

Use a thin mineral oil, machine oil or an engine or gearbox oil. The viscosity of the lubricating oil should be chosen such that the oil remains mobile under all ambient temperatures. Specifically, that means oils with a viscosity of SAE 20 to SAE 50 or from 50 to 300 ISO VG at 40 °C.

	NOTE
	Biodegradable oils are NOT authorized for use in lubrication systems for roller chains and must NOT be used.

Procedure:

Fill the reservoir (Image 95 / pos. 1) with lubricant as follows:

- Release the reservoir lid (Image 95 / pos. 2) from the filler neck (Image 95 / pos. 3) and set it aside.
- Through the filler neck (Image 95 / pos. 3), fill the reservoir (Image 95 / pos. 1) with up to 1 litre of lubricant.
- Refit the reservoir lid (Image 95 / pos. 2) on the filler neck (Image 95 / pos. 3) and screw the reservoir lid Image 95 / pos. 2) closed.

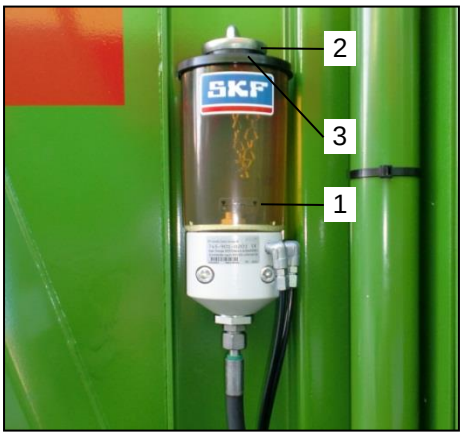


Image 95: Lubrication pump

9.13.2.4 Filling lubricant on central lubrication systems

	NOTE
	Always observe the following points: • Use only lubricants approved for the product. Unsuitable lubricants can cause product failure and material damage. • Fill only clean lubricant with a suitable device. Contaminated lubricants can cause serious system malfunctions. Fill the lubricant reservoir without bubbles. • Do not mix different lubricants, as this can cause damage and require complicated cleaning of the lubrication system. To avoid inadvertent mixing of lubricants, we recommend applying a label with the used lubricant to the lubricant reservoir.

Lubricant:

Grease up to NLGI class 2 DIN 51818 and a flow pressure of max. 700 mbar. Multi-purpose grease with EP additives, compatible with plastics, NBR elastomeric, copper and copper alloys is recommended.

The list of authorized lubricants is being constantly updated and can be found under the following address: http://www.skf.de The above specifications are authoritative.

	NOTE
	Grease with solids, such as graphite, are NOT approved for central lubrication systems and must NOT be used.

Procedure:

If the reservoir is drained below the “Min” mark, the entire system must be bled. Do this as follows:

- Disconnect the main line from the lubrication pump. Pump until bubble free lubricant exits the elbow stud coupling. Connect the main line.
- Disconnect the main line from the main distributor. Pump until no more air is in the line. Connect the main line.
- Disconnect the secondary line from the main distributor. Pump until bubble free lubricant exits all main distributor connections. Connect the secondary line.
- Bleed the secondary lines, secondary distributors, lubrication lines and lubrication points and conduct functions checks.

Fill the reservoir (Image 96 / pos. 1) with lubricant as follows:

- Remove the cap from the lubrication point (Image 96 / pos. 2).
- With a commercial grease gun, apply the correct lubricant at the lubrication point (Image 96 / pos. 2) to fill the reservoir (Image 96 / pos. 1).
- Then refit the cap to the lubrication point (Image 96 / pos. 2).

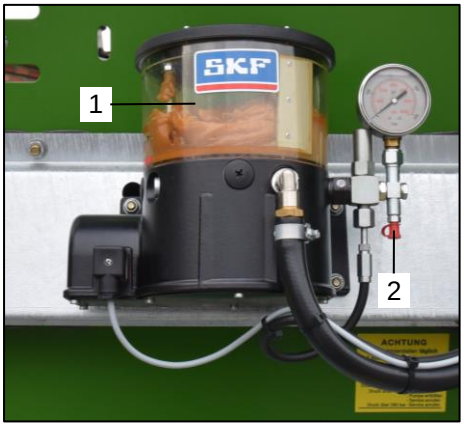


Image 96: Lubrication pump

For ease of lubrication, a further grease nipple (Image 97 / pos. 2) for filling the lubricant reservoir (Image 97 / pos. 1) is fitted at the front left of the vehicle.

Fill the reservoir (Image 97 / pos. 1) with lubricant as follows:

- Remove the cap from the lubrication point (Image 97 / pos. 2).
- With a commercial grease gun, apply the correct lubricant at the lubrication point (Image 97 / pos. 2) to fill the reservoir (Image 97 / pos. 1).
- Then refit the cap to the lubrication point (Image 97 / pos. 2).

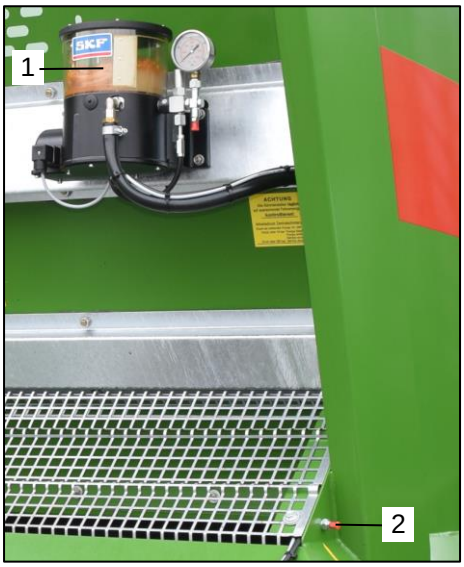


Image 97: Filler neck

9.14 PTO shaft

9.14.1.1 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!

9.14.1.2 Lubrication of Walterscheid PTO shaft

Joints 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

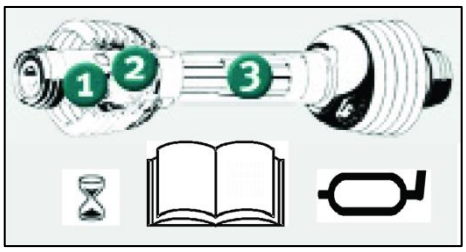


Image: Maintenance markings

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.

9.14.1.3 Lubrication Points and Grease Quantities

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

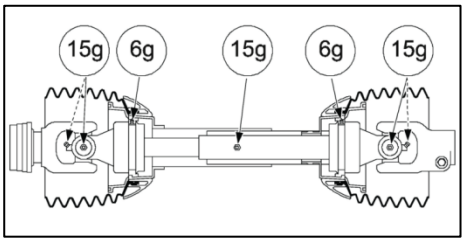


Image: Lubrication points without wide

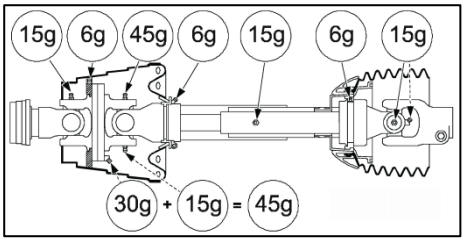


Image: Lubrication points with wide

9.14.1.4 Maintenance Intervals

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.)

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 250 h**		100 h	8 h	60 h		8 h		
2	250 h 100 h*			40 h			50 h			8 h	40 h		8 h		
	1 joints			2 Protection storage			3 Profile tubes								

*Extreme Dust or large flexion angle **with P-seals

Image: Lubrication points with wide angles

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

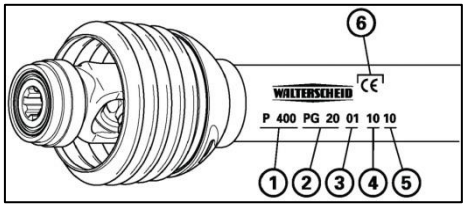


Image: PTO shaft label

9.15 Gearboxes

9.15.1 General

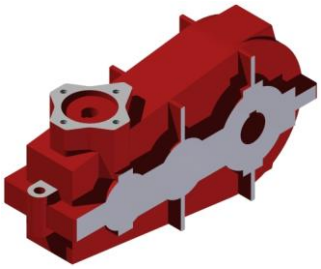
The gearboxes are to be checked for leaks regularly and the oil level checked if necessary. Gearbox oil is to be refilled if necessary. In addition, an oil change should be carried out each year.

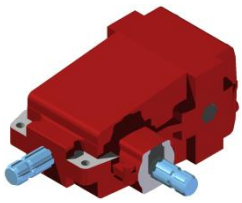
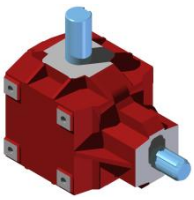
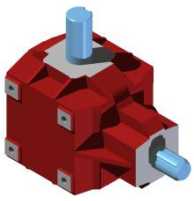
Gearbox oil:

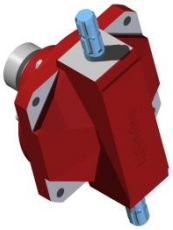
- SAE 85W-90 or equivalent (z.B. ISO VG 320)
- ISO VG320 mineraloil (mobil 600 XP 320 or equivalent)

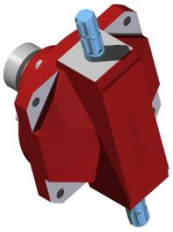
Lubricants can pollute soil and water. Lubricants must be used correctly and disposed of properly. The regional requirements and laws concerning the disposal of lubricants must be observed.

9.15.2 Allocated gearbox and filling quantity

Scraper Floor	
Left 	Right 
Spur gearbox	Spur gearbox
B02-1116	B02-0848
Filling quantity: 2,8 Liter	Filling quantity: 4,2 Liter

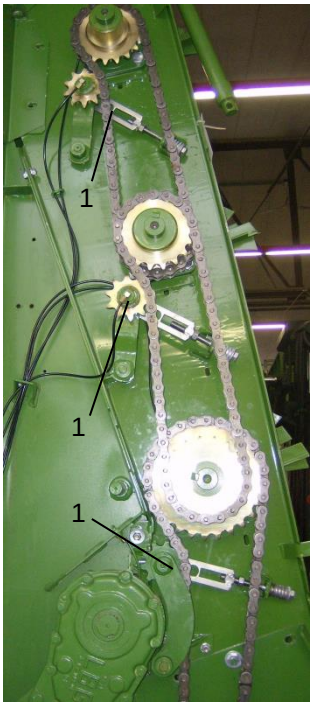
Disk Spreader Unit		
Main gearbox 	Left: 	Right: 
Angle Gearbox	Angle Gearbox	Angle Gearbox
B02-1035	B02-1069	B02-1069
Filling quantity: 3,0 Liter	Filling quantity: 2,2 Liter	Filling quantity: 2,2 Liter

Two-beater spreader unit SL (Cardan- Drive)		
Gearbox at bottom 	1. Roller (bottom) 	1. Roller (top) 
Angle Gearbox	Angle Gearbox	Angle Gearbox
B02-1095	B02-1093	B02-1094
Filling quantity: 1,7 Liter	Filling quantity: 1,0 Liter	Filling quantity: 1,0 Liter

Three-beater spreader unit ST (Cardan- Drive)		
Gearbox at bottom 	1. + 2. Roller (bottom / middle) 	3. Roller (top) 
Angle Gearbox	Angle Gearbox	Angle Gearbox
B02-1095	B02-1093	B02-1094
Filling quantity: 1,7 Liter	Filling quantity: 1,0 Liter	Filling quantity: 1,0 Liter

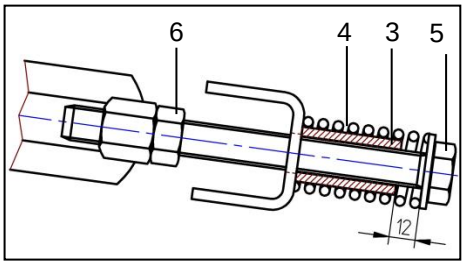
9.16 Roller chains

The drive chains are equipped with chain tensioners. The chain tension is to be checked daily and the chain is to be shortened if necessary. The chains are to be lubricated with motor oil. The beater drive chains are tensioned by a spring-loaded chain tensioner. (Pos. 1 & 2)

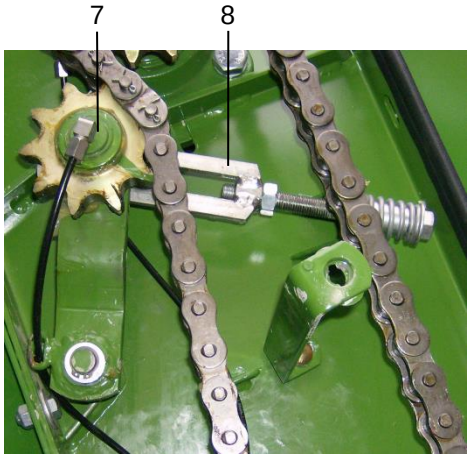
Two-beater spreader unit	Three-beater spreader unit
	

9.16.1.1 Adjusting the Chain Tensioner Pos. 1

To ensure proper tensioning, the tensioners must be set so that the distance between the bushing (Pos 3), which is located in the spring (Pos 4), and the bolt head (Pos 5), is 12 mm. If the distance is greater, the lock nut (Pos. 6) must be loosened and the bolt (Pos. 5) must be screwed in until the prescribed distance between bushing 3 and bolt head 5 has been reached. After making the correction the lock nut (Pos. 6) must be tightened.



