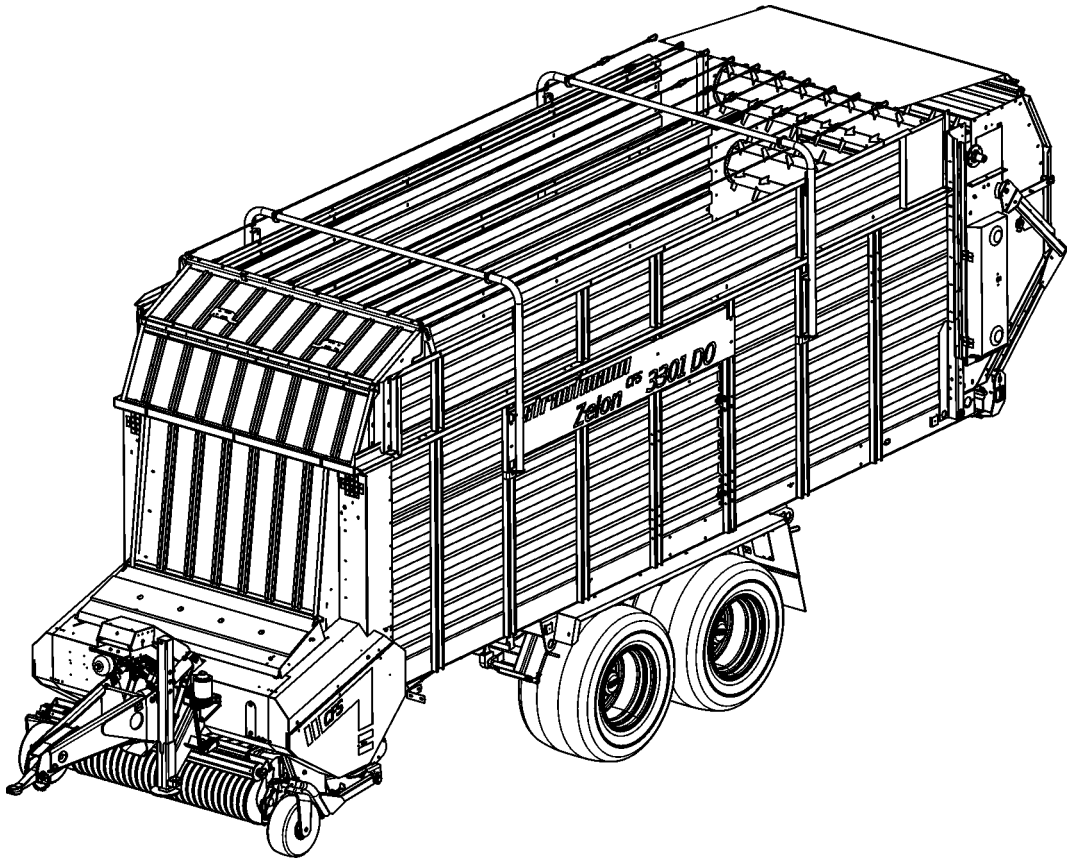
Translation of the Original Operating Instructions

Short-cut forage wagon
Short-cut forage wagon with beaters

Zelon CFS 2501, 2901, 3301
Zelon CFS 2501 DO, 2901 DO, 3301 DO



74400904 0.000

04.15

EN

EC Declaration of Conformity

according to the EC machinery directive 2006/42/EC, Annex II, 1.A

Manufacturer:

B. Strautmann & Söhne GmbH u. Co. KG
Bielefelder Str. 53
D-49196 Bad Laer

Legal person established within the EC and authorized to compile the technical documentation:

B. Strautmann & Söhne GmbH u. Co. KG
Bielefelder Str. 53
D-49196 Bad Laer

Description and identification of machine:

Designation:	Short-cut forage wagon / Short-cut forage wagon with beaters
Function:	Cutting, charging, transport and distribution of green and dried-out forage
Model:	Zelon CFS / Zelon CFS DO
Type:	Zelon CFS 2501, 2901, 3301 / Zelon CFS 2501 DO, 2901 DO, 3301 DO
Vehicle/Machine ID number:	W09744000_0S38001 - W09749000_0S38999
Trade name:	Zelon CFS / Zelon CFS DO

We hereby explicitly declare that the machine complies with all relevant provisions of the following EC directives:

2006/42/EC:2006-05-17	EC machinery directive 2006/42/EC
2004/108/EC:2004-12-15	(Electromagnetic compatibility) Directive 2004/108/EC of the European Parliament and the Council dated 15 December 2004 for approximation of laws of the member states on the electromagnetic compatibility and for repeal of directive 89/336/EEC

Bad Laer, 07.01.2015

R. Kleine Niesse
Chief Designer
Vehicle Technology

Dr. J. Marquering
Head of Development

Dipl.-Kfm. W. Strautmann
Managing Director

Dipl.-Wirt.-Ing. P. Strautmann
Managing Director

Identification data

Please enter the machine's identification data here. They are registered on the type plate.

Manufacturer: B. Strautmann & Söhne GmbH u. Co. KG

Vehicle/Machine ID number: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Type:

Year of manufacture:

Manufacturer's address

B. Strautmann & Söhne GmbH u. Co. KG

Bielefelder Straße 53

D-49196 Bad Laer

Phone: + 49 (0) 5424 802-0

Fax: + 49 (0) 5424 802-64

E-mail: info@strautmann.com

Spare parts order service

B. Strautmann & Söhne GmbH u. Co. KG

Bielefelder Straße 53

D-49196 Bad Laer

Phone: + 49 (0) 5424 802-30

Fax: + 49 (0) 5424 802-64

E-mail: parts@strautmann.com

Spare parts catalogue online: www.strautmann-elise.de

Please always refer to the vehicle/machine ID number of your machine when ordering spare parts.

Formal information about the operating instructions

Document number: 74400904 0.000

Date of compilation: 04.15

Foreword

Dear customer,

You have decided in favour of a quality product from the large B. Strautmann & Söhne GmbH u. Co. KG product range. We thank you for the confidence you have shown in us.

Upon receipt of the machine, please check for transport damage or missing parts! Check the delivered machine for its completeness, including the ordered optional extras, by means of the delivery note. Only immediate complaints will give reason to compensation!

Read and observe these operating instructions and any other included operating instructions for individual machine components before the first start-up; in case of doubt, the details and information contained in such sub-supplier documentation shall prevail! In particular observe the safety instructions, thus being able to fully benefit from the advantages of your recently acquired machine.

Please make sure that all operators of the machine have read these operating instructions before starting the machine.

The machines are available with various optional extras. Due to the individual equipment of your machine, not all descriptions included in these operating instructions apply to your machine. Optional extras are marked in these operating instructions and are available at extra cost.

In case of any inquiries or problems, please refer to these operating instructions or call us.

Regular service and maintenance and timely replacement of worn-out or damaged parts will result in a longer service life of your machine.

Contents

1 User information

The chapter “User information“ provides information about how to use the operating instructions.

1.1 Purpose of document

These operating instructions:

- describe the operation, service and maintenance of the machine,
- provide important information about safety-conscious and efficient handling of the machine.

Please contact us for further inquiries.

1.2 Keeping of operating instructions

The operating instructions are part of the machine.

Therefore, always keep these operating instructions in the machine.

Hand these operating instructions over to the buyer when the machine is sold.

1.3 Location details in the operating instructions

Any directional data in these operating instructions refer to the direction of motion.

1.4 Applied modes of specification

Instructions and responses

Activities which have to be carried out in a predetermined order are specified as numbered instructions. Always adhere to this order. In some cases, the response of the machine to the respective instruction is marked by an arrow.

Example:

1. Instruction 1

   → Response of machine to instruction 1

2. Instruction 2

Lists

Lists without predetermined order are specified as lists with bullet points.

Example:

- Item 1
- Item 2

Position numbers in figures

Numbers in parentheses refer to position numbers in figures. The first number refers to the figure, the second number to the position number in the figure.

Example: (Fig. 3/6) means figure 3, position 6.

Lines of position in figures

Starting from the position numbers, the lines of position refer to the respective components.

A line without an arrow head means: the component can be seen in the figure,

A line with an arrow head means: the component cannot be seen in the figure (e.g. hidden by protective device).

References

An arrow head (►) in front of a sentence indicates a reference to further information elsewhere in the operating instructions.

Example:

► Also observe the information in the chapter "Technical data", page 22.

1.5 Applied terms

Term	The term means
third person/party	… all other persons apart from the operator.
risk	… the source of a possible injury or damage to health.
manufacturer	… B. Strautmann & Söhne GmbH u. Co. KG.
machine	… Short-cut forage wagon / Short-cut forage wagon with beaters Zelon CFS 2501, 2901, 3301 / Zelon CFS 2501 DO, 2901 DO, 3301 DO.
operating element	… the component of an operating element system which is directly actuated by the operator, e. g. by pressing. An operating element may be an adjusting lever, a key button, rotary switch, key etc.

1.6 Activity-related safety instructions and important information

Activity-related safety instructions and important information are included in the operating instructions. Signal words and symbols help to identify activity-related safety instructions and important information at a glance.

1.6.1 Activity-related safety instructions

Activity-related safety instructions:

- warn about risks which may occur in a certain situation or in connection with a certain behaviour,
- are directly mentioned in front of a hazardous activity in the individual chapters,
- are marked by the triangular hazard symbol and a preceding signal word. The signal word refers to the seriousness of the risk.

DANGER 	**DANGER** **marks a direct danger bearing a high risk, which will cause most serious bodily injury (loss of limbs or long-term harm) or even death if it is not prevented.** **Non-observance of the safety instructions marked by “DANGER“ directly causes most serious bodily injury or even death.**

WARNING 	**WARNING** **marks a possible danger bearing a moderate risk, which might cause most serious bodily injury or even death if it is not prevented.** **Non-observance of the safety instructions marked by “WARNING“ may cause most serious bodily injury or even death.**

CAUTION 	**CAUTION** **marks a possible danger bearing a low risk, which might cause light or moderate bodily injury or material damage if it is not prevented.** **Non-observance of the safety instructions marked by "CAUTION" may cause light or moderate bodily injury or material damage.**

1.6.2 Important information

Important information:

- provides details for proper use of the machine,
- provides user hints for optimum use of the machine,
- is marked by the following symbols.

IMPORTANT

marks an obligation to behave in a particular manner or to act in a certain way, in order to use the machine properly.

Non-observance of these instructions may cause malfunctions of the machine or in its vicinity.

INFORMATION

marks user hints and particularly useful information.

This information will help you to use all functions of your machine in the best possible way.

2 Product description

This chapter includes

- comprehensive information about the machine design,
- the designations of the individual assemblies and operating elements.

Please read this chapter in the immediate vicinity of the machine if possible, thus acquainting yourself with the machine in the best possible way.

The machines are available with various optional extras. Due to the individual equipment of your machine, not all descriptions included in these operating instructions apply to your machine. Optional extras are marked in these operating instructions and are available at extra cost.

2.1 General overview of machine

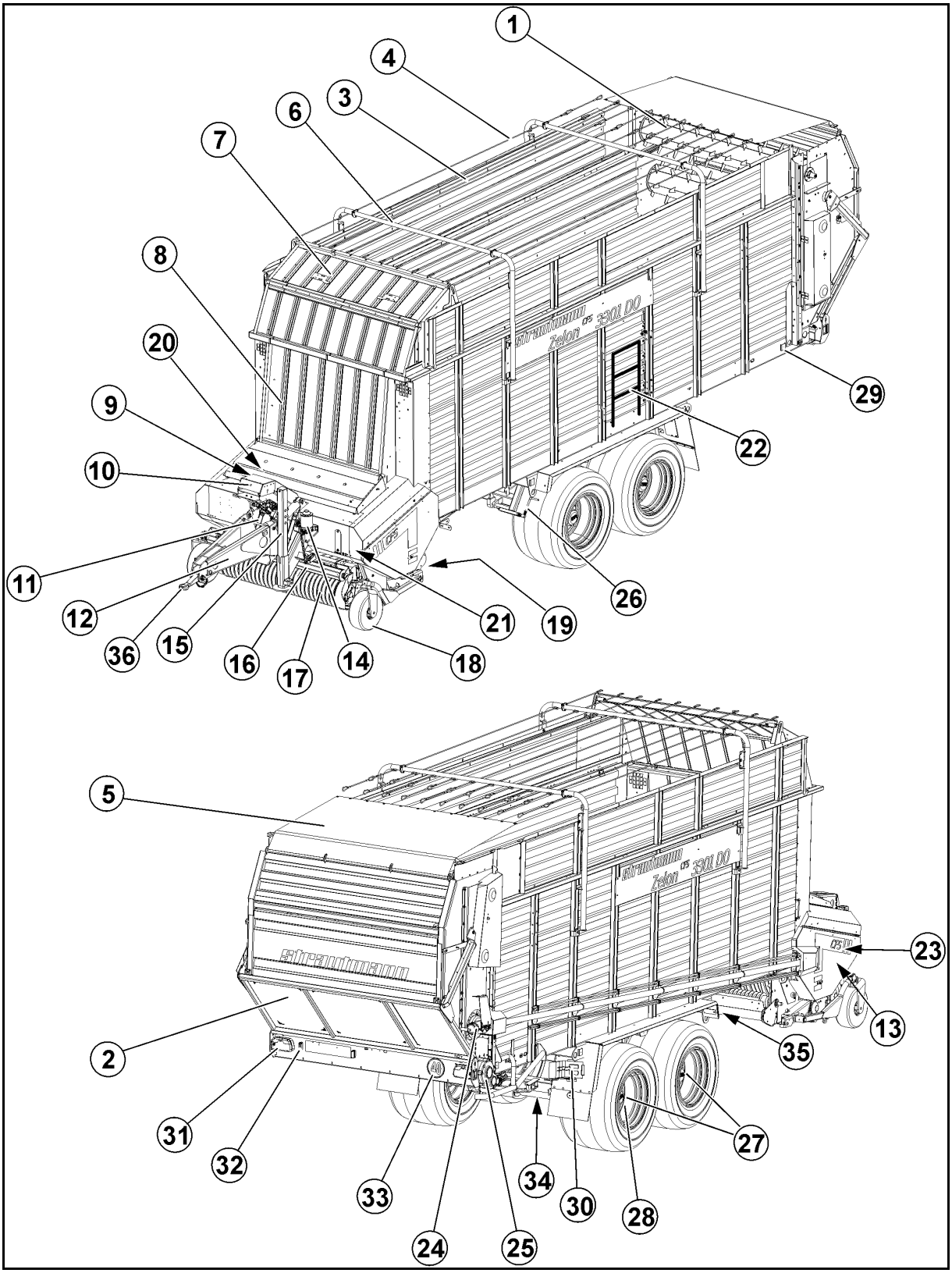


Fig. 1

(1) Beater
(2) Tailgate
(3) Body side panels
(4) Ropes
(5) Body tarpaulin
(6) Tubular support
(7) Load-protection bars with automatic charging system *
(8) Front grating
(9) Electro-hydraulic control block
(10) Switch for silage additive pump * (only with easy-to-use control set)
(11) Hydraulic filter
(12) Folding drawbar
(13) Pressure accumulator for drawbar suspension *
(14) Central lubrication for spur gear of feeder rotor and roller chains of CFS drum and pick-up drive
(15) Supporting leg
(16) Holding-down device with pulley
(17) Pick-up
(18) Guide wheel
(19) Additional guide wheel
(20) Main gearbox for conveying unit
(21) Spur gear for feeder rotor
(22) Access door with ladder
(23) Front angular gear (for beaters)
(24) Rear angular gear (for beaters)
(25) Feed gearing for transport floor
(26) Parking brake
(27) Braking axle
(28) Passive steering axle *
(29) Side reflector
(30) Chock
(31) Multi-function light with rear and brake light, reversing light, indicator, side-marker lamp, reflector
(32) License plate light
(33) Speed sign
(34) Triangular reflector
(35) Knife bag for unused cutting knives, tools: knife lever, mounting lever
(36) Drawgear

* Optional extra

2.2 Drawgear

(1) Drawbar lug 40
(2) Shell 80 *
(3) Drawbar lug 50, rotating (hitch ring) *

* Optional extra

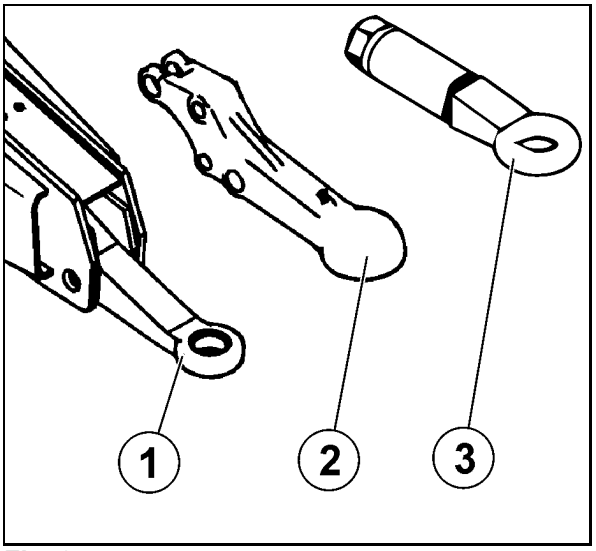


Fig. 2

2.3 Conveying unit

(1) Pick-up
(2) Spring-loaded tines
(3) Strippers
(4) CFS drum
(5) Conveying trough
(6) Conveyor duct
(7) Feeder rotor
(8) Conveying tines
(9) Stripper
(10) Cutting knife
(11) Knife protection system
(12) Upper link

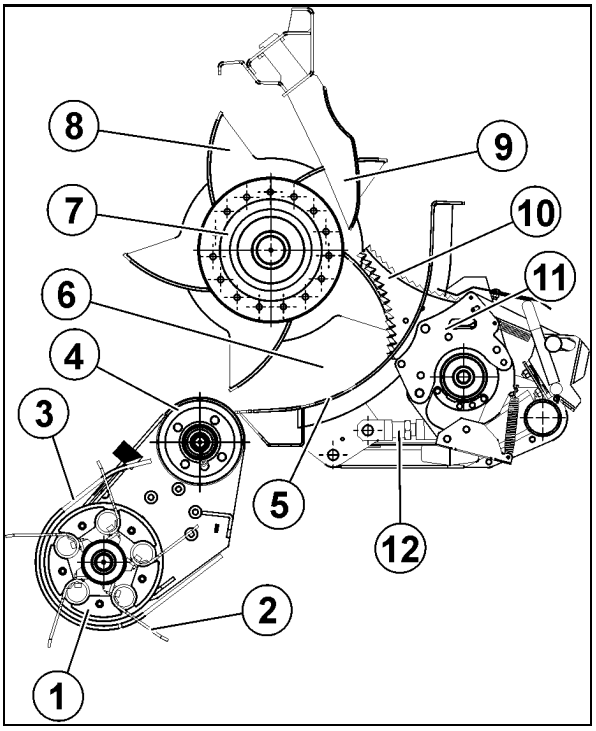


Fig. 3

2.4 Brake system

2.4.1 Dual-line compressed-air brake system with mechanical automatic load-sensitive brake (ALB) regulator

(1) Feed line with hose coupling (red)

(2) Brake line with hose coupling (yellow)

(3) Blank connection for brake line

(4) Trailer brake valve

(5) ALB regulator (mechanical)

The setting dimension (L) must not be changed! It must correspond to the value indicated on the ALB plate.

(6) Release valve

(7) Operating element for release valve (can only be actuated in uncoupled condition)

(8) Diaphragm brake cylinder

(9) Compressed-air reservoir

(10) Drain valve

(11) Test connection in front of ALB regulator

(12) Test connection behind ALB regulator

(13) Test connection, diaphragm brake cylinder

(14) Test connection, compressed-air reservoir

(15) Parking brake

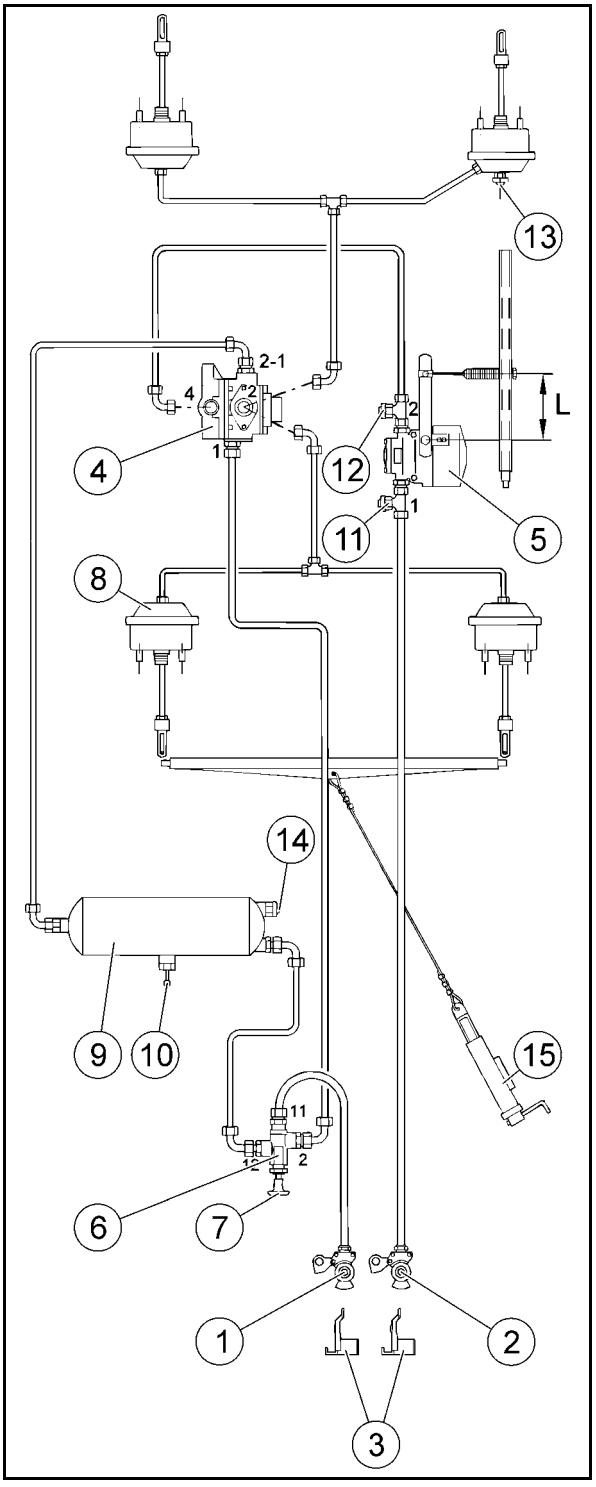


Fig. 4

2.4.2 Braking axle

(1) Diaphragm brake cylinder
(2) Slack adjuster for brake camshaft
(3) Brake camshaft
(4) Connecting rods for parking brake
(5) Test connection for pressure gauge

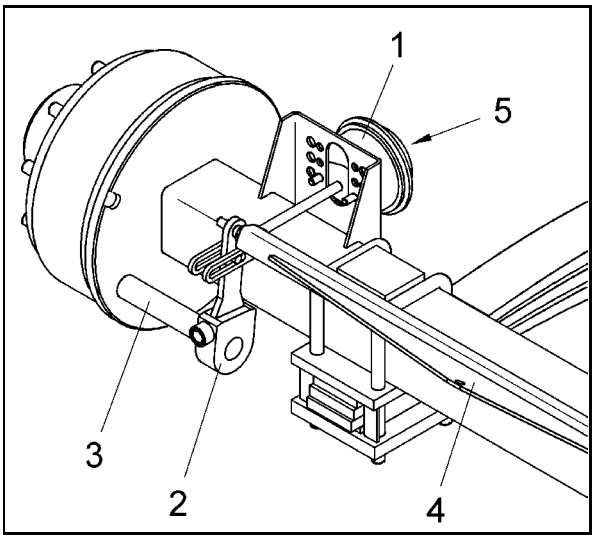


Fig. 5

2.5 Stop-cock for securing tailgate

The stop-cock for securing the tailgate is located at the right-hand rear of the machine.

Always secure the tailgate by closing the stop-cock

- before carrying out work beneath or behind the lifted tailgate.
- as long as the machine is operated with the crossover conveyor (optional extra) pulled out.

Stop-cock on machine without beaters

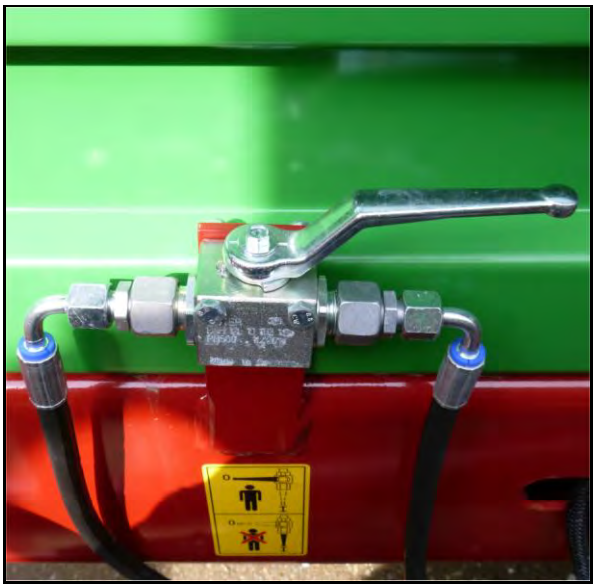


Fig. 6

Stop-cock open

Tailgate can lift and lower

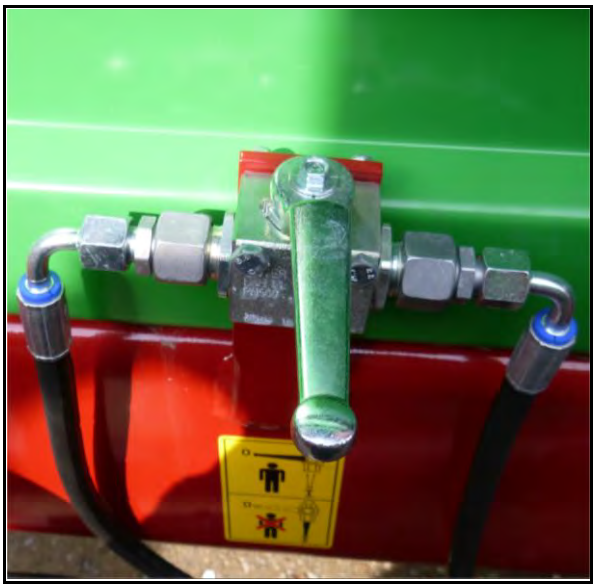


Fig. 7

Stop-cock closed

Tailgate is secured against lifting and lowering.

Stop-cock on machine with beaters

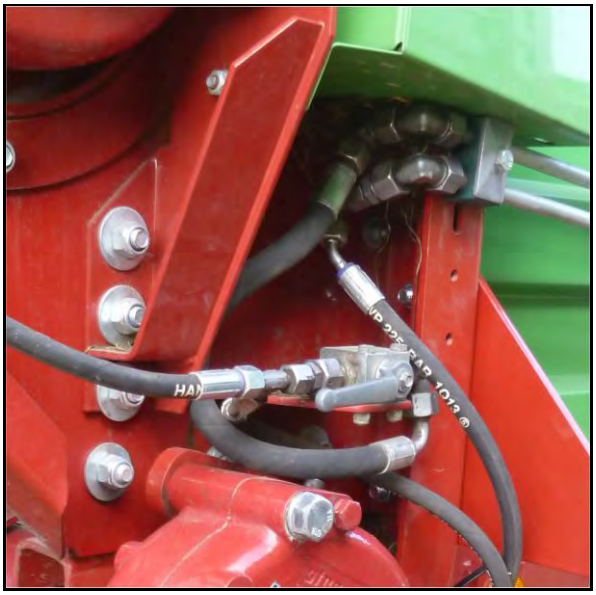


Fig. 8

Stop-cock open

Tailgate can lift and lower

Fig. 9

Stop-cock closed

Tailgate is secured against lifting and lowering.

2.6 Supply lines between tractor and machine

(1) Hydraulic connector "Flow line" SN 16 (red)

(2) Hydraulic connector "Return line" SN 20 (blue)

(3) Load-sensing connector SN 6 (only with available load-sensing connector)

(4) Compressed-air brake, feed line (red)

(5) Compressed-air brake, brake line (yellow)

(6) Lighting connector, 7-pole

(7) Power supply, 3-pole

(8) ISOBUS connector for ISOBUS control unit (only with available ISOBUS control unit)

(9) Hydraulic connector for hydraulic brake system with hydraulic clutch according to ISO 5676 (only with available hydraulic brake system)

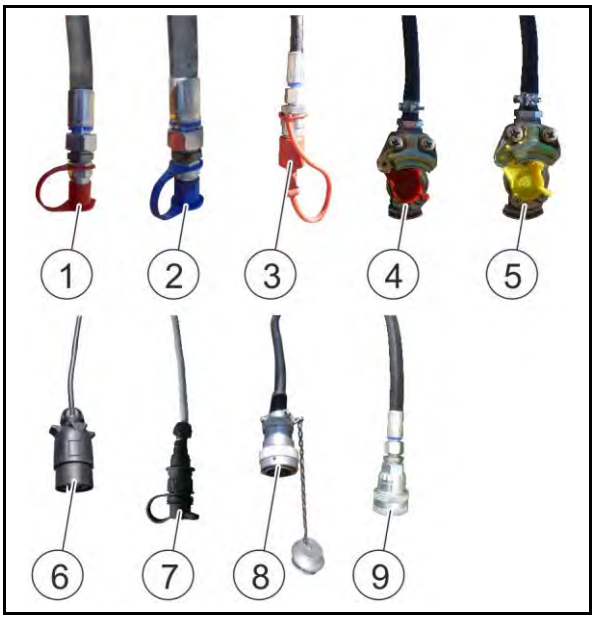


Fig. 10

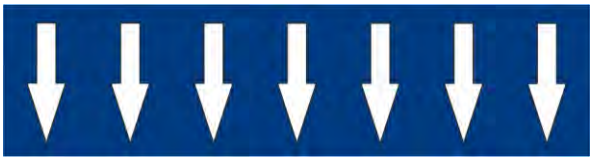
2.6.1 Marking of hydraulic supply lines

Hydraulic connector "Flow line"

- Label
  Arrows: white
  Background: red

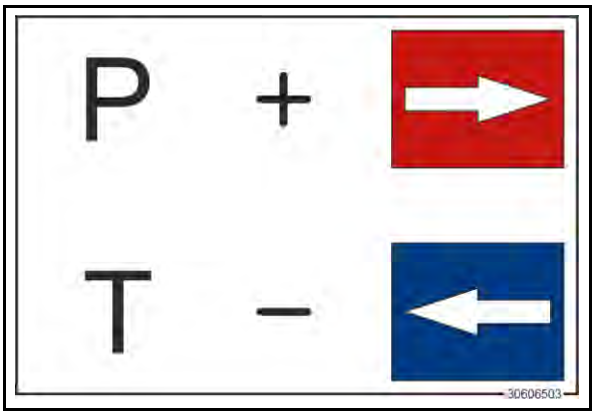
Hydraulic connector "Return line"

- Label
  Arrows: white
  Background: blue



Explanation of hydraulic connector symbols

- P: Pressure pipe (red)
- T: Tank line (blue)

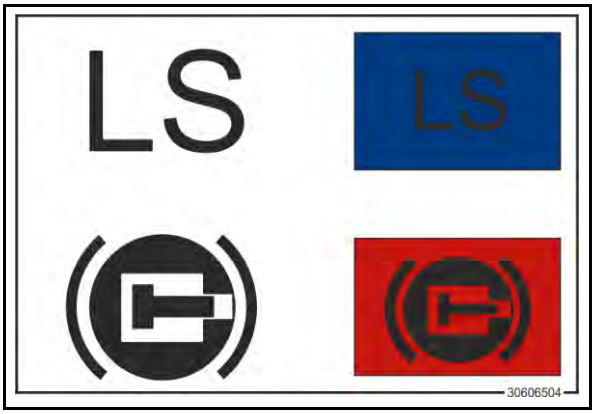


Load-sensing connector

- Label

Explanation of the following symbols:

- Load-sensing connector (blue)
- Hydraulic brake system (red)



2.7 Type plate

The complete marking is treated as a document and must not be altered or made unrecognizable.

(1) Type plate with CE symbol

(2) Vehicle/Machine ID number (embossed into the frame)

(3) ALB plate

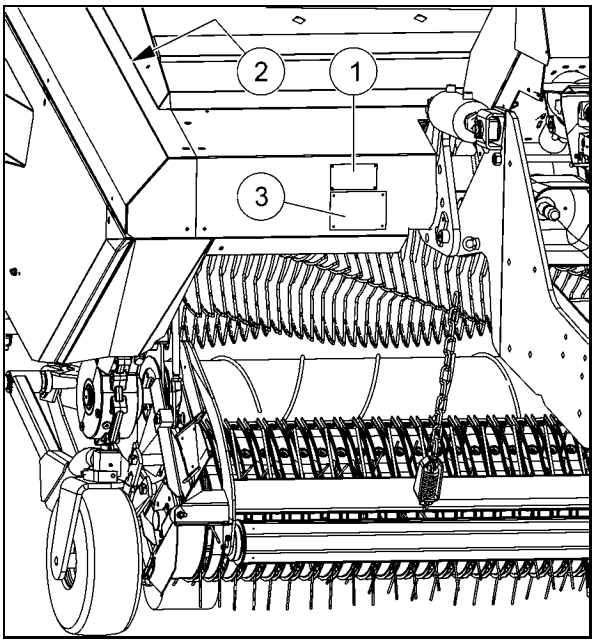


Fig. 11

Information on the type plate:

(1) Manufacturer

(2) CE symbol

(3) Vehicle/Machine ID number

(4) Type

(5) Empty weight [kg]

(6) Gross vehicle weight rating [kg]

(7) Admissible tongue load/front axle load [kg]

(8) Admissible rear axle load [kg]

(9) Approval number

(10) Year of manufacture

(11) Rated speed [min^{-1}]

(12) Admissible hydraulic pressure [bar]

(13) Maximum admissible speed [km/h]

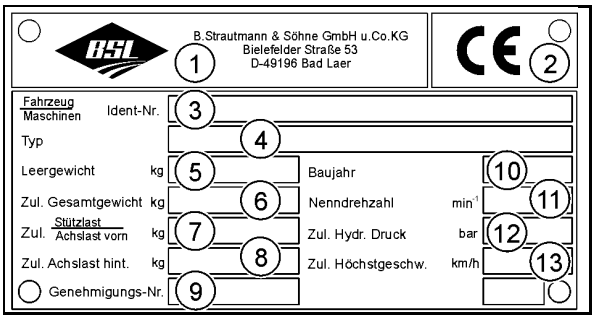


Fig. 12

2.8 Technical data

2.8.1 General data

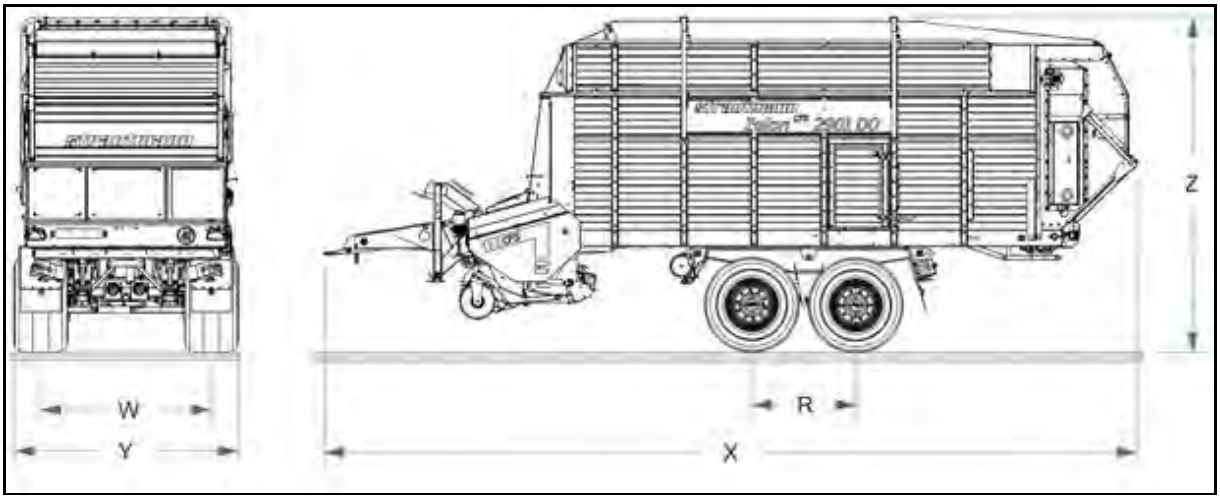


Fig. 13

		Zelon CFS					
		2501	**2501 DO**	**2901**	**2901 DO**	**3301**	**3301 DO**
Total length (X)	m	7.85	8.45	8.65	9.29	9.45	10.10
Total width (Y)	m	2.51	2.51	2.56	2.56	2.81	2.81
Total height (Z)	m	3.68	3.68	3.82	3.82	3.92	3.92
Track (W)	m	1.90	1.90	1.95	1.95	2.10	2.10
Wheelbase (R)	m	1.02	1.02	1.19	1.19	1.32	1.32
Mounting height of folding drawbar	mm	1380	1380	1380	1380	1380	1380
Gross vehicle weight rating	kg	12 000	12 000	15 000	15 000	18 000	18 000
Admissible axle load	kg	10 000	10 000	13 000	13 000	16 000	16 000
Admissible tongue load	kg	2000	2000	2000	2000	2000	2000
Capacity, medium compression	m³	39.1	39.1	45.9	45.9	52.7	52.7
Capacity according to DIN 11741	m³	23	23	27	27	31	31
Picking-up width of pick-up	mm	1685	1685	1685	1685	1685	1685
Number of cutting knives	Pcs.	32	32	32	32	32	32
Theoretical cutting length	mm	44	44	44	44	44	44

Tyres taken as a basis for the data:	500/50-17	500/55-20	710/40-R22.5

Depending on the machine's equipment, the technical data may differ!