By repositioning the bracket (Pos. 7) on the clamping arm (Pos. 8), the tensioning range of the chain tensioner can be increased. If the tensioning range is exhausted, the roller chains must be shortened.



9.17 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!

9.17.1 Hydraulic pressure hoses

WARNING!

Danger through ageing of hydraulic pressure hoses.

Damaged hydraulic pressure hoses can cause serious injuries or death.

Hydraulic pressure hoses can wear and age through their internal pressure, the effects of heat and UV radiation.

- Have the hydraulic pressure hoses checked regularly for safe working condition.
- Replace any hydraulic pressure hoses that are not in safe working condition with original BERGMANN hydraulic pressure hoses.
- Replace any hydraulic pressure hoses that have exceeded their storage duration and/or service life with original BERGMANN hydraulic pressure hoses.

Observe also the notes and instructions in the following sections in these operating instructions: “Markings on hydraulic pressure hoses”, “Service life of hydraulic pressure hoses” and “Inspecting hydraulic pressure hoses”.

9.17.1.1 Markings on hydraulic pressure hoses

Hydraulic pressure hoses contain embossed markings on their hose fitting.

BERGMANN article number

- Image 98 / pos. 1: BERGMANN article number (e.g. B09 1924)

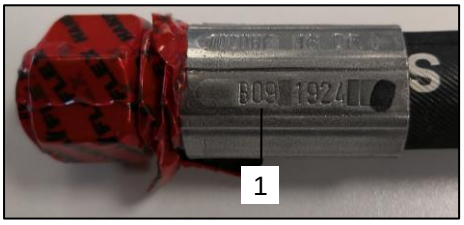


Image 98: Marking 1

Hydraulic pressure

- Image 99 / pos. 2: Max. permissible hydraulic pressure (e.g. PN 330 bar)

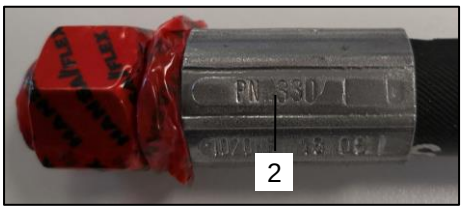


Image 99: Marking 2

Manufacturer marking

- Image 100 / pos. 3: Mark of the manufacturer (e.g. 1020HF)

Date of manufacture

- Image 100 / pos. 4: Date of manufacture of the hydraulic pressure hose
  (e.g. 18 06 = year 2018, month June)

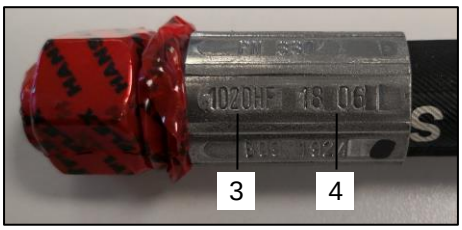


Image 100: Marking 3

Observe also the notes and instructions in the following section “Service life of hydraulic pressure hoses” in these operating instructions.

9.17.1.2 Service life of hydraulic pressure hoses

Hydraulic pressure hoses are subject to natural ageing even when stored correctly and used as specified. This limits their service life. Incorrect storage, mechanical damage and impermissible loads are the most frequent causes of failure. The guideline values for the service life are listed below, but these should be adapted according to practical experience in each case:

- In any case, hydraulic pressure hoses should not be used for more than six years (including storage).
- The storage duration of a hydraulic pressure hose should not exceed two years.

	NOTE
	The date of manufacture of the hydraulic pressure hose is embossed on the hose fitting. • If the service life of the hydraulic pressure hose has been exceeded, it must no longer be used. • If the storage duration of the hydraulic pressure hose has been exceeded, it must no longer be used.

Observe also the notes and instructions in the previous section “Markings on hydraulic pressure hoses” in these operating instructions.

9.17.1.3 Inspecting hydraulic pressure hoses

The safe working condition of hydraulic pressure hoses must be checked by a qualified workshop:

- Before their first use
- At regular intervals after they have been taken into use for the first time (at least once a year)
- After repairs
- After major repairs on the vehicle
- After accidents
- After longer periods of standstill

Inspection criteria for hydraulic pressure hoses

If any of the following damages are identified, have the hydraulic pressure hoses replaced immediately by a qualified workshop:

- Damage of the outer sheath down to the inner layer, e.g. chafing, cuts or tears
- Brittle outer sheath and crack formation in the hose material
- Deformations that do not correspond to the natural shape of the hydraulic pressure hose, both with the hose pressurized and under no pressure, as well as bending (e.g. separation of layers or formation of blisters)
- Leakage
- Damage or deformation of the hose fitting (impaired sealing action)
- Hose moving out of hose fitting
- Impaired function and strength of hose fitting due to corrosion
- Incorrectly routed hydraulic pressure hoses
- Storage duration and/or service life of hydraulic pressure hose is exceeded.

9.17.2 Hydraulic system - circulating hydraulics

9.17.2.1 Hydraulic oil filter

The hydraulic system is equipped with a pressure filter to protect the hydraulic control block against contamination (Image: Hydraulic filter Pos. 1). It is located under the service flap on the front wall of the machine near the control block.

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).

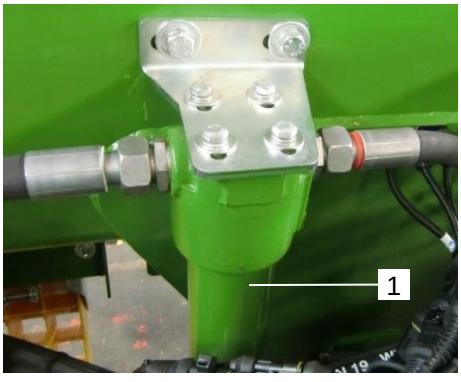


Image: Hydraulic oil filter

9.18 Brake System

9.19 Parking brake

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.

Image: Parking brake

Adjust the parking brake as follows:

- Release the three brake cable clamps on the end of the brake ca.
- 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.

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.

9.20 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 → Reserve
  - 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.

9.20.1 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. The following is an explanation of the symbols on the valves.

 = 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 moved since the brakes are released.)
Depending on the configuration of the machine, a separate release valve (blue button) in the vicinity of the control valve can be used for this purpose.

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.

9.20.2 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.

9.20.3 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.

9.20.4 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.

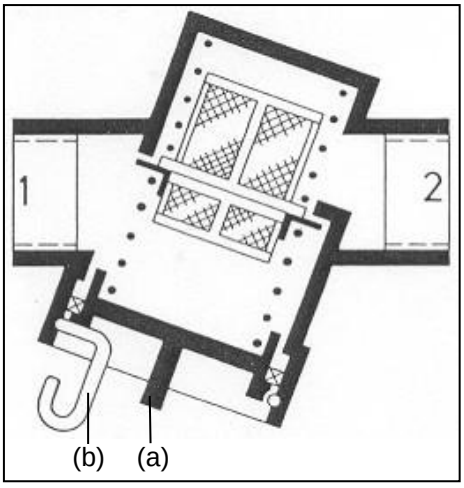


Image: Line Filters

9.20.4.1 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.

9.20.5 Check Pressure in Reserve Tank

The pressure in the reserve tank must be checked every 3-4 months.

- Check the pressure with an attached vehicle, connected air lines and completely air-free system.
- The pressure should be 6.5 to 8.1+0.2 bar.

9.20.6 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.

9.20.7 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.

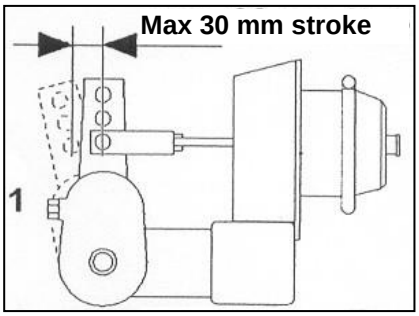


Image: Brake cylinder stroke

9.20.8 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.

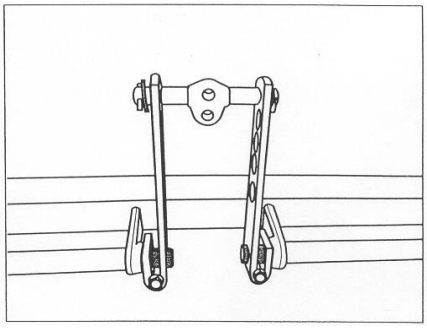


Image: Brake Levers

9.20.9 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 not braked.
- Check brake adjustment under full braking.

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

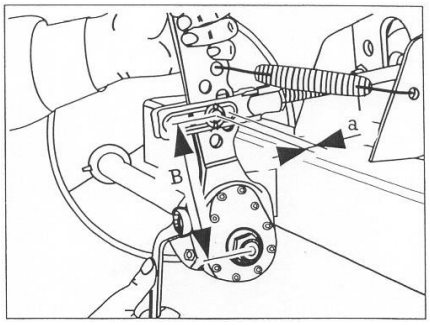


Image: Linkage control element

9.21 Connection diagrams

Section “Connection diagrams” contains, among others, the following diagrams:

- Connection diagrams – hydraulics
- Connection diagrams – electrical system
- Connection diagrams – brake system

The components and vehicle functions listed in the operating instructions may differ from the vehicle standard equipment and are available as optional features in some cases. Since these operating instructions are general, various equipment options can be listed that are not available for your vehicle. This also applies to illustrations. Images, drawings and 3D illustrations in these operating instructions do not always represent the exact vehicle type. However, the information which refers to the illustrations always corresponds to the vehicle type in this document.