Figures, technical data and weights may change due to technical development and are not binding for delivery.

2.8.2 Tyre pressure

If the vehicle width of 2.55 m is exceeded due to the use of wide-base tyres, these must, according to the StVZO (note of transl.: German Road Traffic Licensing Code), possess the load capacity required for reaching the respective admissible axle load at a reference speed of 10 km/h and an internal tyre pressure of 1.5 bar.

Safe road travel must be ensured by setting the internal tyre pressure required for this purpose.

Tyre size	Load index	Unit	25 km/h			40 km/h			max.
			12 t	15 t	18 t	12 t	15 t	18 t	
520/50-17	159A8	bar	2.0	2.4	–	2.2	3.0	–	3.6
500/50-17	149A8	bar	2.2	2.8	–	2.6	–	–	2.8
500/50-17	152A8	bar	2.8	3.8	–	3.8	–	–	3.8
500/55-20	150A8	bar	1.8	2.4	–	2.2	2.8	–	3.0
620/40 R22.5	154D	bar	3.0	3.0	3.0	3.0	3.0	3.4	4.0
620/40 R22.5	148D	bar	1.8	2.4	3.0	2.1	2.8	–	3.2
710/40 R22.5	156D	bar	–	–	2.1	–	–	2.6	3.2
710/40 R22.5	162D	bar	–	–	1.8	–	–	2.3	4.0
710/35 R22.5	158D	bar	–	–	2.4	–	–	2.9	4.0

2.8.3 Required tractor equipment

The employed tractor must meet the following requirements, in order to ensure correct use of the machine:

Tractor engine output and p.t.o. speed

		Zelon CFS					
		2501	2501 DO	2901	2901 DO	3301	3301 DO
Power required	kW	70		77		88	
	HP	95		105		120	
P.t.o. speed	min^{-1}	1000		1000		1000	

Electrical system

Battery voltage:	• 12 V (volt)
Socket for lighting:	• 7-pole
Socket for control set:	• 3-pole (DIN 9680). The feed line of the 3-pole socket should have a minimum cable cross section of 4 mm².

Hydraulics

- Check the compatibility of the hydraulic oils before connecting the machine to the hydraulic system of your tractor. For details about checking the compatibility of the hydraulic oils, contact your agricultural machinery dealer if necessary.
- Do not mix mineral oils with bio oils.

- The actuating speed of the hydraulic functions (hydraulic components) depends on the tractor's hydraulic system.

  Depending on the tractor model, a correction of the set actuating speed at the tractor's control device/the machine's control block may be necessary.
- For information about the required control devices, refer to the chapter "Required tractor equipment", page 23. For information about the hose markings, refer to the chapter "Marking of hydraulic supply lines", page 20.

Maximum operating pressure: 200 bar

Delivery rate: min. 40 l/min at 180 bar, max. 100 l/min at 200 bar

Designed for open or closed-centre hydraulic systems.

Depending on their function, the hydraulic components can be connected to:

- a double-acting control device,
- a single-acting control device and a depressurised return line leading directly into the hydraulic oil tank of the tractor.

Given a free choice, we recommend a single-acting control device and a depressurised return line. The hydraulic oil flows back into the hydraulic oil tank of the tractor through the free return line with a low back pressure. Thus, a free return line reduces heating-up of the hydraulic oil.

Control devices

Hydraulic component	Required control device
Electro-hydraulic control block	Optional: • 1 single-acting control device with return line or • 1 double-acting control device or • 1 load-sensing connector

Brake system

Brake system	Required connectors
Dual-line compressed-air brake system	• 1 hose coupling (red) for the feed line • 1 hose coupling (yellow) for the brake line
Hydraulic brake system	1 hydraulic clutch according to ISO 5676

3 Safety instructions

3.1 Correct use

The machine:

- is exclusively intended for normal use in the course of agricultural work,
- is suitable for cutting, charging, transport and distribution of green and dried-out forage,
- is only allowed to be operated by one person from the driver seat of the tractor.

Slopes can be travelled on as follows:

- Traversing hills:
  - Direction of motion to the left 20 % uphill/downhill gradient
  - Direction of motion to the right 20 % uphill/downhill gradient
- Slope line:
  - Uphill 20 % gradient
  - Downhill 20 % gradient

The following is also part of the correct use:

- the observance of all instructions contained herein,
- the observance of the specified service and maintenance work on the machine,
- the exclusive use of original spare parts.

Any use beyond this is prohibited and will be regarded as incorrect.

For any damage resulting from incorrect use:

- the user will be solely responsible,
- the manufacturer will not assume any liability.

3.2 Safety-conscious working

The machine complies with the safety-related requirements and state of the art. When using the machine, risks and impairments might yet arise:

- for life and limb of the operator or third parties,
- for the machine itself,
- to other material assets.

For the safety-conscious operation of the machine, please observe:

- these operating instructions, in particular:
  - the basic safety instructions, the activity-related safety instructions and the instructions what to do,
  - the instructions regarding correct use.
- the warning signs on the machine,
- the general national occupational safety, accident prevention and environmental protection rules,
- the national road traffic regulations when carrying out transport journeys.

Only operate the machine in perfect safety-related condition.

3.3 Organisational measures

The operating instructions:

- must always be kept at the machine's place of operation,
- must always be easily accessible for operating and maintenance staff.

3.3.1 User’s obligation

The user is obliged:

- to observe the general national occupational safety, accident prevention and environmental protection rules,
- to exclusively have staff operating the machine who:
  - know the basic occupational safety and accident prevention regulations,
  - have been instructed how to operate the machine,
  - have read and understood these operating instructions.
- to keep all warning signs attached to the machine in legible condition,
- to replace any damaged warning signs,
- to provide the necessary personal protective equipment such as protective goggles, work gloves according to DIN EN 388, safety footwear, protective clothing, skin protectant, etc.

3.3.2 Operator’s obligation

Any members of staff charged to operate the machine are obliged:

- to acquaint themselves with the machine before starting operation,
- to acquaint themselves with the following regulations and to observe them during work:
  - the general national occupational safety, accident prevention and environmental protection rules,
  - the chapter "Basic safety instructions“, page 29,
  - the chapter „Warning and instruction signs“, page 37, and the warning signs when operating the machine,
  - the chapters of these operating instructions which are important for the tasks assigned to them.

If the operator notices that a device is not in a sound safety-related condition, the operator shall be obliged to immediately eliminate this defect. If this is not part of the operator's scope of tasks or he/she lacks adequate expert knowledge, the operator shall be obliged to report this defect to his/her superior or to the user.

3.3.3 Qualification of operator

Only trained and instructed staff is allowed to operate the machine. The user must clearly define the responsibilities of the members of staff for operation, service and maintenance.

A person to be trained must be supervised when operating the machine.

The operator is only allowed to carry out such work as specified in these operating instructions which is not marked as "Shop work".

Only authorised workshops are allowed to carry out work on the machine which requires special expert knowledge. Authorised workshops have qualified staff and adequate means (tools, lifting and supporting equipment) at their disposal to carry out this work properly.

This applies to any work:

- which is not mentioned in these operating instructions,
- which is marked as "Shop work" in these operating instructions.

3.4 Product safety

3.4.1 Hazardous areas and dangerous spots

The hazardous area is the area within and/or in the vicinity of a machine, in which the safety or health of people might be impaired.

People are not allowed in the hazardous area:

- if the tractor engine is running with the propeller shaft coupled/ the hydraulic/electronic system connected,
- if tractor and machine are not secured against accidental starting and rolling.

Only if no people are within the hazardous area of the machine, is the operator allowed to:

- move the machine,
- set movable machine parts from transport to working position and from working to transport position,
- power working tools.

Within the hazardous area, risks occur at dangerous spots which cannot be completely eliminated due to the operational safety of the machine. The risks exist permanently or may occur unexpectedly.

Dangerous spots are marked by warning signs attached to the machine, which warn about existing residual risks.

In these operating instructions, activity-related safety instructions mark the existing residual risks.

Risks may arise:

- due to work-related movements of the machine and its working tools,
- due to substances or foreign objects blown out of the machine,
- due to accidental lowering of the lifted machine/of lifted machine parts,
- due to accidental starting and rolling of the machine / of tractor and machine.

Dangerous spots exist:

- within the drawbar area between tractor and machine,
- within the area of the powered propeller shaft,
- within the area of the powered pick-up,
- within the area of the pick-up, when lifting and lowering the pick-up,
- within the area of the cutting unit, when extending and retracting,
- beneath the machine,
- beneath the lifted, unsecured tailgate,
- within the area of the powered beaters,
- within the area of the powered transport floor,
- in the cargo space with the machine powered.

3.4.2 Safety-conscious operation of machine

The machine is only allowed to be operated from the driver's seat of the tractor, provided that no people are within the machine's hazardous area. Observe the information in the chapter "Hazardous areas and dangerous spots", page 27.

3.4.3 Safety and protective devices

- Only operate the machine when all safety and protective devices are properly fixed and in fully operable condition.

  Defective or removed safety and protective devices might cause dangerous situations.
- Check all safety and protective devices for visible damage and functional ability before starting the machine.

3.4.4 Structural alterations

- Vehicles provided with an official operating license or vehicle-linked devices and equipment provided with an official operating license or a road traffic license according to the road traffic regulations must be in the condition specified by that license.
- You are only allowed to carry out structural alterations, extensions or modifications on the machine with the prior written consent of the manufacturer.
- In case of non-authorized structural alterations, extensions or modifications:
  - the declaration of conformity and the CE symbol of the machine will become invalid,
  - the operating license according to national and international regulations will become invalid.
- Exclusively use original parts or modification and accessory parts approved by the manufacturer such that:
  - the declaration of conformity and the CE symbol of the machine will remain unaffected,

- the operating license according to national and international regulations will remain unaffected,
- perfect functioning of the machine will be ensured.

- The manufacturer will not assume any liability for damage resulting from:
  - unauthorized alterations of the machine,
  - non-approved modification and accessory parts,
  - welding and drilling work on load-bearing parts of the machine.

3.4.5 Spare and wearing parts, auxiliary materials

Immediately replace machine parts which are not in perfect condition.

Exclusively use original parts of the manufacturer or parts approved by the manufacturer such that the operating license according to national and international regulations will remain unaffected. If spare and wearing parts produced by third-party manufacturers are used, their stress-related and safety-conscious design and production will not be ensured.

The manufacturer will not assume any liability for damage resulting from the use of non-approved spare and wearing parts or auxiliary materials.

3.4.6 Warranty and liability

As a basic principle, our "General Sales Terms and Delivery Conditions" shall apply. They have been handed over to the user upon conclusion of contract at the latest.

Any warranty and liability claims in case of personal injury and material damage will be excluded if they are due to one or several of the following reasons:

- improper use of the machine,
- improper assembly, commissioning, operation and maintenance of the machine,
- operation of the machine, the safety devices being defective or the safety and protective devices having not been properly installed or being not serviceable,
- non-observance of the instructions included in the operating instructions referring to commissioning, operation and maintenance,
- unauthorized structural alterations on the machine,
- insufficient inspection of machine parts which are subject to wear,
- improperly effected repairs,
- disasters due to foreign objects and force majeure.

3.5 Basic safety instructions

Basic safety instructions:

- shall, as a basic principle, apply to the safe operation of the machine,
- are summarized in the subsections below.

3.5.1 General safety and accident prevention instructions

- Use a mobile service platform with ladder for all work at heights!
- Observe the general national safety and accident prevention regulations in addition to the safety instructions included in this chapter!

- Observe the warning and instruction signs attached to the machine. They provide important information for the safe and trouble-free operation of the machine!
- Observe the activity-related safety instructions included in the other chapters in addition to the basic safety instructions included in this chapter!
- Wear your personal protective equipment when carrying out work on the machine!
- Make sure that people leave the immediate vicinity of the machine before moving or starting the machine! Particularly be aware of children!
- Never carry passengers, animals or objects on the machine! Carrying passengers and transport of animals or objects are not allowed on the machine!
- Adapt your driving such that you have always safe control over the tractor with the attached/hitched machine!

  Consider your personal abilities as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the influences exerted by the attached/hitched machine.
- The following measures are imperative before carrying out any work on the machine such as adjusting work or trouble-shooting:
  - secure the machine against rolling with the machine not hitched to the tractor,
  - turn the tractor engine off and secure tractor and machine against accidental starting and rolling with the machine hitched to the tractor,
  - secure lifted machine parts/the lifted machine against accidental lowering.

► See also chapter "Secure tractor and machine against accidental starting and rolling", page 53!

Hitch and unhitch machine

- Only use appropriate tractors to hitch and transport the machine!
- Properly hitch the machine to the specified devices!
- Be sure not to exceed the following values when hitching the machine to the front and/or rear of a tractor:
  - the gross vehicle weight rating of the tractor,
  - the admissible axle loads of the tractor,
  - the admissible tongue load at the tractor's coupling spot,
  - the admissible towing capacity of the coupling device,
  - the admissible load capacities of the tractor tyres,
  - the tractor's front axle load must never fall below 20 % of the tractor's empty weight!

    The tractor must reach the deceleration specified by the tractor's manufacturer even with the machine attached / hitched up.
- Secure tractor and machine against rolling before hitching or unhitching the machine!
- People are not allowed between tractor and machine, while the tractor is approaching the machine!

  Present helpers are only allowed to act as a guide next to the vehicles and to enter the space between the vehicles after the vehicles have completely stopped.
- Put the support device into support position when hitching and unhitching the machine (stability)!
- Risk of crushing and shearing when actuating support devices!
- Hitching and unhitching the machine to or from the tractor requires particular care! Crushing and shearing zones exist within the area of the coupling spots between tractor and machine!
- Check the connected supply lines. Connected supply lines:
  - must easily give way to any movements during cornering without any stress, buckling or chafing,
  - must not chafe against external components!

- Always park the unhitched machine in a stable position! Pay attention to the ground condition. Beware of soft surfaces.

Use of machine

- Acquaint yourself with all mechanisms and operating elements of the machine and their functions before starting work! During operation it will be too late.
- Wear close-fitting clothing! Loose-fitting clothing increases the risk of becoming entangled in or wound up at drive shafts!
- Start the machine only if all protective devices have been installed and are in protective position!
- Observe the maximum load capacity of the attached/hitched machine and the admissible axle and tongue loads of the tractor! Run the machine with the cargo space being only partly filled if necessary.
- People are not allowed:
  - within the operating/hazardous area of the machine,
  - within the discharge area of the machine,
  - within the turning and swivelling range of movable machine parts,
  - beneath lifted and unsecured movable machine parts!
- You are only allowed to operate powered machine parts if there are no people within the machine's hazardous area!
- Secure the tractor against accidental starting and rolling before leaving it!
- Safely support folded-up covers before standing underneath them!
- As a basic principle, lock the steering axle
  - before travelling over the bunker silo,
  - before reversing,
  - in case of poor road conditions,
  - when travelling on slopes.

Transport of machine

- Before carrying out transport journeys, check:
  - the supply lines for proper connection,
  - the lighting system for damage, proper functioning and cleanliness,
  - the brake and hydraulic system for visible defects,
  - whether the parking brake has been completely released,
  - the brake system for proper functioning,
  - whether the required transport equipment, such as lighting, warning and protective devices, has been properly mounted on the machine!
- Check the braking effect before starting the journey! The tractor must produce the required deceleration for the combination of tractor and attached/hitched machine!
- Always ensure sufficient steerability and braking ability of the tractor!

  Machines attached/hitched to a tractor and front or tail weights influence the driving characteristics as well as the steerability and the braking ability of the tractor.
- Observe the maximum loading capacity of the attached/hitched machine and the admissible axle and tongue loads of the tractor!
- Observe the broad overhang and the flywheel mass of the machine when cornering with attached/hitched machine!

- Set all movable machine parts to transport position and secure them before carrying out transport journeys! Use the transport locks provided for this purpose!

3.5.2 Hydraulic system

- Only an authorised workshop is allowed to carry out work on the hydraulic system!
- Make sure that the hydraulic system on the tractor and on the machine has been depressurized when connecting the hydraulic hose pipes!
- Ensure to properly connect the hydraulic hose pipes!
- Do not block any operating elements on the tractor, which serve to directly initiate hydraulic or electrical movements of components, e. g. folding, swivelling and sliding operations!

  The respective movement must automatically stop as soon as the operating element is released.

  This shall not apply to:
  - continuous movements of devices,
  - automatically controlled movements of devices,
  - movements of devices which, for functional reasons, require an open-centre or pressing position.
- Before carrying out any work on the hydraulic system:
  - secure lifted movable machine parts against accidental lowering,
  - depressurize the hydraulic system,
  - turn the tractor engine off,
  - pull the ignition key out,
  - apply the parking brake.
- Have hydraulic hose pipes checked for their operational safety by an expert at least once a year!
- Hydraulic hose pipes must be replaced in case of visible defects, damage and ageing! Only use original hydraulic hose pipes!
- The period of use of the hydraulic hose pipes should not exceed six years (including a maximum possible shelf life of two years).
- Never try to block leaking hydraulic hose pipes with your hand or fingers! Immediately contact an authorized workshop if a leak is suspected.

  Hydraulic oil squirting out under high pressure may enter the skin and the body and cause serious injuries.

  If injuries caused by hydraulic oil occur, immediately contact the medical services. Risk of infection!
- Never try to detect leakage points with your bare hands. Risk of serious infection! Use appropriate means when trying to locate leakage points (cleaning sprays, special leak detector spray)!

3.5.3 Electrical system

- Before carrying out any work on the electrical system, disconnect the minus pole of the battery!
- Always cover the plus pole of the battery as required. Risk of explosion in case of accidental ground!
- Only use the specified fuses. When using bigger fuses, the electrical system may be destroyed. Risk of fire!
- Ensure correct order when connecting and disconnecting the battery:

  - connection: first connect the plus pole, then the minus pole,
  - disconnection: first disconnect the minus pole, then the plus pole!
- Avoid sparking and open fire in the vicinity of the battery! Risk of explosion!
- The machine can be equipped with electronic components and parts, the functioning of which may be affected by electromagnetic emissions of other devices. Such interferences may be a risk to people if the following safety instructions are not observed:
  - In case of a retrofitting of electrical devices or components into the machine and their connection to the on-board electrical system, the user must check on his own responsibility whether the retrofitted parts interfere with the vehicle electronics or other components.
  - Ensure that the retrofitted electrical and electronic components comply with the EMC directive 2004/108/EC as amended from time to time and bear the CE symbol!
- Never fit the machine with additional work lights without authorisation! The manufacturer will not assume any liability or warranty for subsequent damage on the electrical system.

3.5.4 Propeller shaft operation

- The included operating instructions of the propeller shaft manufacturer shall apply!
- Only use the propeller shafts specified by the manufacturer and equipped with the proper protective devices!
- Always transport the propeller shaft in horizontal position, in order to avoid injuries due to the propeller shaft halves falling apart!
- Check the propeller shaft:
  - protective tube and protective cone of the propeller shaft must be undamaged,
  - a protective cover must be mounted to the tractor's and to the machine's p.t.o. shaft! The protective covers must be in proper condition!
- Working with the protective devices being damaged is not allowed!
- Mounting and dismounting of the propeller shaft is only allowed:
  - with the p.t.o. shaft switched off,
  - with the tractor engine turned off,
  - with the ignition key pulled out,
  - with the parking brake applied!
- Always ensure proper mounting and securing of the propeller shaft!
- Secure the propeller shaft guard against rotation by installing the chain/s!
- Always mount the wide-angle joint at the pivot point between tractor and machine when using a wide-angle propeller shaft!
- In case of propeller shafts equipped with overload or overrunning clutch, this clutch must always be mounted at the machine!
- Before switching the propeller shaft on, check whether the selected speed and the sense of rotation of the tractor's p.t.o. shaft have been adjusted to the admissible drive speed and the sense of rotation of the machine!
- Make sure that people leave the hazardous area of the machine before switching the p.t.o. shaft on!
- Do not use the coupled propeller shaft as a step!
- Never switch the propeller shaft on with the tractor engine turned off!
- Observe the admissible angular misalignment and the travel of the propeller shaft when cornering!

- Observe the transport and working position of the specified tubular covers of the propeller shafts!
- People are not allowed within the range of the rotating propeller shaft when work with the propeller shaft is being carried out!
- Always switch the propeller shaft off if the angular misalignments occurring are too large or when it is not required!
- Risk of injury due to the flywheel mass of the machine parts continuing to rotate for a short time after the propeller shaft has been switched off!

  Do not approach the machine too closely during that time! Do not carry out any work on the machine until all machine parts have completely stopped.
- Secure tractor and machine against accidental starting and rolling before carrying out any maintenance, cleaning, lubrication or setup work on machines powered by propeller shafts or before hitching/unhitching them!
- Place the uncoupled propeller shaft on the respective holder!
- Put the protective cover onto the p.t.o. shaft stub after the propeller shaft has been uncoupled!

3.5.5 Hitched machines

- Only couple admissible combinations of tractor and hitched machine!
- Observe the maximum admissible tongue load of the tractor at the coupling device in case of single-axle machines!
- Always ensure sufficient steerability and braking ability of the tractor!

  Machines attached/hitched to a tractor influence the driving characteristics as well as the steerability and the braking ability of the tractor, in particular single-axle machines with the tongue load being exerted on the tractor.
- Only an authorized workshop is allowed to adjust the height of the drawbar for drawbars with tongue load!
- Ensure sufficient tongue load at the support device when unhitching and parking a single-axle machine!

  Risk of tipping, particularly in case of unevenly charged machine (stability).

3.5.6 Brake system

- The brake system of the tractor must be compatible with the brake system of the machine!
- Immediately stop the tractor in case of a malfunction of the brake system. Have the malfunction promptly remedied by an authorized workshop!
- Only authorized workshops or qualified personnel are allowed to carry out adjustment and repair work on the brake system!
- Have the brake system regularly and thoroughly checked!

  In order to maintain the operational safety, the wheel brakes must always be properly adjusted.
- Before carrying out any work in the brake system:
  - safely park the machine and secure it against accidental rolling (chocks),
  - secure the lifted machine/machine parts against accidental lowering!
- Especially beware when carrying out welding and drilling work and work involving open fire in the vicinity of brake lines!
- As a basic principle, test the brakes after any adjusting and maintenance work on the brake system!

- Observe the fact that the braking axle needs to run in during the first service hours – the brake lining is adjusting to the brake drum. Full braking power is only reached after this running-in period.

Compressed-air brake system

- The compressed-air brake systems of the tractor and of the machine must be compatible!
- Clean the sealing rings at the hose couplings of the feed and brake lines from possible soiling before hitching the machine!
- You are only allowed to start the tractor with the hitched machine moving when the pressure gauge on the tractor indicates 5.0 bar!
- Drain the air reservoir every day!
- Cover the tractor's hose couplings before carrying out journeys without machine!
- Hang the couplings of the feed and brake line on the provided blank connections with the machine unhitched!
- Do not modify the specified settings at the brake valves!
- Replace the air reservoir if:
  - the air reservoir can be moved in the tensioning straps,
  - the air reservoir is damaged,
  - the type plate at the air reservoir is getting rusty, is loose or is missing!
- The setting dimension at the mechanical ALB regulator (automatic load-sensitive brake pressure regulator) must always correspond to the value indicated on the ALB plate. The setting dimension must not be changed – risk due to insufficient braking ability of the machine!

Hydraulic brake system for export machines

- Hydraulic brake systems are not licensed for road traffic in Germany!
- Only use the specified hydraulic oils when topping up or changing oils. Observe the relevant regulations when changing hydraulic oils!

3.5.7 Axles

As a basic principle, never overload the axles. Overloading of axles reduces the service life of the axle bearings and causes damage to the axles.

Therefore avoid:

- overloading of the machine,
- bumping into curbs,
- exceeding the speed limit,
- mounting wheels of wrong inserting depth,
- mounting wheels and tyres of wrong dimensions.

3.5.8 Tyres

- Safely park the machine and secure it against accidental lowering and rolling (parking brake, chocks) before carrying out any work on the tyres!
- Only qualified personnel equipped with appropriate fitting tools is allowed to carry out repair work on tyres and wheels! Mounting of wheels and tyres requires sufficient know-how and appropriate tools.

- Deflate the tyre before removing it!
- Regularly check the tyre pressure!
- Observe the maximum admissible tyre pressure. Risk of explosion in case of excessive pressure!
- Retighten all fastening screws and nuts according to the manufacturer's specifications!

3.5.9 Operation of machine

- Ensure that the fastening elements fit properly before each startup of the machine!
- People are not allowed within the operating area!
- Do not approach rotating beaters!
- Climbing onto the transport floor is not allowed as long as the tractor engine is running!
- Passengers are not allowed on the machine!
- Unhitch the machine from the tractor only when empty!

3.5.10 Service and maintenance of machine

- Carry out the required service and maintenance work on the machine in due time!
- Observe the maintenance intervals for wearing parts!
- Secure the tractor against accidental starting and rolling before carrying out any service or maintenance work on the machine or climbing onto the machine!
- Existing mechanical, hydraulic, pneumatic and electrical or electronic residual energies may cause accidental machine movements!

  Beware of existing residual energies in the machine when carrying out maintenance work. Warning signs mark the components with residual energies.
- Fix larger assemblies carefully to lifting equipment and secure them before replacing larger assemblies!
- Secure the lifted machine or lifted machine parts against accidental lowering before carrying out service or maintenance work on the machine!
- Regularly check screws and nuts for tightness! Retighten loosened screws and nuts!
- Check unscrewed joints for tightness. After finishing maintenance work, check the safety and protective devices for proper functioning!
- Use appropriate equipment and gloves when replacing working tools with blades!
- Disconnect the generator and battery cable on the tractor before carrying out electrical welding work on the tractor and/or on the attached/hitched machine!
- Dispose of oils, greases and filters properly!
- Properly handle and dispose of substances and materials used for cleaning the machine, especially:
  - when working on lubrication systems and devices,
  - when carrying out cleaning work with solvents!
- Spare parts must at least comply with the specified technical standards of the manufacturer! This is guaranteed when using original parts!

3.6 Warning and instruction signs

The following warning and instruction signs are attached to the machine:

- Warning signs mark dangerous spots on the machine and warn about residual risks, which cannot completely be eliminated due to the machine's operational safety.
- Instruction signs include information referring to proper use of the machine.

Always keep these signs in clean and clearly legible condition! Replace illegible signs. Order the warning and instruction signs according to their order number:

- from the dealer,
- directly via the Strautmann spare parts warehouse (+ 49 (0) 5424 802-30).

3.6.1 Warning signs

A warning sign consists of 2 pictographs:

(1) Pictograph for description of risk

The pictograph shows the pictographic description of the risk, surrounded by a triangular hazard symbol.

(2) Pictograph for avoidance of risk

The pictograph shows the pictographic instruction how to avoid the risk.

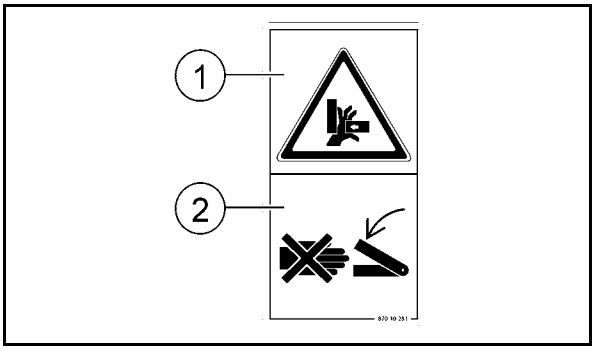
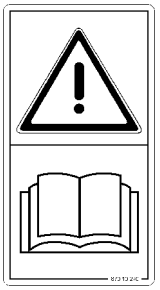
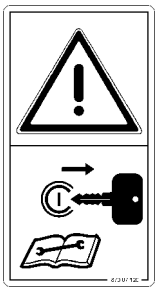


Fig. 14

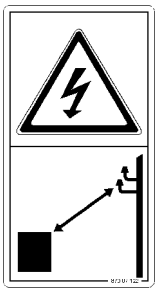
Explanations of warning signs

The following list includes:

- in the right-hand column all warning signs attached to the machine,
- in the left-hand column the following details referring to the warning sign on the right-hand side:
  - the order number.
  - the description of risk, e.g. "Risk of crushing fingers or hand due to accessible movable machine parts!"
  - the consequences in case of non-observance of the instruction(s) how to avoid the risk, e.g. "This risk may cause most serious injuries involving loss of limbs."
  - the instruction(s) how to avoid the risk, e.g. "Never reach into the dangerous spot as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/ electronic system connected. Make sure that people leave the hazardous area of the machine before moving machine parts."

Order number and explanation	Warning signs
87010270 Please read and observe the operating and safety instructions before commissioning!	
87007120 **Risks when carrying out work on the machine such as mounting, adjusting, trouble-shooting and maintenance, due to accidental starting or rolling of tractor and machine!** This risk may cause most serious injuries or even death. • Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine. • Read and observe the instructions in the respective chapters in the operating instructions depending on the work to be carried out.	
87007104 **Risk to any part of the body of being crushed if people stand within the swivelling range of the tailgate!** This risk may cause most serious injuries or even death. • People are not allowed within the swivelling range of the tailgate as long as the tractor engine is running with the propeller shaft coupled/the hydraulic system connected. • Make sure that people leave the swivelling range of the tailgate before opening the tailgate.	
87007110 **Risk to any part of the body of being crushed due to necessary work underneath unsecured, suspended loads or lifted machine parts!** This risk may cause most serious injuries or even death! Activate the safety locking mechanism against accidental lowering of suspended loads or lifted machine parts before entering the hazardous area.	
87007117 **Risk to any part of the body of being drawn in or becoming entangled due to powered working tools!** This risk may cause most serious injuries or even death. Never enter the cargo space as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected.	

87007122



Risk of electrical shock or burns due to accidental touching of electrical overhead lines or due to inadmissible approach to high-voltage overhead lines!

This risk may cause most serious injuries or even death.

Keep sufficient safe distance to high-voltage overhead lines.

Nominal voltage	Safe distance to overhead lines
up to 1 kV	1 m
over 1 up to 110 kV	3 m
over 110 up to 220 kV	4 m
over 220 up to 380 kV	5 m
nominal voltage unknown	5 m

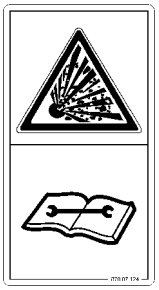
87007123

Risk due to hydraulic oil squirting out under high pressure, caused by leaking hydraulic hose pipes!

This risk may cause most serious injuries or even death if hydraulic oil squirting out under high pressure enters the skin and the body.

- Never try to block hydraulic hose pipe leaks with your hands or fingers.
- Read and observe the information included in the operating instructions before carrying out service and maintenance work on hydraulic hose pipes.

87007124



Risk due to explosion or hydraulic oil squirting out under high pressure, caused by the pressure accumulator being under gas and oil pressure!

This risk may cause most serious injuries or even death if hydraulic oil squirting out under high pressure enters the skin and the body.

- Read and observe the information included in the operating instructions before carrying out any work on the hydraulic system.
- If injuries caused by hydraulic oil occur, immediately contact the medical services.

87007126

Risk to any part of the body of being rolled over by the machine due to accidental rolling of the machine parked in unsecured condition!

This risk may cause most serious injuries or even death.

Secure the machine against accidental rolling before unhitching the machine from the tractor or before parking the machine. Use the parking brake and/or the chock(s) for this purpose.

87007130

Risk to any part of the body of being crushed if people stand within the swivelling range of the drawbar between the tractor and the hitched machine!

This risk may cause most serious injuries or even death.

- People are not allowed within the hazardous area between tractor and machine as long as the tractor engine is running and the tractor has not been secured against accidental rolling.
- Make sure that people leave the hazardous area between tractor and machine as long as the tractor engine is running and the tractor has not been secured against accidental rolling.

87010276

Risk to any part of the body of being drawn in or becoming entangled due to powered working tools!

This risk may cause most serious injuries or even death.

- Keep sufficient safe distance to powered working tools.
- Ensure that people keep sufficient safe distance to powered working tools.

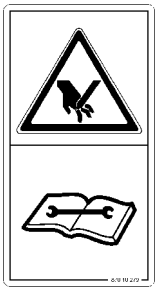
87010278

Risk of becoming entangled and wound up due to the powered propeller shaft!

This risk may cause most serious injuries or even death.

- Keep sufficient safe distance to the propeller shaft as long as the tractor engine is running with the propeller shaft coupled/the hydraulic system connected.
- Ensure that people keep sufficient safe distance to the powered propeller shaft.

87010279



Risk of cuts for fingers and hands due to work on sharp / sharp-edged working tools!

This risk may cause most serious injuries including loss of limbs.

Observe the information in the operating instructions before carrying out work on sharp working tools.

87010280

Risk to hands or arms of being drawn in or becoming entangled in moving power transmission parts!

This risk may cause most serious injuries including loss of limbs.

Never open nor remove protective devices as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected.

87010281

Risk to fingers or hands of being crushed due to accessible movable machine parts!

This risk may cause most serious injuries including loss of limbs.

Never reach into the hazardous area as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected.

87010282

Risk of crushing, being drawn in or becoming entangled due to unprotected movable machine parts, caused by missing protective devices!

This risk may cause most serious injuries including loss of limbs.

Close open protective devices or mount previously removed protective devices before powering the machine.

87010283

Risk due to substances or foreign objects blown away from or out of the machine to people standing within the hazardous area of the machine!

This risk may cause most serious injuries to any part of the body.

- Keep sufficient safe distance to the hazardous area of the machine.
- Ensure that people keep sufficient safe distance to the hazardous area of the machine as long as the tractor engine is running.

87010284

Risk to any part of the body of being crushed if people stand beneath the open, unsecured tailgate!

This risk may cause most serious injuries or even death.

- Never stand beneath the open tailgate without securing the tailgate against accidental lowering.
- Ensure that there are no people beneath the open tailgate.

87010287

Dangerous situations may occur if load-bearing parts break due to mechanical work on frame elements!

This risk may cause most serious injuries or even death.

As a basic principle, the following work is not allowed:

- mechanical processing of the chassis,
- drilling at the chassis,
- boring up of existing holes at the chassis frame or at load-bearing parts,
- welding on load-bearing parts.

87010289

Risk to any part of the body of being drawn in and becoming entangled due to powered working tools (pick-up and feeder rotor)!

This risk may cause most serious injuries or even death.

- Keep sufficient safe distance to powered working tools.
- Never reach into the hazardous are of powered working tools as long as the tractor engine is running with the propeller shaft coupled/the hydraulic system connected.
- Ensure that people keep sufficient safe distance to powered working tools.

3.6.2 Instruction signs

An instruction sign consists of a pictograph:

(1) Pictograph including information about proper use of the machine.

The pictograph includes visual or descriptive information or information summarized in a table.

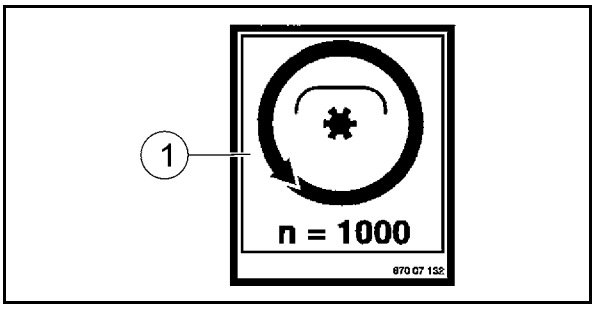
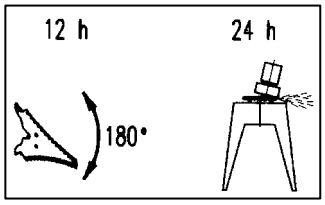


Fig. 15

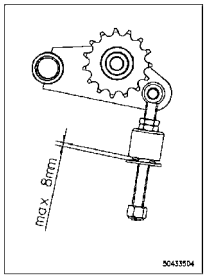
50406501

Turn cutting knives over every 12 service hours, grind them every 24 service hours.



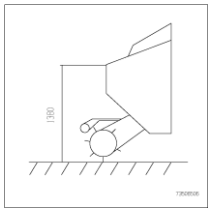
50433504

Check the tension of the roller chain at the chain tensioner.



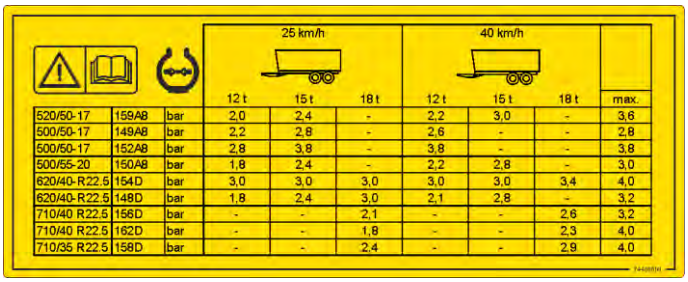
73506506

Adjust mounting height of folding drawbar (1380 mm).



74406509

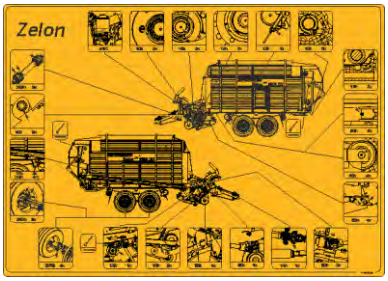
Tyre pressure chart



			25 km/h			40 km/h			
			12 t	15 t	18 t	12 t	15 t	18 t	max.
520/50-17	159A8	bar	2,0	2,4	-	2,2	3,0	-	3,6
500/50-17	149A8	bar	2,2	2,8	-	2,6	-	-	2,8
500/50-17	152A8	bar	2,8	3,8	-	3,8	-	-	3,8
500/55-20	150A8	bar	1,8	2,4	-	2,2	2,8	-	3,0
620/40-R22.5	164D	bar	3,0	3,0	3,0	3,0	3,0	3,4	4,0
620/40-R22.5	148D	bar	1,8	2,4	3,0	2,1	2,8	-	3,2
710/40 R22.5	156D	bar	-	-	2,1	-	-	2,6	3,2
710/40 R22.5	162D	bar	-	-	1,8	-	-	2,3	4,0
710/35 R22.5	158D	bar	-	-	2,4	-	-	2,9	4,0

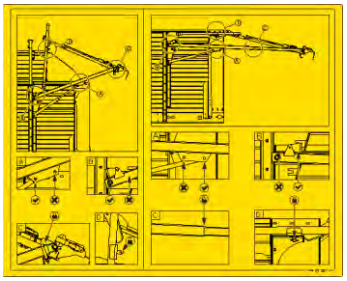
74407500

Lubrication plan



74407501

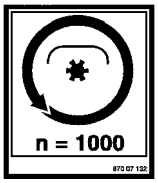
Operation of telescopic tailgate (optional extra)



87007132

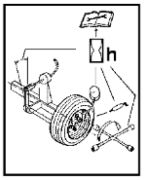
The required drive speed of the machine is 1000 min^{-1}.

Before switching the propeller shaft on, check whether the selected speed and sense of rotation of the tractor's p.t.o. shaft have been adjusted to the admissible speed and sense of rotation of the machine.



87007133

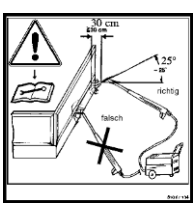
Observe the information for braking axle maintenance included in the operating instructions.



87007134

Risk due to improper cleaning of the machine.

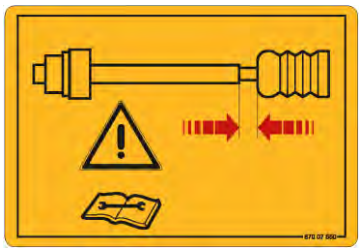
Absolutely observe the information in the chapter "Cleaning of machine", page 141 when using a pressure washer/steam blaster for cleaning the machine.



87007550

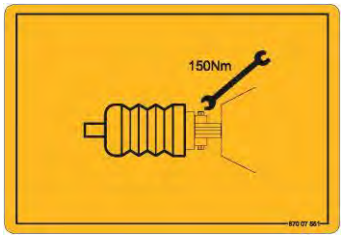
Adjust length of propeller shaft.

Before commissioning the machine, shorten the propeller shaft, in order to avoid damage to the tractor and the machine. Absolutely observe the information in the chapter "Adjust length of propeller shaft to tractor", page 64 as well as the operating instructions provided by the propeller shaft manufacturer along with the propeller shaft.



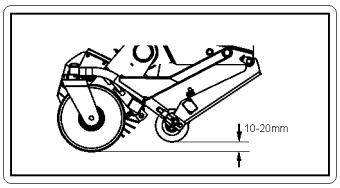
87007551

Tighten the screws of the propeller shaft on the machine at 150 Nm.



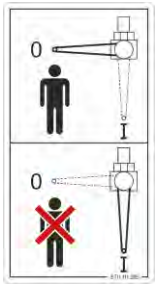
87007556

Set additional guide wheels (optional extra) 10-20 mm higher than the guide wheels.



87010285

Close the stop-cock (position 0) to secure the tailgate before carrying out work beneath the lifted tailgate.



87010288

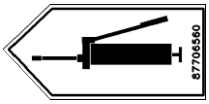
This pictograph illustrates fixing points for lifting equipment (jack).

877 06 091

The pictograph marks anchorage points for fixing slings for transport of the machine.

87706560

Lubrication point



3.7 Risks in case of non-observance of safety instructions and warning signs

Non-observance of the safety instructions and warning signs may:

- cause risk to people, environment and machine such as:
  - risk to people due to non-secured work areas,
  - failure of essential machine functions,
  - failure of specified methods for the use, service and maintenance of the machine,
  - risk to people due to mechanical and chemical effects,
  - threat to the environment due to leaking operating media.
- lead to invalidation of any claims for damages.

4 Loading of machine

Only the haulage contractor is authorised to carry out this work!

This work requires special know-how and/or specific technical equipment.

Otherwise, this work will impair your safety and the functional ability of the machine during and after its execution.

Release the compressed-air brake via the release valve, in order to be able to manoeuvre the machine by means of tractors without compressed-air brake system.

The release valve can only be actuated with the brake and feed line of the compressed-air brake system disconnected.

► See also chapter "Release compressed-air brake via release valve", page 68!

4.1 Loading by means of tractor

WARNING

Risk to people due to uncontrolled movements of the tractor and the machine if insufficient stability and insufficient steerability and braking ability of the tractor occur!

- Properly hitch the machine to the tractor before loading or unloading the machine onto or from a transport vehicle.
- When hitching and transporting the machine for loading and unloading, only use a tractor which meets the performance requirements and can safely slow down the machine..

  If the machine is equipped with a compressed-air brake system, you are only allowed to start moving the machine when the pressure gauge on the tractor indicates 5.0 bar.

Avoid damage to the machine!

Exclusively support the conveying unit at the fixed bearing surfaces, never at movable parts such as the frame of the guide wheels or additional guide wheels!

Use a suitable base (e.g. hardwood) for supporting!

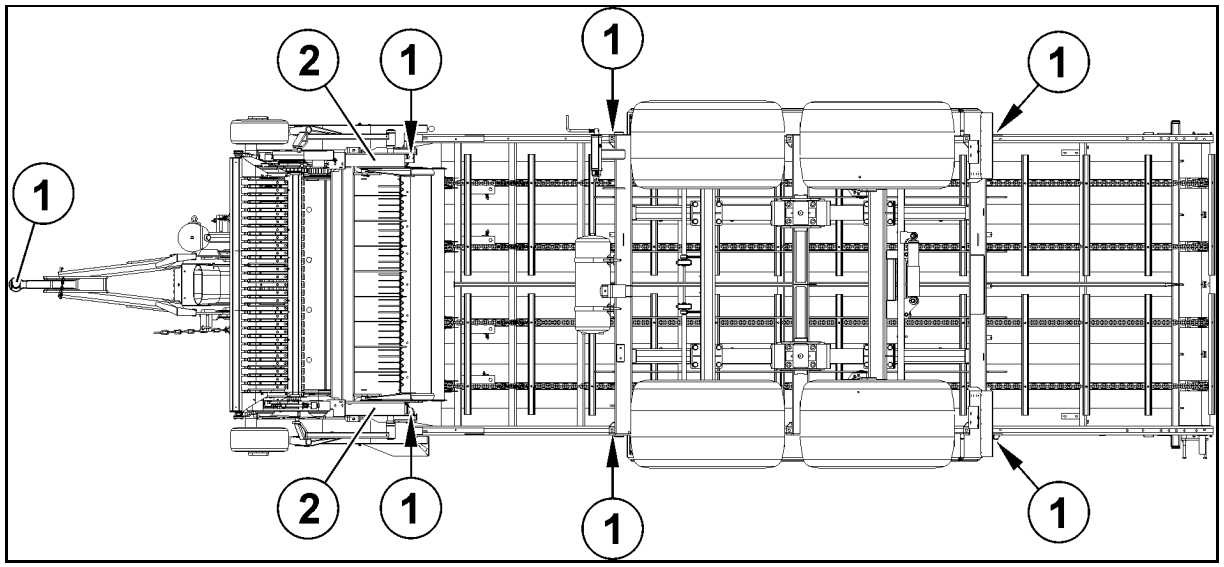


Fig. 16

(1) Sling point for lashing

(2) Bearing surface for support of conveying unit

4.2 Loading by means of lifting devices

WARNING

Risk of crushing and/or impact to people if the lifted machine accidentally comes down!

- Use appropriate slings which are able to safely carry the machine's weight.
- Never stand within the lifting zone beneath the lifted machine.

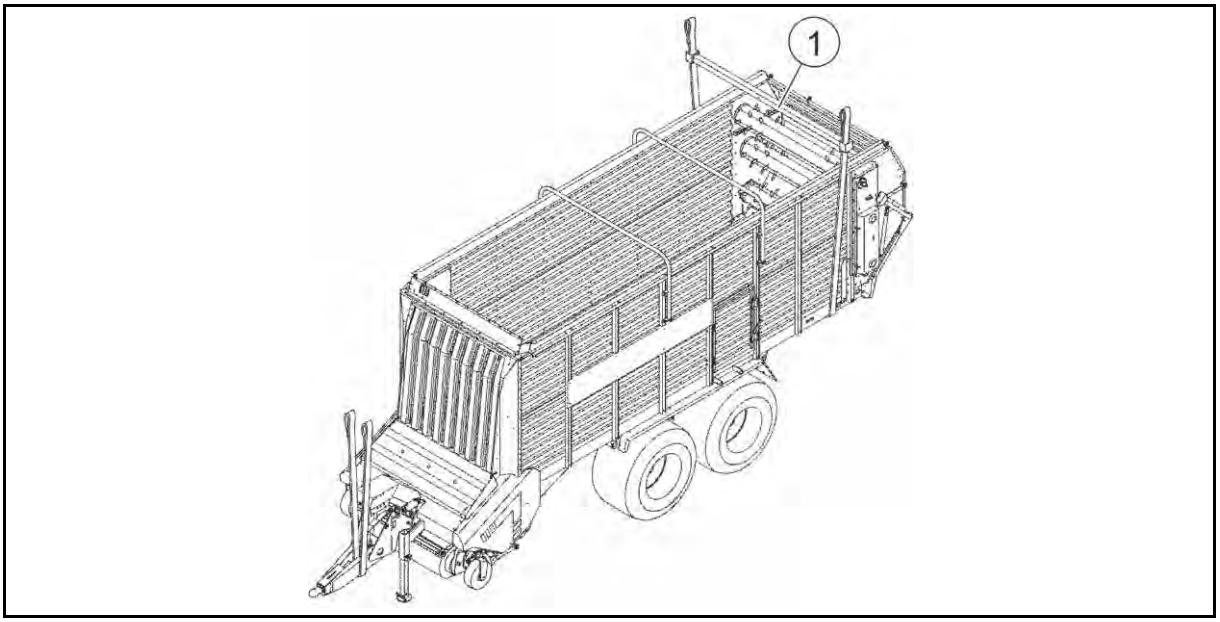


Fig. 17

(1) Spacer

5 Commissioning

This chapter will provide information:

- on how to proceed when commissioning your machine,
- on how to check whether the machine is licensed for being attached/hitched to your tractor.

- Before commissioning, the operator must:
  - have read and understood these operating instructions.
  - lubricate all lubrication points.
- When commissioning the machine, additionally observe the information included in the chapters:
  - "Operator's obligation", page 26,
  - "Qualification of operator", page 27,
  - "Basic safety instructions", page 29,
  - "Warning and instruction signs", page 37,
  - "Service and maintenance of machine", page 136.

  Observance of these chapters serves your safety.
- Before each startup, the operator must check the tractor and the machine for their road and operational safety.
- Only use appropriate tractors to hitch and transport the machine.
- Check the following adjustments when changing the tractor:
  - Length of propeller shaft. Observe the information in the chapter "Adjust length of propeller shaft to tractor", page 64,
  - Setting of pressure regulator (load-sensing screw).

  Readjust if necessary.
- Tractor and machine must comply with the national road traffic regulations.

  Owner (user) and driver (operator) of the vehicle are responsible for observing the national road traffic regulations.

WARNING

Risk of crushing, shearing, cuts, becoming entangled and being drawn in to people if operating elements used to actuate movable components carrying out dangerous movements are blocked!

Do not block any operating elements which serve to initiate movable components to carry out dangerous movements, e. g. folding, swivelling or sliding operations of components.

The movement must automatically stop as soon as the operating element is released.

This shall not apply to movements of devices:

- in continuous action for constant loads,
- with automatic control,
- which, for functional reasons, require an open-centre or pressing position.

5.1 Check tractor's compatibility

► See also chapter "Technical data", page 22!

WARNING

Risk due to incorrect use of the tractor if this causes failure of components, insufficient stability and insufficient steerability and braking ability of the tractor!

- Check your tractor for compatibility before attaching/hitching the machine to the tractor.

  Only attach/hitch the machine to appropriate tractors.
- Carry out a brake test to check whether the tractor reaches the required deceleration with the machine attached / hitched up.

The following features are crucial prerequisites for the compatibility of the tractor:

- the gross vehicle weight rating of the tractor,
- the admissible axle loads of the tractor,
- the admissible tongue load/towing capacity at the coupling device of the tractor,

  These details are registered on the type plate, in the vehicle registration certificate and in the operating instructions of the tractor.
- the load-bearing capacities of the tyres mounted on the tractor.

The tractor's front axle load must never fall below 20 % of the tractor's empty weight.

The tractor must reach the deceleration specified by the tractor's manufacturer even with the machine attached/hitched up.

5.1.1 Calculate actual values

The gross vehicle weight rating of the tractor, which is specified in the operating instructions/in the tractor's vehicle registration certificate, must exceed the sum of:

- the tractor's empty weight,
- the ballasting mass,
- the tongue load of the hitched machine.

5.1.2 Preconditions for the operation of tractors with rigid drawbar trailers

WARNING

Risk due to failure of components caused by incorrect use of the tractor!

Ensure:

- that the coupling device at the tractor has a sufficient admissible tongue load rating for the actually existing tongue load.
- that the coupling device at the tractor and the drawgear at the rigid drawbar trailer are able to take up the towed load of the rigid drawbar trailer (towed load = axle load). Calculate the tractor’s admissible towing capacity if necessary.
- that the tractor's axle loads and weights influenced by the tongue load are within the admissible limits. Check the weight in case of doubt.
- that the static, actual rear-axle load of the tractor will not exceed the admissible rear-axle load rating.
- that the gross vehicle weight rating of the tractor will not be exceeded.
- that the admissible load-bearing capacities of the tyres mounted on the tractor are not exceeded.

5.1.2.1 Combination options of coupling devices and drawgears

The following table shows admissible combination options of the tractor's coupling device and the machine's drawgear depending on the maximum admissible tongue load.

The maximum admissible tongue load for your tractor is directly indicated on the type plate of the coupling device/in the operating instructions/in the vehicle registration certificate of your tractor.

Maximum admissible tongue load	Tractor's coupling device	Machine's drawgear
2000 kg	Bolt-type coupling DIN 11028, ISO 6489-0	Drawbar lug 40 reinforced DIN 11026, ISO 5692-2
		Drawbar lug 40 DIN 74054-1/2, ISO 8755
	Non-automatic bolt-type coupling DIN 11025	Drawbar lug 40 DIN 74054-1/2, ISO 8755
4000 kg ≤ 40 km/h 2000 kg > 40 km/h	Tow-hook (hitch hook) ISO 6489-1	Drawbar lug (hitch ring) ISO 20019
		Drawbar lug (hitch ring) ISO 5692-1
	Draw pin (Piton-Fix) ISO 6489-4	Drawbar lug (hitch ring) ISO 5692-1
4000 kg ≤ 40 km/h 2000 kg > 40 km/h	Ball-type coupling 80	Shell 80

5.1.2.2 Calculate actual D_C value for combination to be coupled

WARNING

Risk to people due to failure of components caused by breaking coupling devices between tractor and machine in case of incorrect use of the tractor!

- Only combine compatible coupling devices and drawgears.
- Calculate the actual D_C value of your combination consisting of tractor and rigid drawbar trailer to check the coupling device of your tractor for the required D_C value. The actual calculated D_C value for the combination must be less than or equal to (≤) the specified D_C value of the coupling device of your tractor and the drawgear of the rigid drawbar trailer. If this is not the case, the admissible towing capacity for your tractor must be calculated. In each case, the lowest D_C value shall be relevant.
- Calculate the admissible towing capacity of your tractor if the calculated D_C value for the combination is higher than the specified D_C value of the coupling device of your tractor or of the drawgear of the rigid drawbar trailer. This calculated towing capacity must not be exceeded when charging your rigid drawbar trailer.

The actual D_C value of a combination to be coupled is calculated as follows:

$$D_C = g \times \frac{T \times C}{T + C}$$

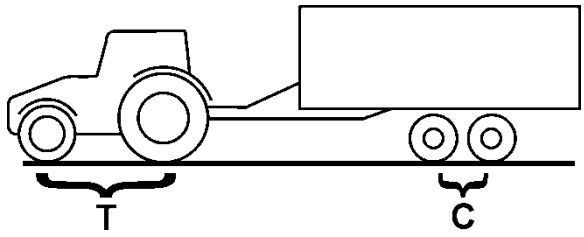


Fig. 18 D_C value of combination

T: Gross vehicle weight rating of your tractor in [t]

(see operating instructions/vehicle registration certificate of tractor)

C: Axle load/sum of axle loads of the machine charged with the admissible mass (loading capacity) in [t] without tongue load

g: Gravitational acceleration (9.81 m/s²)

Actual calculated D_C value for the combination		**Specified D_C values of the tractor's coupling device and the machine's drawgear**
kN	≤	kN

The D_C value:

- for the coupling device is directly indicated on the type plate of the coupling device/in the operating instructions/in the vehicle registration certificate of your tractor.

  In case of differing values on the type plates of the trailer bracket and the coupling device, the lower value shall be relevant.

- for the drawgear is directly indicated on the type plate of the drawgear.

Example

Gross vehicle weight rating of the tractor: 14 t

Admissible axle load(s) of the rigid drawbar trailer: 18 t

$$D_C = 9.81\ m/s^2 \times \frac{14\ t \times 18\ t}{14\ t + 18\ t} = 77.2\ kN$$

5.1.2.3 Calculate tractor's admissible towing capacity

The lowest D_C value of your tractor's coupling device or of the drawgear of your rigid drawbar trailer determines the admissible towing capacity C of your tractor. In case of rigid drawbar trailers, the tractor's towing capacity is equal to the axle load(s) of the rigid drawbar trailer.

The admissible towing capacity of your tractor determines the admissible load capacity of your rigid drawbar trailer. This calculated towed load/axle load must not be exceeded when charging your rigid drawbar trailer.

$$C = \frac{T \times D_C}{g \times T - D_C}$$

T: Gross vehicle weight rating of your tractor in [t]

(see operating instructions/vehicle registration certificate of tractor)

D_C: Lowest D_C value of your tractor's coupling device/of your machine's drawgear/of the combination

g: Gravitational acceleration (9.81 m/s²)

Example

Gross vehicle weight rating of the tractor:	14 t
D_C value of tractor's coupling device	70 t
D_C value of machine's drawgear:	77.5 t
D_C value for the combination to be coupled:	77.2 t

$$C = \frac{14\ t \times 70\ kN}{9.81\ m/s^2 \times 14\ t - 70\ kN} = 14.5\ t$$

Due to the D_C value of the tractor's coupling device, the admissible axle load is 14.5 t. This calculated axle load must not be exceeded when charging your rigid drawbar trailer.

5.2 Secure tractor and machine against accidental starting and rolling

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people during work on the machine:

- **if the unsecured machine not hitched to the tractor accidentally rolls,**
- **if powered working tools are not switched off,**
- **if hydraulic functions are accidentally carried out, working tools or machine parts are unintentionally powered with the machine hitched to the tractor and the tractor engine running,**
- **if the tractor engine is accidentally started,**
- **if tractor and machine accidentally roll,**
- **if lifted machine parts accidentally come down.**

Risk due to accidental contact with powered, unsecured working tools and lifted, unsecured machine parts when carrying out work on the machine.

Therefore, the following measures are imperative before carrying out any work on the machine such as adjusting work or trouble-shooting:

- Secure the machine against rolling with the machine not hitched to the tractor,
- turn the tractor engine off and secure tractor and machine against accidental starting and rolling with the machine hitched to the tractor,
- make sure that third persons (children) leave the tractor,
- secure lifted machine parts against accidental lowering.

Secure tractor and machine against accidental starting and rolling

1. Lower lifted, unsecured machine parts to a secure stop position.

→ This will prevent accidental lowering.

2. Apply the parking brake of the tractor.
3. Turn the tractor engine off.
4. Pull the ignition key out.
5. Make sure that third persons (children) leave the tractor.
6. Lock the tractor cabin.
7. Secure the machine against rolling:
   - o on even ground by means of the parking brake or the chocks,
   - o on extremely uneven ground or downhill gradients by means of the parking brake and the chocks.

5.3 Hydraulic system of machine

5.3.1 Connect hydraulic hose pipes

- Check the compatibility of the hydraulic oils before connecting the machine to the hydraulic system of your tractor.
- Do not mix mineral oils with bio oils!
- Observe the maximum admissible operating pressure of the hydraulic oil.
- Only connect clean hydraulic plugs and hydraulic sleeves.
- Slip the hydraulic plug into the hydraulic sleeve until the hydraulic plug noticeably locks.
- Check the coupling spots of the hydraulic hose pipes for correct and tight seat.
- Connected hydraulic hose pipes:
  - must easily give way to any movements during cornering without any stress, buckling or chafing,
  - must not chafe against external components.

WARNING

Risk of injury and infection due to hydraulic oil squirting out under high pressure and entering the body!

Make sure that the hydraulic system on the tractor and on the machine has been depressurised when connecting and disconnecting the hydraulic hose pipes. Always swivel the operating element at the control device on the tractor to open-centre position.

WARNING

Risk of being crushed, cut, becoming entangled, being drawn in and risk of impact to people due to malfunctions caused by improperly connected hydraulic hose pipes!

- Check the assignment of the hydraulic hose pipes at the control block of the machine if the coloured markings (dust caps) are missing:
  - P = Pressure line
  - T (R;S) = Return line

5.3.1.1 Open hydraulic system

1. Always swivel the respective operating element at the control device on the tractor to open-centre position.
2. Turn the tractor engine off.
3. Unscrew the load-sensing screw (1) at the electro-hydraulic control block as far as it will go.
4. Connect the pressure line (flow line) to a single-acting or double-acting control device of the tractor.
5. Connect the tank line (return line) to a depressurised return line of the tractor.

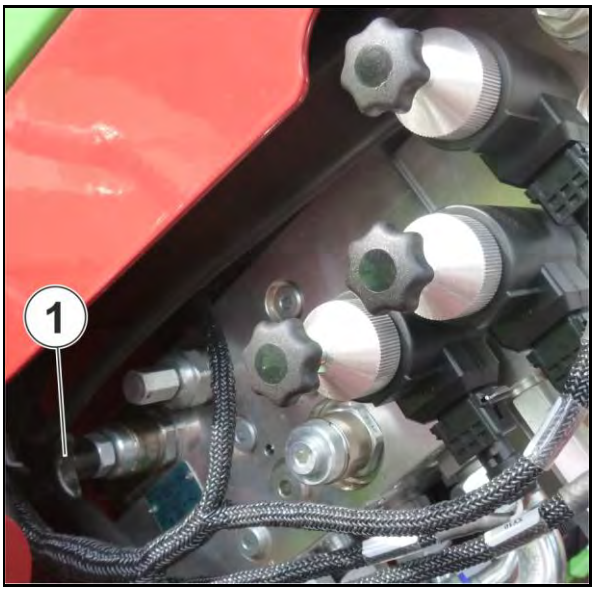


Fig. 19

5.3.1.2 Load-sensing mode

1. Always swivel the respective operating element at the control device on the tractor to open-centre position.
2. Turn the tractor engine off.
3. Screw the load-sensing screw (1) at the electro-hydraulic control block in as far as it will go.
4. Connect the load-sensing control line to the load-sensing control system of the tractor.
5. Connect the tank line (return line) to a depressurised return line of the tractor.
6. Connect the pressure line (flow line) to the hydraulic pump of the tractor (Power-Beyond connection).

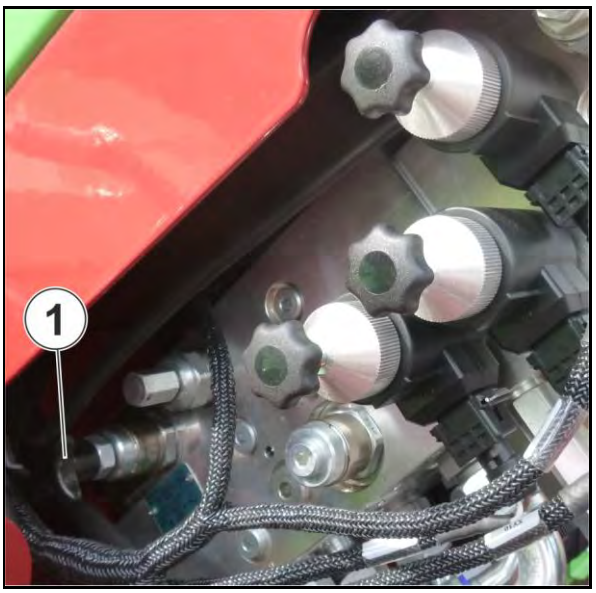


Fig. 20

5.3.2 Disconnect hydraulic hose pipes

WARNING

Risk of injury and infection due to hydraulic oil squirting out under high pressure and entering the body!

Make sure that the hydraulic system on the tractor and on the machine has been depressurised when connecting and disconnecting the hydraulic hose pipes. Always swivel the operating element at the control device on the tractor to open-centre position.

CAUTION

Risk of burns due to contact with hot hydraulic hose pipe components!

Do not touch considerably warmed-up components of the hydraulic hose pipes (particularly do not touch any hydraulic plugs and hydraulic sleeves).

1. Always swivel the respective operating element at the control device on the tractor to open-centre position.
2. Turn the tractor engine off.
3. Disconnect the hydraulic hose pipes.
4. Use the dust caps to protect the hydraulic plugs against soiling.
5. Put the hydraulic hose pipes down onto the hose holder.

5.4 Drawbar

5.4.1 Adjust mounting height of folding drawbar

Shop work

You must have the mounting height of the folding drawbar adjusted to the respective tractor model by an authorised workshop, in order to ensure that the lowered pick-up can properly adapt to uneven terrain. Only a properly adjusted mounting height of the folding drawbar guarantees best possible picking-up of the material to be loaded.

Only an authorised workshop is allowed to adjust the mounting height of the folding drawbar!

WARNING

Risk of being crushed, drawn in, becoming entangled and risk of impact to people if the hitched machine accidentally loosens from the tractor due to worn drawbar lug and coupling bolt!

Ensure that there is enough free space between the drawbar lug and the coupling bolt when lifting the folding drawbar.

Assembly instructions for authorized workshop:

The distance X must be 1380 mm between the ground and the machine frame with the machine with lowered folding drawbar hitched up to the tractor.

The mounting height of the folding drawbar in relation to the machine frame must be aligned by means of the threaded spindles of the hydraulic cylinders if the actual distance X is not 1380 mm.

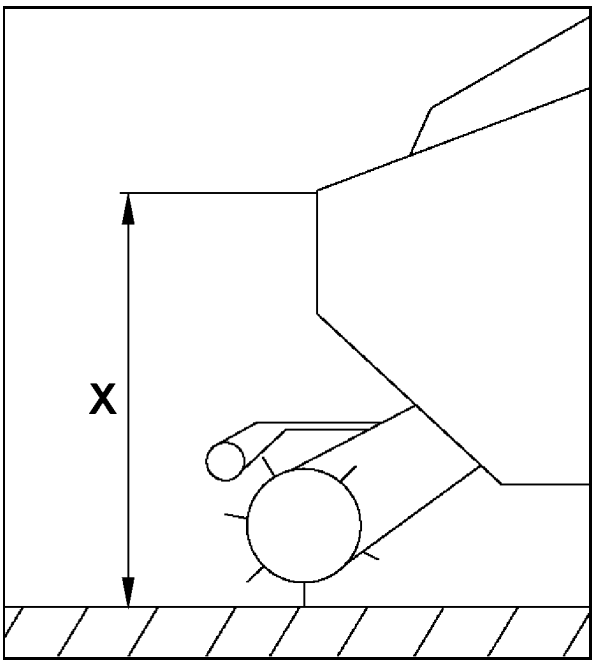


Fig. 21

1. Park the tractor and the hitched machine on firm, even ground.
2. Lower the supporting leg to support position.
3. Lower the folding drawbar such that the drawgear of the machine is loosely connected with the coupling device of the tractor.
4. Secure tractor and machine against accidental starting and rolling.
5. Unscrew the counter nut (1) of the threaded spindle (2) at the two hydraulic cylinders.
6. Use an appropriate tool to turn the piston rod (3) of the two hydraulic cylinders in the required direction.

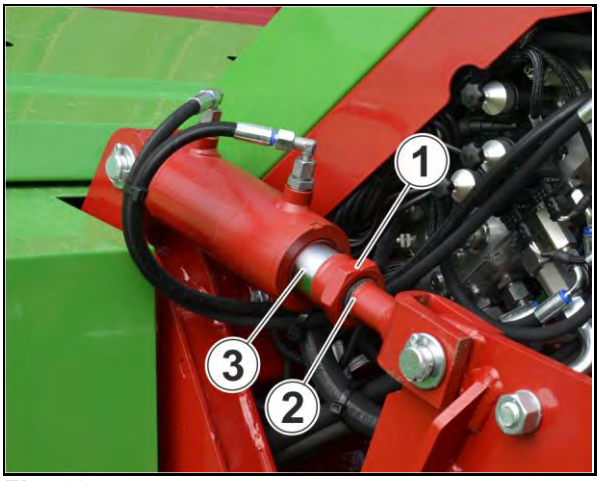


Fig. 22

Adjust the two threaded spindles evenly!

7. Retighten the counter nuts of the threaded spindles.
8. Lift the supporting leg to transport position.
9. Completely lift the folding drawbar.

10. Ensure that there is enough free space between the drawgear and the coupling device.

    In case of a bolt-type coupling, the coupling bolt (4) must not chafe against the borehole of the drawbar lug (5)!

    Change the level of the bolt-type coupling at the tractor if necessary.

11. Ensure that there is enough free space around the propeller shaft in any operating state.

    Insufficient free space will lead to damage to the propeller shaft!

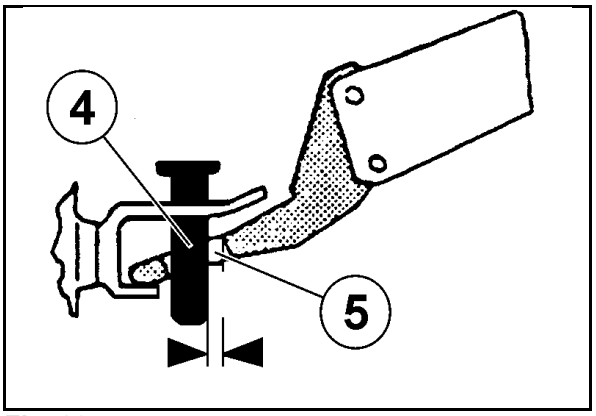


Fig. 23

5.4.2 Couple drawbar

WARNING

Risk of being crushed, drawn in, becoming entangled and risk of impact to people if the machine accidentally loosens from the tractor!

- Check whether the coupling device on your tractor is licensed for taking up the machine's drawgear.

  Absolutely observe the information in the chapter "Preconditions for the operation of tractors with rigid drawbar trailers"“, page 50.

- Properly hitch the machine to the tractor and secure it.
- Never use damaged or deformed trailer systems.

WARNING

Risk of being crushed and of impact to people standing between tractor and machine while the machine is being hitched!

Make sure that people leave the hazardous area between tractor and machine before approaching the machine.

Present helpers are only allowed to act as a guide next to the tractor and the machine and to enter the space between the tractor and the machine after the vehicles have completely stopped.

5.4.2.1 Bolt-type coupling

1. Prepare for coupling:
   1.1 Lock the grab jaw of a bolt-type coupling with movable grab jaw (non-automatic bolt-type coupling).
   1.2 Open the hitch, i. e. it should be in a pre-coupling position (automatic bolt-type coupling).
2. Reverse the tractor until the bolt-type coupling engages into the drawbar lug.
3. Secure the tractor against accidental starting and rolling.
4. Check that the connection is secure after coupling:
   4.1 Secure the inserted coupling bolt by positive locking (non-automatic bolt-type coupling).
   4.2 Ensure that the automatic bolt-type coupling is locked (control pin, end position of operating lever, etc.).
5. Connect the supply lines.
6. Release the parking brake of the machine.
7. Lift the supporting leg to transport position.

5.4.2.2 Ball-type coupling and shell

WARNING

Risk of being crushed, drawn in, becoming entangled and risk of impact to people if the machine accidentally loosens from the tractor!

- Before travelling on extremely uneven ground/over bunker silos, ensure that there is enough free space at the holding down-device above the shell.
- Mount the shorter holding-down device at the tractor's ball-type coupling in case of insufficient free space.

Lubricate the coupling device every day to minimize wear on the ball head and the shell. Lubricate the area between the holding-down device and the surface of the shell as well.

(1) Shorter holding-down device for ball-type coupling

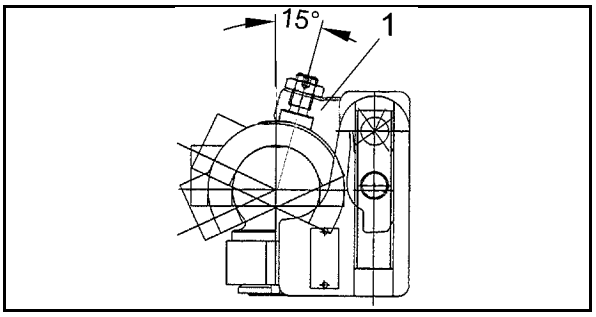


Fig. 24

1. Prepare for coupling:
   - 1.1 Remove grease and dirt from the ball head, the holding-down device and the shell.
   - 1.2 Lubricate the ball head and the surface of the shell with new grease.
   - 1.3 Unlock the holding-down device at the bearing block.
   - 1.4 Swivel the holding-down device to coupling position.
   - 1.5 Clean and grease the ball head.
2. Connect the supply lines.
3. Approach the machine as closely as possible such that the ball head can take up the shell.
4. Lower the drawbar by means of the supporting leg until the ball head engages in the shell.
5. Lock and secure the holding-down device at the bearing block.
6. Release the parking brake of the machine.
7. Lift the supporting leg to transport position.

5.4.2.3 Tow-hook (hitch hook) and drawbar lug (hitch ring)

1. Secure the machine against rolling.
2. Make sure that people leave the hazardous area between tractor and machine before approaching the machine.
3. Lower the tow hook.
4. Approach the machine as closely as possible such that the lowered tow hook can take up the drawbar lug.
5. Lift the tow hook to catch the drawbar lug.

→ After automatic engaging, the drawbar lug is fixed between the tow hook and the locking

mechanism (holding-down device).

6. Secure the tractor against accidental starting and rolling.
7. Ensure that the tow hook is properly locked.
8. Connect the supply lines.
9. Release the parking brake of the machine.
10. Lift the supporting leg to transport position.

5.4.3 Uncouple drawbar

WARNING

Risk of being crushed, cut, drawn in, becoming entangled and risk of impact to people due to insufficient stability of the unhitched machine!

- Park the empty machine on even, firm ground.
- Secure the machine against rolling.

5.4.3.1 Bolt-type coupling

1. Secure the tractor against accidental starting and rolling.
2. Secure the machine against rolling. Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling".
3. Lower the supporting leg to support position such that the drawbar no longer transmits any tongue load to the tractor.
4. Disconnect the supply lines.
5. Place the supply lines onto the hose holder.
6. Prepare unhitching:
   - Remove the coupling bolt (non-automatic bolt-type coupling).
   - Open the trailer hitch (automatic bolt-type coupling).
7. Move the tractor forward.

5.4.3.2 Ball-type coupling and shell

1. Lift the folding drawbar.
2. Secure the machine against rolling.
3. Unlock the holding-down device at the bearing block.
4. Swivel the holding-down device to coupling position.
5. Lower the supporting leg to support position such that the shell disengages from the ball head.
6. Move the tractor forward (approx. 25 cm).
7. Secure tractor and machine against accidental starting and rolling.
8. Lock and secure the holding-down device at the bearing block.
9. Disconnect the supply lines.
10. Place the supply lines onto the hose holder.
11. Move the tractor forward.

5.4.3.3 Tow-hook (hitch hook) and drawbar lug (hitch ring)

1. Secure the tractor against accidental starting and rolling.
2. Secure the machine against rolling. Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling".
3. Lower the supporting leg to support position.
4. Lower the tow hook.
5. Move the tractor forward (approx. 25 cm).
6. Lift the tow hook.
7. Secure the tractor against accidental starting and rolling.
8. Disconnect the supply lines.
9. Place the supply lines onto the hose holder.
10. Move the tractor forward.

5.5 Mechanical supporting leg

WARNING

Risk to people of crushing fingers and hands when lifting the supporting leg to transport position!

When lifting the supporting leg, keep sufficient safe distance to the supporting leg as long as parts are moving.

WARNING

Risk to people of crushing their feet beneath the lowering supporting leg!

When lowering the supporting leg, keep sufficient safe distance to the supporting leg as long as parts are moving.

The machine is equipped with a mechanical supporting leg, which supports the unhitched machine.

5.5.1 Lift mechanical supporting leg to transport position

WARNING

Risk to feet of being crushed if the lifted supporting leg accidentally falls down!

Check whether the locking bolt has completely engaged into the borehole and properly locks the supporting leg in its transport position.

1. Lift the machine hitched to the tractor via the hydraulic folding drawbar (1).

→ The supporting leg is relieved.

2. Pull the locking bolt (3) out of the borehole.
3. Use one hand to grip the handle (4) and lift the supporting leg (2) until the locking bolt engages into the borehole (5).
4. Check whether the locking bolt has completely engaged into the borehole and properly locks the supporting leg in its transport position.