9.21.1 Connection diagrams – hydraulics

9.21.1.1 Chassis - Version: Manual control

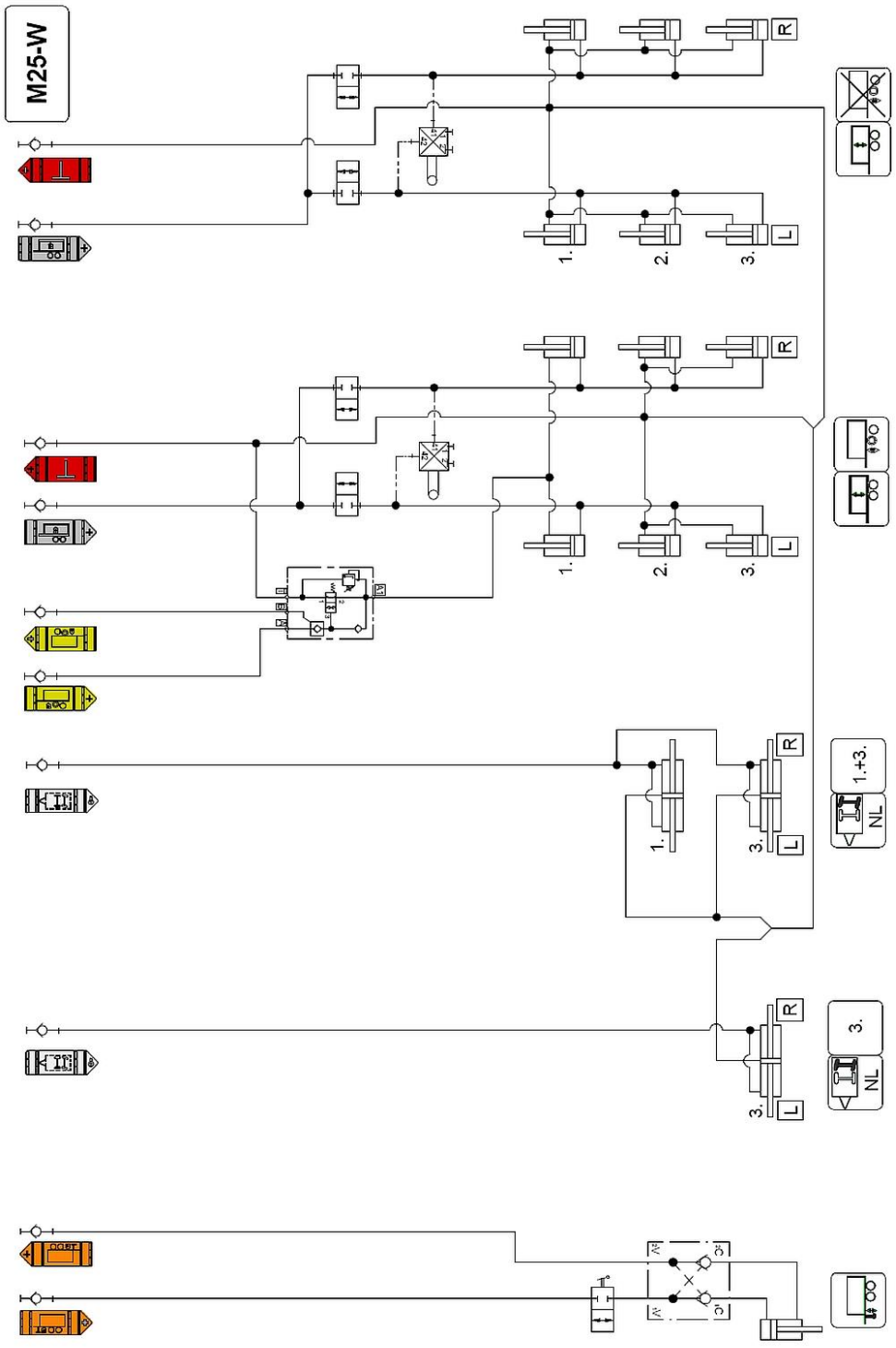


Image 101: Hydraulic diagram, manual control (1) 10-71-0726-BTA1

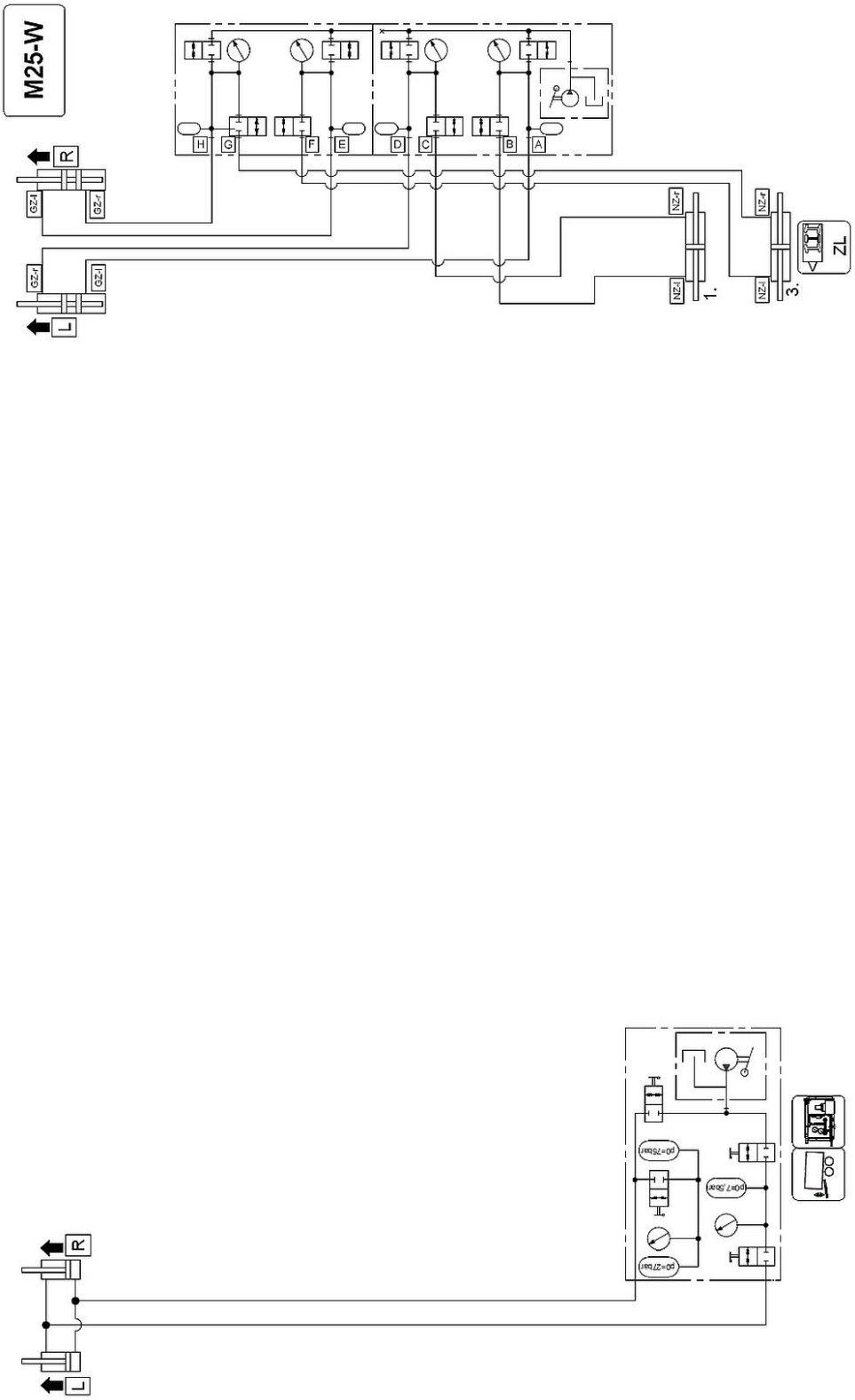


Image 102: Hydraulic diagram, manual control (2) 10-71-0726-BTA2

9.21.1.2 Chassis - Version: E-control

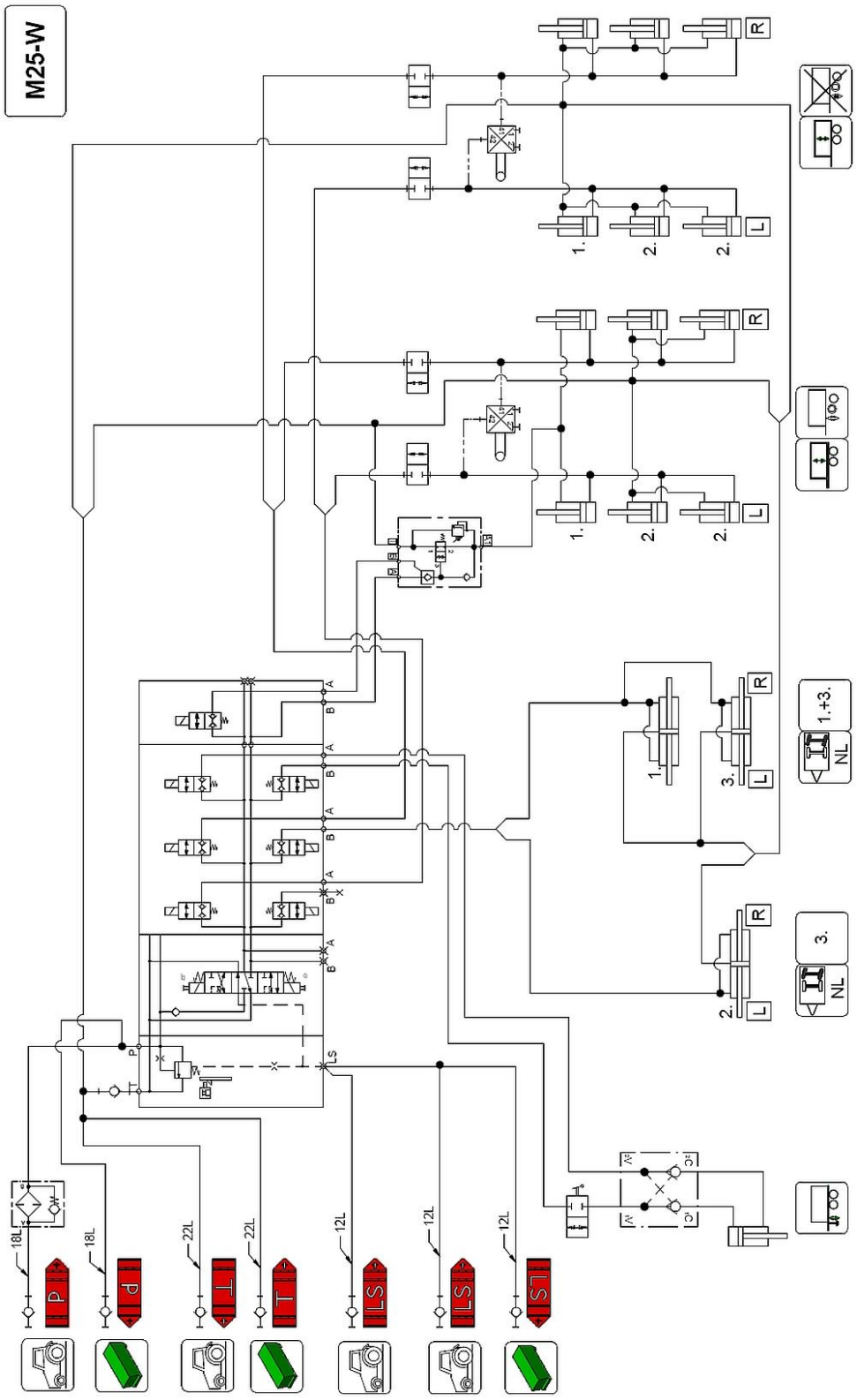


Image 103: Hydraulic diagram, E-control (1) 10-71-0727-BTA1

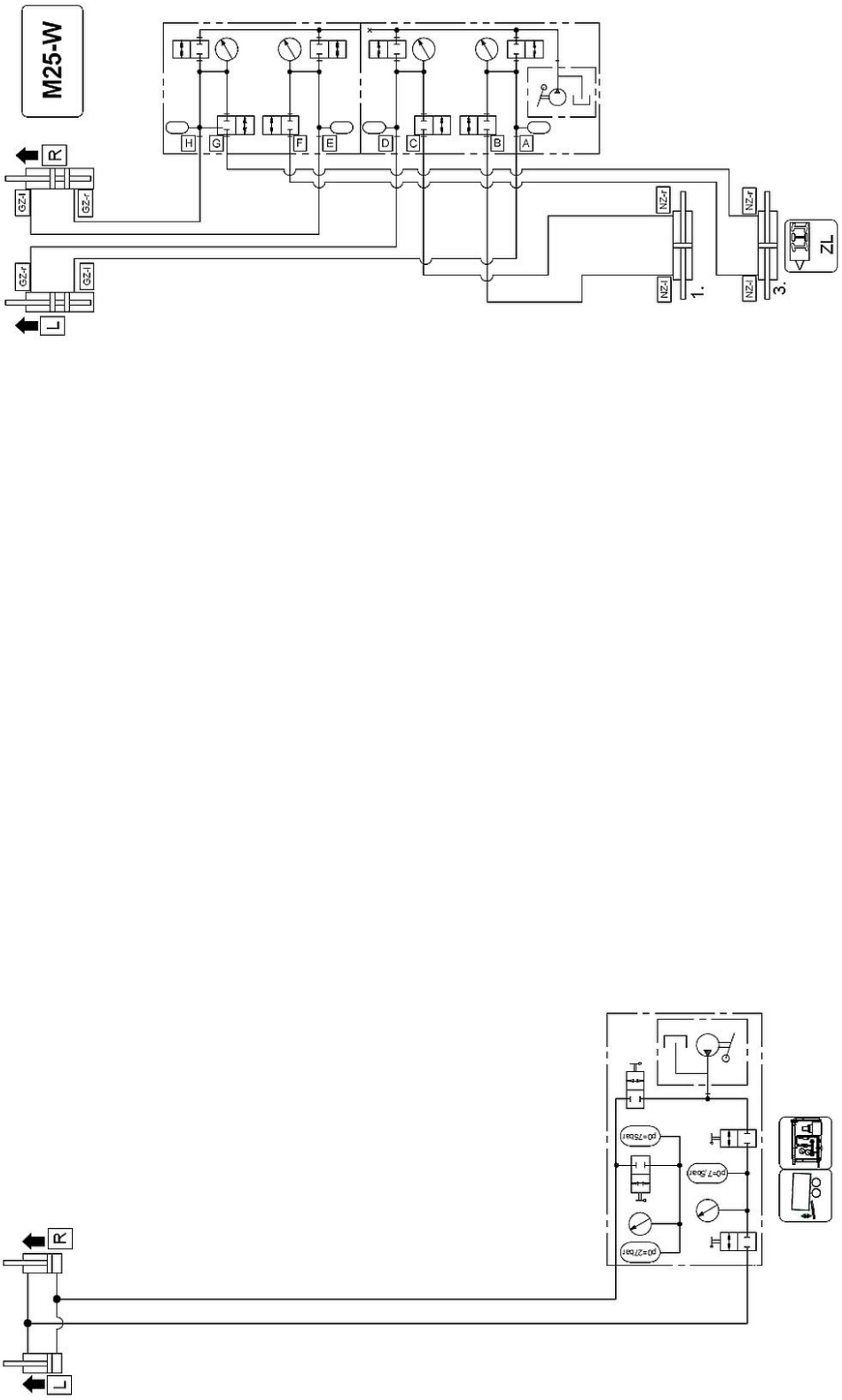


Image 104: Hydraulic diagram, E-control (2) 10-71-0727-BTA2

9.21.1.3 Spreader Body - Version: Manual control

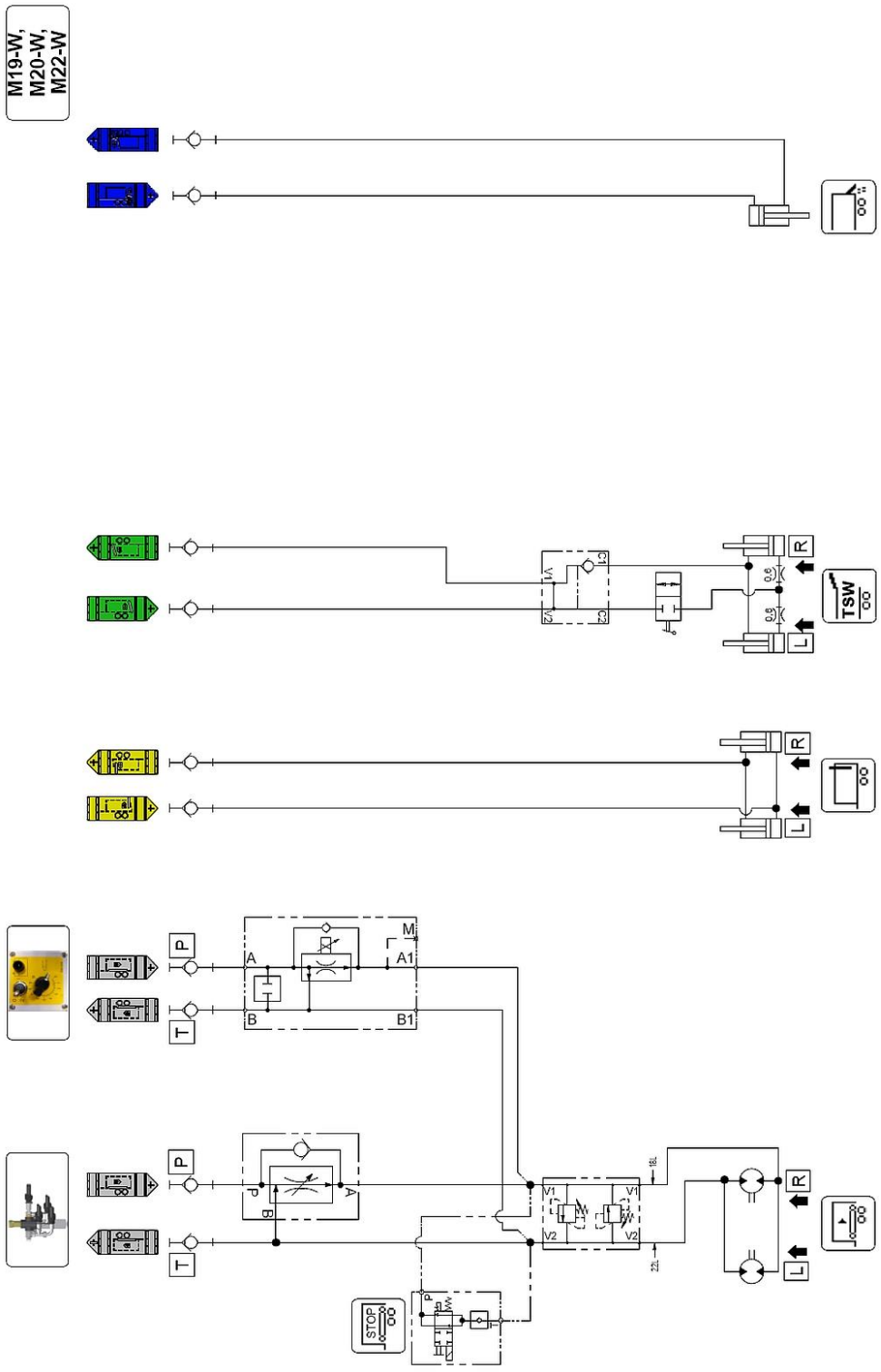


Image 105: Hydraulic diagram, manual control 10-40-0179-BTA1

9.21.1.4 Spreader Body - Version: E-control

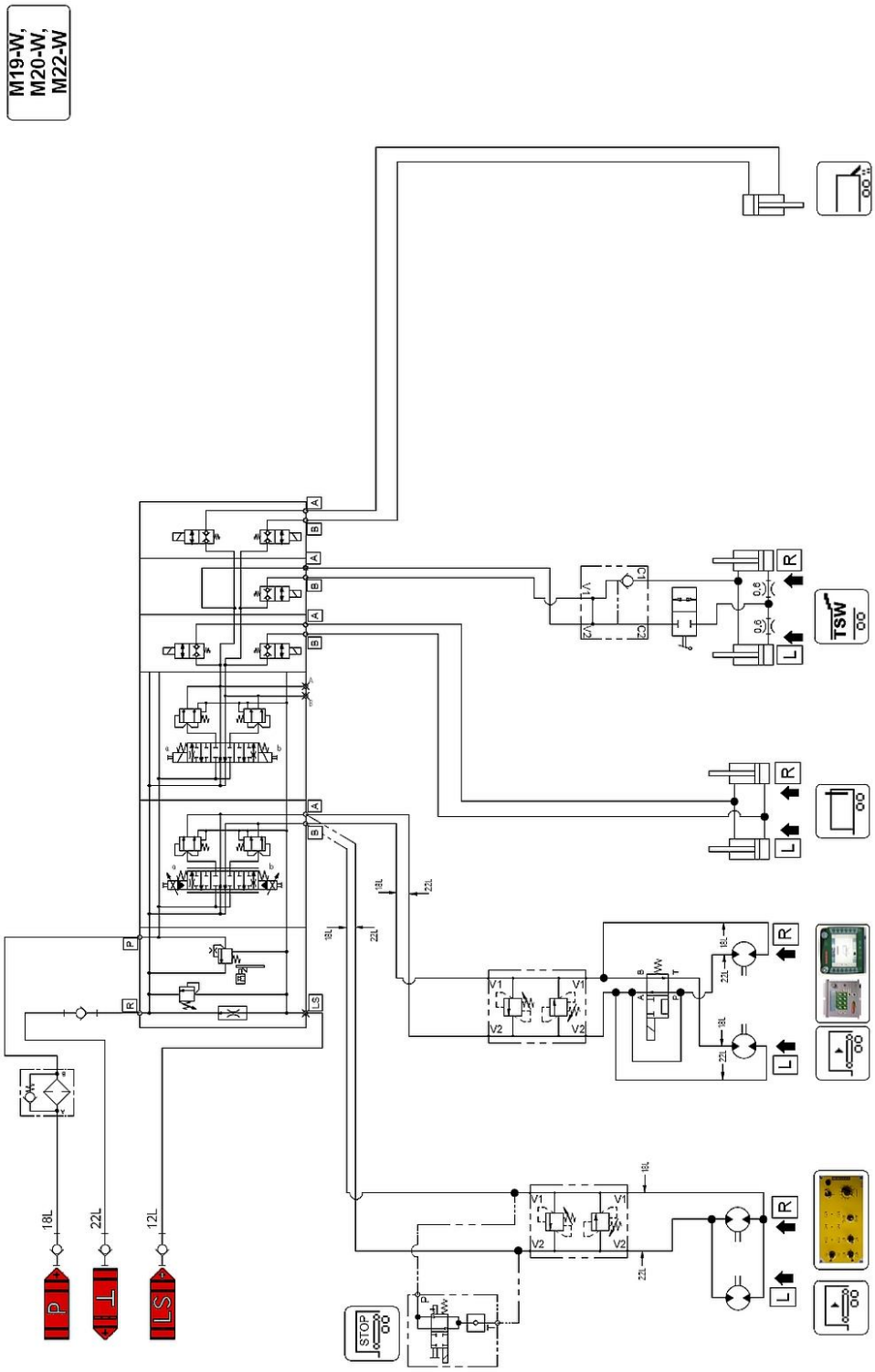


Image 106: Hydraulic diagram, E-control 10-40-0180-BTA1