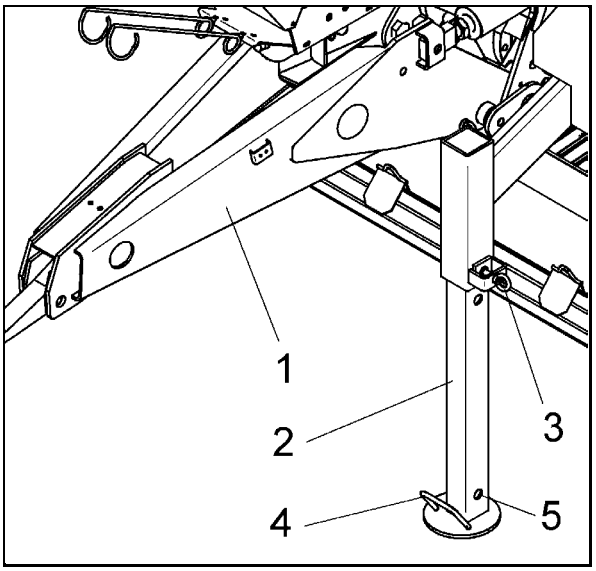


Fig. 25

5.5.2 Lower mechanical supporting leg to support position

WARNING

Risk to people of being crushed due to the unhitched and improperly supported machine falling over!

After lowering the supporting leg to working position, check whether the locking bolt has completely engaged into the borehole and properly locks the supporting leg in its support position.

1. Lift the machine hitched to the tractor via the hydraulic folding drawbar (1).
2. Use one hand to grip the handle (4) of the supporting leg (2).
3. Use the other hand to pull the locking bolt (3) out of the borehole.
4. Lower the supporting leg until the locking bolt engages into the borehole.
5. Check whether the locking bolt has properly engaged into the borehole and properly locks the supporting leg in its support position.
6. Lower the machine via the hydraulic folding drawbar until the machine rests on the supporting leg.

→ The folding drawbar no longer transmits any tongue load to the tractor.

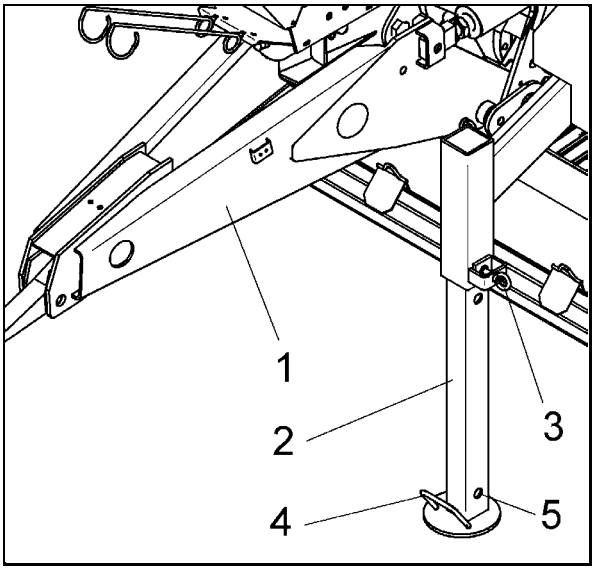


Fig. 26

5.6 Propeller shaft

The power transmission between tractor and machine is effected by means of the propeller shaft.

- Proper use and maintenance of the propeller shaft prevent serious accidents.
- When coupling the propeller shaft, observe:
  - the admissible drive speed of the machine,
  - the correct driving direction of the propeller shaft,
  - the correct fitting length of the propeller shaft, see chapter "Adjust length of propeller shaft to tractor", page 64,
  - the correct fitting position of the propeller shaft. The tractor symbol on the protective tube of the propeller shaft indicates the propeller shaft connection at the tractor.
- Before switching the propeller shaft on, observe the safety instructions for propeller shaft operation.

WARNING

Risk to people of becoming entangled and wound up due to an unsecured propeller shaft or damaged protective devices!

- Never use the propeller shaft without protective device or with a damaged protective device or without proper handling of the clip chain.
- Before starting operation, always check:
  - all protective devices of the propeller shaft for proper mounting and functioning,
  - whether there is sufficient free space around the propeller shaft in any operating state. Insufficient free space will lead to damage on the propeller shaft.
- Immediately have damaged or missing parts of the propeller shaft replaced by original parts from the propeller shaft manufacturer.

  Observe the fact that only an authorized workshop is allowed to repair a propeller shaft.

WARNING

Risk to people of becoming entangled and wound up due to unprotected propeller shaft parts within the power transmission area between the tractor and the powered machine!

Only carry out work with the drive unit between tractor and powered machine completely protected.

- The unprotected parts of the propeller shaft must always be protected by means of a protective cover mounted on the tractor and a protective sleeve mounted on the machine.
- Check whether the protective cover mounted on the tractor or the protective sleeve mounted on the machine and the safety and protective devices of the extended propeller shaft overlap by at least 50 mm. If not, the machine must not be powered via the propeller shaft.

5.6.1 Adjust length of propeller shaft to tractor

Shop work

WARNING

Risk to people of being drawn in and becoming entangled due to assembly work on the propeller shaft carried out improperly or due to unauthorized structural alterations!

Only an authorized workshop is allowed to carry out structural alterations on the propeller shaft. Observe the included operating instructions of the propeller shaft manufacturer.

Adjustment of the propeller shaft length is allowed if observing the required minimum transverse contact ratio.

Structural alterations to the propeller shaft which are not specified in the included operating instructions for the propeller shaft are not allowed.

WARNING

Risk to people due to blown out objects if the length of the propeller shaft has been improperly adjusted thus being compressed during cornering!

Have the length of the propeller shaft checked in all operating states by an authorized workshop and adjusted if necessary before coupling the propeller shaft to your tractor for the first time.

This will prevent propeller shaft compression or insufficient transverse contact ratio.

- Absolutely observe the operating instructions provided by the propeller shaft manufacturer along with the propeller shaft when determining the length and shortening the propeller shaft!
- The adjustment of the propeller shaft only applies to the current tractor model. Readjustment of the propeller shaft may be necessary if hitching the machine to another tractor.

Assembly instructions for authorized workshop:

1. Hitch the machine to the tractor (do not couple the propeller shaft).
2. Take the shortest operating position of the propeller shaft.
3. Pull the propeller shaft apart.
4. Slip the locking mechanism of the propeller shaft half with the tractor symbol (Fig. 27) on the protective tube onto the p.t.o. shaft of the tractor until the locking mechanism noticeably engages.

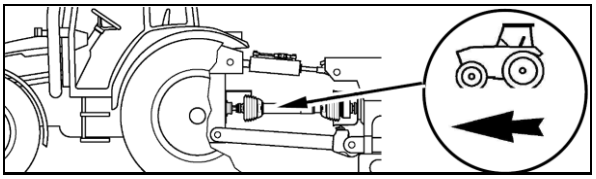


Fig. 27

5. Slip the locking mechanism of the other propeller shaft half onto the p.t.o. shaft of the machine.
6. Shorten the propeller shaft, such that the **minimum free space (X) is 40 mm** in its shortest operating position (**Fig.** 28).

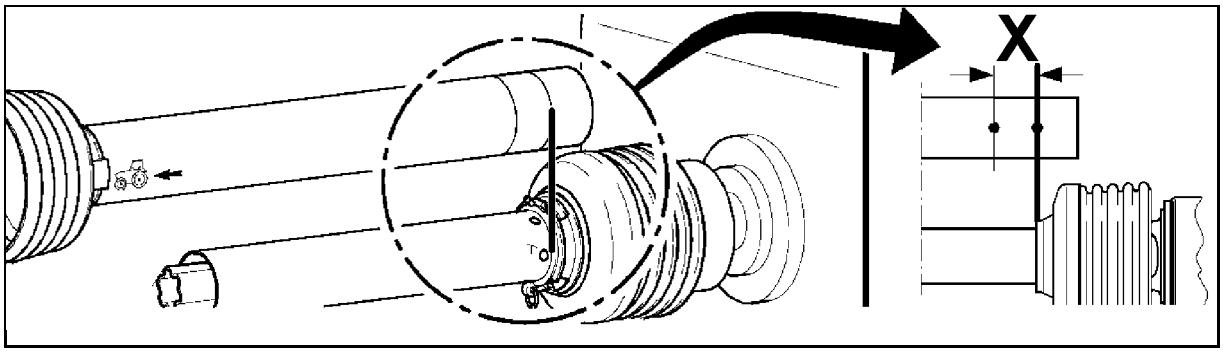


Fig. 28

7. Reinsert the shortened propeller shaft halves into each other.
8. Lubricate the p.t.o. shaft of the tractor and the propeller shaft of the machine before coupling the propeller shaft.

5.6.2 Couple propeller shaft to tractor

WARNING	**Risk of injury due to movements of tractor and machine or machine parts!**
	Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!
	Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Clean and lubricate the p.t.o. shaft on the tractor.
2. Hitch the machine to the tractor.
3. Check whether the p.t.o. shaft has been switched off.
4. Slip the locking mechanism of the propeller shaft onto the p.t.o.shaft of the tractor until it noticeably engages. When coupling the propeller shaft, observe the included operating instructions for the propeller shaft.
5. Secure the propeller shaft guard at the tractor and at the machine against rotating by means of the clip chains (1):
   - 5.1 Fix the clip chains at right angles to the propeller shaft if possible.
   - 5.2 Fix the clip chains such that a sufficient swivelling range of the propeller shaft is ensured in any operating state. Clip chains must not get entangled in tractor or machine components.
6. Ensure that there is sufficient free space around the propeller shaft in any operating state. Insufficient free space will lead to damage on the propeller shaft.

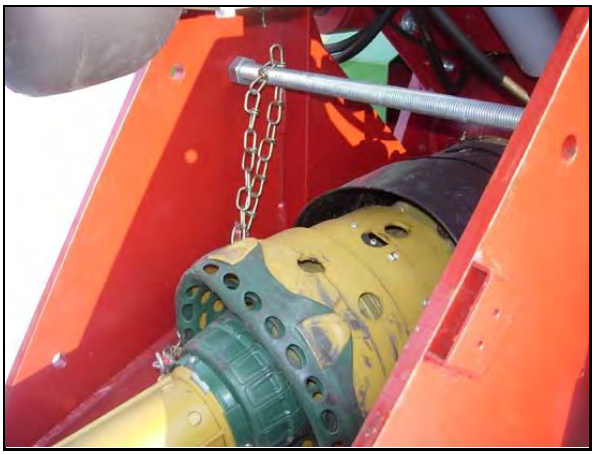


Fig. 29

5.6.3 Uncouple propeller shaft from tractor

Clean and lubricate the propeller shaft before longer downtimes.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

CAUTION

Risk of burns due to contact with hot propeller shaft components!

Do not touch considerably warmed-up propeller shaft components (particularly do not touch any couplings).

1. Pull the propeller shaft locking mechanism off the tractor's p.t.o. shaft.
2. Place the propeller shaft onto the respective holder (1).

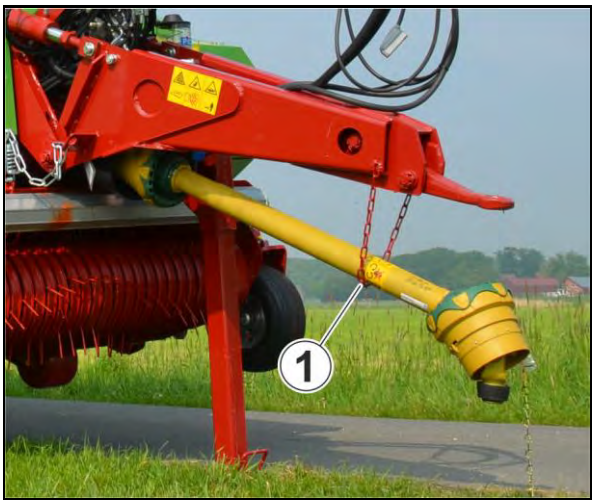


Fig. 30

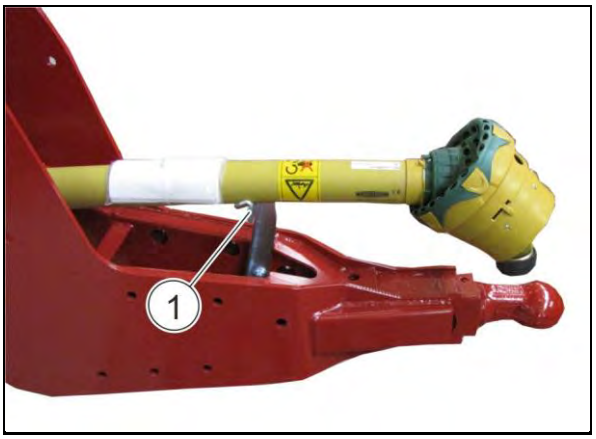


Fig. 31

5.7 Brake system

- Observe the fact that the braking axle needs to run in during the first service hours – the brake lining is adjusting to the brake drum. Full braking power is only reached after this running-in period.
- Check the brake system for proper functioning before carrying out transport journeys.

If your machine is equipped with a combination of compressed-air brake system and hydraulic brake system: Always use only one of the two brake systems during coupling!

Observe the fact that in Germany it is only allowed to use the compressed-air brake system! Hydraulic brake systems are not licensed in Germany.

5.7.1 Dual-line compressed-air brake system with mechanical automatic load-sensitive brake (ALB) regulator

5.7.1.1 Connect brake and feed line

WARNING

Risk of crushing, cuts, becoming entangled, being drawn in and risk of impact to people due to improper functioning of the service brake system!

- When connecting the brake and feed line, ensure that:
  - the sealing rings of the hose couplings are clean,
  - the sealing rings of the hose couplings seal tightly.
- Immediately replace damaged sealing rings.
- Drain the air reservoir every day before the first trip.
- Only start the tractor with the hitched machine moving when the pressure gauge of the compressed-air brake system on the tractor indicates 5.0 bar.
- Check the course of the connected brake lines! The brake lines must not chafe against external components.

WARNING

Risk of crushing, cuts, becoming entangled, being drawn in and risk of impact to people if the machine rolls due to the service brake system being released!

Always connect the hose coupling of the brake line (yellow) first and then the hose coupling of the feed line (red).

The machine's service brake system immediately comes off the brake position if the red hose coupling is connected.

1. Open the caps of the hose couplings on the tractor.
2. Remove the hose coupling of the brake line (yellow) from the blank connection.
3. Properly fix the hose coupling of the brake line (yellow) to the yellow marked coupling device at the tractor.

4. Remove the hose coupling of the feed line (red) from the blank connection.
5. Properly fix the hose coupling of the feed line (red) to the red marked coupling device at the tractor.

→ When connecting the feed line (red), the system pressure coming from the tractor automatically pushes the push button for the release valve on the trailer brake valve out.

6. Release the parking brake and/or remove the chocks.

5.7.1.2 Disconnect brake and feed line

WARNING

Risk of crushing, cuts, becoming entangled, being drawn in and risk of impact to people if the machine rolls due to the service brake system being released!

Always disconnect the hose coupling of the feed line (red) first and then the hose coupling of the brake line (yellow).

The machine's service brake system only moves to brake position if the red hose coupling is disconnected.

It is imperative to observe this order, as otherwise the service brake system will be released and the non-braked machine may start to move.

When the machine is unhitched or torn off, the feed line connected to the trailer brake valve bleeds. The trailer brake valve automatically switches over thus actuating the service brake system in accordance with the automatic load-sensitive brake pressure control.

1. Release the hose coupling of the feed line (red).
2. Release the hose coupling of the brake line (yellow).
3. Fix the hose couplings to the blank connections.
4. Close the caps of the hose couplings at the tractor.

5.7.1.3 Release compressed-air brake via release valve

Release the compressed-air brake via the release valve, in order to be able to manoeuvre the machine by means of tractors without compressed-air brake system.

The release valve can only be actuated with the brake and feed line of the compressed-air brake system disconnected.

WARNING

Risk of injury due to the accidentally rolling machine which cannot be slowed down!

Actuate the release valve only if the machine is parked on firm, even ground!

Hitch the machine to the tractor and secure both against accidental starting and rolling before actuating the release valve!

Stand beside, never beneath the machine before actuating the release valve!

Actuate the release valve exclusively for manoeuvring on the premises, never for road travel!

1. Press the push button (1) of the release valve.

   → The compressed-air brake is released.

2. Manoeuvre the machine.

3. Pull the push button (1) of the release valve.

   → The compressed-air brake is applied.

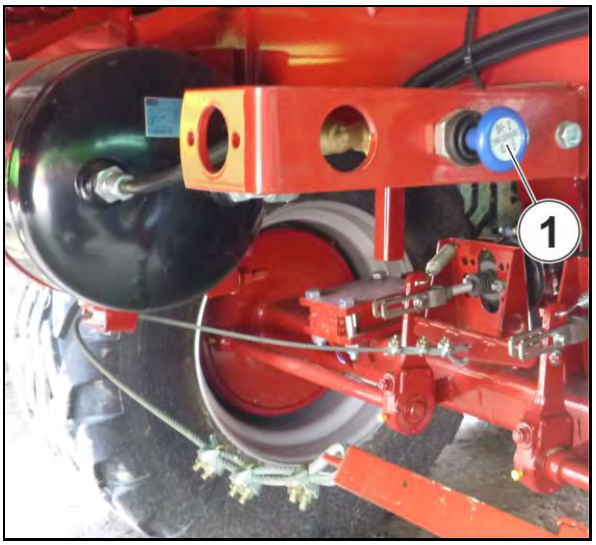


Fig. 32

5.7.2 Hydraulic service brake system

The controlled hydraulic service brake system is connected to the special brake valve of the tractor. If the brake pedal on the tractor is pressed, the machine is slowed down.

(1) Hydraulic sleeve ISO 5676

Fig. 33

(2) Hydraulic cylinder of braking axle

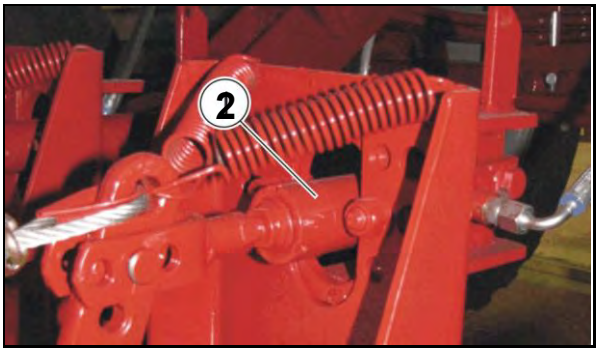


Fig. 34

5.7.2.1 Emergency brake valve

The brakes must be tested before each journey to refill the pressure accumulator.

WARNING

Risk of infection to people due to hydraulic oil squirting out under high pressure and entering the body!

Always ensure to depressurize the pressure accumulator before carrying out work on the hydraulic system.

If injuries caused by hydraulic oil occur, immediately contact the medical services.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

If the machine is torn off, the ripcord will actuate the emergency brake valve. The hydraulic oil then flows from the pressure accumulator into the brake cylinders, thus initiating the braking process.

Couple:

1. Fasten the ripcord to the tractor such that in case of the machine being torn off, the ripcord is in a horizontal position between tractor and machine.

Couple after emergency braking:

1. Connect the brake hose to the tractor.
2. Set the brake valve at the tractor such that the hydraulic oil can flow back to the tractor.
3. Press the drain valve at the emergency brake valve.

→ The hydraulic oil flows back to the tractor and the pressure accumulator is depressurized.

4. Insert the ripcord with the clip connector into the borehole of the operating lever.
5. Set the operating lever back to its initial position.
6. Actuate the brake system of the machine several times.

→ The pressure accumulator is filled and the emergency brake valve is ready for operation again.

Uncouple:

1. Make sure that the hydraulic pipe between tractor and machine has been depressurized.
2. Secure tractor and machine against accidental rolling by means of the parking brake.

The emergency brake valve does not replace the parking brake!

3. Remove the ripcord from the tractor.

Depressurize pressure accumulator

1. Connect the brake hose to the tractor.
2. Set the brake valve at the tractor such that the hydraulic oil can flow back to the tractor.
3. Press the drain valve (7) at the emergency brake valve (3).

→ The hydraulic oil flows back to the tractor and the pressure accumulator is depressurized.

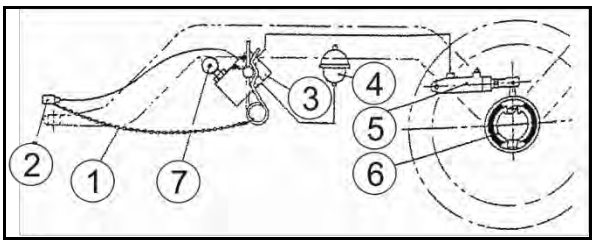


Fig. 35

(1) Ripcord
(2) Coupling box
(3) Emergency brake valve
(4) Pressure accumulator
(5) Brake cylinder
(6) Brake drum
(7) Drain valve

5.7.2.2 Connect hydraulic brake system

- Only couple clean hydraulic clutches.
- Clean hydraulic plug and hydraulic sleeve if necessary.
- Slip the hydraulic plug into the hydraulic sleeve until the hydraulic plug noticeably locks.
- Check the coupling spot of the hydraulic brake line for correct and tight seat.
- The connected hydraulic brake line:
  - must easily give way to any movements during cornering without any stress, buckling or chafing,
  - must not chafe against external components.
- Check the hydraulic brake system for proper functioning before carrying out transport journeys.

1. Remove the hydraulic sleeve (1) from the machine's blanked-off connecting piece (2).
2. Couple the machine's hydraulic sleeve to the tractor's hydraulic plug of the hydraulic brake system.
3. Release the parking brake of the machine.

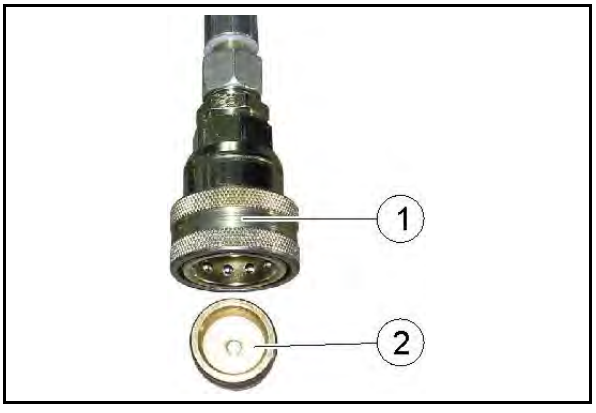


Fig. 36

5.7.2.3 Disconnect hydraulic brake system

1. Apply the parking brake of the machine.
2. Uncouple the hydraulic sleeve (Fig. 36/1).
3. Slip the hydraulic sleeve onto the machine's blanked-off connecting piece (Fig. 36/2).

5.7.3 Parking brake

The applied parking brake secures the unhitched machine against rolling. The parking brake is actuated via spindle and cable when turning the crank handle.

5.7.3.1 Release / Apply parking brake

(1) Crank handle; in adjusting position (2)

(2) Adjusting position

(3) Resting position; swivelled by 180° compared to the adjusting position

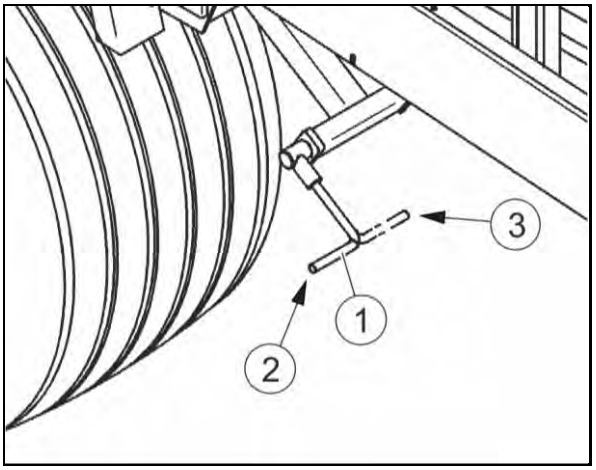


Fig. 37

Release parking brake

Ensure that the cable does not rest on or chafe against other vehicle components.

With the parking brake released, the cable shall slightly sag.

1. Swivel the crank handle (1) from resting position (3) by 180° to adjusting position (2).
2. Turn the crank handle anticlockwise until the cable (5) is relieved.

→ The parking brake is released.

3. Swivel the crank handle to resting position.

Apply parking brake

Correct the setting of the parking brake if the tension path of the spindle (4) is no longer sufficient.

1. Swivel the crank handle (1) from resting position (3) by 180° to adjusting position (2).
2. Turn the crank handle clockwise.

→ The parking brake is applied via the cable (2).

5.8 Mount control set on the tractor

5.8.1 Mount easy-to-use control set on the tractor

1. Fix the control set (1) in the cabin within view and reach to the right of the driver seat.
2. Plug the 3-pole plug (DIN 9680) of the power cable (2) into the socket of the tractor.

   (Pole 15/30 = Plus; Pole 31 = Minus)
3. Plug the 20-pole plug (3) of the control cable into the socket of the control set.

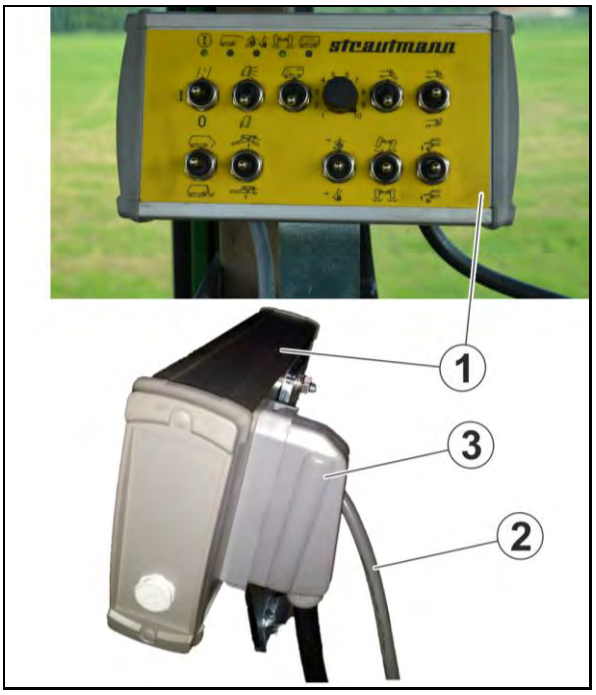


Fig. 38

5.8.2 Mount ISOBUS control set on the tractor

- Do not draw the current from the light socket.
- Retrofit the 3-pole socket if your tractor is not equipped with a 3-pole socket. An appropriate retrofit kit is available.
- A constant power supply of 12 V is required. The 3-pole socket must be protected by a fuse of at least 25 A.
- The feed line of the 3-pole socket must have a minimum cable cross section of 4 mm^2.

1. Fix the control set (1) in the cabin within view and reach to the right of the driver seat.
2. Connect the signal plug (2) of the control set with the signal socket (3) of the mobile cable harness or with the signal socket of the tractor (if available).
3. Plug the 3-pole plug (4) (DIN 9680) of the mobile cable harness into the 3-pole socket of the tractor.

   (Pole 15/30 = Plus; Pole 31 = Minus)

   This is not necessary if the tractor is equipped with an ISOBUS cable harness.
4. Depending on the machine's equipment,

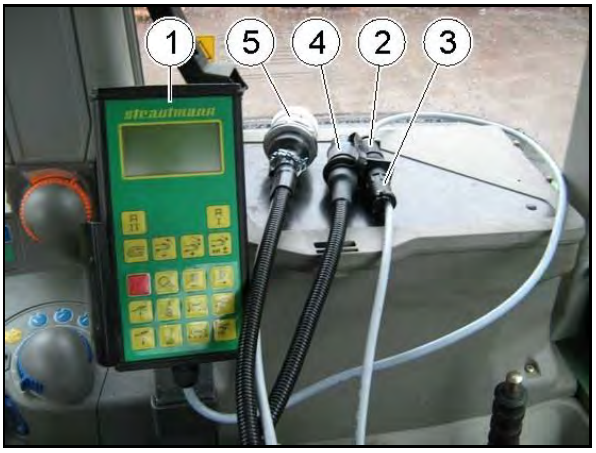


Fig. 39

plug:

- the ISO socket (5) of the mobile cable harness into the ISO plug of the control unit on the machine.
- the ISO plug of the control unit into the ISO socket of the tractor.

5.9 Pick-up

5.9.1 Set operating height

WARNING 	**Risk of injury due to movements of tractor and machine or machine parts!** Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine! Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

First adjust the height of the guide wheels and then the height of the additional guide wheels (optional extra) on both machine sides if necessary:

1. Park the tractor and the empty machine on firm, even ground.
2. Lift the pick-up (for adjusting the guide wheels) or lower the pick-up (for adjusting the additional guide wheels).
3. Remove the linch pin (1).
4. Hold the supporting tube (2) of the guide wheel or the frame (5) of the additional guide wheels up and hang the perforated strut (3) into the desired borehole, if necessary after turning the threaded spindle (4).

   Observe the following distances:

   - The distance between the spring-loaded tines of the pick-up and the ground should be 10-20 mm. The spring-loaded tines must not scratch the ground!
   - With the pick-up lowered, the distance between the additional guide wheels and the ground should be 20 mm.

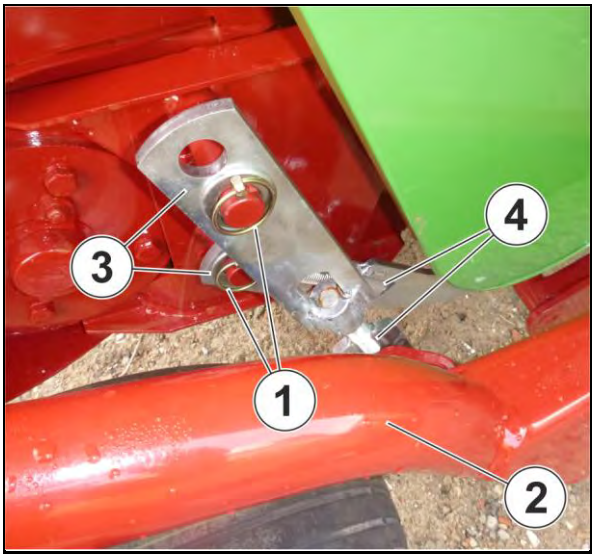


Fig. 40

- With the pick-up lifted, the minimum distance between the additional guide wheels and the CFS drum must be 8 mm.
- The frame (5) of the additional guide wheels must only bump against the check screws (6) when the pick-up has been lifted.

5. Secure the perforated strut again by means of the linch pin.

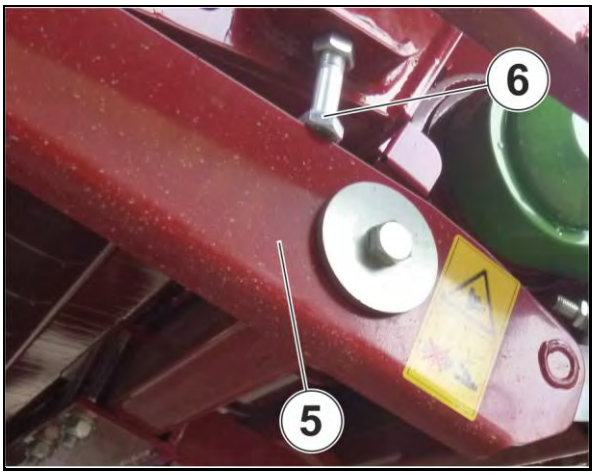


Fig. 41

5.9.2 Set holding-down device with pulley

When picking up the material to be loaded, the holding-down device and the advancing pulley press the material against the spring-loaded tines of the pick-up.

The distance set between the holding-down device/pulley and the pick-up is vital for proper picking-up of the material from the swathe.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Lower the pick-up.
2. Set the desired distance between the holding-down device (1) and pulley (2) and the spring-loaded tines (3) of the pick-up by means of the two clip chains (4):
   - large swathe = large distance,
   - small swathe = small distance.

   In any case, the pulley must easily turn to guide the holding-down device properly.

Fig. 42

5.10 Crossover conveyor

Optional extra

5.10.1 Pull out crossover conveyor

2 people are required for this work!

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

WARNING

Risk of injury due to the freely swinging bottom part of the tailgate!

Stand beside the machine before unlocking or locking the bottom part of the tailgate by means of the locking bolt!

1. Lift the tailgate slightly (approx. 5 cm).
2. Stand beside the machine and unlock the left-hand and right-hand locking bolt (1).
   → The bottom part (2) of the tailgate swings open.
3. Lift the tailgate up to its first opening position.

Fig. 43

4. Swivel the lever of the stop-cock (3) to closed position (4) such that the tailgate is secured against lowering.

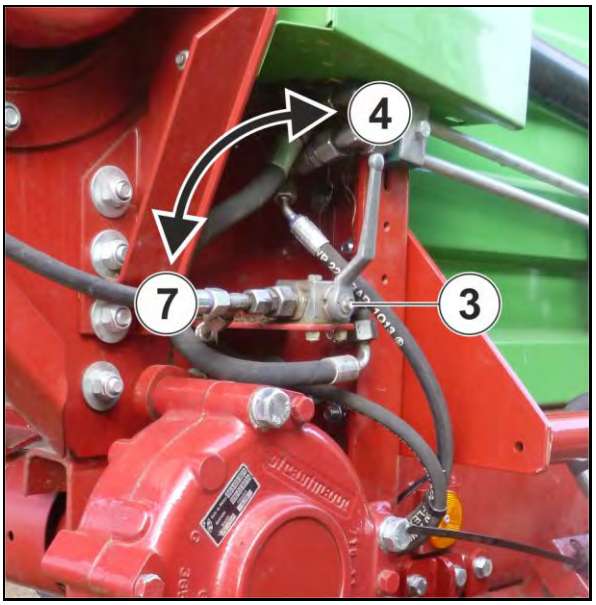


Fig. 44

5. Use the lever (6) to unlock the crossover conveyor (5) and pull the conveyor backwards until it audibly engages.
6. Swivel the lever of the stop-cock (3) to open position (7).
7. Lower the tailgate completely such that the bottom edge of the tailgate is behind the crossover conveyor.

Ensure that the tailgate does not rest on the crossover conveyor when lowering the tailgate!

This might damage the tailgate and the crossover conveyor.

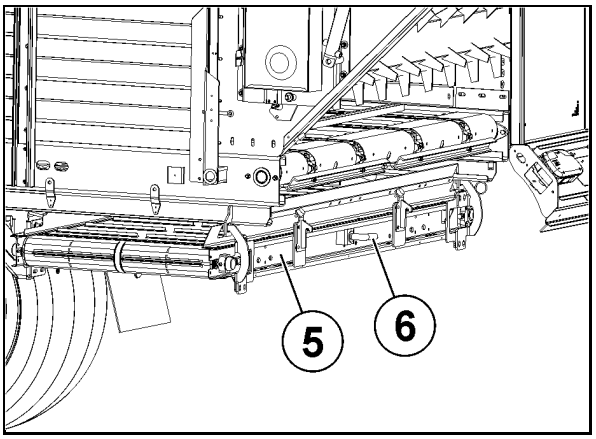


Fig. 45

8. Swivel the lever of the stop-cock (3) to closed position (4) such that the tailgate is secured against lifting.

9. Use the eccentric closures (8) to take up the hooks (9) of the crossover conveyor and lock the eccentric closures.

   → Tailgate and crossover conveyor are now firmly connected.

Never lift the tailgate as long as it is connected with the crossover conveyor!

This causes damage to tailgate and crossover conveyor.

In order to avoid unintentional lifting of the tailgate, leave the stop-cock closed while operating the crossover conveyor!

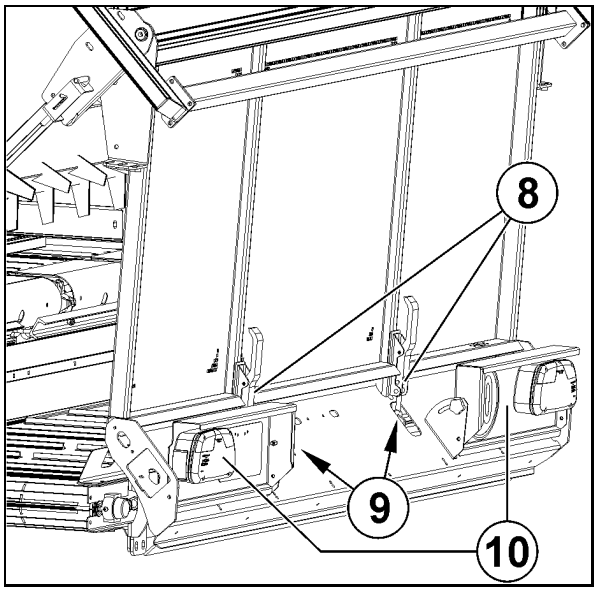


Fig. 46

10. Swivel the lamp brackets (10) to vertical position and lock them in that position.

5.10.2 Push in crossover conveyor

2 people are required for this work!

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

WARNING

Risk of injury due to the freely swinging bottom part of the tailgate!

Stand beside the machine before unlocking or locking the bottom part of the tailgate by means of the locking bolt!

1. Unlock the eccentric closures (8) to unblock the hooks (9) of the crossover conveyor.

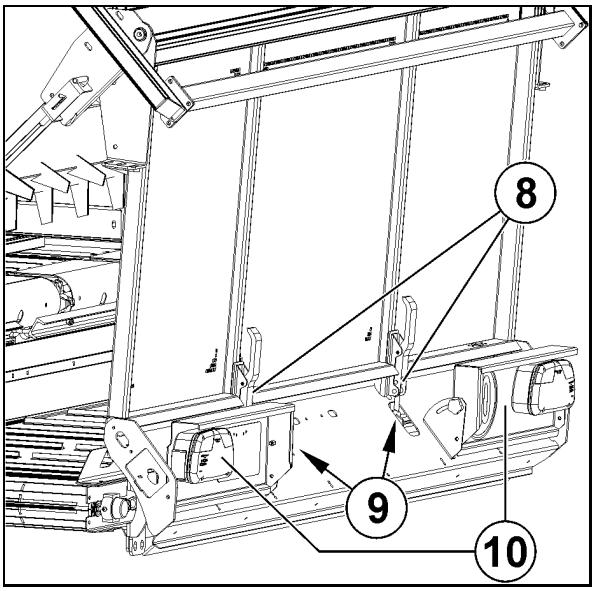


Fig. 47

2. Swivel the lever of the stop-cock (3) to open position (7).
3. Lift the tailgate up to its first opening position.
4. Swivel the lever of the stop-cock (3) to closed position (4) such that the tailgate is secured against lowering.