9.21.2 Connection diagrams – brake system

9.21.2.1 Version: Air brake system

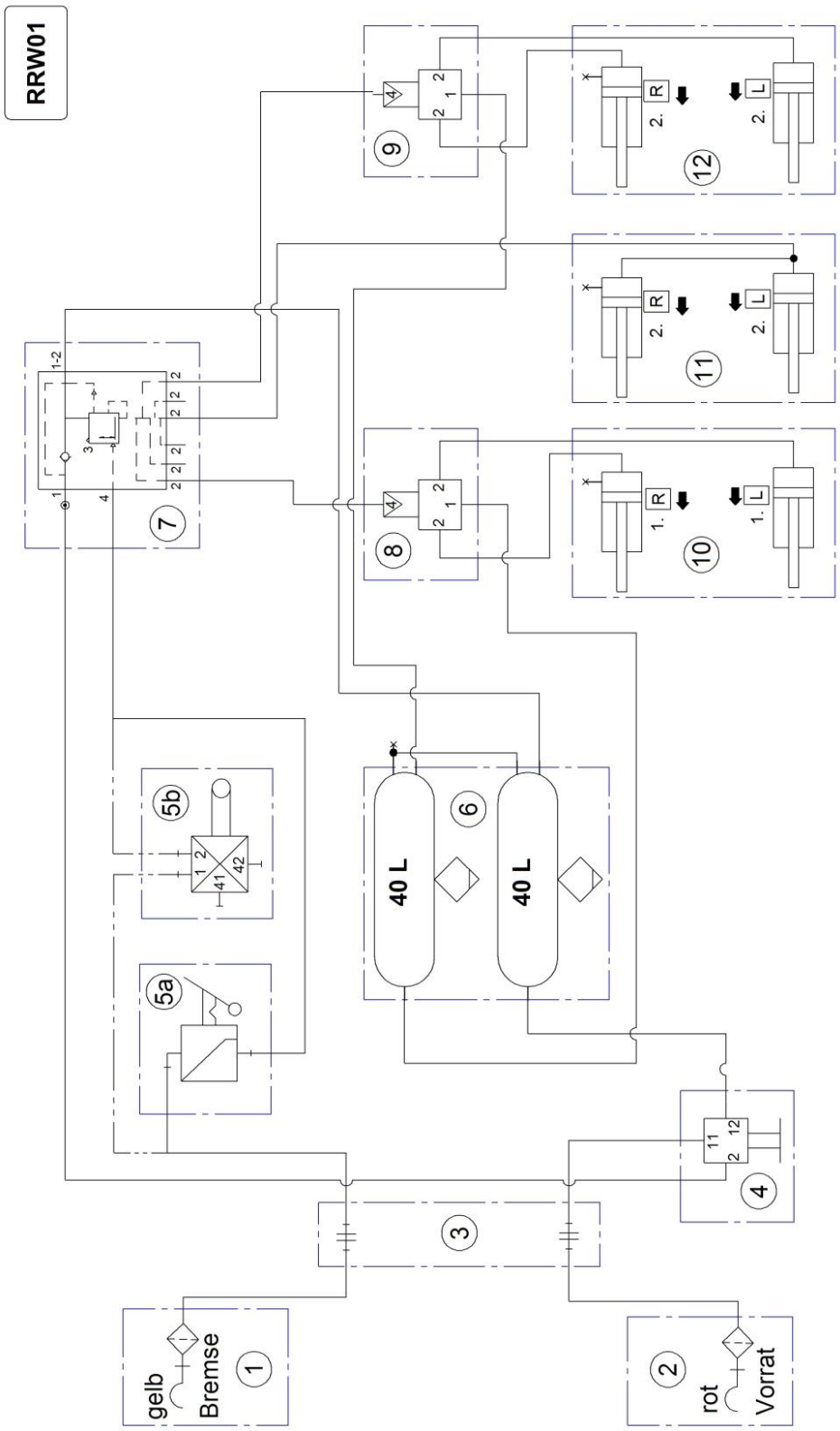


Image 107: Air brake system 25-10-0003-BTA

Pos.	Designation	Description
1	Coupling – brake	Yellow
2	Coupling – supply	Red
3	Transition unit	
4	Release valve	
5a	Brake effect regulator (manual adjustment)	(depending on equipment)
5b	Brake effect regulator (ALB)	(depending on equipment)
6	Compressed air tank	
7	Trailer brake valve	
8	Relay valve	1st axle
9	Relay valve	3rd axle
10	Membrane cylinder	1st axle
11	Membrane cylinder	2nd axle
12	Membrane cylinder	3rd axle

9.21.3 Connection diagrams – electrical system

9.21.3.1 Terminal for electromagnetic scraper floor adjustment (E-control light)

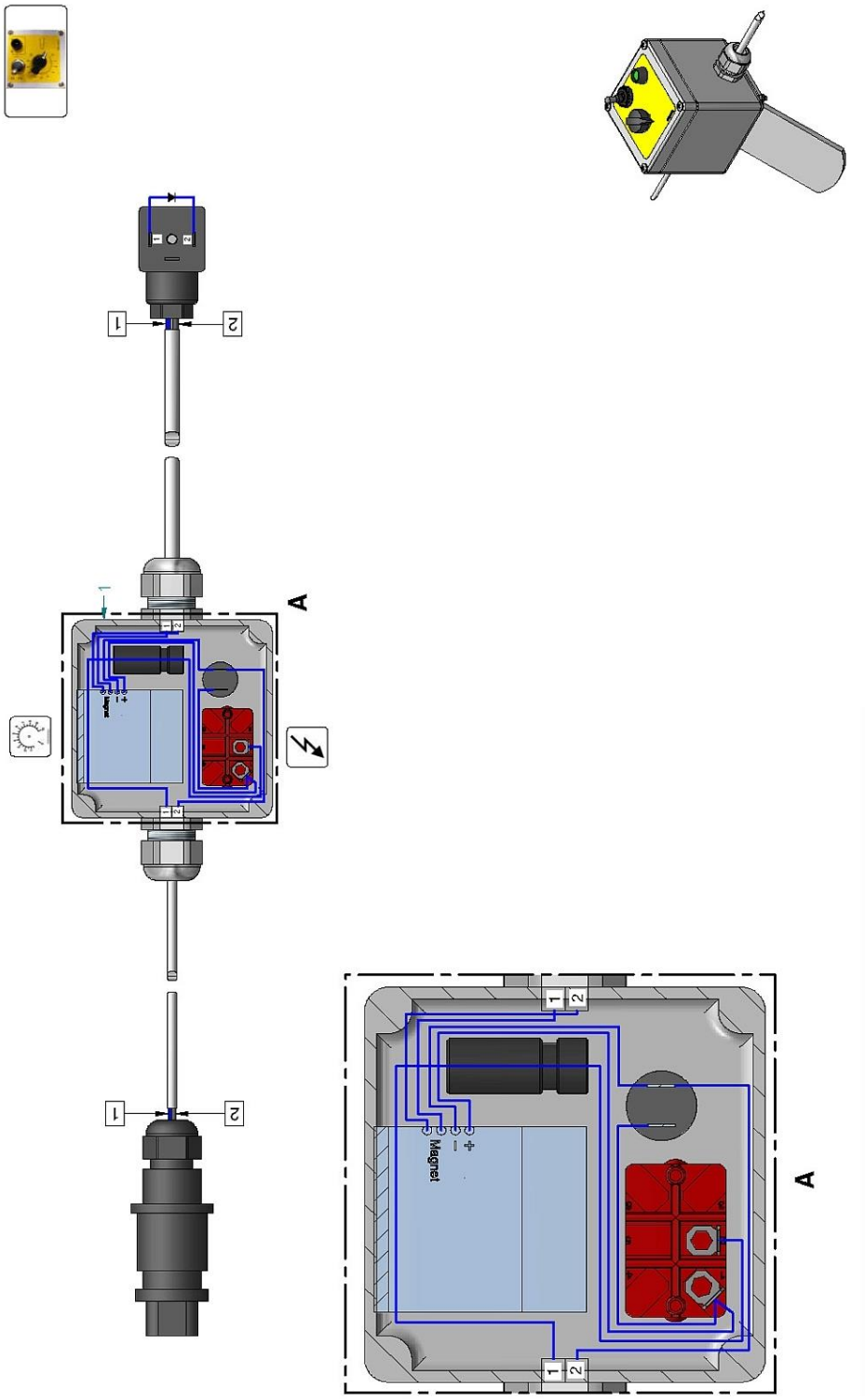


Image 108: Terminal for electromagnetic scraper floor adjustment (E-control light) 09-75-0036-BTA1

9.21.3.2 Pilotbox Spreader terminal

Basic equipment

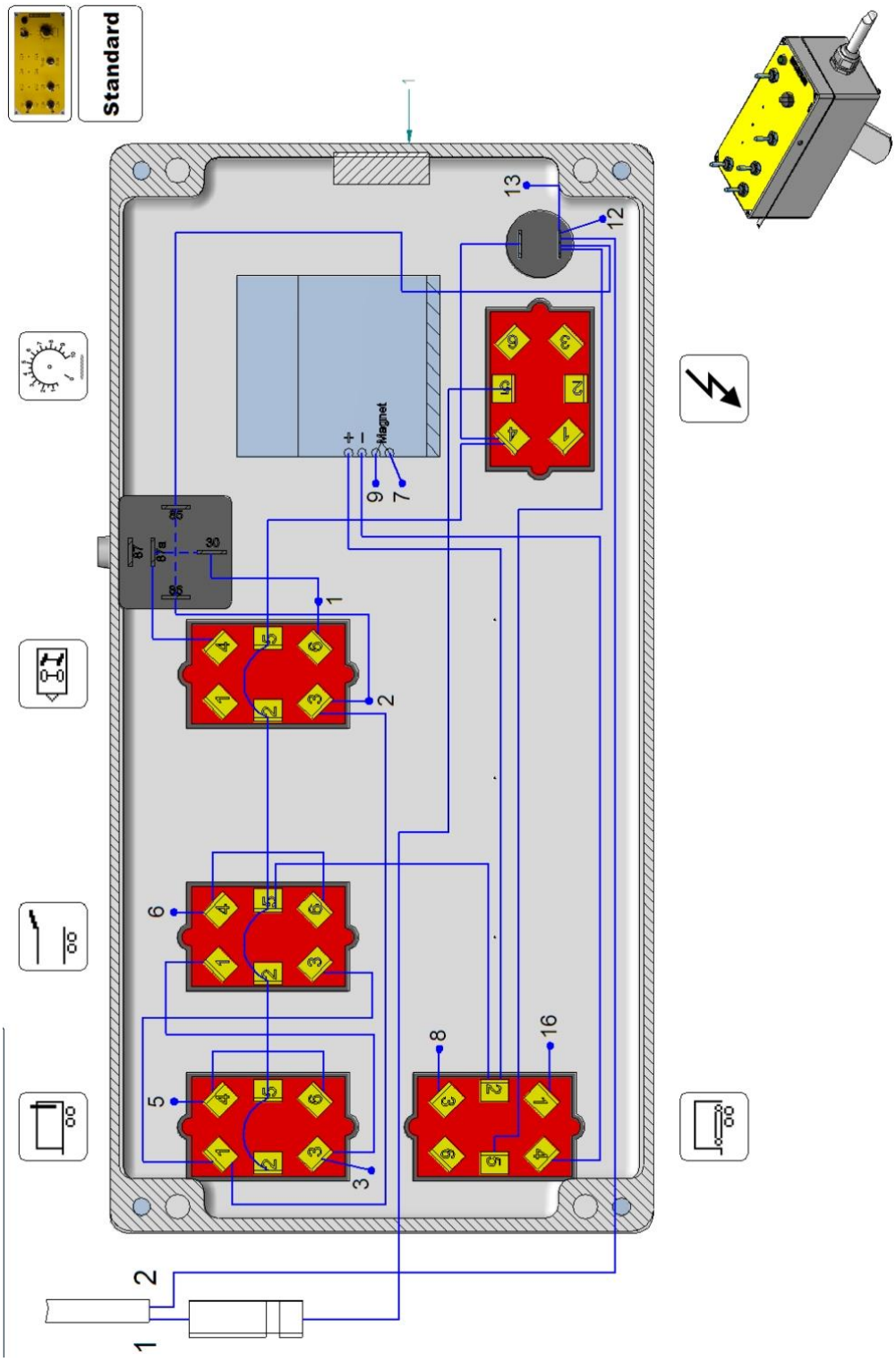


Image 109: Pilotbox Spreader terminal (1) 09-12-0010-BTA1

Optional equipment

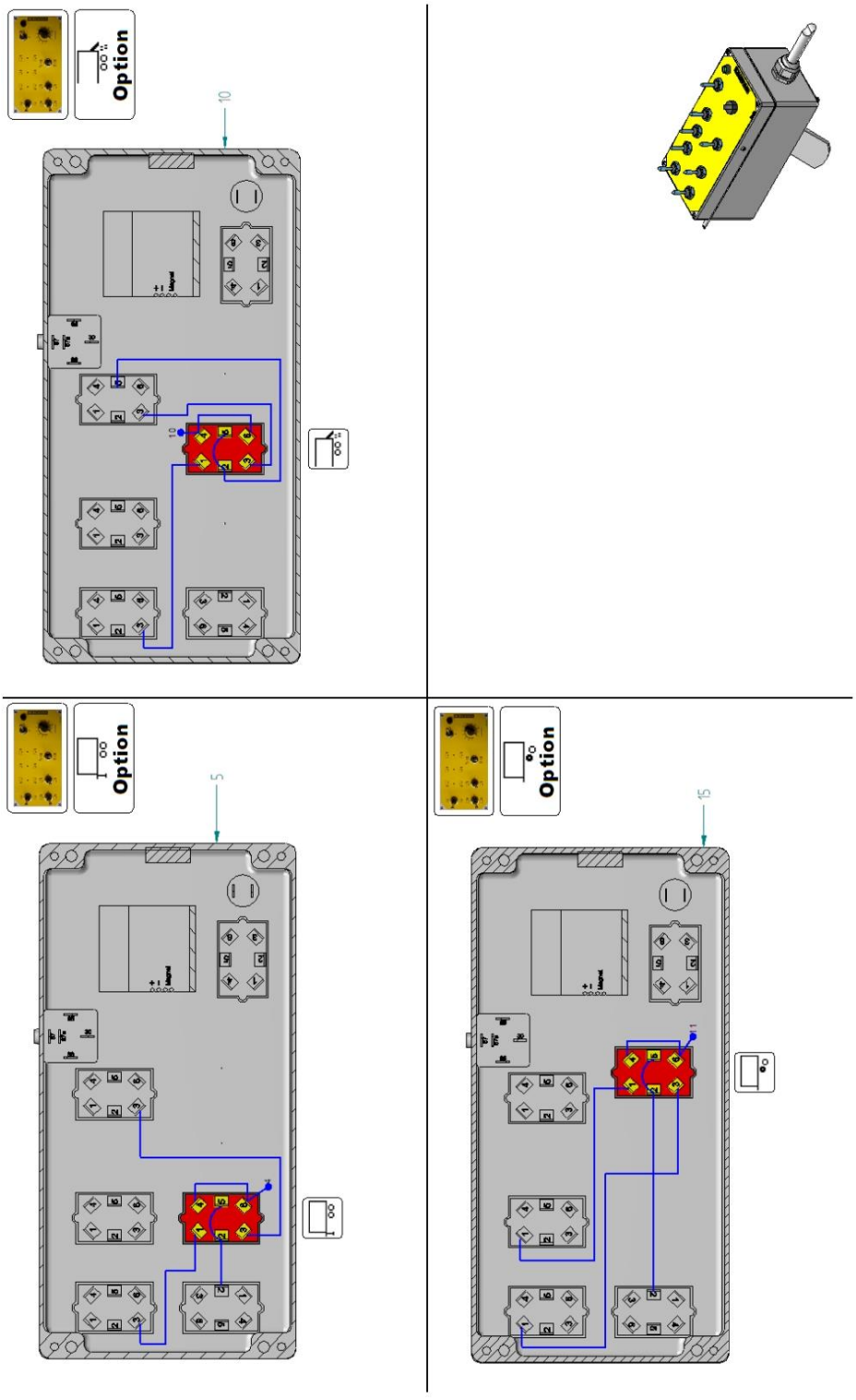


Image 110: Pilotbox Spreader terminal (2) 09-12-0010-BTA2

9.21.3.3 Terminal box at Pilotbox Spreader terminal

Basic equipment

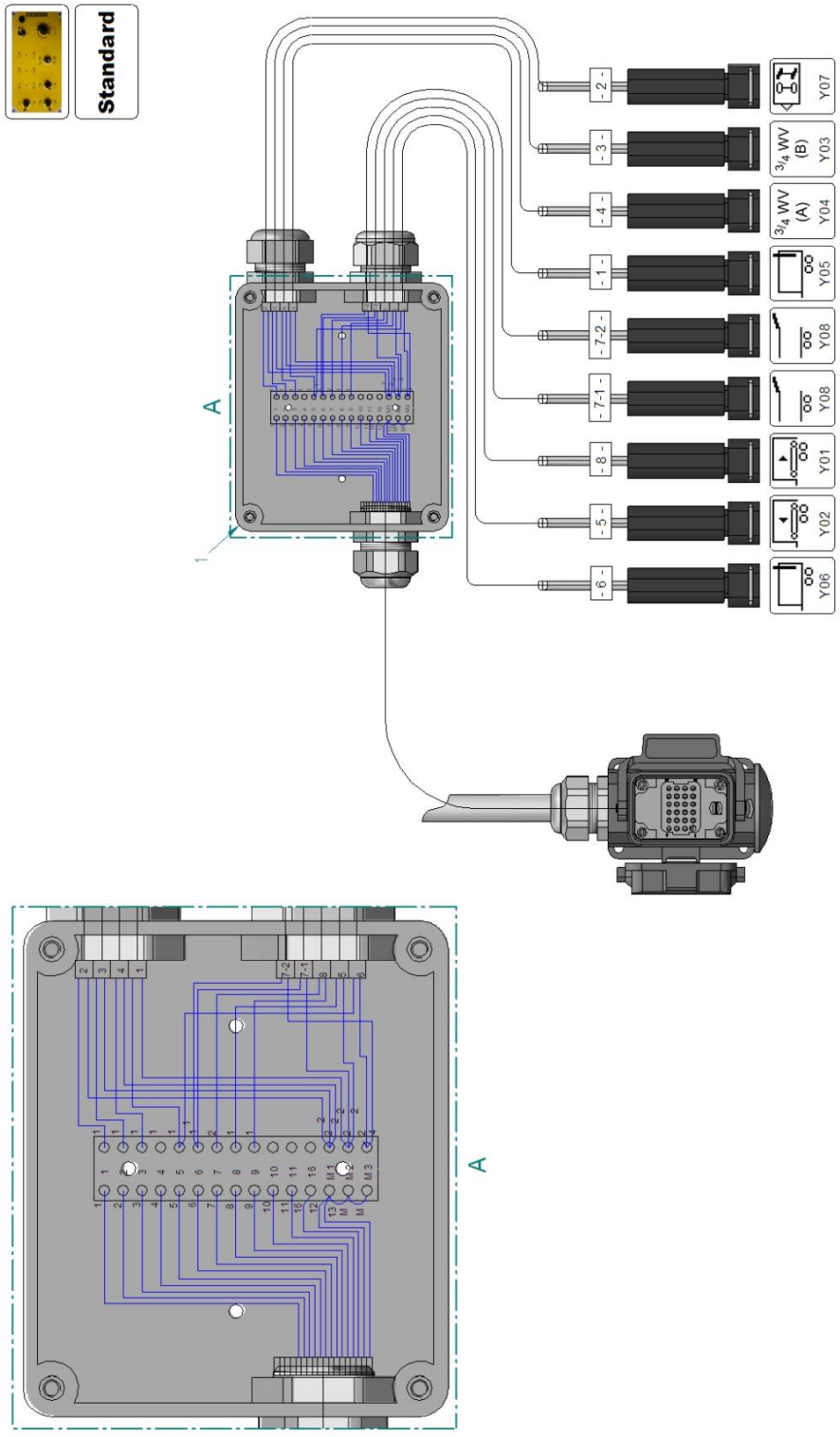


Image 111: Terminal box at Pilotbox terminal (1) 09-30-0026-BTA1

Optional equipment

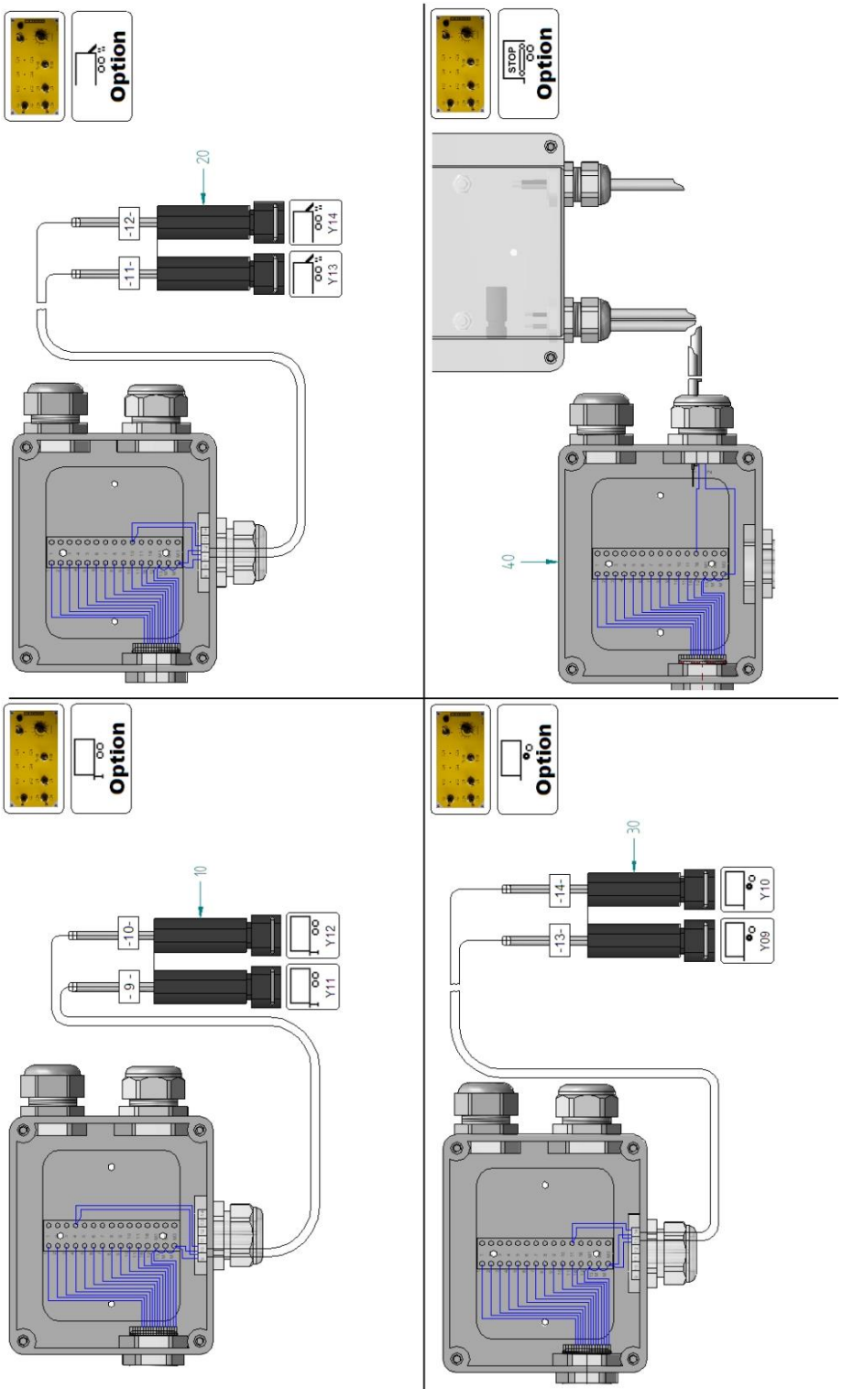
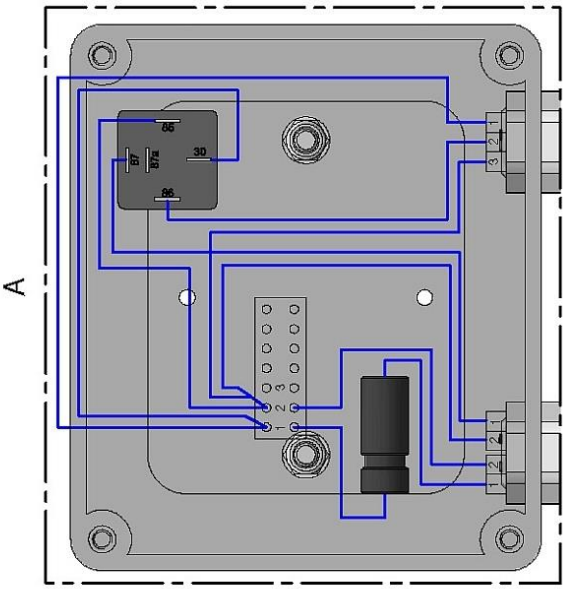