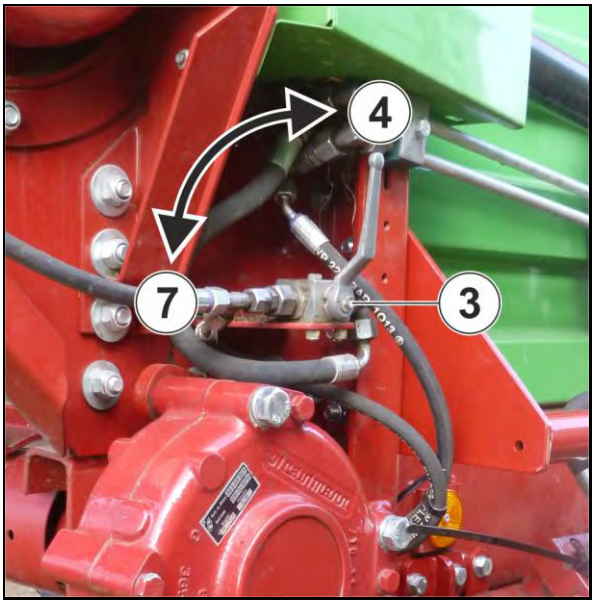


Fig. 48

5. Use the lever (6) to unlock the crossover conveyor (5) and push the conveyor forward until it audibly engages.

Ensure that the hooks (11) of the crossover conveyor rest on the lugs (12) on the left-hand and right-hand side!

Otherwise, the crossover conveyor may be damaged due to uncontrolled movements while travelling.

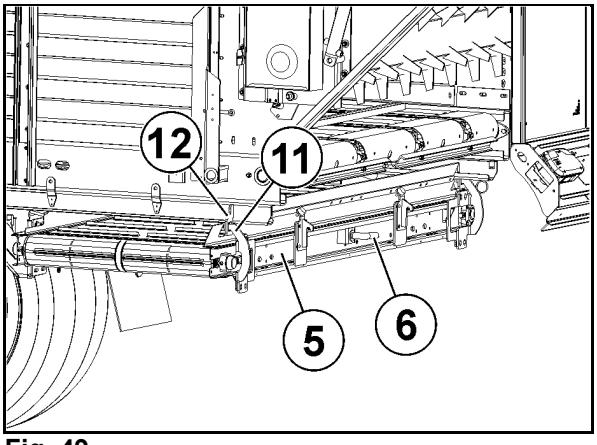


Fig. 49

6. Swivel the lever of the stop-cock (3) to open position (7).
7. Lower the tailgate almost completely.
8. Swivel the lever of the stop-cock (3) to closed position (4) such that the tailgate is secured against lifting.
9. Stand beside the machine, swivel the bottom part (2) of the tailgate forward by hand and lock it by means of the locking bolts (1) on the left-hand and right-hand side.
10. Swivel the lamp brackets (10) to vertical position.
11. Swivel the lever of the stop-cock (3) to open position (7).

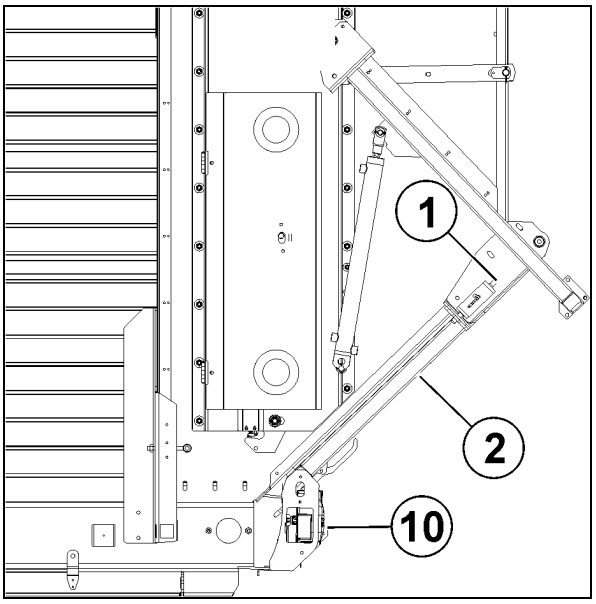


Fig. 50

5.11 Open / Close access door

WARNING

Risk of crushing, becoming entangled, wound up and being drawn in if people enter the cargo space with the drive running!

Secure tractor and machine against accidental starting and rolling before opening the access door to the cargo space and entering the cargo space.

Open access door

1. Hold the folding ladder (1) with one hand and use the other hand to swivel the locking lever (2) up.
2. Fold the ladder down.
3. Open the access door (3).

Close access door

1. Swivel the locking lever (2) up.
2. Close the access door (3).
3. Fold the ladder (1) up.
4. Swivel the locking lever behind the locking bracket down (4).

   Ensure that the upper part (5) of the locking mechanism is behind the upper locking bracket (6) and in front of the side rail (7) of the ladder.

Fig. 51

5.12 Body

5.12.1 Mount body side panels, ropes and body tarpaulin

Two people are required for mounting the attachment sections, ropes and the body tarpaulin.

DANGER

Risk of electrical shock or burns due to machine components accidentally touching electrical overhead lines or approaching high-voltage overhead lines in an inadmissible manner!

Make sure not to exceed the maximum vehicle height of 4 m.

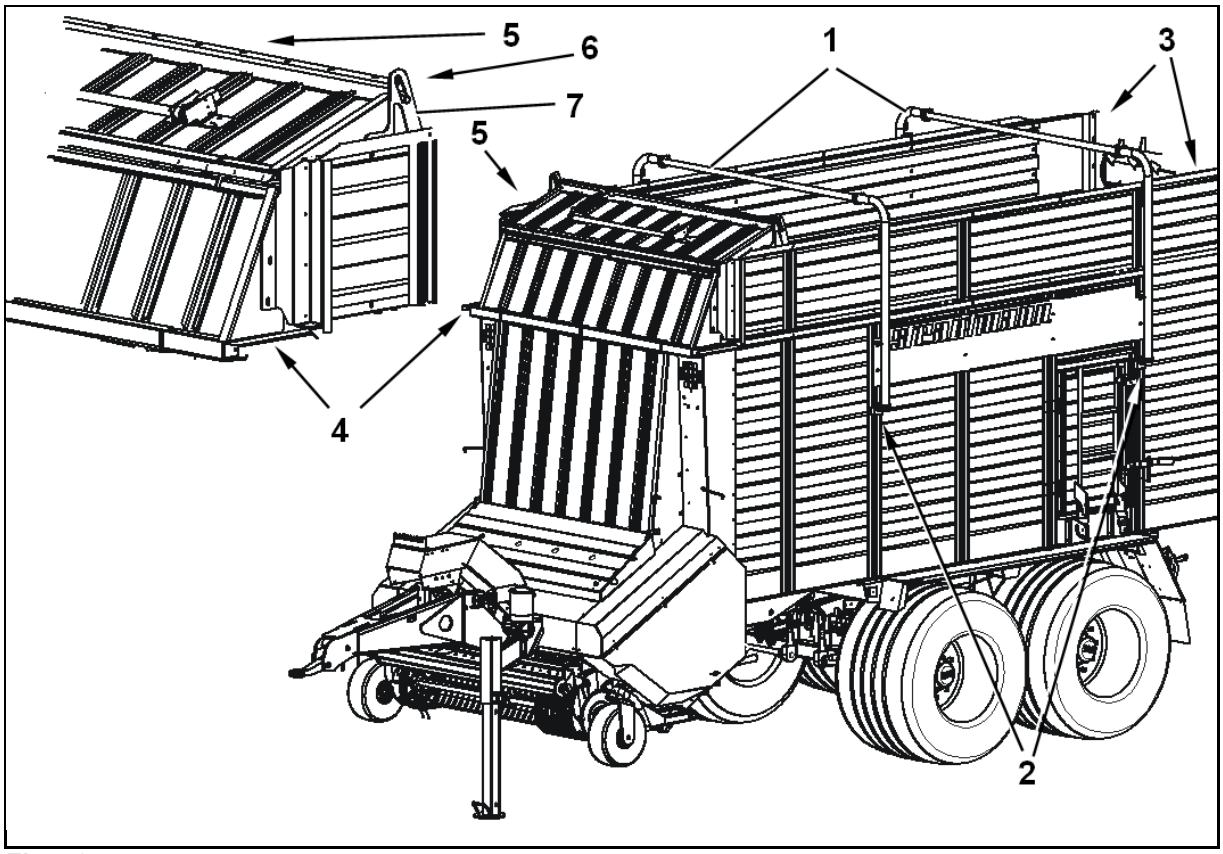


Fig. 52

1. Secure tractor and machine against accidental starting and rolling.
2. Mount the tubular supports (1) loosely to the fixing supports (2); positions of tubular supports see Positions of tubular supports, page 84.
3. Enter the cargo space through the access door.
4. Fold the side panel extensions (3) up one after the other.
5. Screw the side panel extensions (3) to the tubular supports (1).
6. Swivel the upper front grating (4) and the load-protection bars (5) up.
7. Screw the upper front grating (4) to the side panel extensions (3).
8. Swivel the load-protection bars (5) up.
9. Insert the bolts (6) into the mounts (7).
10. Secure the bolts (6) by means of the split-pins provided for that purpose.
11. Screw the tubular supports (1) to the body supports (2) such that the maximum vehicle height of 4 m is not exceeded.

On machines without beaters

12. Mount the tarpaulin (1).

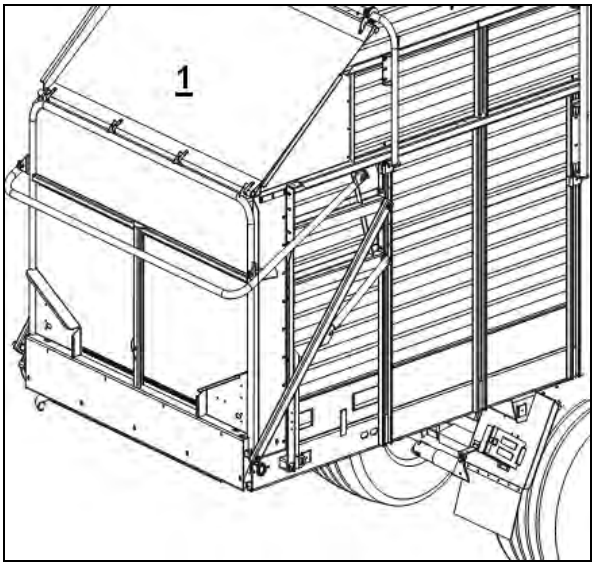


Fig. 53

On machines equipped with beaters

12. Mount the connecting tube (1).
13. Put the body tarpaulin (3) across the connecting tube (1).
    The hemstitch of the body tarpaulin is equipped with slots to accommodate the eyes (5) at the tailgate.
14. Push the tarpaulin rod (4) through the eyes (5) at the tailgate and through the hemstitch of the tarpaulin.
15. Secure the tarpaulin rod (4) at both ends against slipping out by means of the safety bolts (6).

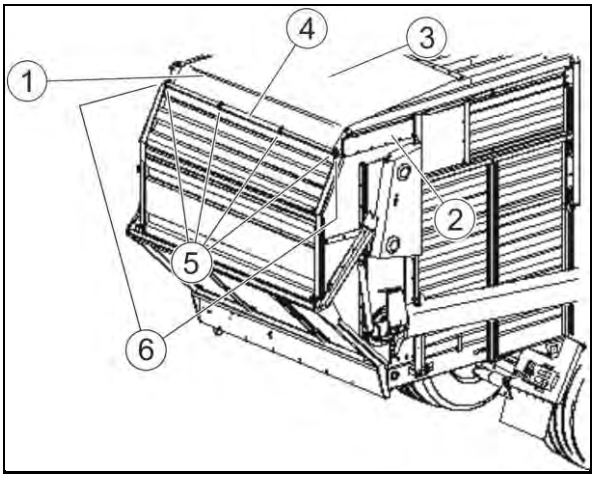


Fig. 54

16. Thread each rope with the loop (1) through a hole (2) in the load-protection bars.
17. Put the other end (3) of the rope through the loop (2).

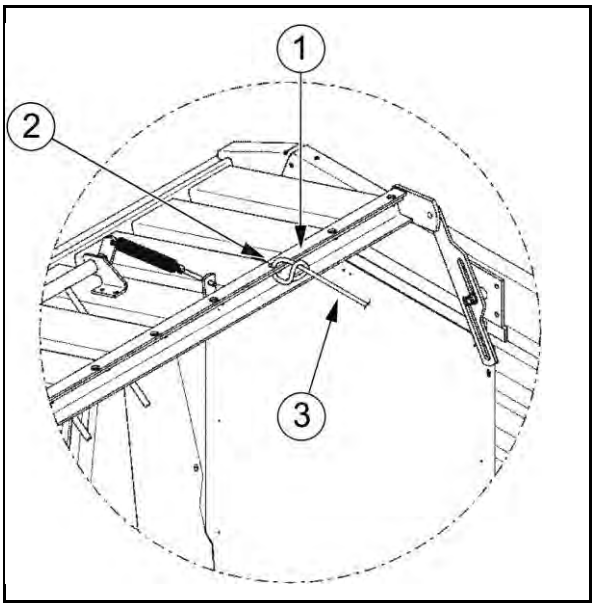


Fig. 55

18. Pull the ropes from the bottom through the eyes of the central tubular support.

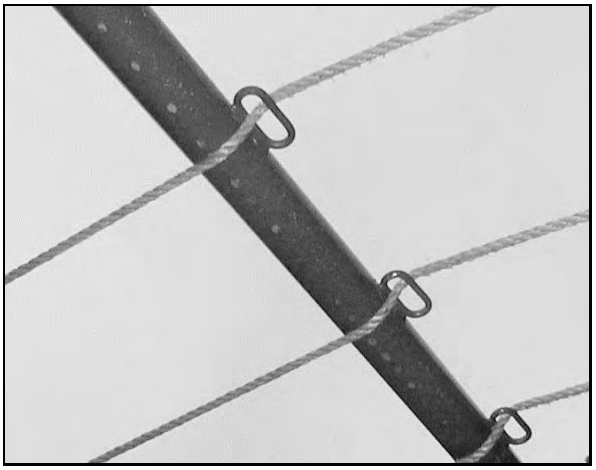


Fig. 56

19. Hang the rope hooks of the rubber clamps into the rear tubular support (machines without beaters) or into the body tarpaulin (machines equipped with beaters).
20. Bend the rope hooks such that they are closed. Thus, unhooking of the ropes will be prevented.

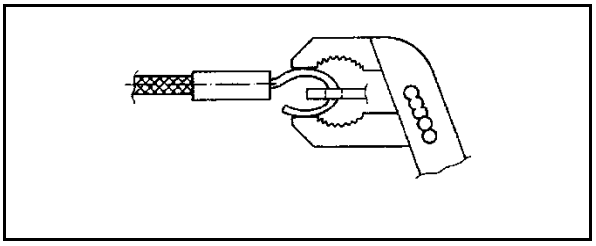


Fig. 57

Positions of tubular supports

(1) long tubular support

(2) short tubular support

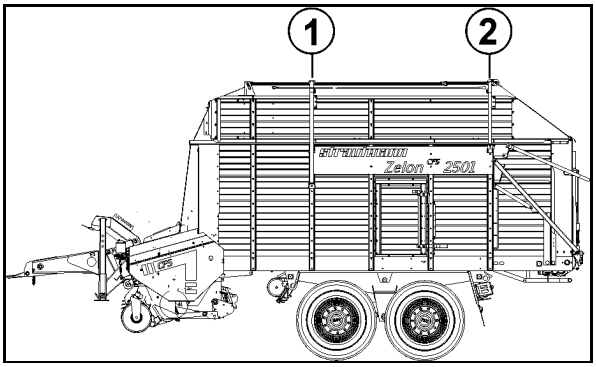


Fig. 58 Zelon CFS 2501

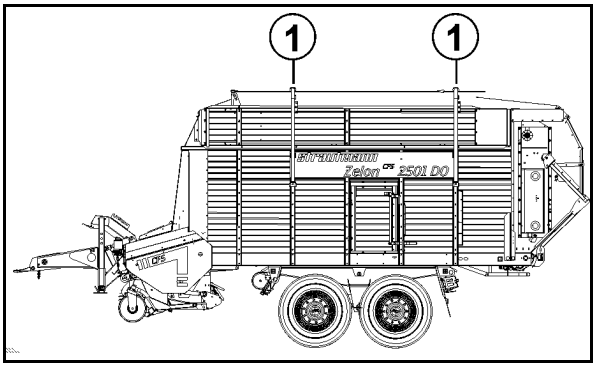


Fig. 59 Zelon CFS 2501 DO

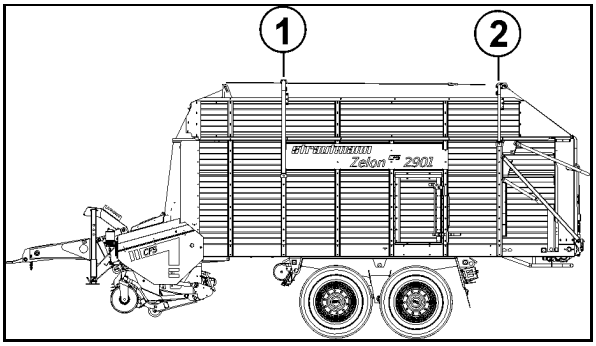


Fig. 60 Zelon CFS 2901

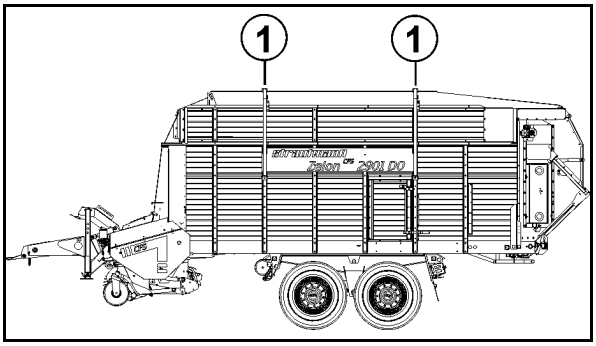


Fig. 61 Zelon CFS 2901 DO

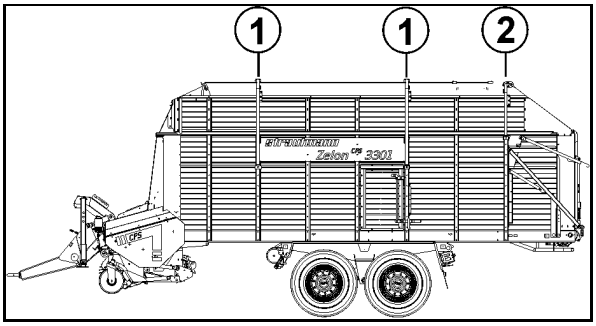


Fig. 62 Zelon CFS 3301

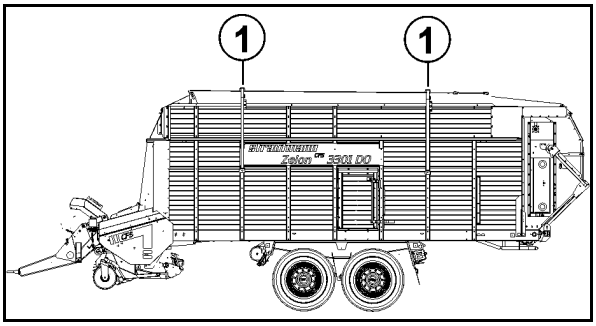


Fig. 63 Zelon CFS 3301 DO

5.12.2 Unfold / Collapse folding grille

Optional extra

WARNING 	**Risk of injury due to movements of tractor and machine or machine parts!** Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine! Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

Unfold folding grille

1. Connect the hydraulic hose pipe for the folding grille attachment to a single-acting control device of the tractor.
2. Actuate the control device until the folding grille (1) has been completely unfolded.

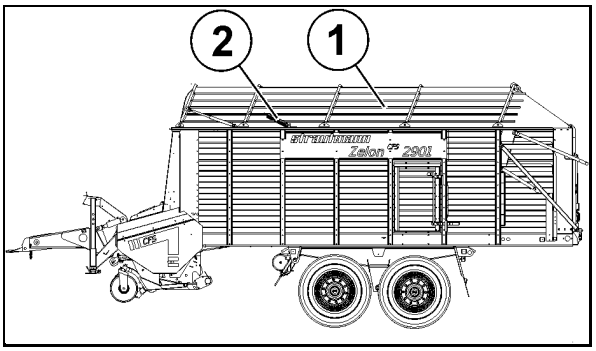


Fig. 64

Collapse folding grille

Set the control device of the tractor to open-centre position.

→ The folding grille (1) is collapsed by means of the spring (2).

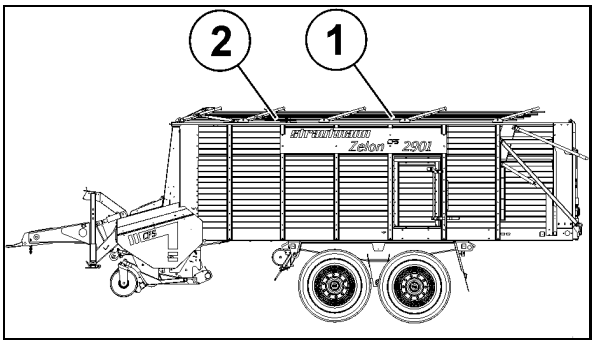


Fig. 65

5.13 Tailgate with telescopic function

Optional extra

5.13.1 Prepare tailgate for telescopic operation

	Remove or unhook the body tarpaulin before preparing the tailgate for telescopic operation! Otherwise, the body tarpaulin might be torn.

WARNING 	**Risk of injury due to movements of tractor and machine or machine parts!** Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine! Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

WARNING 	**Risk of injury to people and risk of material damage due to the enlarged swivelling range of the tailgate during telescopic operation!** Make sure that people leave the swivelling range of the tailgate! Keep sufficient distance between the rear of the machine and walls, vehicles etc.!

1. Lower the tailgate completely.
2. Lock the bolt (1) on both sides of the machine by plugging the linch pin (2) into another socket such that the tubular support (3) cannot lift.
3. Fix the sensor plate (4) on both sides in rear position (4) after unscrewing the screw (5).

   Otherwise, the sensor (6) will not respond when the tailgate has been completely lifted which might lead to malfunctions of the machine.
4. Remove the bolt (7) from the telescopic tube (8) on both sides.
5. Remove the screw (9) on both sides.
6. Extend the hydraulic cylinders (10) ("Lift tailgate") such that they can be screwed down in the rear position (11).
7. Screw down the hydraulic cylinder in the rear position (11) on both sides.
8. Lift the tailgate.

→ The tailgate pivots around the rear pivot point (12).

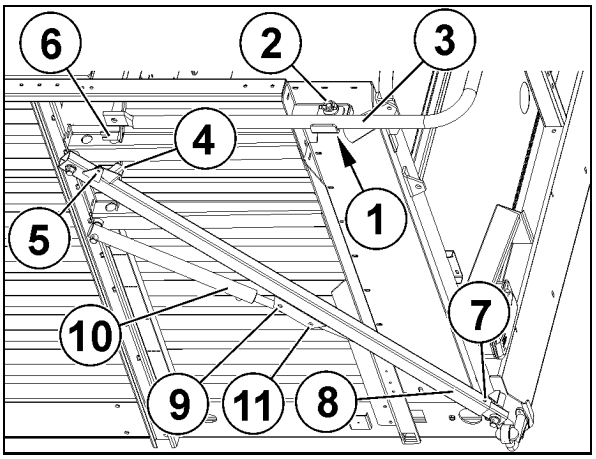


Fig. 66

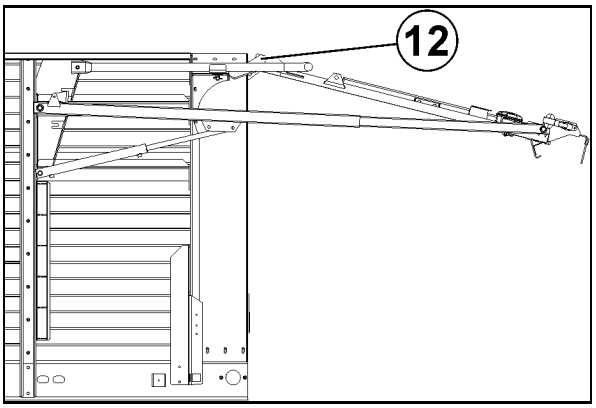


Fig. 67

5.13.2 Prepare tailgate for normal operation

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Lower the tailgate completely.
2. Remove the screw (11) on both sides of the machine.
3. Retract the hydraulic cylinders (10) ("Lower tailgate") such that they can be screwed down in the front position (9).
4. Screw down the hydraulic cylinder in the front position (9) on both sides.
5. Use the bolt (7) to lock the telescopic tube (8) on both sides.
6. Unlock the bolt (1) on both sides of the machine by plugging the linch pin (2) into another socket such that the tubular support (3) can lift.
7. Fix the sensor plate (4) on both sides in the front position (4) after unscrewing the screw (5).

   Otherwise, the sensor (6) responds too soon such that the tailgate cannot be lifted completely.
8. Lift the tailgate.

→ The tailgate pivots around the rear pivot points (12).

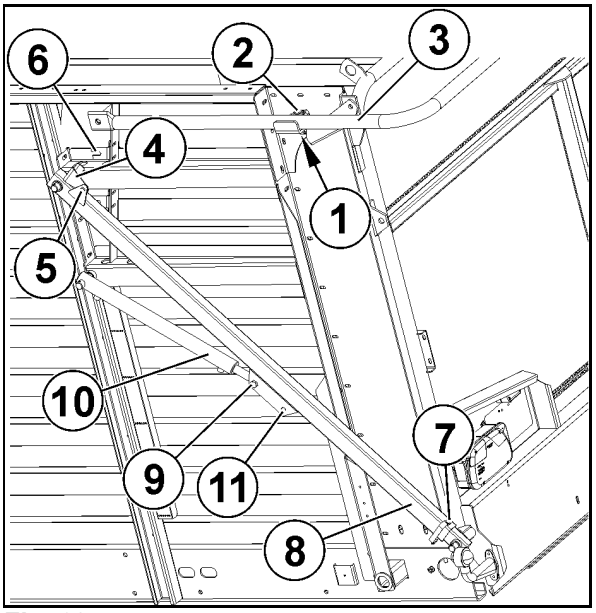


Fig. 68

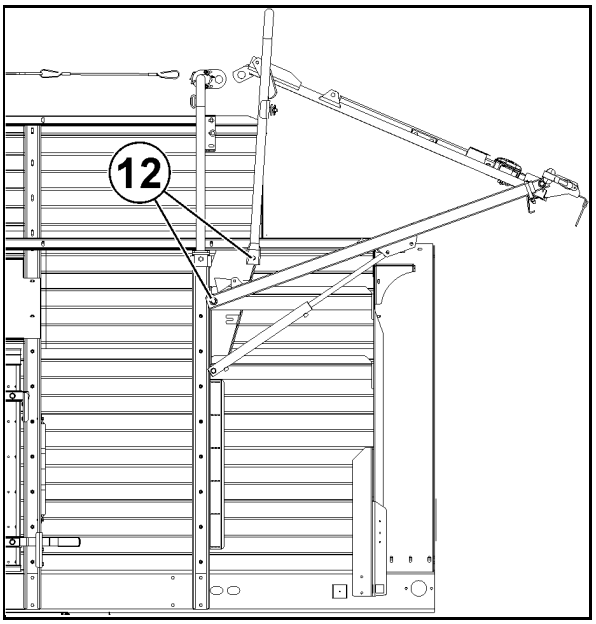


Fig. 69

5.14 Activate / Deactivate silage additive pump (with easy-to-use control)

The silage additive pump is not included in the machine's scope of delivery.

1. Press the switch (1) at the front of the hydraulics protective device (2) to activate the silage additive pump.
2. Switch the pick-up to open-centre position to spray silage additives.
3. Switch the open-centre position of the pick-up off to interrupt the spraying of silage additives.
4. Press the switch (1) again to deactivate the silage additive pump.

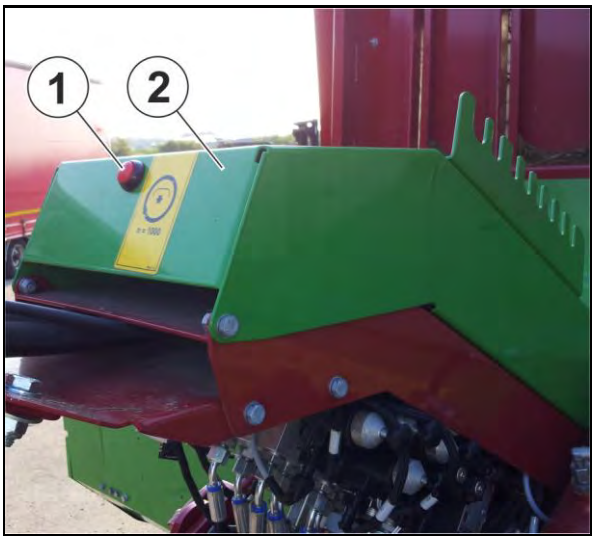


Fig. 70

6 Operation

The hydraulic functions of the machine are operated via the easy-to-use or the ISOBUS control.

6.1 Easy-to-use control

6.1.1 Design

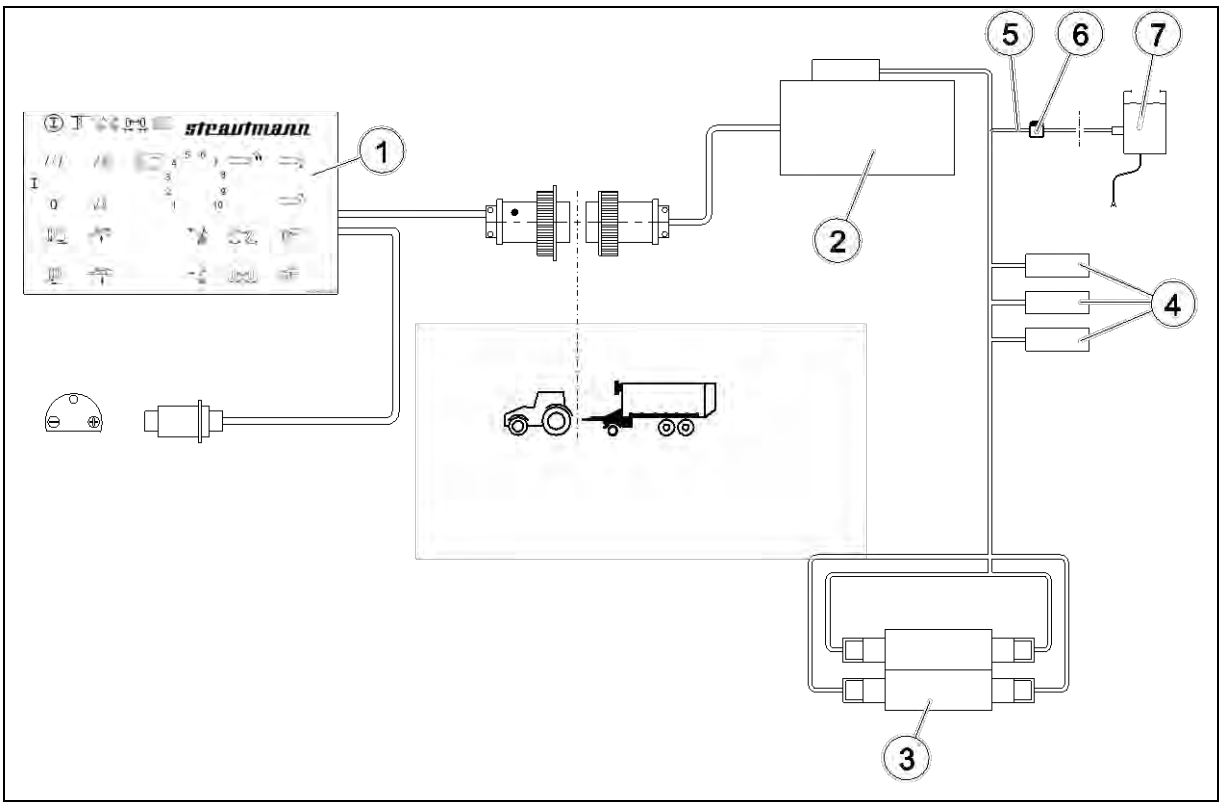


Fig. 71

The easy-to-use control mainly consists of:

- the control set (1),
- the power unit (2),
- the control block (3),
- the sensors (4) for determining the operating states of the individual machine components, e.g. "Tailgate open",
- the connecting cable (5) with ON / OFF switch (6) for the connection of a silage additive pump (7) (optional extra).

The control set is mounted on the tractor and is connected to the power unit (2) of the machine.

All functions required for charging and discharging the forage wagon with or without beaters as well as for transport journeys are actuated via the operating elements of the easy-to-use control set. The symbols above the operating elements identify the executable functions.

After an operating element has been actuated, the power unit triggers the corresponding solenoid valve at the electro-hydraulic control block (3) to carry out the selected functions. Individual sensors (4)

determine the respective operating state of the selected function / setting, e. g. "Tailgate open".

One operating element is required for each function of the machine.

The control set:

- is mounted on the tractor within view and easy reach such that the operating elements are easily accessible,
- must be connected to the tractor's power supply (12 V, min. 25 A) via the 3-pole plug (DIN 9680),
- is equipped with several operating elements such as key buttons, toggle switches and a control dial.

The operating elements are in touch-control design (key buttons), in latch-in design (toggle switches) or in control-dial design:

- In touch-control design for folding, swivelling or sliding movable machine parts, e.g. the tailgate. The function is only carried out when the operating element is activated and kept hold of. As soon as the operating element is released, it returns to its neutral position and the action is stopped.
- In latch-in design for movements requiring continuous action, e.g. work lights.
- Control dials for variably adjusting the transport floor speed to the feed rates I and II.

The operating elements in touch-control or in latch-in design can be set to a maximum of 3 positions:

- Function I (upper position)
- Neutral position (middle position)
- Function II (lower position).

The easy-to-use control is switched on and off via the main switch.

In case of longer downtimes of the machine, switch the control set off, in order to avoid a discharging of the tractor's battery due to switched-on loads!

6.1.2 Functions of the easy-to-use control

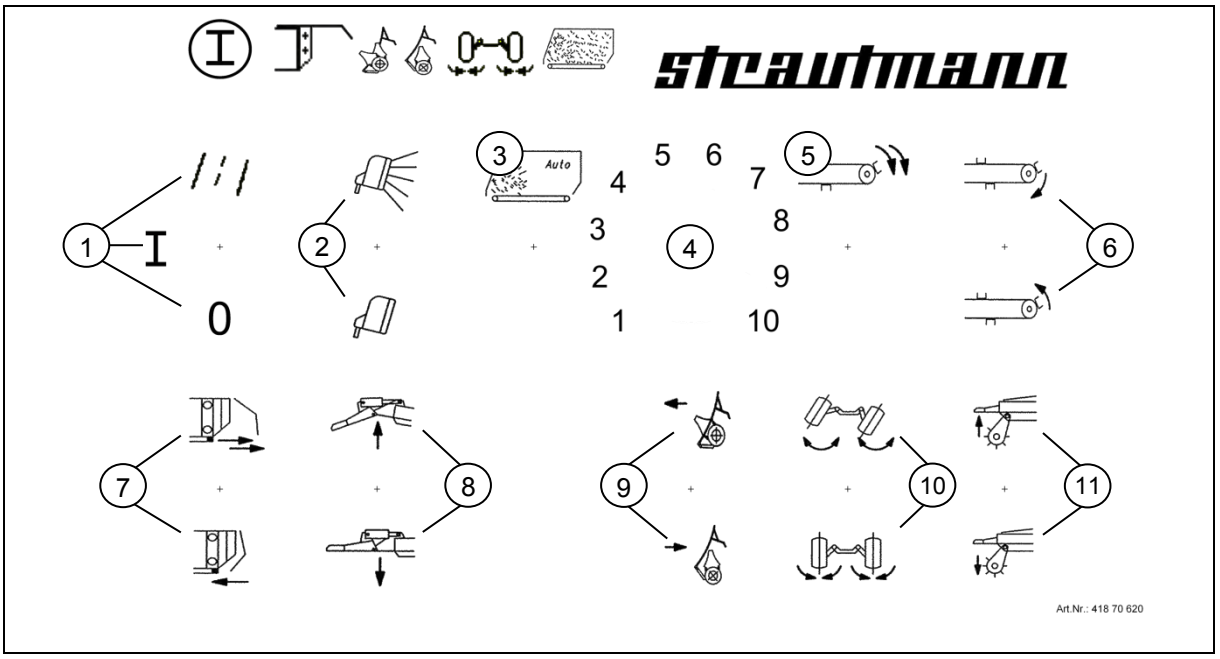


Fig. 72

Functions of switches:

(1) Switch operating mode / road travel mode on / switch machine off

(2) Switch work lights on / off

(3) Switch automatic charging system on / off

(4) Adjust feed rate of transport floor

(5) Double feed rate of transport floor for complete emptying (transport floor level II)

(6) Switch feed function on (transport floor level I) / Reverse feed direction of transport floor for a short time

(7) Open / close tailgate

(8) Lift / lower folding drawbar

(9) Extend / retract cutting unit

(10) Lock / unlock steering axle

(11) Lift / lower pick-up

Simultaneous actuation of two functions is only possible to a certain degree, e.g.:

- the functions "Open tailgate" and "Lift folding drawbar" can be carried out simultaneously,
- the functions "Open tailgate" and "Lower folding drawbar" cannot be carried out simultaneously.