Image 112: Terminal box at Pilotbox terminal (2) 09-30-0026-BTA2

9.21.3.4 Speed monitor



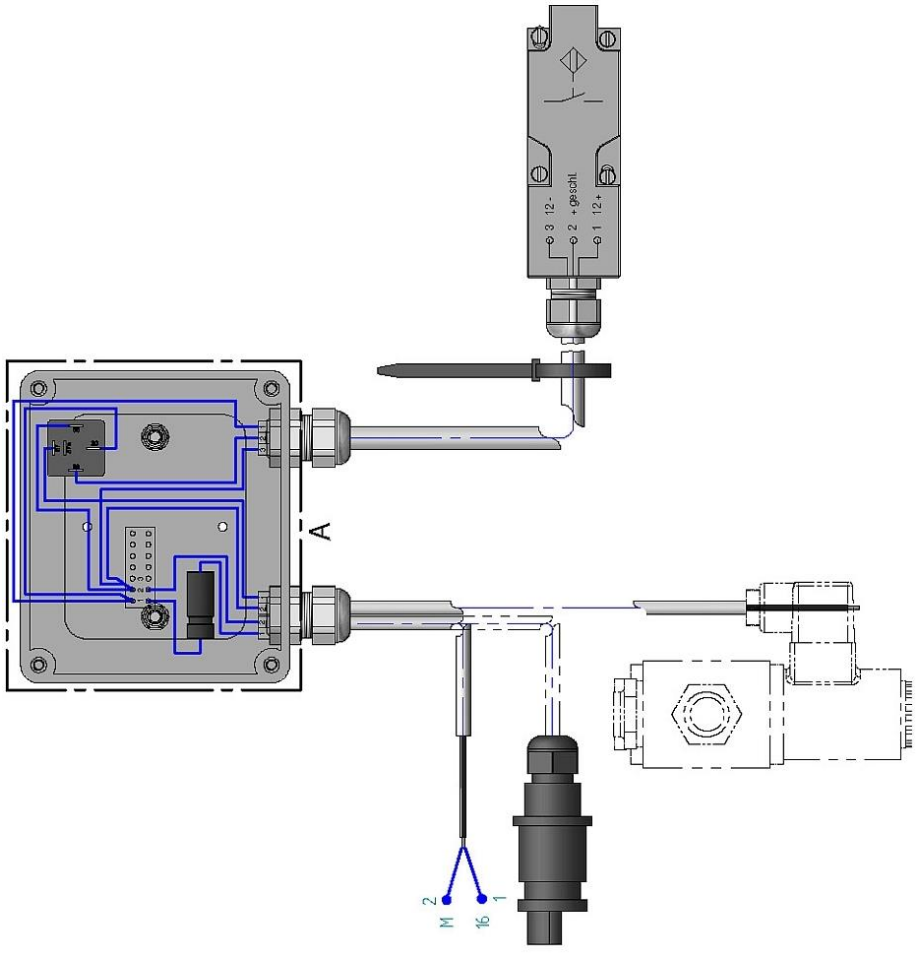


Image 113: Speed monitor 09-16-0017-BTA

9.21.3.5 BCT 20 terminal

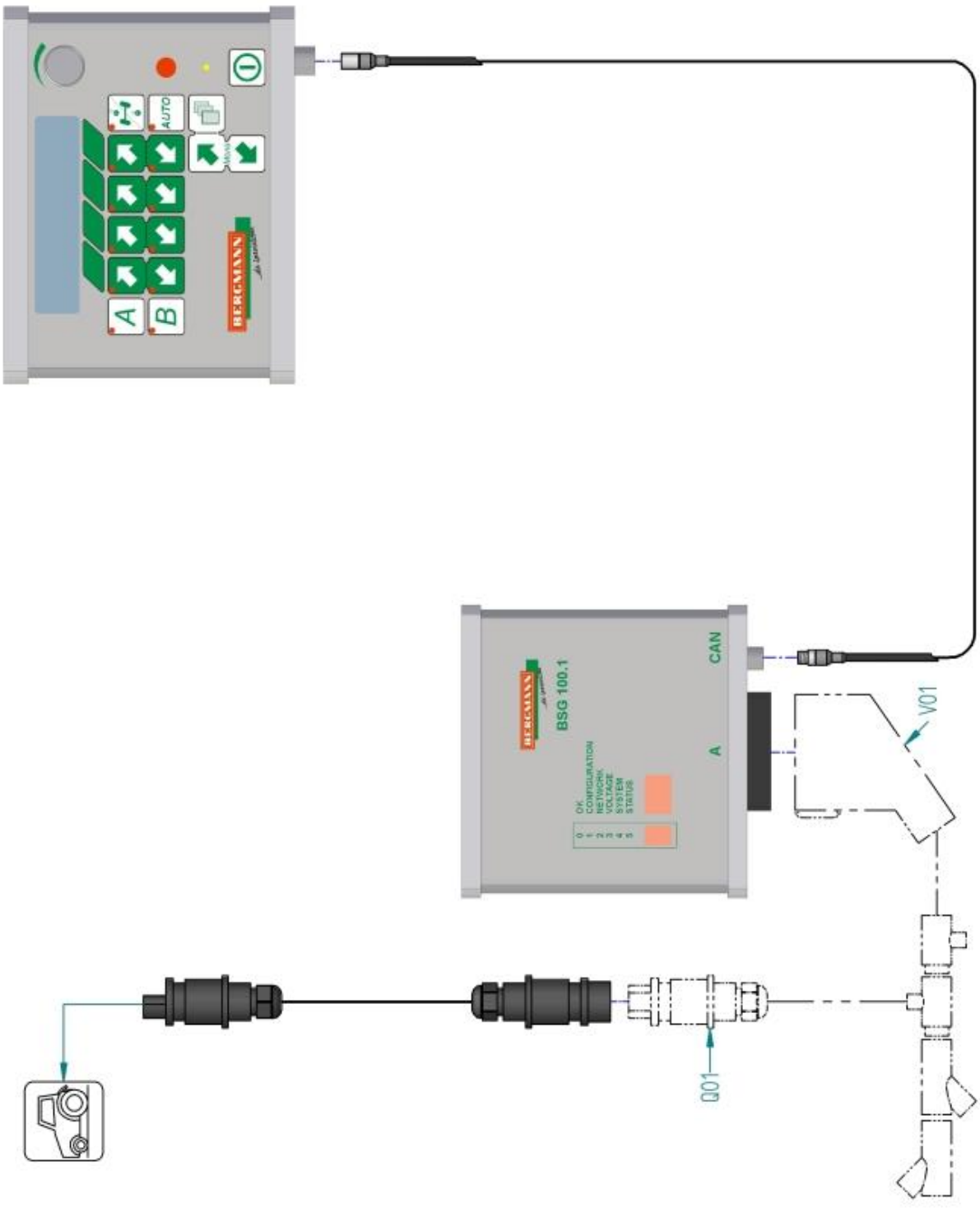


Image 114: BCT 20 terminal 18-14-0709-BTA

9.21.3.6 CCI 50 & CCI 200 terminal (standard 1)

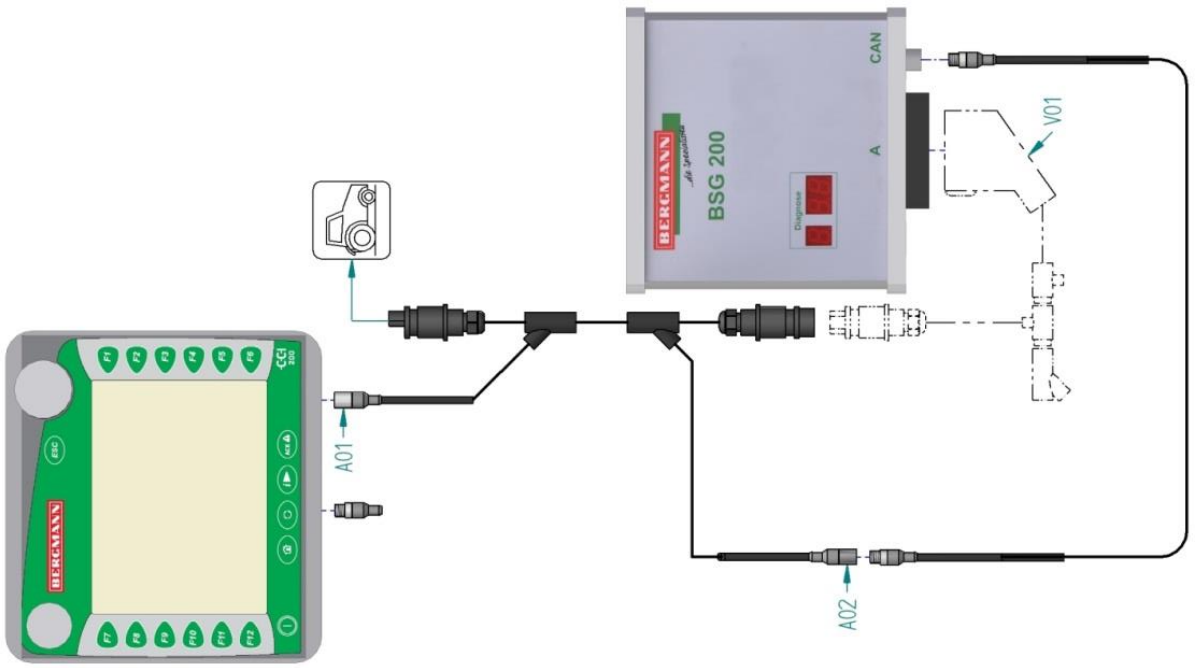


Image 115: CCI 50 & CCI 200 terminal (standard 1) 18-14-0712-BTA

9.21.3.7 CCI 50 & CCI 200 terminal (standard 2)

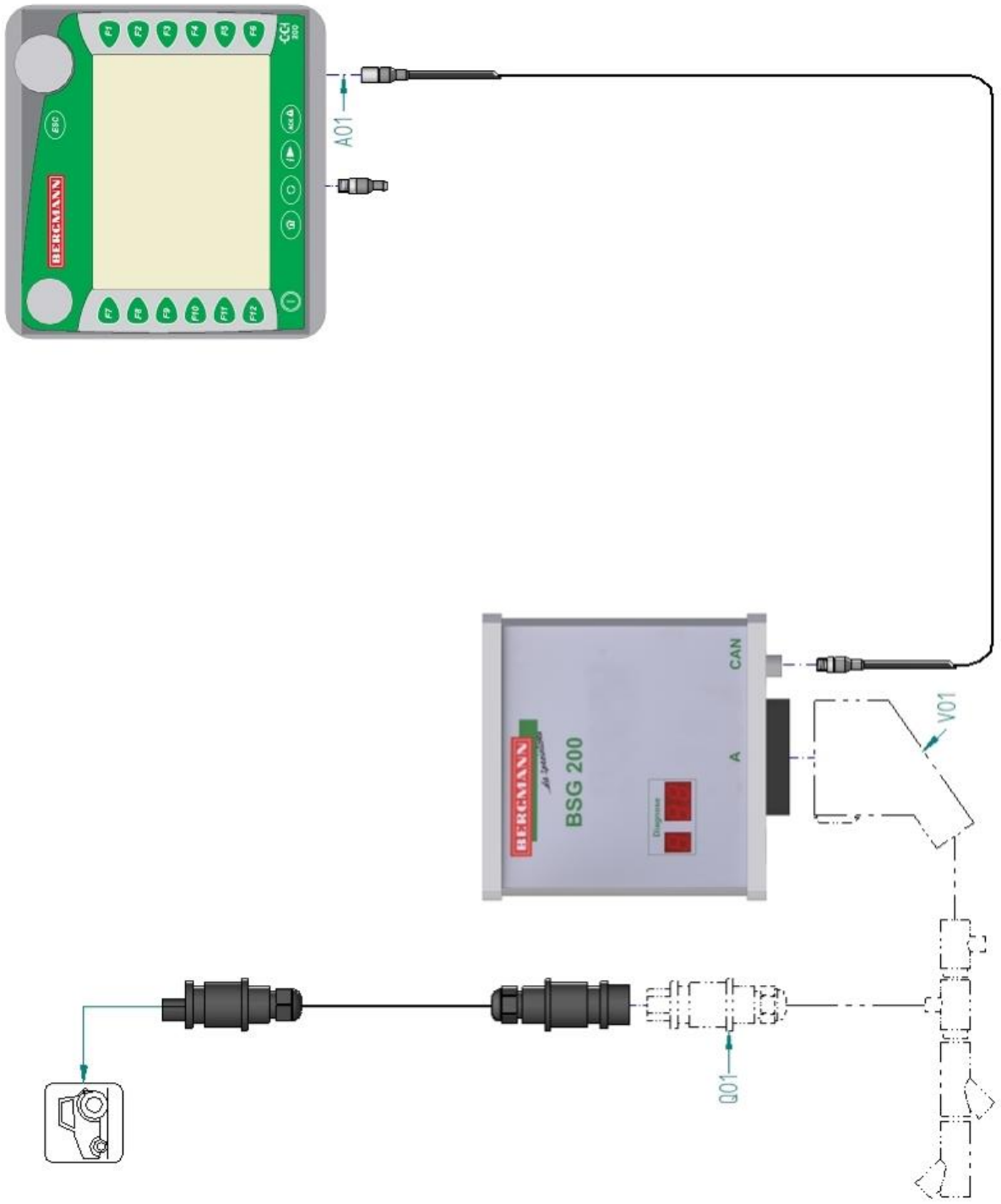


Image 116: CCI 50 & CCI 200 terminal (standard 2) 18-14-0714-BTA

9.21.3.8 CCI 50 & CCI 200 terminal (optional)

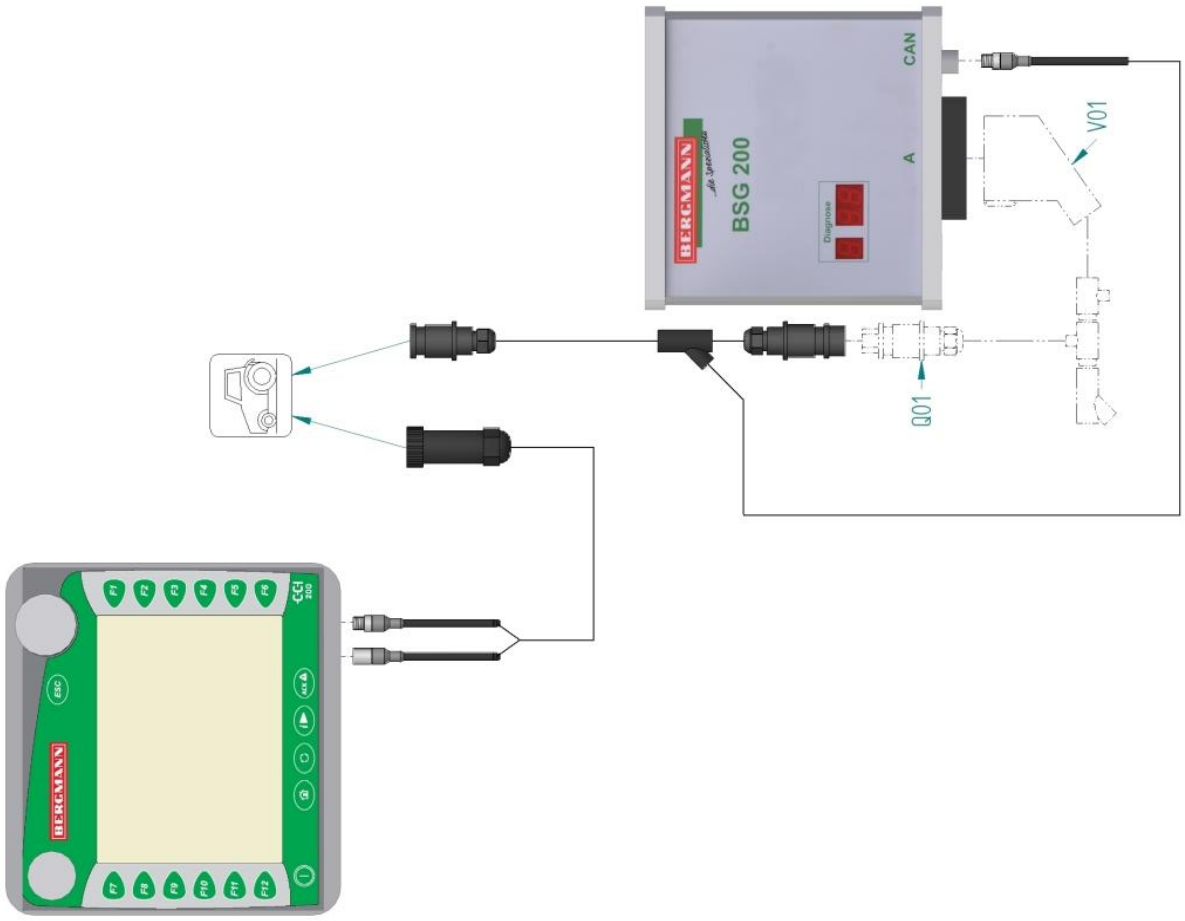


Image 117: CCI 50 & CCI 200 terminal (optional) 18-14-0728-BTA

9.21.3.9 ISOBUS terminal (standard 1)

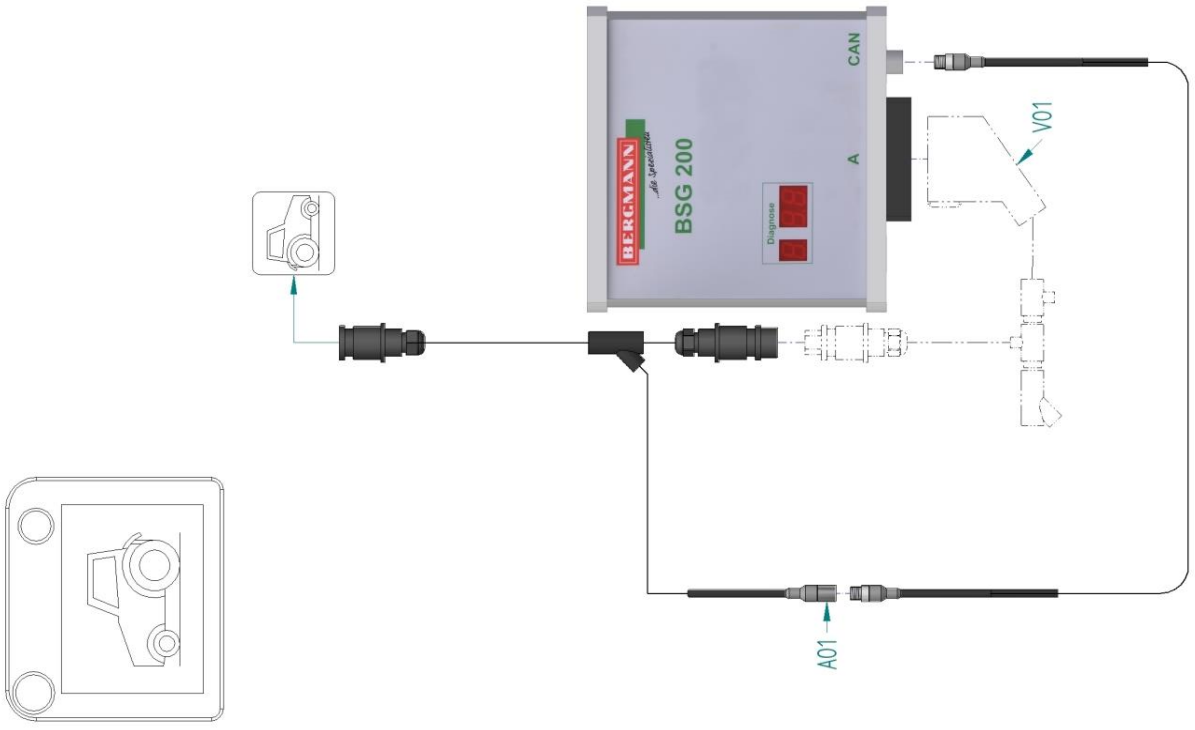


Image 118: ISOBUS terminal (standard 1) 20180403-123456-BTA

9.21.3.10 ISOBUS terminal (standard 2)

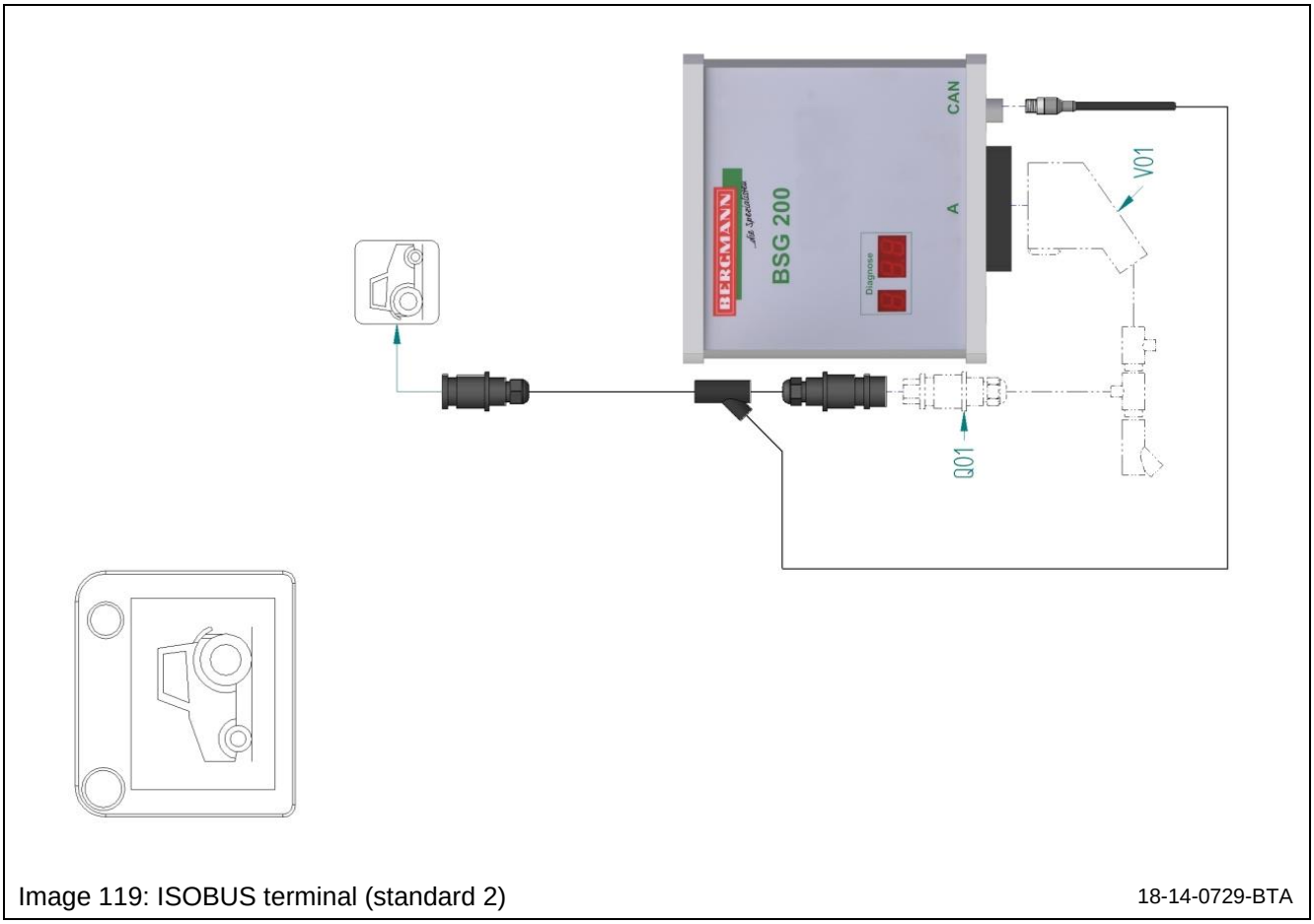


Image 119: ISOBUS terminal (standard 2) 18-14-0729-BTA

9.21.3.11 Wiring harness BCT / CCI / ISOBUS

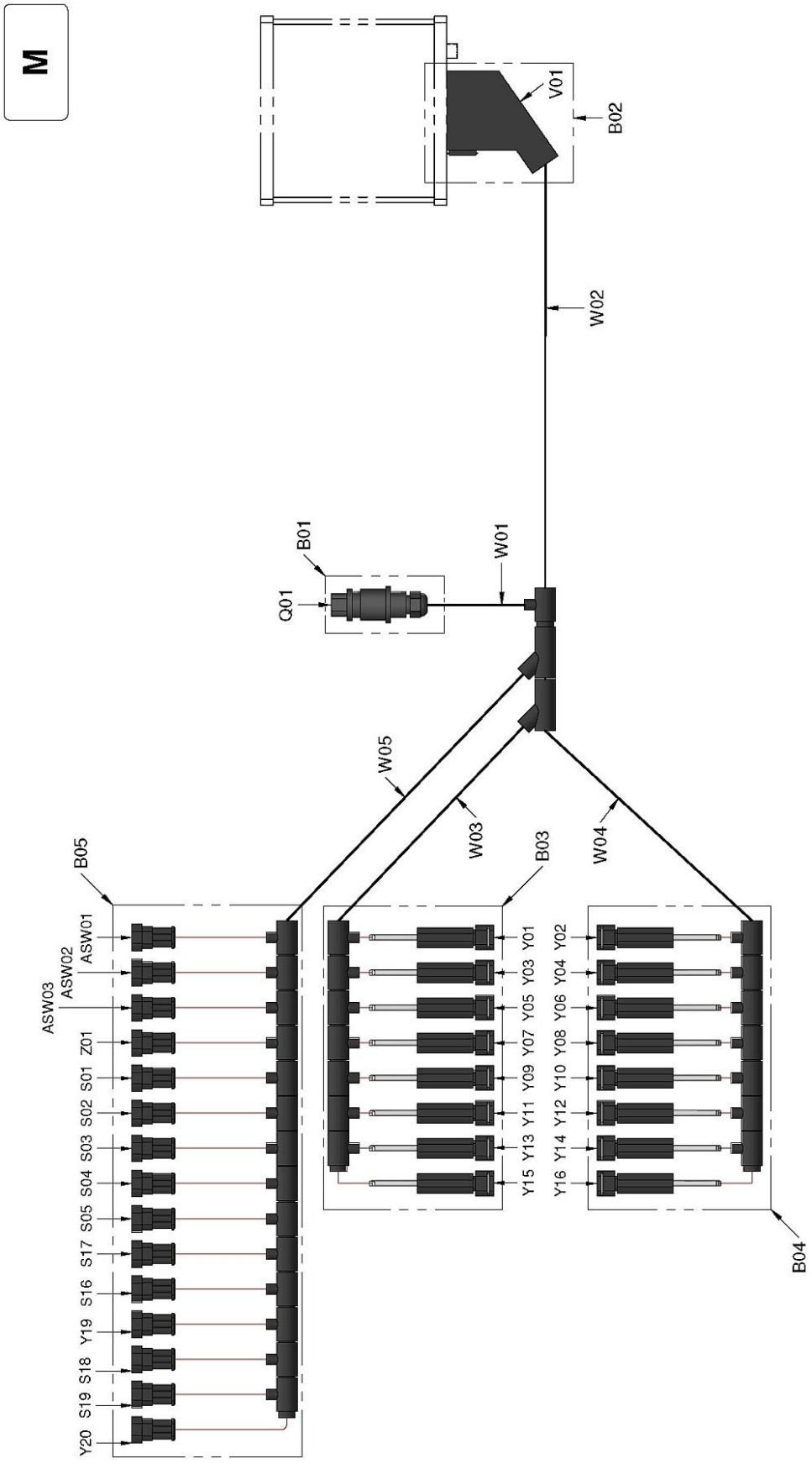


Image 1: Wiring harness

18-14-0632-BTA

9.21.3.11.1Wiring 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	

S ...: Sensor plug

S01	Driving speed	ABS Sensor
S02	Scraper floor speed	Ind closer
S03	Spreader drum speed	Hall Sensor
S04	Table speed left	Hall Sensor
S05	Table speed right	Hall Sensor
S16	Steering axle close	Pressure switch
S17	Height measuring system dosing wall	0,5-4,5 V
S18	Spread Pattern Limiter	
S19	Reverse drive	

Y ...: Plug valve

Y01	Scraper floor forward (Prop.)	
Y02	Scraper floor reverse	
Y03	Pilot control valve	
Y04	Pilot control valve	
Y05	Dosing wall	
Y06	Dosing wall	
Y07	Steering axle	
Y08	Tailgate	
Y09	Lift axle	
Y10	Lift axle	
Y11	Jack stand	
Y12	Jack stand	
Y13	Spread Pattern Limiter	
Y14	Spread Pattern Limiter	
Y15	Universal function	
Y16	Universal function	
Y17		
Y18		
Y19	Scraper floor overdrive	
Y20	EN 690	

10 Faults and remedies

The following sections list various faults that can occur both during operation and when handling the vehicle. The listed causes and instructions for remedying them are intended to assist in rectifying the fault.

When rectifying faults, see also the instructions and notes in the operating instructions, chapters “Functions and settings” and “Care and maintenance”.

Should anything be unclear, please contact BERGMANN customer service to obtain information about rectifying the fault.

BERGMANN contact information can be found in chapter “Contact details & contact persons”.

10.1 Roller chain lubrication system (spreader unit)

Fault	Cause	Remedy
No feed	Intake valve soiled or defective	Clean intake valve; replace if necessary
	Check valve defective	Replace check valve
Too much lubricant at lubrication points	Dosing elements too large	Check dosing elements; replace if necessary
	Piston seal defective	Replace piston seal, ensuring proper seal position.

10.2 Central lubrication system

Fault	Cause	Remedy
Stirrer blade in grease reservoir does not rotate when pump is running.	Mechanical damage e.g. motor is defective	Replace pump: Disconnect lubricant reservoir at pressure relief valve outlet. Disconnect electrical connection. Remove the three mounting screws. Remove defective pump. Mount new pump and connect lubricant line and electrical cable. Commission and conduct function test. Check for proper interval and contact times!
	Electrical connection interrupted	Check fuse and replace if necessary. Check electrical connection. Check cables for damage.
Pump does not function when DK button is pressed even though all electrical connections are in order.	Electric control system failed Pump drive / motor defective	Replace pump
Pump does not pump lubricant even though stirrer blade rotates.	Lubricant level in reservoir below minimum	Fill lubricant reservoir to maximum.
	Check valve in pump element does not close (can be detected when the main line is disconnected and the outlet can be held closed with a finger).	Replace pump element Note: Check the correct number of dosing grooves on the pump element
	Suction problems caused by bubbles in grease	Remove pump element and activate pump using DK button until grease comes out of the housing outlet.
	Pump element does not build pressure. Pump element is worn. (can be detected when the main line is disconnected and the outlet can be held closed with a finger).	Replace pump element Note: Check the correct number of dosing grooves on the pump element.
Pressure relief valve on pump opens and lubricant leaks out.	System pressure above 300 bar, e.g. due to manifold blockage or blocked lubrication point	Check system pressure and correct, or modify system so that system pressure at 20 °C is max. 200 bars.
	A valve is damaged and/or soiled and does not close properly	Replace pressure relief valve
Pump does not run.	No power supply to Pilotbox Pump defective	Repair electrical system on tractor or vehicle. Call customer service
Pump turns in wrong direction (must turn anticlockwise)	Electrical socket installed incorrectly Supply cable installed incorrectly	Install electrical socket correctly Install supply cable correctly
Pump runs but grease pressure remains below 10 bars	Grease reservoir was empty	Remove grease line from pump and let pump run until grease escapes without bubbles
	Check valve in pump soiled or defective	Change pump elements
Grease pressure raises to 300 bars.	Lubrication point clogged Manifold clogged	Call customer service