Meaning of control lamps:

(H1) is flashing (green): Road travel mode is activated

lights up (green): Operating mode is activated

(H2) lights up (green): Tailgate is open

(H3) is flashing (red): Cutting unit securing function is activated

lights up (red): Cutting unit is retracted

(H4) lights up (green): Steering axle is locked

(H5) lights up (red): Cargo space is full

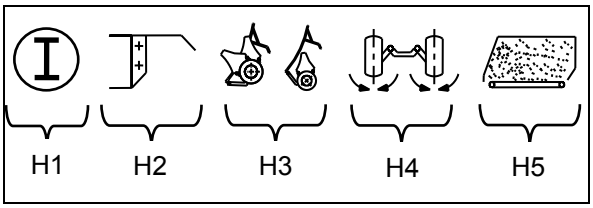


Fig. 73

The intensity of the control lamps can be adjusted manually as follows:

1. Switch the control system off: Switch (1) to lower position 0.
2. Keep hold of switch (6) in the lower position (reverse transport floor) and at the same time
3. keep hold of switch (11) in the upper position (lift pick-up),
4. switch the control system to operating mode: Switch (1) to middle position **I**:

   → all control lamps are flashing,
5. operate the control dial (4):

   → The higher the value set at the control dial, the stronger the intensity of the control lamps,
6. switch the control system off: Switch (1) to lower position 0:

   → the setting is stored.

6.1.2.1 Switch road travel mode on

The road travel mode can always be switched on.

However, ensure that:

- the tailgate is closed,
- the pick-up is lifted,
- the transport floor is at a standstill.

With the road travel mode switched on:

- apart from the functions "Lock steering axle" and "Unlock steering axle", all other functions on the easy-to-use control set are disabled,
- the work lights are switched off,
- the hydraulic drawbar suspension (optional extra) is switched on,
- the control lamp H1 ("Road travel mode active") is flashing,
- the states are indicated by the control lamps H2 ("Tailgate open""), H4 ("Steering axle locked") and H5 ("Cargo space full").

If the folding drawbar is equipped with a drawbar suspension, the hydraulic cylinders of the folding drawbar must be extended by approx. 20 mm before switching the road travel mode on.

The drawbar suspension will not work if the folding drawbar is lowered to its end position.

- Toggle switch in upper switch position

→ The road travel mode is switched on.

The control lamp H1 ("Road travel mode active") is flashing.

6.1.2.2 Switch operating mode on

If the operating mode is switched on:

- all functions on the easy-to-use control set are enabled,
- the hydraulic drawbar suspension (optional extra) is switched off,
- the control lamp H1 ("Operating mode active") lights up.

If the control lamp H1 ("Road travel mode active") is flashing with the operating mode being active, the control system is disabled due to one / several functions being active.

→ Check the easy-to-use control system for inconsistent active functions and deactivate them. This might refer to:

- the tailgate,
- the folding drawbar,
- the cutting unit,
- the steering axle,
- the pick-up,
- the transport floor.

I

- Toggle switch in central switch position

→ The operating mode is switched on.

The control lamp H1 ("Operating mode active") lights up.

6.1.2.3 Switch machine off

0

- Toggle switch in lower switch position

→ The machine is switched off.

6.1.2.4 Switch work lights on/off

When switching the road travel mode on, the work lights are automatically switched off.

When switching the road travel mode off, the work lights are automatically switched on again.

- Toggle switch in upper switch position

→ The work lights are switched on.

- Toggle switch in lower switch position

→ The work lights are switched off.

6.1.2.5 Switch automatic charging system on/off

Switch the automatic charging system on for uniform and complete filling of the cargo space.

The automatic charging system:

- has to be switched on only once,
- automatically switches the transport floor on and off during charging,
- is automatically deactivated if the easy-to-use control set generates an acoustic signal (horn sound) and a visual signal (control lamp H5: "Forage wagon full"),
- is automatically activated if the forage wagon has been emptied and the pick-up is lowered the next time,
- remains switched on until the automatic charging system is manually switched off.

The automatic charging system only works with the pick-up lowered.

The automatic charging system:

- is mounted at the load-protection bars and mainly consists of the sensing band (1), the gear shifting gate (2) and the limit switch (3),
- is connected with the hydraulic drive of the transport floor in ON mode,

During charging, the loaded material piles up at the front panel of the cargo space. If the loaded material piling up deflects the sensing band (1) upwards, the hydraulic drive of the transport floor starts and conveys the loaded material backwards. The transport floor stops as soon as the loaded material does not deflect the sensing band (1) upwards any more.

The position of the gear shifting gate (2) with respect to the sensing band (1) determines the switch-on behaviour for the transport floor. The gear shifting gate (2) can be fixed to the sensing band (1) in different positions, in order to change the filling degree of the cargo space.

Low filling degree = smaller deflection of sensing band

High filling degree = larger deflection of sensing band

- Sensing band in upper switch position

→ The automatic charging system is switched on.

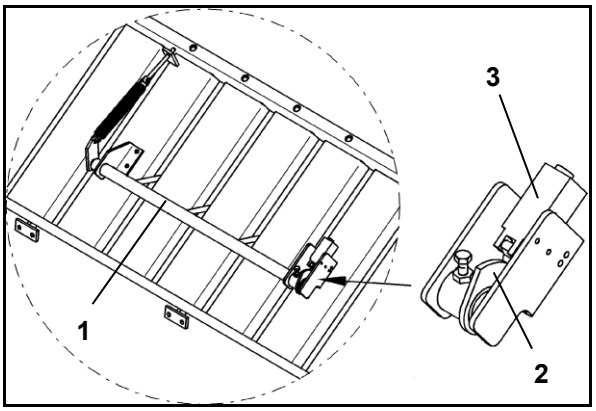
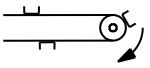


Fig. 74

6.1.2.6 Switch transport floor on (level I)

- If the forage wagon is full, the easy-to-use control set will generate an acoustic signal (horn sound) and a visual signal (control lamp H5: "Forage wagon full"). The automatic charging system is deactivated and the automatic feed function for the transport floor is switched off.

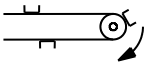
  → The acoustic signal (horn sound) and the visual signal (control lamp H5: "Forage wagon full") can be switched off by deactivating the "Transport floor ON" function.

  You can now still continue to charge forage wagons without beaters and to switch the transport floor feed manually on for a maximum of three times for a short time of 2 seconds via the switch lever  .

  Stop the charging procedure after the acoustic signal has appeared for the third time at the latest.

- In case of a forage wagon equipped with beaters, the transport floor will stop for a short time during discharge if the transport floor is running too fast.

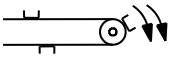
→ Reduce the transport floor speed.



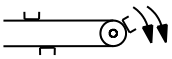
- Toggle switch in upper switch position

→ As long as the lever is kept in its upper switch position, the transport floor will move at the set feed rate.

6.1.2.7 Double feed rate of transport floor for complete emptying (level II)

If the transport floor stops when switching over, increase the set feed rate of the transport floor if necessary before operating the toggle switch  to double the feed rate for complete emptying.

At both levels, the feed rate can be set by means of the control dial.



- Toggle switch in upper switch position

→ The transport floor moves at fast feed rate (level II).

- Toggle switch in lower switch position

→ The transport floor moves at normal feed rate (level I).

6.1.2.8 Reverse feed direction of transport floor for a short time

The feed direction of the transport floor must be reversed for a short time if the slip clutch responds during discharge.

Thus, the pressing power which the loaded material applies to the beaters, and the starting torque for loosening the beaters are reduced.

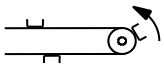
Risk due to failure of components caused by frequent or long reverse of transport floor!

Observe the fact that the feed direction of the transport floor is only allowed to be reversed for a short time (max. 3 seconds).

Check the transport floor chains for proper tension every day, in order to prevent material damage.

Reverse:

- only for a short time,
- only in case of emergency,
- if the slip clutch responds during discharge or
- in order to reduce the pressing power which the loaded material applies to the beaters.

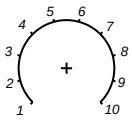


- Toggle switch in lower switch position

→ The transport floor starts to run and conveys the loaded material away from the beaters for a maximum time of 3 seconds. The pressing power which the loaded material applies to the beaters is reduced.

6.1.2.9 Change feed rate of transport floor

The feed rate of the transport floor is adjusted by means of the control dial at both level I and II.



- Control dial to "1" = low feed rate of transport floor.
- Control dial to "10" = high feed rate of transport floor.

6.1.2.10 Open tailgate

- Sensing band in upper switch position
  - o Forage wagon without beaters:

  → The tailgate opens as long as the switch position is held or until the end position has been reached.

  As soon as the tailgate has reached its end position, the control lamp H2 ("Tailgate open") lights up.

  - o Forage wagon equipped with beaters:

  → The tailgate opens as long as the switch position is held or until position I has been reached.

  → When actuated again, the tailgate opens further as long as the switch position is held or until the end position has been reached.

  As soon as the tailgate has reached position I, the control lamp H2 ("Tailgate open") lights up.

6.1.2.11 Close tailgate

- Key button in lower switch position

→ The tailgate is closed.

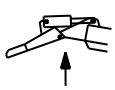
- ○ On forage wagons without beaters:

  The control lamp H2 ("Tailgate open") goes out as soon as the tailgate is no longer completely open.

- ○ On forage wagons equipped with beaters:

  The control lamp H2 ("Tailgate open") goes out as soon as the tailgate is below position I.

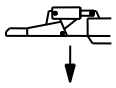
6.1.2.12 Lift folding drawbar



- Leave the key button in its upper switch position until the folding drawbar has been lifted to the desired position or has reached its end position.

→ The ground clearance of the pick-up is increased.

6.1.2.13 Lower folding drawbar



- Leave the key button in its lower switch position until the folding drawbar has been lowered to the desired position or has reached its end position.

→ The ground clearance of the pick-up is reduced.

6.1.2.14 Retract cutting unit

- Leave the key button in its lower switch position until the end position has been reached.

→ The cutting unit is retracted from the conveyor duct.

The control lamp H3 ("Cutting unit retracted") lights up as soon as the cutting unit is retracting.

If the control lamp H3 ("Cutting knives retracted") lights up during charging:

- at least one cutting knife has been retracted from the conveyor duct due to a foreign object,
- the cutting unit is heavily soiled.

One or several cutting knives retracted from the conveyor duct

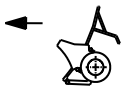
Swivel the cutting unit completely out of the conveyor duct and in again with the feeder rotor running.

The cutting unit is soiled

Clean the cutting unit.

6.1.2.15 Extend cutting unit

Extend the cutting unit only with the feeder rotor running.



- Leave the key button in its upper switch position until the control lamp H3 ("Cutting unit retracted") goes out.

→ The cutting unit is completely extended into the conveyor duct.

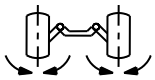
6.1.2.16 Unlock steering axle

- Key button in upper switch position

→ The control lamp H4 ("Steering axle locked") goes out. The steering axle can move freely (is unlocked) and follows the turning radius of the corner during cornering.

6.1.2.17 Lock steering axle

Align the wheels of the steering axle in a straight line by means of a short forward travel of the tractor and the hitched machine before locking the steering axle.



- Key button in lower switch position

→ The control lamp H4 ("Steering axle locked") lights up. The steering axle is locked in "Straight" position.

6.1.2.18 Lift pick-up

- Leave the key button in its upper switch position until the end position has been reached.

→ The pick-up is lifted.

6.1.2.19 Lower pick-up

- Toggle switch in lower switch position

→ The pick-up lowers and is held in open-centre position such that it can adapt to uneven terrain.

6.2 ISOBUS control

In case of longer downtimes of the machine, switch the control set off, in order to avoid a discharging of the tractor's battery due to switched-on loads!

Protect the control set against moisture and humidity!

6.2.1 Design of ISOBUS control

The ISOBUS control complies with the latest ISO standard.

If your tractor's software and hardware comply with the latest ISO standard, you will not require our control set. You will then be able to directly operate the machine via your tractor control set.

The included ISO cable harness is not compatible with LBS or LBS-Plus.

The ISOBUS control set is automatically switched on and off when the tractor ignition is turned on and off. In case of longer downtimes of the machine, additionally disconnect the mobile tractor connecting cable.

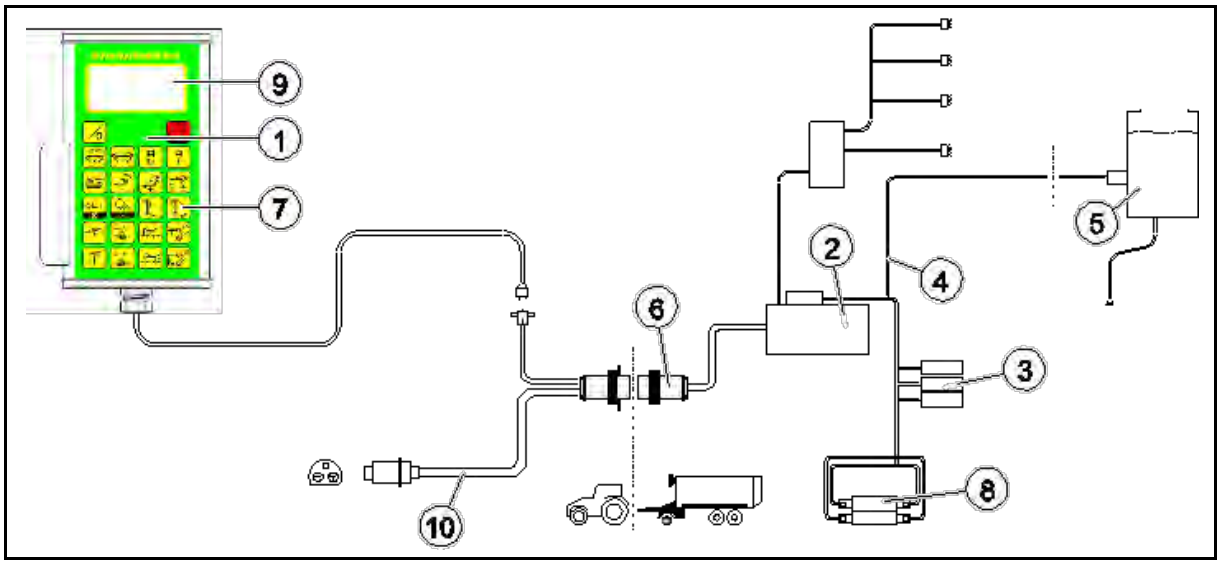


Fig. 75

The ISOBUS control mainly consists of:

- the control set (1),
- the control unit (2),
- the sensors (3) to determine operating states, e. g. Steering axle locked or Steering axle unlocked,
- the connecting cable (4) for the silage additive pump (5) (optional extra).

The control set (1) is mounted on the tractor and is connected to the control unit (2) of the machine via the connecting cable (6).

All functions required for operating the machine as well as for transport journeys are actuated via the keys (7) of the control set. The symbols on the keys identify the executable functions.

After a key has been pressed, the control unit triggers the corresponding solenoid valve at the electro-hydraulic control block (8) to carry out the selected functions. Individual sensors (3) determine the respective operating state of the selected assembly, e. g. Steering axle locked or Steering axle unlocked. The operating states are graphically shown on the screen (9).

(1) Screen. Depending on the selected function, the following menu appears:

- **Working** menu. The **Working** menu displays the selected functions and the operating states during charging and discharging.
- **Road travel** menu. The **Road travel** menu appears with the road travel mode activated.
- **SET** menu. The **SET** menu displays:
  - o the software version,
  - o machine parameters.

(2) Switch control system on (I)/off (0)

(3) Switch road travel mode on/off/ Scroll through menu

(4) Switch crossover conveyor off

(5) Switch crossover conveyor on and change driving direction

(6) Switch **Discharge mode A II** on/off

(7) Switch **Discharge mode A I** on

(8) Switch automatic charging system on/off

(9) Reverse transport floor/Reduce feed rate of transport floor during discharge (in combination with key 11)

(10) Double feed rate of transport floor for complete emptying (transport floor level II)/Increase feed rate of transport floor during discharge (in combination with key 11)

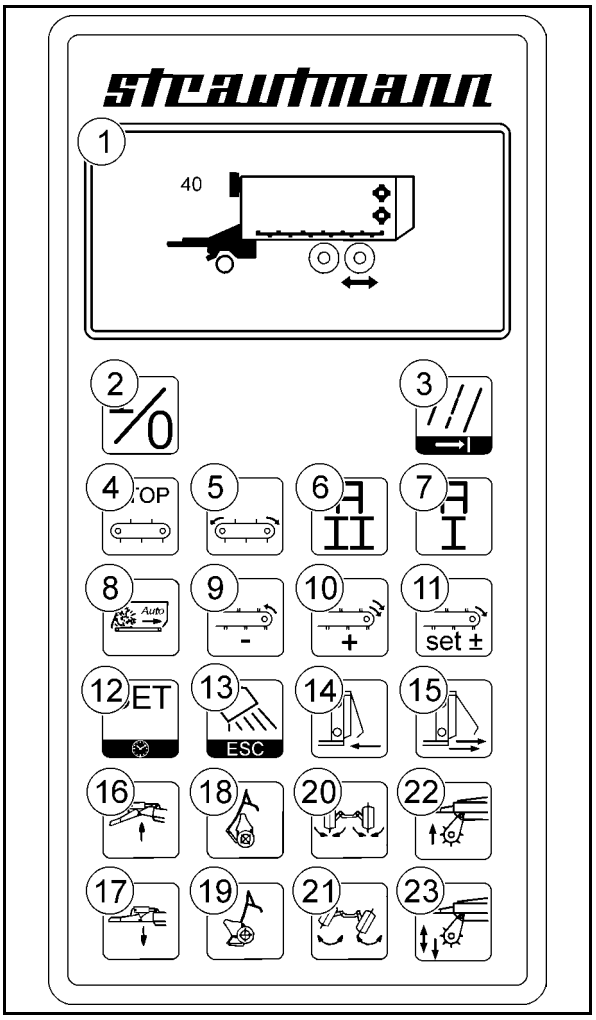


Fig. 76

(11) Switch transport floor on/Set feed rate of transport floor (in combination with keys 9 and 10)

(12) Select **SET** menu/Call service hours and transported loads counter

(13) Switch lighting in the cargo space on/off/ Return to **Working** menu

(14) Lower tailgate

(15) Lift tailgate

(16) Lift folding drawbar

(17) Lower folding drawbar

(18) Retract cutting unit

(19) Extend cutting unit

(20) Lock steering axle

(21) Unlock steering axle

(22) Lift pick-up

(23) Lower pick-up to open-centre position/ no open-centre position (rigid)

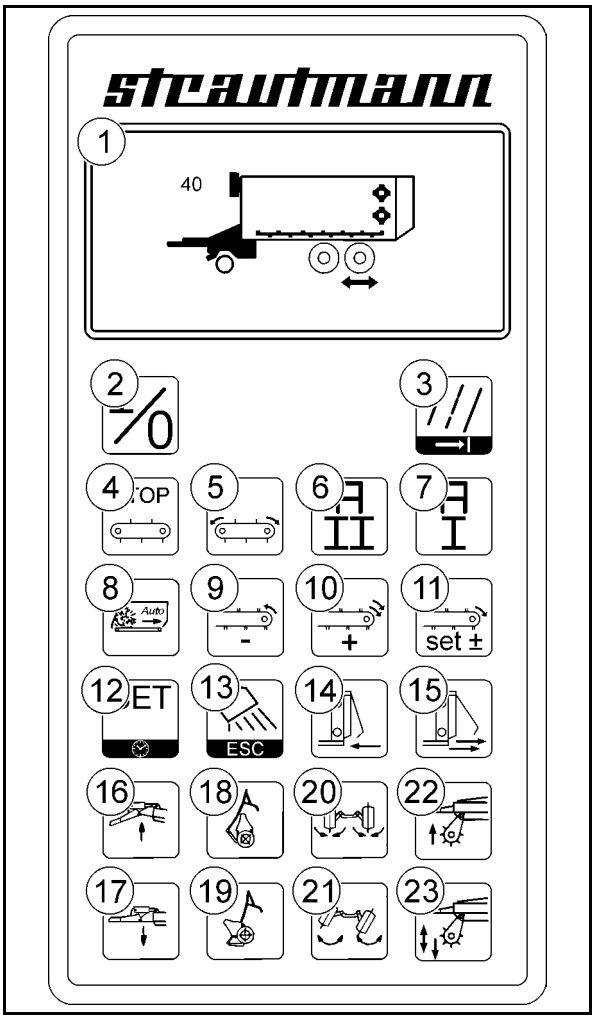


Fig. 77

6.2.2 Display information in Working menu

(1) Display of current transport floor speed

(2) Operating state "Automatic charging system on/off", here "Automatic charging system on"

(3) Operating state "Discharge mode I on/ Discharge mode II on/off", here "Discharge mode II on"

(4) Operating state "Cargo space lighting on/off", here "Cargo space lighting on"

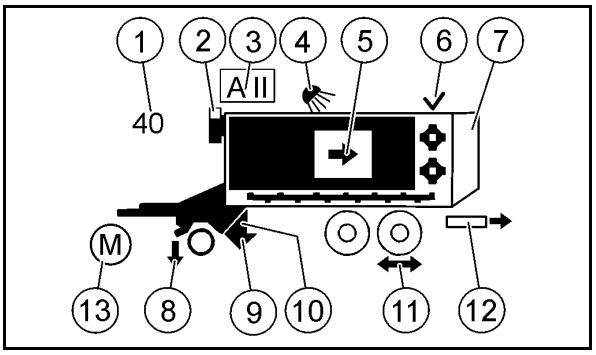
(5) Operating state "Transport floor forward/ forward level II/reverse", here "Transport floor forward"

(6) Operating state "Beaters powered/not powered", here "Beaters powered"

(7) Operating state "Tailgate lowered/lifted to first opening width/completely lifted", here "Tailgate lowered"

(8) Operating state "Pick-up lifted/lowered, here "Pick-up lowered"

(9) Operating state "Cutting knives



extended/retracted", here "Cutting knives retracted"

(10) Operating state "Cutting unit extended/retracted", here "Cutting unit retracted"

(11) Operating state "Steering axle locked/unlocked", here "Steering axle unlocked"

(12) Operating state "Crossover conveyor ccw rotation on/cw rotation/stop", here "Crossover conveyor cw rotation on"

(13) Operating state "Silage additive pump on/off", here "Silage additive pump on"

6.2.3 Functions and their symbols

The following paragraphs show the symbols of the operating elements of the control set, their functions and the displays on the screen.

Switch control set on/off

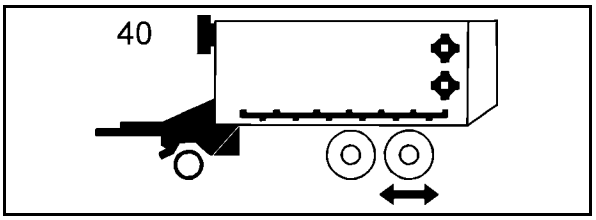
At the same time, this key serves as emergency stop. After the control set has been switched off, all hydraulic functions are also switched off.

1. Press the  key once.

→ The control set is switched on or off.

With the control set switched on, the **Working** menu appears on the screen. With the control set switched off, the display on the screen goes out

The screen shows:



Switch road travel mode on

The road travel mode can only be switched on:

- with lifted pick-up (attention, the pick-up is not checked for having been lifted completely),
- with lowered tailgate,
- with the transport floor stationary,
- with the beaters stationary.

If these requirements are not fulfilled, a beep is emitted, a corresponding warning message and the non-fulfilled requirement in the **Working** menu appear:

(1) Warning message

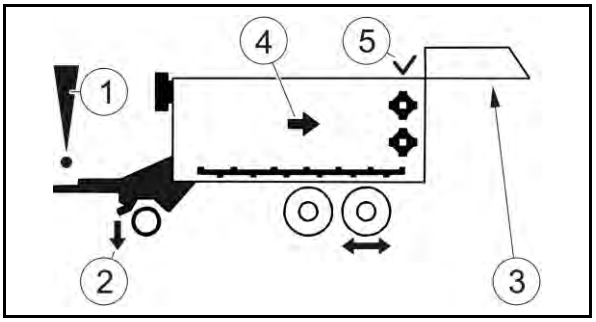
(2) Pick-up down

(3) Tailgate lifted

(4) Transport floor powered

(5) Beaters powered

The screen shows:



With the road travel mode switched on:

- The **Road Travel** menu appears,
- apart from the functions "Lock steering axle" and "Unlock steering axle", all other functions of the control set are disabled,
- the drawbar suspension (optional extra) and the warning beacon (optional extra) are switched on,
- the work lights (optional extra) are switched off.

If the folding drawbar is equipped with a drawbar suspension, the hydraulic cylinders of the folding drawbar must be extended by approx. 20 mm before switching the road travel mode on.

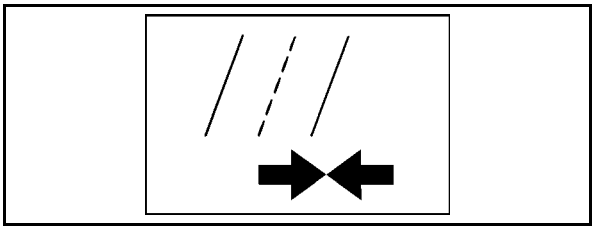
The drawbar suspension will not work if the folding drawbar is lowered to its end position.

1. Press the  key once.

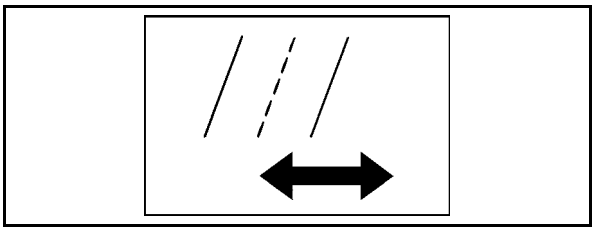
→ Road travel mode is switched on. The **Road travel** menu appears with

- the "Steering axle locked" symbol or

The screen shows:



- the "Steering axle unlocked" symbol.



Switch road travel mode off

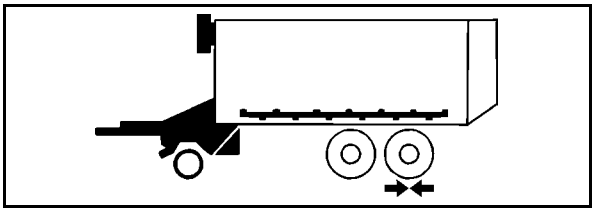
With the road travel mode switched off:

- The **Working** menu appears,
- all functions of the control set are enabled,
- the drawbar suspension (optional extra) and the warning beacon (optional extra) are switched off,
- the work lights (optional extra) are switched on if the work lights were on when carrying out the function "Switch on road travel mode".

1. Press the  key again.

→ Road travel mode is switched off. The **Working** menu appears.

The screen shows:



Switch Discharge mode A I on

Align the wheels of the steering axle in a straight line by means of a short forward travel of the tractor and the hitched machine before switching the **Discharge mode A I** on.

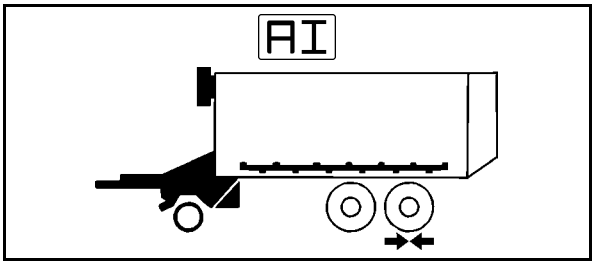
The **Discharge mode A I** is automatically switched off if the tailgate is lowered.

1. Press the  key until the pick-up has sufficient ground clearance.

→ The following functions will be automatically carried out one after the other:

- Lock steering axle
- Lift folding drawbar

The screen shows:



Switch Discharge mode A II on (Machine without beaters)

The **Discharge mode A II** is automatically switched off when the tailgate is lowered.

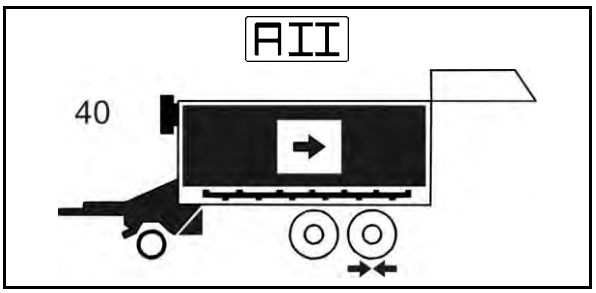
During discharge, the transport floor feed can be switched on and off as often as desired by pressing the A II key.

1. Press the A II key once when being on the bunker silo.

→ The following functions will be automatically carried out one after the other:

- Lift tailgate
- Switch transport floor on when the tailgate has reached its end position

The screen shows:



Switch Discharge mode A II on (Machine with beaters)

The **Discharge mode A II** is automatically switched off when the tailgate is lowered.

During discharge, the transport floor feed can be switched on and off as often as desired by pressing the A II key.

Switch the p.t.o. shaft off to discharge step by step.

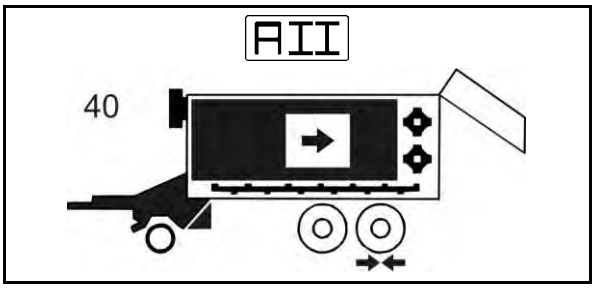
→ The beaters and the transport floor stop. The transport floor automatically switches to standby mode and the "Feed On" symbol is flashing.

1. Press the A II key once when being on the bunker silo.

→ The following functions will be automatically carried out one after the other:

- Lift tailgate until the set first opening width is reached.
- Switch gearboxes and clutches.
- Switch transport floor to standby mode when the tailgate has reached its set first opening width. The "Feed on" symbol is flashing.

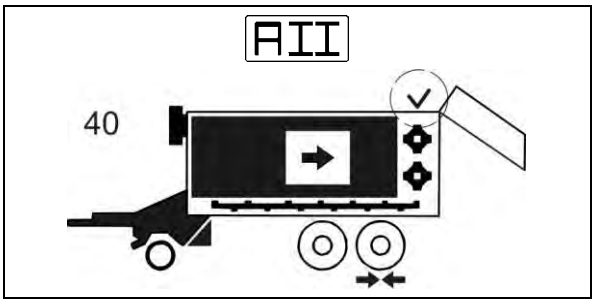
The screen shows:



As soon as the p.t.o. shaft is switched on, the beaters start to run and after a short delay, the transport floor automatically starts.

→ With the beaters powered, the "Beaters On" symbol appears.

With the transport floor powered, the "Feed On" symbol is permanently lit.



Switch automatic charging system on/off

Switch the automatic charging system on for uniform and complete filling of the cargo space.

The automatic charging system:

- has to be switched on only once,
- automatically and infinitely variably switches the transport floor on and off during charging,
- will automatically be deactivated if the control set generates the acoustic signal (horn sound) and the visual signal "Forage wagon full",
- will automatically be activated if the machine has been emptied and the pick-up is lowered the next time,
- remains switched on until the automatic charging system is manually switched off,
- permits to pre-select the filling degree of the loaded material in the cargo space. Observe the information in the chapter "Pre-select filling degree of loaded material in cargo space", page 119.

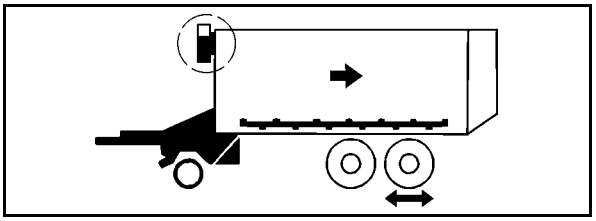
The automatic charging system only works with the pick-up lowered.

The higher the set filling degree, the higher the transport floor feed rate and the smaller the filling capacity.

1. Press the  key once.

→ The automatic charging system is switched on. The "Automatic charging system on" symbol appears.

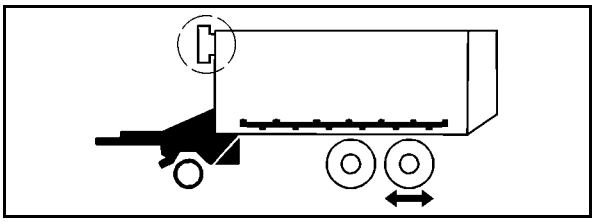
The screen shows:



2. Press the  key again.

→ The automatic charging system is switched off. The "Automatic charging system off" symbol appears.

The screen shows:



Switch transport floor on

Information for machines **without beaters:**

- When the machine is fully charged, the ISOBUS control set generates an acoustic signal (horn sound) and a visual signal "Forage wagon full". The automatic charging system is deactivated and the automatic feed function for the transport floor is switched off.

  You can still continue to charge machines without beaters. The feed function of the transport floor can still be switched on for a maximum of three times for a short period of 2 seconds via the 

  key.

  Stop the charging procedure after the acoustic signal has appeared for the third time at the latest.

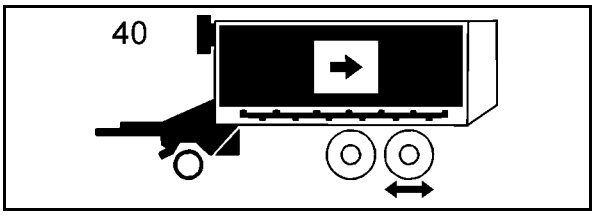
- During discharge on the bunker silo, the transport floor is automatically switched on after pressing the  key, when the tailgate has reached its end position.

1. Press the 

   key for a maximum of 2 seconds during charging to switch the transport floor feed manually on.

→ The transport floor will move at the set feed rate as long as the key is pressed. The "Feed on" symbol appears.

The screen shows:



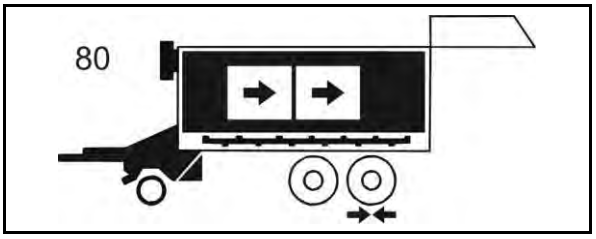
Double feed rate of transport floor for complete emptying (transport floor level II)

The minimum set feed rate must be "40" before doubling the feed rate of the transport floor for complete emptying.

1. Press the  key once during discharge.

→ The feed rate of the transport floor is doubled. The symbols "Double set feed rate" and "Double feed" appear.

The screen shows:



Change feed rate of transport floor during discharge

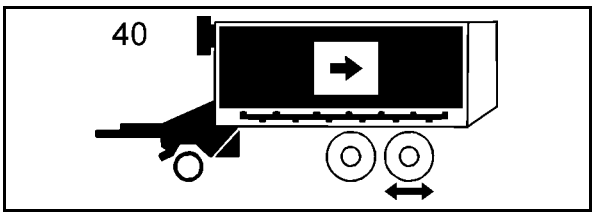
1. Press the  key once and the  key quickly in succession as often as required until the transport floor has reached the desired feed rate.

→ The feed rate of the transport floor is increased by 10 % of the maximum feed rate each time the key is pressed.

2. Press the  key once and the  key quickly in succession as often as required until the transport floor has reached the desired feed rate.

→ The feed rate of the transport floor is reduced by 10 % of the maximum feed rate each time the key is pressed.

The screen shows:



Reverse transport floor

Risk due to failure of components caused by frequent or long reverse of transport floor!

Observe the fact that the feed direction of the transport floor is only allowed to be reversed for a short time (max. 3 seconds).

Check the transport floor chains for proper tension every day, in order to prevent material damage.

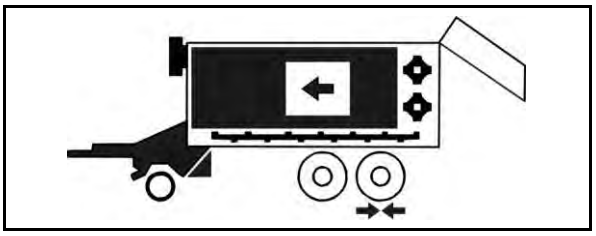
Reverse:

- only for a short time,
- only in case of emergency,
- if the slip clutch responds during discharge or
- in order to reduce the pressing power which the loaded material applies to the beaters.

1. Press the  key to switch the transport floor feed off.
2. Press the  key.

→ The transport floor starts running and conveys the loaded material away from the beaters for a maximum time of 3 seconds. The "Reverse feed" symbol appears.

The screen shows:



Crossover conveyor ccw rotation/cw rotation on

The preferred sense of rotation of the crossover conveyor is set in the **SET** menu.

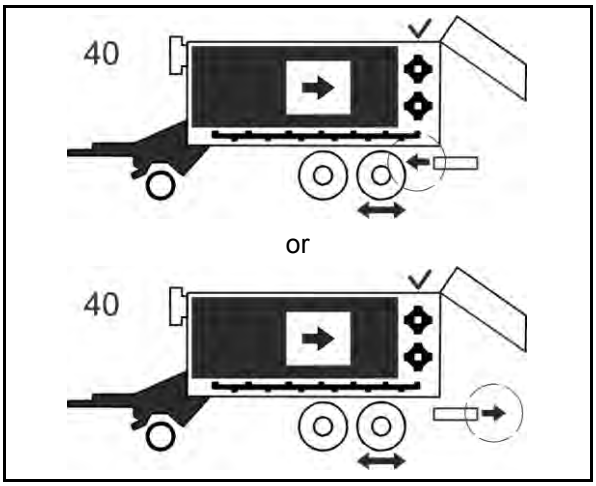
1. Press the  key once.

→ The crossover conveyor starts to run in the most recently set direction.

2. Press the  key again.

→ The sense of rotation of the crossover conveyor alternates between cw and ccw.

The screen shows:

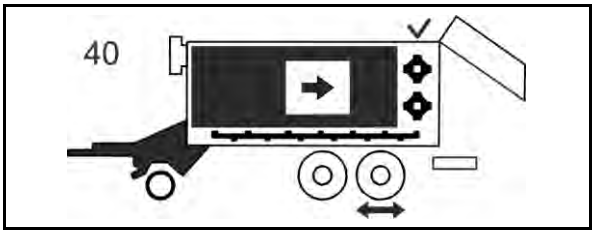


Stop crossover conveyor

1. Press the STOP key once.

→ The crossover conveyor stops.

The screen shows:



Switch cargo space lighting on/off

If the cargo space lighting is switched on:

- the lighting is automatically switched off if the road travel mode is switched on,
- the lighting is automatically switched on if the road travel mode is switched off.

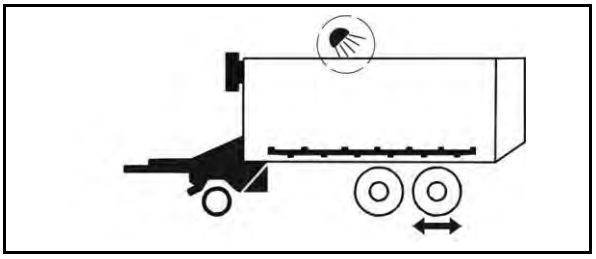
1. Briefly press the ESC key once.

→ The cargo space lighting is switched on. The "Cargo space lighting on" symbol appears.

2. Press the ESC key quickly again.

→ The cargo space lighting is switched off. The "Cargo space lighting on" symbol goes out.

The screen shows:



Switch silage additive pump on/off

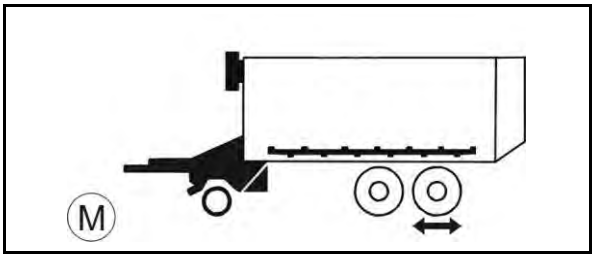
1. Press and hold the ESC key once.

→ The silage additive pump is switched on. The "Silage additive pump on" symbol appears.

2. Press and keep hold of the ESC key again.

→ The silage additive pump is switched off. The "Silage additive pump on" symbol disappears.

The screen shows:



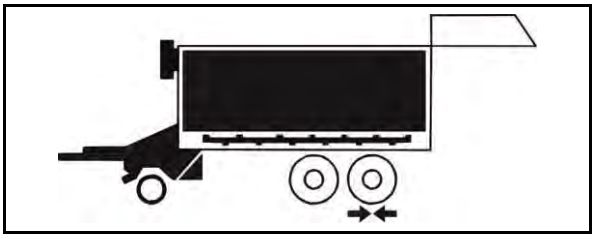
Lift tailgate (Machine without beaters)

When discharging on the bunker silo, the tailgate is automatically lifted to its full extent after pressing the A II key.

1. Press the key until the tailgate has reached its end position.

→ When the tailgate is completely lifted, the "Tailgate lifted" symbol appears.

The screen shows:



Lift tailgate (Machine with beaters)

When discharging on the bunker silo, the tailgate is automatically lifted to the set first opening width after pressing the A II key.

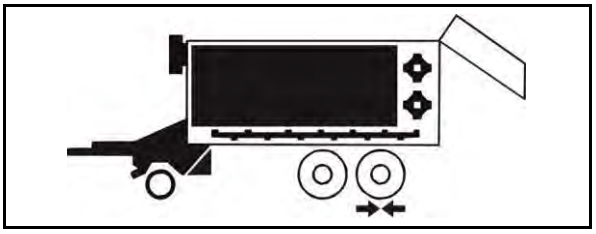
1. Press the key until the tailgate has reached its end position.

→ When the tailgate has been lifted to the set first opening width, the "Tailgate lifted" symbol appears.

2. Release the key and press it again.

→ The tailgate is lifted as long as the key is pressed or until the tailgate has been completely lifted.

The screen shows:



Lower tailgate

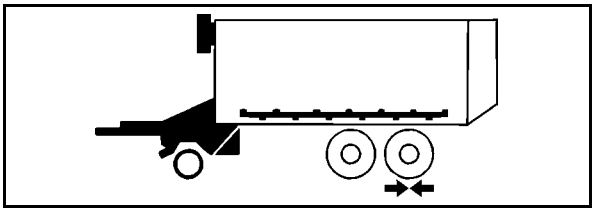
1. Press the key until the tailgate has reached its end position.

→ The tailgate is lowered. At the same time, the **discharge modes A I** and **A II** are automatically stopped:

- The transport floor automatically stops.
- The tailgate is lowered.

As soon as the tailgate is completely lowered, the "Tailgate lowered" symbol appears.

The screen shows:



Lift folding drawbar

1. Press the  key until the folding drawbar has been lifted to the desired position or has reached its end position.

→ The ground clearance of the pick-up is increased.

The screen shows:

no additional symbol

Lower folding drawbar

1. Press the  key until the folding drawbar has been lowered to the desired position or has reached its end position.

→ The ground clearance of the pick-up is reduced.

The screen shows:

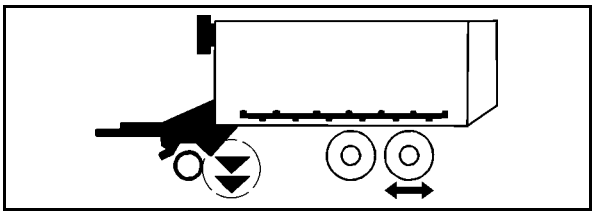
no additional symbol

Retract cutting unit

1. Press the  key until the "Cutting unit" symbol is in "Cutting unit retracted" position and a beep is emitted.

→ The cutting unit is retracted from the conveyor duct.

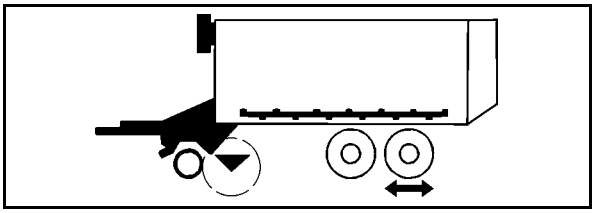
The screen shows:



If the "Cutting unit" symbol moves to "Cutting knives retracted" position during charging:

- at least one cutting knife has been retracted from the conveyor duct due to a foreign object,
- the cutting unit is heavily soiled.

The screen shows:



Remedy in case of cutting knife/knives retracted from the conveyor duct:

1. Swivel the cutting unit completely out of the conveyor duct and in again with the feeder rotor running.

Remedy in case of soiled cutting unit:

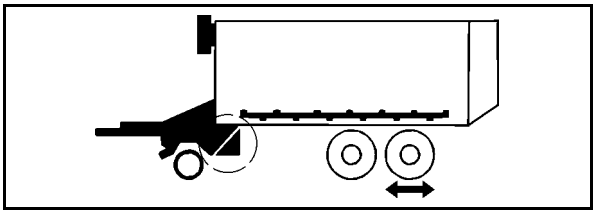
1. Clean the cutting unit.

Extend cutting unit

1. Press the  key until the "Cutting unit" symbol is in "Cutting unit extended" position and a beep is emitted.

→ The cutting unit is completely extended into the conveyor duct.

The screen shows:



Lock steering axle

WARNING

Risk to people due to insufficient stability and tipping over of the machine if the steering axle is not properly used!

It is absolutely necessary to lock the steering axle:

- before travelling over bunker silos,
- at travelling speeds of more than 40 km/h,
- on rough road tracks,
- when traversing hills,
- before carrying out reverse travels.

Align the wheels of the steering axle in a straight line by means of a short forward travel of the tractor and the hitched machine before locking the steering axle.

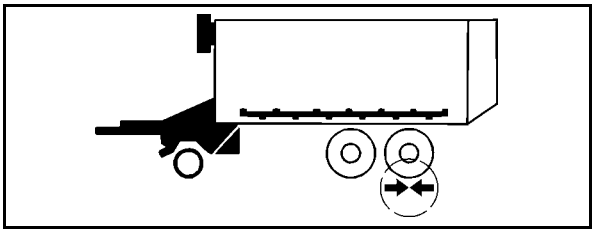
When switching the control set on, the single-acting steering axle is always in unlocked condition.

1. Press the  key once.

→ The steering axle is locked in "Straight" position. The "Steering axle locked" symbol appears and a beep is emitted.

→ If the symbol is flashing, the steering axle could not be completely locked. Check the steering system.

The screen shows:

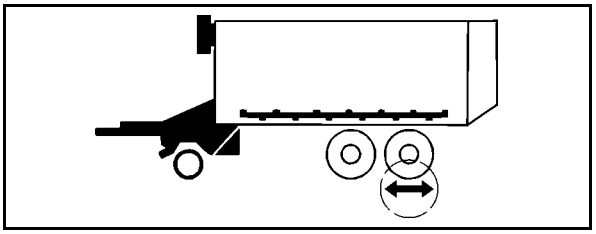


Unlock steering axle

1. Press the  key once.

→ The steering axle can move freely (is unlocked) and follows the turning radius of the corner during cornering. The "Steering axle unlocked" symbol appears and a beep is emitted.

The screen shows:



Lift pick-up

1. Press the  key until the pick-up has been lifted to its end position.

→ The pick-up raises.

The screen shows:

no additional symbol

Lower pick-up

CAUTION

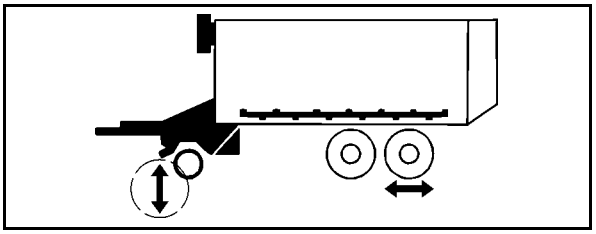
Risk of material damage when travelling on uneven ground with the pick-up lowered/locked.

Only move the machine on uneven ground with the pick-up held in open-centre position.

1. Press the  key once.

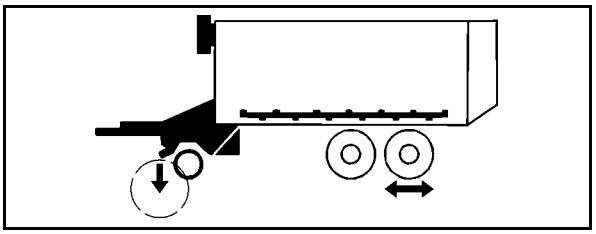
→ The pick-up lowers and is held in open-centre position. The "Lower pick-up/Open-centre position" symbol appears.

The screen shows:



2. Press the  key again.

→ The open-centre position is switched off and the pick-up is fixed. The "Lower pick-up/Locked position" symbol appears.



6.2.4 Set machine parameters

Shop work

For proper functioning of the ISOBUS control, setting of the appropriate machine parameters is required.

The machine parameters are set in the **SET** menu. Depending on the machine model and the machine's equipment, the indicated symbols may differ. The arrow in the centre indicates which parameter may currently be changed.

6.2.4.1 Call up SET menu

1. Press and hold the 

key once.

→ After switching to the **SET** menu, the arrow (1) is at the top and is pointing to the right. Now the right-hand functions 2 to 4 can be selected.

2. Briefly press the  key to move the arrow down.

3. Press and hold the  key such that the arrow is pointing to the left.

→ Now the left-hand functions 6 to 7 can be selected.

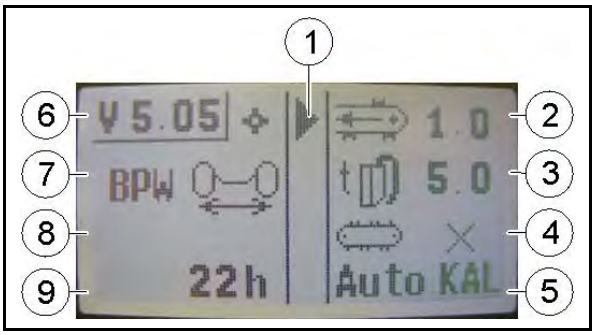
4. Use the  and  keys to change the values by 0.1.

5. Press the 

key once.

→ The **Working** menu appears.

The screen shows:



(1) Arrow

(2) Only for machines equipped with beaters: Entry of time during which the transport floor shall reverse if the "Forage wagon full" switch is switched on when starting **Discharge mode A II**.

(3) Only for machines equipped with beaters: Entry of time during which the tailgate shall be activated after reaching the "First opening width" sensor.

(4) Crossover conveyor display:
- an arrow indicates the direction in which the crossover conveyor starts to run
- "X" indicates that a crossover conveyor is not available
- "W" indicates that the Wollschläger hydraulic system is used

(5) Display of potentiometer position:
- value from 0 to 100
- "KAL" appears during the calibration procedure

(6) Left: Display of current software version

Right: Entry whether equipped with beaters or not; here "with beaters"

(7) Entry of steering axle model

(8) Vacant

(9) Display of total number of service hours

6.2.4.2 Pre-select filling degree of loaded material in cargo space

The higher the set filling degree, the higher the transport floor feed rate and the smaller the filling capacity.

1. Press the SET and  keys one after the other.

→ The **Filling degree** menu appears.

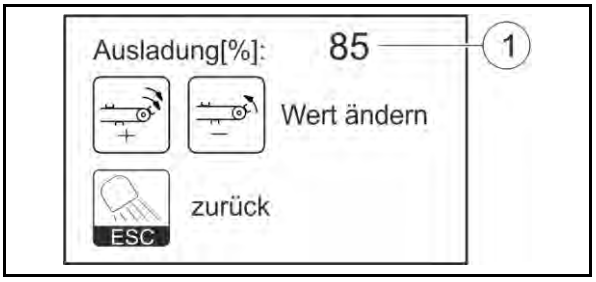
2. Press the  or  key to change the setting in 5% steps.

→ The filling degree (1) is changed.

3. Press the  key.

→ The **Working** menu appears with the "Automatic charging system on" symbol.

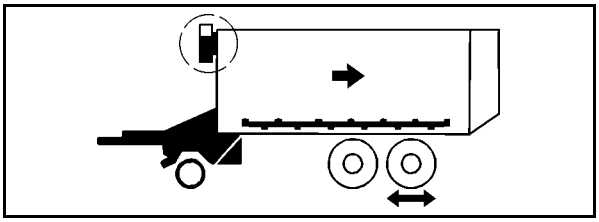
The screen shows:



„Ausladung“ = Filling degree

„Wert ändern“ = Change value

„zurück“ = Backwards



6.2.5 Calibration (ISOBUS control)

6.2.5.1 Calibrate automatic charging system

Shop work

A calibration of the automatic charging system helps to separately set the bottom position of the sensing band for switching the transport floor on and off and the top position of the sensing band to switch over to maximum feed rate.

Two people are required for calibration of the automatic charging system. One person moves the sensing band in the cargo space, while the other person operates the control set on the tractor.

WARNING

Risk of crushing, becoming entangled, wound up and being drawn in if people enter the cargo space with the drive running!

Secure tractor and machine against accidental starting and rolling before opening the access door to the cargo space and entering the cargo space.

1. Hitch the machine to the tractor.

2. Turn the tractor engine off.
3. Apply the parking brake of the tractor.
4. A second person enters the cargo space through the access door.
5. Switch the tractor ignition on.
6. Press and hold the SET key once.

→ The **SET** menu appears.

7. The person in the cargo space swivels the sensing band to the bottom position which shall be the automatic start position for the transport floor.
8. Press the key once to start the calibration mode.

→ The display "KAL" (5) appears.

9. The person in the cargo space swivels the sensing band to the top position which shall be the start position for the transport floor running at maximum feed rate.
10. Press the key again.
11. Press the STOP key once to acknowledge the settings and to finish the calibration procedure.

→ A horn sounds.

12. Check the set range for its suitability by manually moving the sensing band from the bottom position (indicated value: 0) to the top position (indicated value: 100). Adjust the range in case of a collision.
13. Press the ESC key once.

→ The **Working** menu appears.

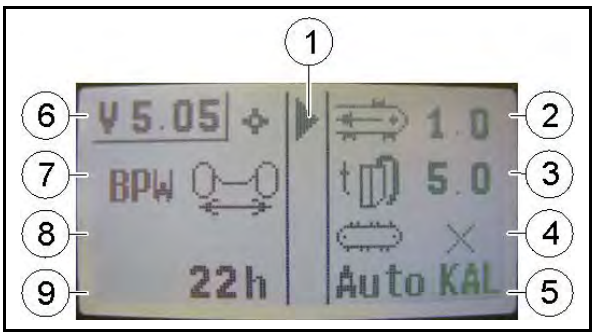


Fig. 78

6.2.6 Operating hours counter, service hours counter and transported loads counter

- The daily operating hours counter and the daily transported loads counter can be reset at any time.
- The daily operating hours counter and the daily transported loads counter are not automatically reset every day. These counters must be reset manually.
- The total service hours counter, the total operating hours counter and the total transported loads counter cannot be reset.

The operating hours counter and the transported loads counter are designed each as daily and total counters. The service hours counter is designed as total counter.

- Daily operating hours counter (operating hours until reset (h)). The operating hours of the machine during which the pick-up is in lowered position are registered.
- Daily transported loads counter (transported loads until reset). The number of transported loads is registered by counting the number of opening cycles of the tailgate.
- Total operating hours counter. The total operating hours counter registers the overall period of use of the machine during which the pick-up is in lowered position.
- Total service hours counter. The total service hours counter registers the overall period of use the machine by registering the time during which the ISOBUS control set is in switched-on mode.
- Total number of transported loads counter. The total number of transported loads counter registers the number of transported loads during the overall period of use of the machine.

6.2.6.1 Call up Counter menu

The total service hours counter is displayed in the **SET** menu, see chapter "Call up SET menu", page 118.

1. Briefly press the SET key once.

→ The **Counter** menu appears.

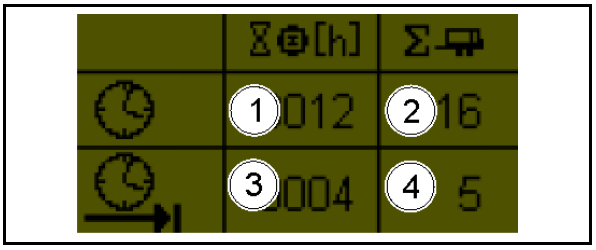
(1) Total operating hours counter

(2) Total number of transported loads counter

(3) Daily operating hours counter

(4) Daily transported loads counter

The screen shows:



2. Press the ESC key once.

→ The **Working** menu appears.

6.2.6.2 Reset daily counters

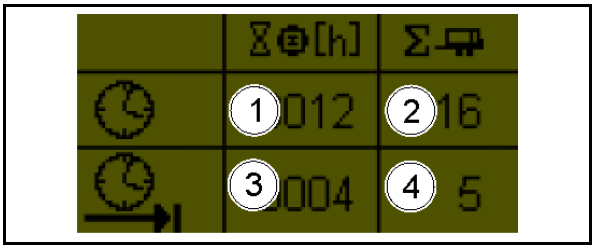
1. Briefly press the SET key once.

→ The **Counter** menu appears.

2. Press and hold the SET key once.

→ The daily service hours counter and the daily transported loads counter are reset.

The screen shows:



3. Press the ESC key once.

→ The **Working** menu appears.

7 Transport journeys

A transport journey is a journey of the charged or empty machine to or from the place of operation.

- Observe the fact that the braking axle needs to run in during the first service hours – the brake lining is adjusting to the brake drum. Full braking power is only reached after this running-in period.
- Check the brake system for proper functioning before carrying out transport journeys.

If the folding drawbar is equipped with a drawbar suspension, the hydraulic cylinders of the folding drawbar must be extended by approx. 20 mm before switching the road travel mode on.

The drawbar suspension will not work if the folding drawbar is lowered to its end position.

WARNING

Risk due to incorrect use of the tractor if this causes failure of components, insufficient stability and insufficient steerability and braking ability of the tractor!

Observe the maximum loading capacity of the attached/hitched machine and the admissible axle and tongue loads of the tractor. Run the machine being only partly filled if necessary.

WARNING

Risk to people due to accidental actuation of hydraulic functions during transport journeys!

Switch the **Road travel mode** on before carrying out transport journeys.

WARNING

Risk to people due to insufficient stability and tipping over of the machine if the steering axle is not properly used!

It is absolutely necessary to lock the steering axle:

- before travelling over bunker silos,
- at travelling speeds of more than 40 km/h,
- on rough road tracks,
- when traversing hills,
- before carrying out reverse travels.

1. Deactivate the automatic charging system and close the front panel.
2. Activate the **Road Travel mode** on your control set.

→ With the **Road Travel mode** switched on:

- The **Road Travel** menu appears,
- apart from the functions "Lock steering axle" and "Unlock steering axle", all other functions on the control set are disabled,

- the drawbar suspension (optional extra) and the warning beacon (optional extra) are switched on,
- the work lights are switched off.

3. Lock the passive steering axle when travelling at a speed of more than 40 km/h.
4. Start your transport journey.

7.1 Transport journeys with partly discharged machine

Ensure sufficient tongue load when carrying out transport journeys with partly discharged machine. Transport the loaded material from the rear to the front if the machine has been discharged to an extent of approx. 50%. The transport floor may be reversed for a short time (max. 3 seconds) for this purpose.

Observe the fact that the driving characteristics of the tractor are influenced by the load, in particular if the machine is partly empty.

8 Use of machine

When using the machine, additionally observe the information included in the following chapters:

- "Operator's obligation", page 26,
- "Qualification of operator", page 27,
- "Basic safety instructions", page 29,
- "Warning and instruction signs", page 37.

Observance of these chapters serves your safety.

Check the machine for visible defects every day.

Immediately remedy or have remedied visible defects.

Clean the cutting unit, in particular the retainer of the cutting knives, and the cutting knives themselves every day.

Permanent oil circulation between tractor and machine is required for initiating the individual hydraulic functions.

WARNING

Risk of becoming entangled, wound up and risk due to blown-away foreign objects to people within the hazardous area of the powered propeller shaft!

- Check the safety and protective devices of the propeller shaft for proper functioning and completeness before each startup of the machine.

  Have damaged safety and protective devices of the propeller shaft immediately replaced by an authorized workshop.
- Immediately turn the tractor engine off in case of emergency.

WARNING

Risk to people of being crushed, drawn in and becoming entangled due to unprotected powered driving elements during machine operation!

- Start the machine only with the protective devices completely mounted.
- It is not allowed to open protective devices:
  - when the machine is powered,
  - as long as the tractor engine is running with the propeller shaft coupled/the hydraulic system connected,
  - if the ignition key is in the tractor and the tractor engine can be accidentally started with the propeller shaft coupled/the hydraulic system connected,
  - if tractor and machine have not been secured against accidental rolling by means of their respective parking brake and/or the chocks.

  Close open protective devices before powering the machine.

WARNING

Risk to people due to failure of components if the machine is powered at inadmissible high drive speed!

Observe the admissible drive speed of the machine before switching the tractor's p.t.o. shaft on.

WARNING

Risk of crushing, shearing, being drawn in and becoming entangled to people within the hazardous area of the powered transport floor, especially at the deflection points!

- Keep sufficient safe distance to the powered transport floor.
- Make sure that people leave the hazardous area of the transport floor before switching on the transport floor feed.
- Always keep the transport floor chain tightened.
- Switch the transport floor feed off as soon as it is no longer required.

WARNING

Risk due to failure of components in case of actuation of the overload clutch!

Immediately switch the tractor's p.t.o. shaft off in case of actuation of the overload clutch.

8.1 Charging

► See also chapter "Eliminate clogging at the pick-up and the feeder rotor", page 177!

Check the cutting knives for sharpness every day. Turn blunt cutting knives over (if possible) or grind them early enough.

Before charging the machine:

- check the set operating height of the pick-up and readjust if necessary, see chapter "Set operating height", page 74.
- check the set distance between pick-up and holding-down device/pulley and readjust if necessary, see chapter "Set holding-down device with pulley", page 75.
- check whether the desired cutting length of the loaded material can be achieved by means of the number of mounted cutting knives.

When charging the machine, absolutely observe the following information:

- Only lift the pick-up with the conveyor duct being empty!
- Reduce the tractor engine speed during cornering!
- Switch the p.t.o. shaft off and lift the pick-up when taking tight curves!
- Avoid uneven charging of the machine which might cause overloading of the drawbar!
- Switch the automatic charging system on for uniform and complete filling of the cargo space.

  The automatic charging system:

  - has to be switched on only once,
  - automatically and infinitely variably switches the transport floor on and off during charging,
  - will automatically be deactivated if the control set generates the acoustic signal (horn sound) and the visual signal "Forage wagon full",
  - will automatically be activated if the machine has been emptied and the pick-up is lowered the next time,
  - remains switched on until the automatic charging system is manually switched off,
- Pre-select the filling degree of the loaded material in the cargo space. Observe the information in the chapter "Pre-select filling degree of loaded material in cargo space", page 119.
- Observe the visual and acoustic signals of the control set during charging.
- Observe the maximum admissible load capacity of the machine.

WARNING

Risk due to incorrect use of the tractor if this causes failure of components, insufficient stability and insufficient steerability and braking ability of the tractor!

Observe the maximum loading capacity of the attached/hitched machine and the admissible axle and tongue loads of the tractor. Run the machine being only partly filled if necessary.

WARNING 	**Risk of crushing, shearing and risk of impact when lowering and lifting the pick-up!** Make sure that people leave the hazardous area of the pick-up before lowering or lifting the pick-up.

WARNING 	**Risk of becoming entangled, wound up and being drawn in within the area of the movable pick-up components!** Make sure that people leave the pick-up area before switching the pick-up drive on.

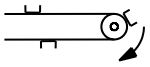
CAUTION 	**Risk due to failure of components caused by loaded material being still in the conveyor duct when lifting the pick-up!** Only lift the pick-up when there is no more loaded material in the conveyor duct.

8.1.1 Charging with easy-to-use control

► See also chapter "Activate / Deactivate silage additive pump (with easy-to-use control)", page 88!

1. Set switch (1) to the middle position **I** to switch on the operating mode.
2. Set switch (3) to the upper position  to switch on the automatic charging system.

   Or:

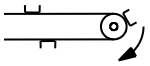
   Set switch (6) to the upper position  to switch on the transport floor feed.

   The feed rate of the transport floor can be adjusted by means of the control dial (4).
3. Lower the folding drawbar if necessary:

   Keep hold of switch (8) in the lower position  until the folding drawbar has reached the desired height.
4. Set switch (11) to the lower position  to lower the pick-up.
5. Switch the tractor's p.t.o. shaft on (1000 min^{-1}).
6. Start charging. Select the tractor speed according to the swathe size and cutting length.

- If the forage wagon is full, the easy-to-use control set will generate an acoustic signal (horn sound) and a visual signal (control lamp (H5): "Forage wagon full"). The automatic charging system is deactivated and the automatic feed function for the transport floor is switched off.

  The acoustic signal (horn sound) and the visual signal (control lamp (H5): "Forage wagon full") can be switched off by setting switch (6) to the middle position.

- You can still continue to charge forage wagons **without beaters** and to switch the transport floor feed manually on for a maximum of three times for a short time of 2 seconds with switch (6) being in the upper position  .

  Stop the charging procedure when the acoustic signal has appeared for the third time at the latest.

- On forage wagons **equipped with beaters** the transport floor stops for a short time during discharge if the transport floor is running too fast.

  Use the control dial (4) to reduce the transport floor speed.

8.1.2 Charging with ISOBUS control

1. Press the  key once to switch off the **Road travel mode** on the field.
2. Press the  key once to switch on the automatic charging system.
3. Press the  key once if necessary to lower the folding drawbar.
4. Press the  key once to lower the pick-up.
5. Switch the tractor's p.t.o. shaft on (1000 min^{-1}).
6. Start charging. Select the tractor speed according to the swathe size and cutting length.

→ When the machine is fully charged, the ISOBUS control set generates an acoustic signal (horn sound) and a visual signal "Forage wagon full". The automatic charging system is deactivated and the automatic feed function for the transport floor is switched off.

Machines without beaters:

7. You can still continue to charge the machines. The feed function of the transport floor can still be switched on for a maximum of three times for a short period of 2 seconds via the 

key. Stop the charging procedure after the acoustic signal has appeared for the third time at the latest.

Machines equipped with beaters:

7. The front section of the cargo space can still be topped up.
8. Stop the charging procedure and let the p.t.o. shaft continue to run until the conveyor duct is free from any loaded material.
9. Switch the tractor's p.t.o. shaft off.

10. Press the  key once to lift the pick-up.
11. Press the  key once to switch on the **Road travel mode** for transport journeys on public roads.

8.2 Discharging

- Lift the pick-up completely!
- Lock the steering axle!
- Lift the folding drawbar such that there is enough ground clearance for the pick-up when moving onto the bunker silo und distributing the loaded material!

  Insufficient ground clearance may cause bending of the pick-up carriers.

WARNING

Risk of crushing, impact and being drawn in when opening and closing the tailgate!

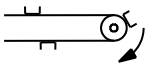
Make sure that people leave the swivelling range of the tailgate before starting discharge.

8.2.1 Discharging with easy-to-use control

8.2.1.1 Machine without beaters

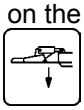
1. Set switch (1) to the middle position **I** to switch on the **operating mode**.
2. Keep hold of switch (11) in the upper position  until the pick-up has sufficient ground clearance.
3. Keep hold of switch (8) in the upper position  until the folding drawbar has been sufficiently lifted.
4. Keep hold of switch (10) in the lower position  until the steering axle is locked.

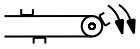
   → The control lamp (H4) lights up.
5. Move onto the bunker silo.
6. Keep hold of switch (7) in the upper position  until the tailgate is open.

   → The control lamp (H2) lights up.
7. Set switch (6) to the upper position  to switch on the transport floor.

8. Start to move and select the travelling speed of the tractor according to the height of the desired discharged material stack.

   For step-by-step discharge, the transport floor feed can be repeatedly switched off by setting switch (6) to the middle position for a short time.

- During discharge, the feed rate of the transport floor can be changed via the control dial (4).
- For lowering the folding drawbar again during discharge on the bunker silo, keep hold of switch (8) in the lower position  until the folding drawbar has reached the desired height.

9. Set switch (5) to the upper position  to double the feed rate of the transport floor for complete emptying.
10. Keep hold of switch (7) in the upper position  to close the tailgate.
11. Drive off the bunker silo.
12. Keep hold of switch (8) in the lower position  until the folding drawbar has been lowered to the desired position.

    If the folding drawbar is equipped with a drawbar suspension, lower the folding drawbar just as far as to ensure that the hydraulic cylinders of the folding drawbar are still extended by approx. 20 mm.
13. Set switch (1) to the upper position  to switch on the **road travel mode** for transport journeys.

8.2.1.2 Machine equipped with beaters

- Open the tailgate only with the tractor's p.t.o. shaft stopped.

  Non-observance of this information may cause damage to the jaw clutch of the powertrain of the beaters.
- Reduce the feed rate for the transport floor during discharge if the control set frequently generates the acoustic and visual signal "Forage wagon full"!

  The beaters may become clogged if the feed rate for the transport floor is not reduced.

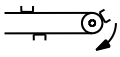
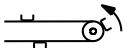
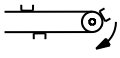
WARNING

Risk of being drawn in and becoming entangled within the area of powered beaters when opening and closing the tailgate and when discharging the machine!

Make sure that people leave the swivelling range of the tailgate before actuating switch (7) (position  or ).

1. Set switch (1) to the middle position **I** to switch on the **operating mode**.

2. Keep hold of switch (11) in the upper position  until the pick-up has sufficient ground clearance.
3. Keep hold of switch (8) in the upper position  until the folding drawbar has been sufficiently lifted.
4. Keep hold of switch (10) in the lower position  until the steering axle is locked.
   → The control lamp (H4) lights up.
5. Move onto the bunker silo.
6. Keep hold of switch (7) in the upper position  until the tailgate is open.
   → The control lamp (H2) lights up.

   Gearbox and clutch are switched automatically.
7. Switch the tractor's p.t.o. shaft on.
8. Let the tractor's p.t.o. shaft smoothly start to run such that the beaters are able to loosen themselves.
9. Set switch (6) to the upper position  to switch on the transport floor.
10. Switch the tractor's p.t.o. shaft immediately off if the slip clutch responds.
11. Set switch (6) to the middle position to switch off the transport floor feed.
12. Keep hold of switch (6) in the lower position  to reverse the transport floor feed for 3 seconds.
    Thus, the pressing power which the loaded material applies to the beaters, and the starting torque for loosening the beaters are reduced.
13. Switch the tractor's p.t.o. shaft on.
14. Let the tractor's p.t.o. shaft smoothly start to run such that the beaters are able to loosen themselves.
15. Set switch (6) to the upper position  to switch on the transport floor.
16. Switch the p.t.o. shaft off when the cargo space has been emptied up to the beaters.
17. Set switch (6) to the middle position to switch off the transport floor feed.
18. Set switch (7) to the lower position  to close the tailgate.
19. Drive off the bunker silo.
20. Keep hold of switch (8) in the lower position  until the folding drawbar has been lowered to the desired position.

    If the folding drawbar is equipped with a drawbar suspension, lower the folding drawbar just as far as to ensure that the hydraulic cylinders of the folding drawbar are still extended by approx. 20 mm.
21. Set switch (1) to the upper position  to switch on the **road travel mode** for transport journeys.

8.2.2 Discharging with ISOBUS control

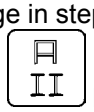
8.2.2.1 Machine without beaters

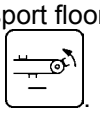
1. Press the  key once to switch the **Road travel mode** off.
2. Press the  key until the pick-up has sufficient ground clearance.

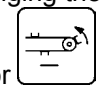
   The following functions will be automatically carried out one after the other:

   2.1 Lock steering axle.
   2.2 Lift folding drawbar.
3. Move onto the bunker silo.
4. Press the  key for a short time when being on the bunker silo.

   The following functions will be automatically carried out one after the other:

   4.1 Lift tailgate
   4.2 Switch transport floor on when the tailgate reaches its end position.
5. Start to move and select the travelling speed of the tractor according to the height of the desired discharged material stack. To discharge in steps, the transport floor feed can be switched on and off as often as desired by pressing the  key.

- During discharge, the feed rate of the transport floor can be changed via the keys  and  or  .

  For changing the feed rate, press the  key once and the  or  key quickly in succession several times if necessary.
- Press the  key to lower the folding drawbar during discharge on the bunker silo.

8.2.2.2 Machine equipped with beaters

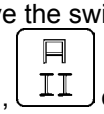
- Press the  key only with the tractor's p.t.o. shaft stopped!

  Non-observance of this information may cause damage to the jaw clutch of the powertrain of the beaters.
- Reduce the feed rate for the transport floor during discharge if the control set frequently generates the acoustic and visual signal "Forage wagon full"!

  The beaters may become clogged if the feed rate for the transport floor is not reduced.

WARNING

Risk of being drawn in and becoming entangled within the area of powered beaters when opening and closing the tailgate and when discharging the machine!

Make sure that people leave the swivelling range of the tailgate before pressing the  ,  or  key.

1. Press the  key once to switch the **Road travel mode off**.
2. Press the  key until the pick-up has sufficient ground clearance.

   The following functions will be automatically carried out one after the other:

   2.1 Lock steering axle.

   2.2 Lift folding drawbar.
3. Move onto the bunker silo.
4. Press the  key for a short time when being on the bunker silo.

   The following functions will be automatically carried out one after the other:

   4.1 Lift tailgate until the first set opening width is reached.

   4.2 Switch gearboxes and clutches.

   4.3 Switch transport floor to standby mode when the tailgate has reached its end position. The "Feed On" symbol is flashing on the control set.
5. Switch the tractor's p.t.o. shaft on.
6. Let the tractor's p.t.o. shaft smoothly start to run such that the beaters are able to loosen themselves.

→ The beaters start to run and after a short delay, the transport floor automatically starts.

6.1 Switch the tractor's p.t.o. shaft immediately off if the slip clutch responds.

6.2 Press the  key to switch the transport floor feed function off.

6.3 Press the  key once to reverse the feed direction of the transport floor for 3 seconds. Thus, the pressing power which the loaded material applies to the beaters, and the starting torque for loosening the beaters are reduced.

6.4 Press the  again.

→ The transport floor automatically switches to standby mode and the "Feed On" symbol is flashing on the control set.

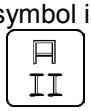
6.5 Switch the tractor's p.t.o. shaft on.

6.6 Let the tractor's p.t.o. shaft smoothly start to run such that the beaters are able to loosen themselves.

→ The beaters start to run and after a short delay, the transport floor automatically starts.

7. Start to move and select the travelling speed of the tractor according to the height of the desired discharged material stack.

7.1 Switch the p.t.o. shaft off before changing the lane on the bunker silo.

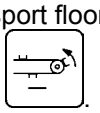
→ The beaters and the transport floor stop. The transport floor automatically switches to standby mode and the "Feed on" symbol is flashing on the control set if the transport floor is not separately switched off via the  key.