No grease collar at several lubrication points.	Supply line to manifold defective or leaking	Replace lines or retighten screw couplings. If grease pressure then rises to 300 bars, call customer service.

11 Declaration of Conformity

11.1.1 TSW 7340 S

BERGMANN ...die Spezialisten

EC-Declaration of Conformity

Translation en

according to 2006/42/EX, Annex II, No. 1 A

Manufacturer:

Ludwig Bergmann GmbH
Maschinenfabrik
Hauptstraße 64 - 66
49424 Goldenstedt / Germany

Person established in the Community / authorised to compile technical data

Ludwig Bergmann GmbH
Maschinenfabrik
Hauptstraße 64 - 66
49424 Goldenstedt / Germany

Description and identification of the machinery

Designation:	**Universal-Spreader**
Function:	**Spreading of organic fertilizers**
Type / model:	**M25-W + M22-W**
Commercial designation:	**TSW 7340 S**
Vehicle identification no.:	**1 … … M**

We herewith declare that the machine designated above corresponds to al relevant provisions of the following directive:

2006/42EC: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

References of the harmonised standards used, as referred to in Article 7 (2).

Goldenstedt, 28.10.2013

Dr. jur. Jutta Middendorf-Bergmann
Managing Director

Dipl.-Ing. (FH) Martin Kallage
Head of Development and Design Department

12 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.

12.1 Manufacturer

Ludwig Bergmann GmbH	+49 (0)4444 - 2008-0
	+49 (0)4444 - 2008-88
	-
Hauptstraße 64-66 49424 Goldenstedt	info@l-bergmann.de
	www.Bergmann-Goldenstedt.de

12.2 Authorized officer / Sale

Viktor Ripke	+49 (0)4444 - 2008-12
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	www.Bergmann-Goldenstedt.de

12.3 General Manager Export

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	+49 (0)175 - 5888841
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	www.Bergmann-Goldenstedt.de

12.4 Sales management Export West

Thomas Kastler	+49 (0)4444 - 2008-11
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	+49 (0)160 - 96950157
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	www.Bergmann-Goldenstedt.de

12.5 Sales management Export East

Eugen Wiens	+49 (0)4444 - 2008-10
	+49 (0)4444 - 2008-88
	+49 (0) 151 - 17618648
Hauptstraße 64-66 49424 Goldenstedt	eugen.wiens@l-bergmann.de
	www.Bergmann-Goldenstedt.de

12.6 Spare Parts Stock

Spare parts store	+49 (0)4444 - 2008-16
	+49 (0)4444 - 2008-25
	-
Hauptstraße 64-66 49424 Goldenstedt	ersatzteil@l-bergmann.de
	www.Bergmann-Goldenstedt.de

12.7 Customer service management

Jörg Kammacher	+49 (0)4444 - 2008-15
	+49 (0)4444 - 2008-43
	-
Hauptstraße 64-66 49424 Goldenstedt	kundendienst@l-bergmann.de
	www.Bergmann-Goldenstedt.de

12.8 Emergency service

Emergency service	+49 (0)175 - 58 88 82 0

12.9 Worldwide Sales Partners

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