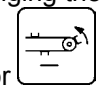
7.2 Change the lane.

7.3 Switch the tractor's p.t.o. shaft on.

7.4 Let the tractor's p.t.o. shaft smoothly start to run such that the beaters are able to loosen themselves.

→ The beaters start to run and after a short delay, the transport floor automatically starts.

- During discharge, the feed rate of the transport floor can be changed via the keys  and  or  .

  For changing the feed rate, press the  key once and the  or  key quickly in succession several times if necessary.

- Press the  key to lower the folding drawbar during discharge on the bunker silo.

8. Press the  key once to double the feed rate of the transport floor for complete emptying.
9. Switch the p.t.o. shaft off when the cargo space has been emptied up to the beaters.

→ The transport floor will not switch off if the  key has been pressed for complete emptying.

10. Press the  key to lower the tailgate.

→ The **Discharge modes A I** and **A II** are deactivated and the transport floor is automatically switched off.

11. Drive off the bunker silo.

12. Press the  key until the folding drawbar has been lowered to the desired position.

    If the folding drawbar is equipped with a drawbar suspension, lower the folding drawbar just as far as to ensure that the hydraulic cylinders of the folding drawbar are still extended by approx. 20 mm.

13. Press the  key once to switch on the **Road travel mode** for transport journeys.

8.2.3 Determine admissible loading capacity

Observe the different specific weights of the various loaded materials when charging the machine! Heavy loaded materials lead to a reduced admissible loading capacity.

The admissible axle load and the empty weight are indicated on the type plate or in the chapter "Technical data", page 22.

Max. admissible load = Admissible axle load - Empty weight

$$\text{Max. admissible loading capacity} = \frac{\text{Max. load [kg]}}{\text{Specific weight of loaded material [kg/m}^3\text{]}}$$

8.2.4 Bulk densities of different materials

Agricultural products	Weight [kg/m³]	TS content
Grass silage "dry"	approx. 250	approx. 40 %
Grass silage "humid"	approx. 400	approx. 30 %
Maize silage	approx. 400	approx. 30 %

TS = dry matter content of loaded material

9 Service and maintenance of machine

Regular and proper service and maintenance:

- will keep your machine ready for use for a long time and avoid early wear,
- will reduce downtimes and repairs,
- is a precondition for our warranty provisions.

- When carrying out service and maintenance work on the machine, additionally observe the information included in the following chapters:
  - "Operator's obligation", page 26,
  - "Qualification of operator", page 27,
  - "Basic safety instructions", page 29,
  - "Warning and instruction signs", page 37.
- Immediately replace worn or damaged components, in particular a worn drawbar.
- Only use original spare parts.
- Observe environmental protection measures when carrying out service and maintenance work on the machine.
- Observe legal provisions when disposing of operating media such as oils and greases. This applies also to parts having come into contact with those operating media.
- The time intervals, service hours and maintenance intervals specified in the included sub-supplier documentation shall prevail.
- As a basic principle, disconnect all electrical/electronic plug connections to the tractor before carrying out service and maintenance work on the machine. This shall particularly apply to welding work.
- It is necessary to take protective measures such as covering power supply lines, hydraulic hose pipes, brake and feed lines or removal of such lines at particularly critical spots:
  - when carrying out welding, drilling and grinding work.
  - when carrying out work by means of cutoff wheels in the vicinity of these pipes and lines.
- Check brake lines, air pipes and hydraulic hose pipes with special care for visible defects.

- Special know-how is required for carrying out testing and maintenance work. This know-how is not imparted by these operating instructions.
- The maintenance intervals depend on the frequency of use of your machine. The maintenance plan has been tailored to medium axle loads and stress exerted on the brakes.

  In case of higher loads and amount of stress, maintenance work must be carried out at respectively shorter intervals. This shall in particular apply to the brakes and chassis.
- Modifications to the maintenance instructions shall be reserved!

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people if:

- **lifted, unsecured machine parts accidentally come down or are unintentionally lowered,**
- **tractor and machine accidentally start and roll!**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure tractor and machine against accidental starting and rolling before carrying out any service or maintenance work on the machine.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

9.1 Operating media

Exclusively use the operating media specified in these operating instructions and in the included sub-supplier documentation!

The manufacturer will not assume any warranty or liability for damage on the machine caused by the use of non-approved operating media.

Filling-up point / Lubrication point	Quantity when filled	Liquid / Lubricant	Specification	Trade name (manufacturer)
Lubrication points	s. p. 143	Grease	Lithium-saponified multi-purpose grease	Avialith 2EP
Feed gearing, transport floor	0.75 l	Liquid grease	NLGI-00/000	Avialith 000EP
Main gearbox, conveying unit	3.5 l	Gear lubricant oil	ISO VG 320	Mobilgear 600 XP 320
Angular gear, beaters (front)	1 l			
Angular gear, beaters (rear)	0.4 l			
Hydraulic system		Hydraulic oil	Hydraulic oil according to DEXRON II D	ATF 86 (Avia) * RSL 46 (Avia) * Azolla ZS 46 (Total) Fluide ATX (Total) ATF 22 (Aral) Autran DX II (BP) ATF D2 (Esso) Titan ATF 3000 (Fuchs) Donax TA (Shell)
			Biodegradable hydraulic oil	Forbex SE 46 (Aral) Biohyd SE-S 46 (BP) Mobil EAL Hydraulic Oil 46 (Esso/Mobil) Plantosyn 3268 (Fuchs) Naturelle HF-E 46 (Shell) Biohydran SE 46 (Total)

* Initially filled by the manufacturer (optional)

9.2 Service and maintenance plan - Overview

► See also chapter "Lubrication plan", page 143!

► See also chapter "Lubrication and maintenance plan – Chassis", page 172!

Before first start-up and after longer downtimes

Check:

- the wheel nuts for tightness, retighten if necessary.
- all screwed connections for:
  - drawbar,
  - chassis,
  - hydraulic system.

  Retighten if necessary.
- the float of the wheel hub bearing.
- all components of the hydraulic system for tightness and visible defects, immediately remedy or have remedied leaks and defects if necessary.
- the oil level of all gearboxes, top up if necessary.
- the tyre pressure, readjust if necessary.
- all functions of the machine, in particular:
  - the function of the brake system.
  - lifting and lowering of pick-up,
  - extending and retracting of cutting unit,
  - lifting and lowering of tailgate,
  - switching on and reversing (max. 3 seconds) of transport floor,
  - ccw and cw rotation of crossover conveyor (if available),
  - locking and unlocking of steering axle,

Bleed the friction clutch of the pick-up.

Check:

- the machine for visible defects.

  Immediately remedy or have remedied visible defects.
- the cutting knives for sharpness. Turn blunt cutting knives over or sharpen them.
- the lighting system for proper functioning.
- the service brake system for proper functioning.
- the parking brake for smooth action.

  Lubricate all movable parts of the parking brake if necessary.
- the tension of the transport floor chains, shorten chain if necessary.
- the tension of the roller chain for the CFS drum drive, retighten if necessary.
- the grease level in the reservoir of the central lubrication, top up if necessary.
- the open spur gear for the feeder rotor for proper lubrication; the toothed wheels must be covered by a shiny layer of grease.

Drain the compressed-air reservoir of the compressed-air brake system via the drain valve.

Use compressed air to clean the cutting unit, in particular the retainer of the cutting knives and the knife security system.

Every 50 service hours

- Pick-up:
  - Check tension of the roller chains of the pick-up drive, tighten roller chains if necessary.
- Beaters:
  - Check tension of the roller chains of the beater drive, tighten roller chains if necessary.
- Hydraulic system:
  - Check hydraulic hose pipes for visible defects, remedy defects if necessary,
  - retighten screwed connections of hydraulic system.
- Change the gear lubricant oils (once; further intervals see below).

Every 250 service hours

- Check compressed-air brake system for tightness:
  - The pressure in the compressed-air reservoir of the unhitched vehicle must not drop more than 0.15 bar within 10 minutes.
- Drawbar lug: Check for wear and screwed connection:
  - Borehole diameter of drawbar lug 40: max. 41.5 mm.
  - Admissible wear at the angular cross-section of the drawbar lug: max. 2.5 mm.
- Check drawbar connection, retighten if necessary:
  - Tightening torque of crown nut: 800^{+50} Nm,
- Check:
  - all bearings,
  - the oil level of all gearboxes, top up if necessary,
  - all cables for visible defects, replace if necessary.

Every 500 service hours or once a year

- Check frame and drawbar for fissures.
- Clean the filter elements of the compressed-air brake system depending on the operating conditions.
- Change the gear lubricant oil
  - in the main gearbox of the conveying unit,
  - in the front angular gear of the beaters.
- Have the hydraulic hose pipes checked for their operational safety by an expert.

Every 2000 service hours or once a year

Change or replace

- the liquid grease in the feed gearing of the transport floor,
- the gear lubricant oil in the rear angular gear of the beaters.
- Remove all cutting knives.
- Thoroughly clean the machine.
- Touch up paintwork.

- Grease and lubricate all movable machine parts (in particular those of the cutting unit).
- Lubricate transport floor chains, in order to prevent the chain links from getting rusty.

9.3 Cleaning of machine

- Regularly and thoroughly clean the machine! Dirt may attract humidity thus facilitating the formation of rust.

  Regular cleaning of the machine is the precondition for proper maintenance and makes operation of the machine easier.
- Lubricate the machine after cleaning, especially after cleaning by means of a pressure washer/steam blaster or fat dissolving agents.
- Continuously inspect the machine for corrosion damage! Remedy corrosion damage by touching up paintwork.

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people if:

- **lifted, unsecured machine parts accidentally come down or are unintentionally lowered,**
- **tractor and machine accidentally start and roll!**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure tractor and machine against accidental starting and rolling before carrying out any service or maintenance work on the machine.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

Cleaning by means of pressure washer / steam blaster

It is absolutely imperative to observe the following when using a pressure washer/steam blaster for cleaning:

- Admissible injection pressure: max. 80 bar.
- Water temperature: max. 60°C.
- Distance between cleaning nozzle and machine: min. 300 mm.
- Nozzle spraying angle: min. 25°.

  Never aim the cleaning nozzle jet at machine parts at right angles.
- Never aim the cleaning nozzle jet of the pressure washer/steam blaster
  - o directly at lubrication points and bearings,
  - o directly at hydraulic components,
  - o directly at rubber seals (e.g. at the door of the driver's cabin).
- Do not clean electrical components such as control set, weighing rods, distributor boxes, weighing computer.
- Do not clean chromium-plated components.
- Do not use any chemical additives.

9.4 Lubrication of machine

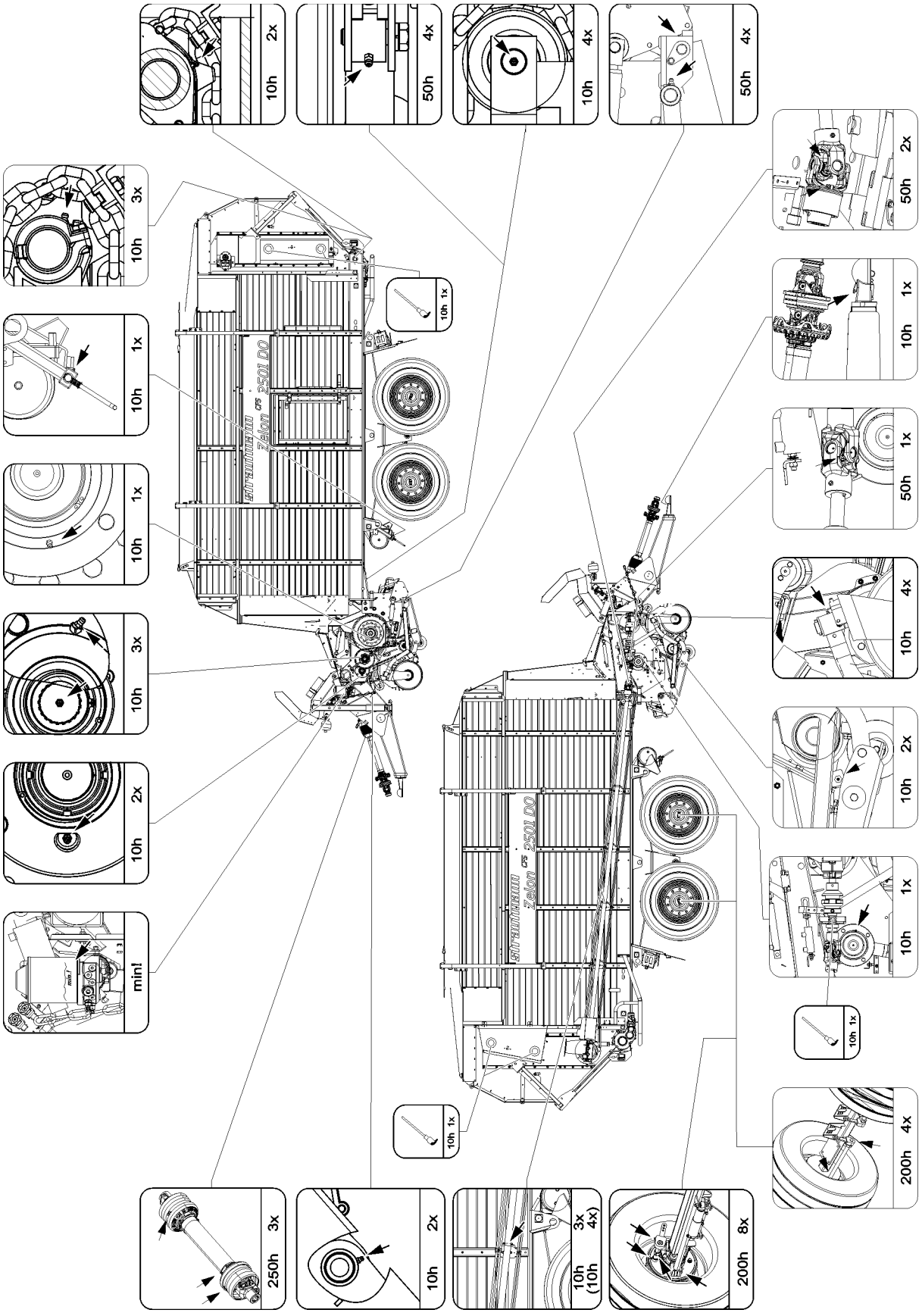
WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people if:

- **lifted, unsecured machine parts accidentally come down or are unintentionally lowered,**
- **tractor and machine accidentally start and roll!**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure tractor and machine against accidental starting and rolling before carrying out any service or maintenance work on the machine.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

9.4.1 Lubrication plan

► See also chapter "Lubrication and maintenance plan – Chassis", page 172!



9.4.2 Check / Top up central lubrication

With the pick-up in open-centre position, the central lubrication starts and supplies grease to the open spur gear of the feeder rotor and the roller chains of the CFS drum and the pick-up drive.

Particularly check the open spur gear for sufficient lubrication at regular intervals!

Never operate the machine with unlubricated spur gear! The manufacturer will not assume any warranty or liability for damage resulting therefrom.

WARNING

Risk of injury due to the running gearbox and overheated toothed wheels!

Only carry out a visual check of the lubrication of the open spur gear with the machine having been stopped and secured against starting!

In case the toothed wheels must be touched: Let the toothed wheel cool down first!

1. Check the grease level (1) in the reservoir (2) of the central lubrication:

   The level must not fall below minimum (3) (approx. 1 cm).

2. Top up grease through the lubricating nipple (4) if necessary.

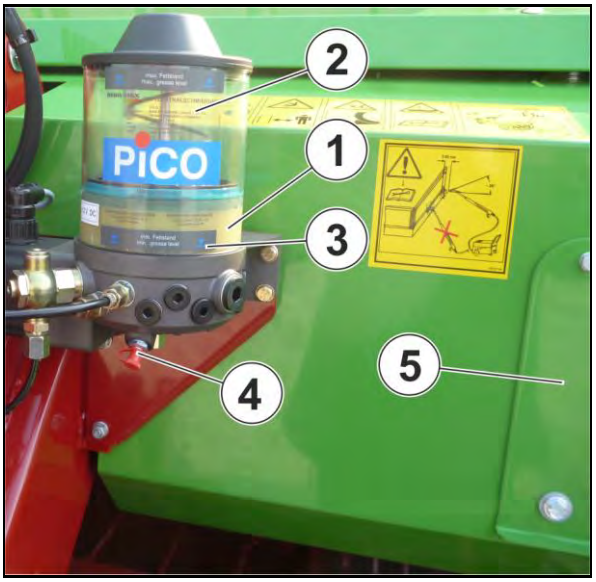


Fig. 79

3. Remove the cover (5) from the opening and check the toothed wheels of the spur gear for sufficient lubrication:
   - The toothed wheels (6) must be covered with a shiny layer of grease.
   - With the pick-up lowered and the control device of the tractor in open-centre position, the overflowing grease (7) must be visible.
4. Reinstall the cover (5) on the opening.

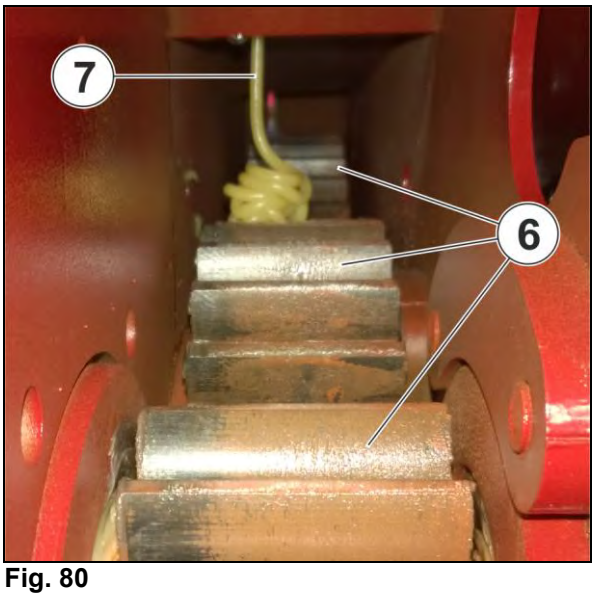


Fig. 80

9.5 Check/top up/change gear lubricant oil

► See also chapter "Service and maintenance plan - Overview", page 139!

► See also chapter "Operating media", page 138!

CAUTION

Risk of damage to machine components when powering gearboxes without gear lubricant oil!

Always ensure a sufficient oil level in the gearboxes.

- Change the oil when the gear lubricant oil has reached its operating temperature (30-40°C) if possible. The flowability of the gear lubricant oil is at its optimum at operating temperature.
- The optimum oil level is reached at an oil temperature of 0-20°C.

Dispose of used oil according to regulations. Contact your oil supplier in case of disposal problems!

WARNING

Risk of slipping to people due to leaking oil during topping-up of oil / oil change!

Immediately remove fresh oil stains by means of binding agents.

9.5.1 Feed gearing of transport floor

(1) Oil inspection plug
(2) Oil filling screw
(3) Oil drain plug

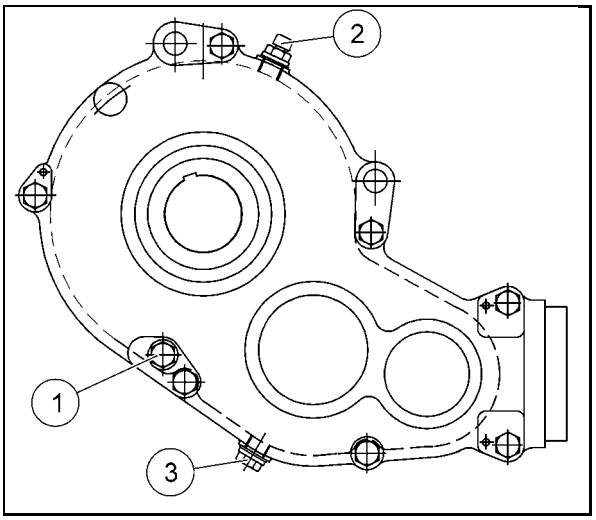


Fig. 81

9.5.2 Main gearbox of cutting unit

(1) Oil inspection plug
(2) Oil filling screw
(3) Oil drain plug

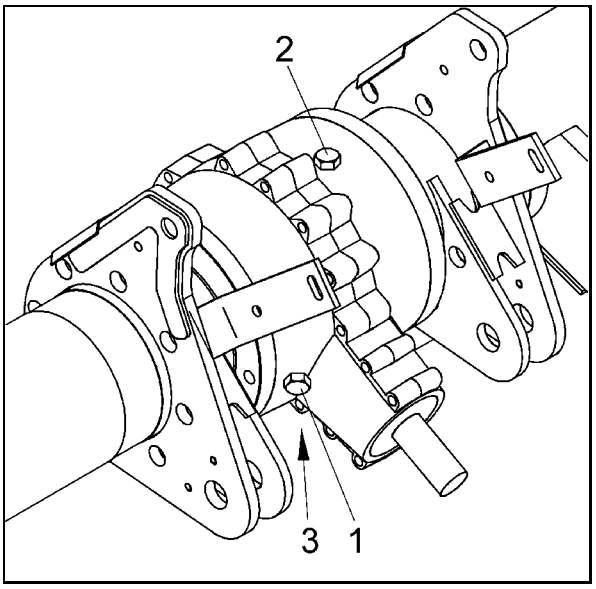


Fig. 82

9.5.3 Angular gear of beater unit

Front

(1) Oil filling screw
(2) Oil drain plug

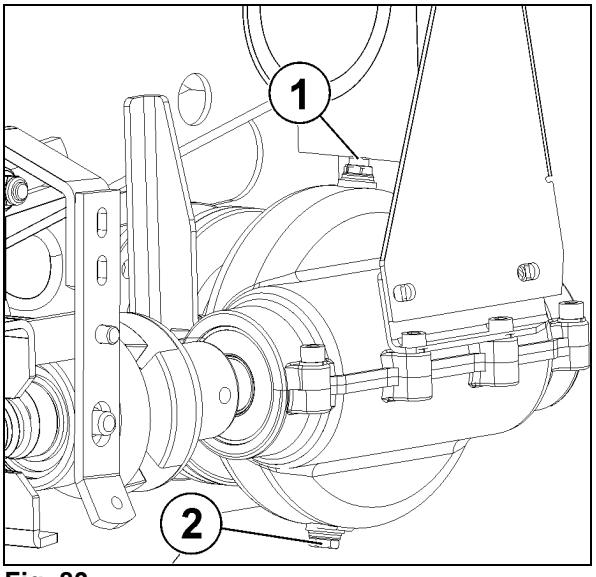


Fig. 83

Rear

(1) Oil filling screw

(2) Oil drain plug

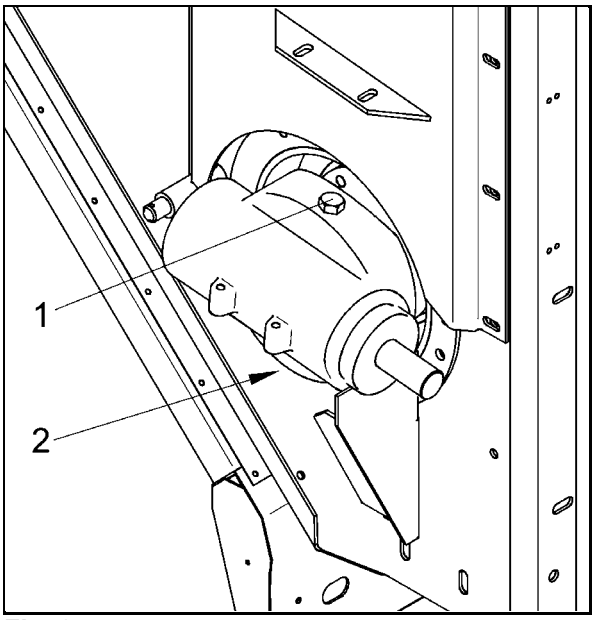


Fig. 84

9.5.4 Check/Top up oil level

WARNING 	**Risk of injury due to movements of tractor and machine or machine parts!** Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine! Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Align the machine in horizontal position.
2. Unscrew the oil inspection plug.
   → The oil must be visible at the oil inspection plug.
3. Top up gear lubricant oil through the oil filler neck if necessary.

9.5.5 Change gear lubricant oil

WARNING 	**Risk of injury due to movements of tractor and machine or machine parts!** Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine! Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Align the machine in horizontal position.
2. Place a drip tray beneath the gearbox. The tray's capacity must at least be equivalent to the quantity filled in.
3. Unscrew the oil drain plug.
   → The gear lubricant oil drains off.
4. Unscrew the oil filling screw.

5. Wait for the oil to stop draining out of the oil drain opening.
6. Screw in again and tighten the oil drain plug. Use sealant.
7. Fill the specified oil quantity in through the oil filler neck.
8. Clean the oil filling screw and screw it in.
9. Check the oil level after 5 service hours. The oil must be visible at the oil inspection plug.

9.6 Cutting unit

- Observe the detailed information in the following chapters about service and maintenance, in particular about the maintenance of chassis and axles.
- The maintenance intervals specified in the included sub-supplier documentation shall prevail.
- Carry out the maintenance intervals according to the time limit reached first.

9.6.1 Clean knife security system

The knife security system of the cutting knives must be cleaned by means of compressed air every day!

A soiled cutting unit leads to worse response characteristics of the knife security system.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

WARNING

Risk due to blown-away grass and dirt particles when blowing out the retainers, slots and knife security system by means of compressed air!

Always wear protective goggles when blowing out the retainers, slots and knife security system by means of compressed air.

1. Retract the cutting unit from the conveyor duct.
2. Clean:
   - the gaps (1) between the cutting knives/knife holders.
   - the lever pockets (2) of the individual knife holders.

     Use the mounting lever (3) and compressed air for this purpose.
3. Lubricate the roller (4) in the lever pocket of the individual knife holders several times during the season. Check the smooth running of the rollers during that procedure as follows:

   3.1 Take off the spring (5) at the outer ring (6) of the knife holder by means of the mounting lever.

   → The lever pocket falls down and the roller can be accessed.

   3.2 Free stuck rollers by means of a pair of water-pump pliers.

   3.3 Lubricate the roller.

   3.4 Hang up the spring at the outer ring of the knife holder by means of the mounting lever.

   3.5 Repeat steps 2.1 to 2.4 for the other knife holders.
4. Extend the cutting unit into the conveyor duct **with the feeder rotor running**.

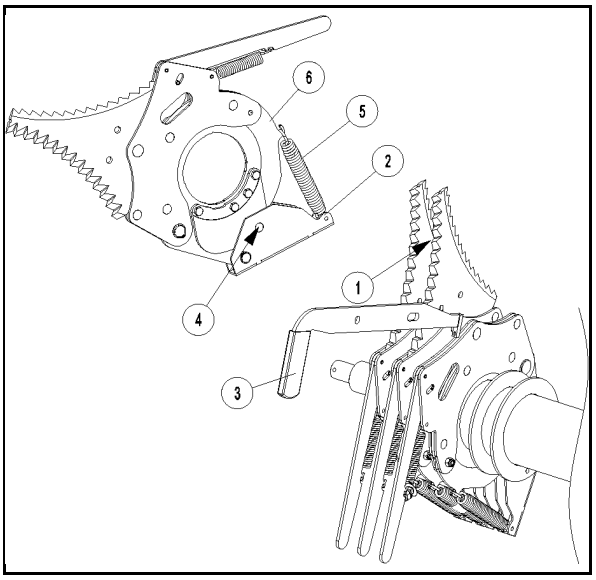


Fig. 85

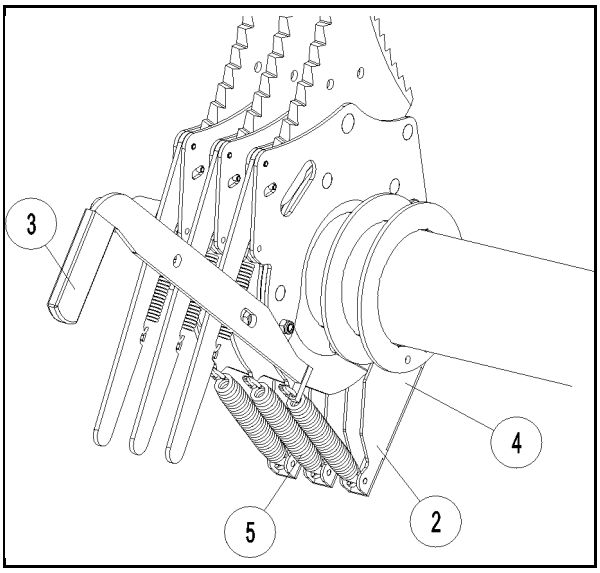


Fig. 86

9.6.2 Remove and install cutting knives

The cutting knives must be removed and installed:

- for setting the cutting length of the loaded material,
- for turning over the double-sided cutting knives,
- for grinding the cutting knives.

These measures will support easier removal and reinstallation of the cutting knives:

- Use compressed air to clean the retainer of the cutting knives before removing the cutting knives.
- Use compressed air to clean the slots of the cutting knives before reinstalling the cutting knives.

9.6.2.1 Remove cutting knives

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

WARNING

Risk of injury due to sharp cutting knives!

Wear cut-proof protective gloves when carrying out work on the cutting knives!

1. Retract the cutting unit from the conveyor duct.
2. Lift the folding drawbar to increase the free space to the cutting knives.
3. Pull out the bolt (1) to unlock the cover plate (2) and fold the cover plate down.
4. Check the gaps between the cutting knives / knife holders for contamination.

   Clean the gaps if necessary.
5. Insert the knife lever (3) into the boreholes of the cutting knife (4).
6. Pull the locking lever (5) up and remove the cutting knife together with the knife lever upwards.

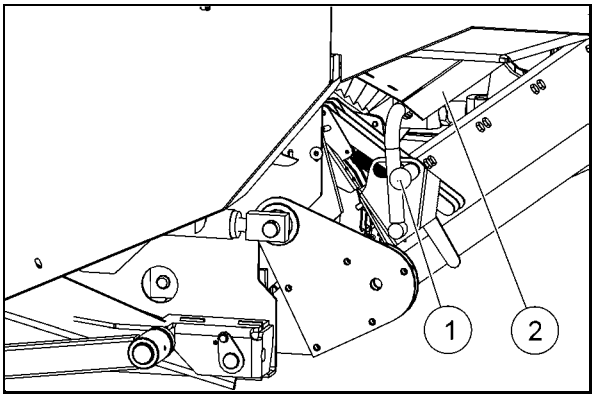


Fig. 87

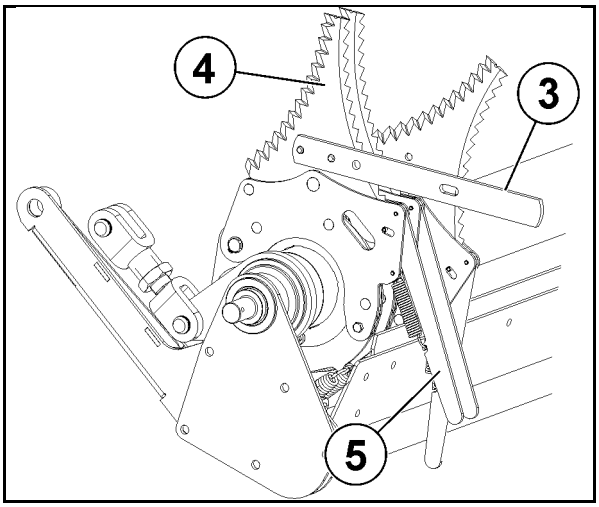


Fig. 88

9.6.2.2 Install cutting knives

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

WARNING

Risk of injury due to sharp cutting knives!

Wear cut-proof protective gloves when carrying out work on the cutting knives!

1. Retract the cutting unit from the conveyor duct.
2. Lift the folding drawbar to increase the free space to the cutting knives.
3. Pull out the bolt (1) to unlock the cover plate (2) and fold the cover plate down.
4. Check the gaps between the cutting knives / knife holders for contamination.

   Clean the gaps if necessary.
5. Put the cutting knife (1) onto the knife lever (2).
6. Pull the locking lever (3) up and insert the cutting knife from the top into the knife holder (4).

When installing the cutting knives, ensure that the locking lever completely engages again.

The locking lever has completely engaged if it is in close contact with the frame (5) of the cutting unit, the slotted dowel pin (6) being at the front in the oblong hole.

7. Fold the cover plate (7) up again and use the bolt (8) to lock it.
8. Extend the cutting unit into the conveyor duct **with the feeder rotor running**.

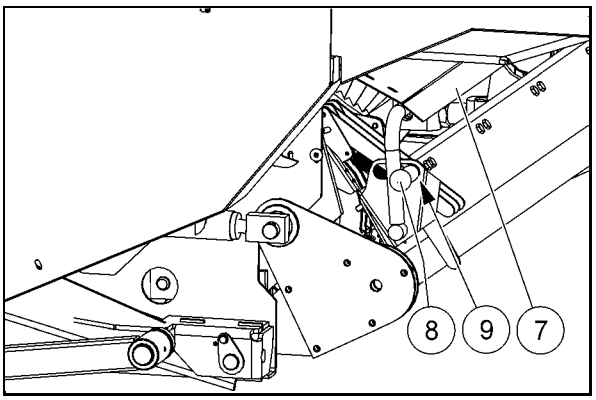


Fig. 89

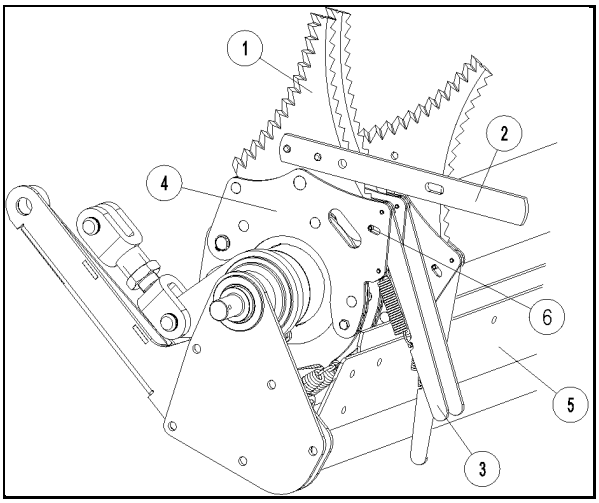


Fig. 90

9.6.3 Grind cutting knives

Sharp cutting knives:

- reduce the effort required for powering the conveying unit,
- reduce conveying unit wear,
- increase the service life of the conveying unit.

WARNING

Risk of injury due to sharp cutting knives!

Wear cut-proof protective gloves when carrying out work on the cutting knives!

WARNING

Risk to eyes due to blown-away abrasive particles when grinding the cutting knives!

Always wear protective goggles when grinding cutting knives.

Regularly check the cutting knives for sharpness.

Turn blunt cutting knives over (every 12 service hours) or grind them (every 24 service hours).

Use a wet grinding machine or a right-angle grinder with a flap grinding wheel to grind the cutting knives.

Only grind the cutting knives on their smooth side, never on their corrugated side!

9.6.4 Set distance between cutting knives and rotor

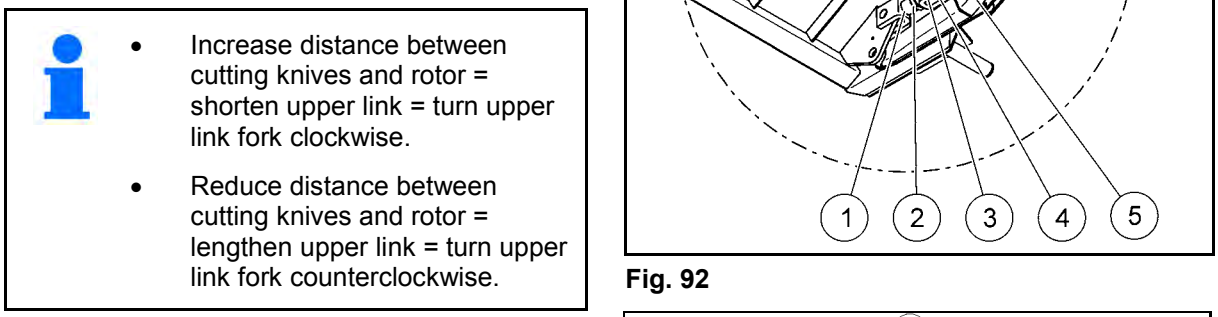
WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Completely extend the cutting unit.
2. Lift the folding drawbar to increase the free space to the cutting knives.
3. Enter the cargo space through the access door.
4. Measure:
   - the distance (X) between the cutting knives (1) and the rotor (2) from the cargo space through the slots of the conveyor duct.
   - the distance on the right-hand and left-hand side of the rotor, as the distance between the cutting knives and the rotor must be equal over the entire width of the rotor.
5. Adjust the distance (X) between the cutting knives (1) and the rotor (2) at the respective upper link (3) on the right-hand and left-hand side of the machine if the measured value is not approx. 33 mm.
   - 5.1 Unscrew the counter nut (Fig. 92/2).
   - 5.2 Remove the bolt (4) to loosen the upper link fork (Fig. 92/3) from the receiver pipe (5).
   - 5.3 Turn the respective upper link fork to set the distance between the cutting knives and the rotor.



- Increase distance between cutting knives and rotor = shorten upper link = turn upper link fork clockwise.
- Reduce distance between cutting knives and rotor = lengthen upper link = turn upper link fork counterclockwise.

   - 5.4 Measure again the distance on the right-hand and left-hand side of the rotor to check the set distance.
   - 5.5 Fix the upper link fork to the receiver pipe by means of the bolt if the distance between cutting knives and rotor has been properly set.
   - 5.6 Tighten the counter nut.
6. Reset the bracket (6):
   - 6.1 Unscrew the screws (7).
   - 6.2 Completely retract the cutting unit.
   - 6.3 Push the bracket (6) as far as it will go below the knife mount (8).
   - 6.4 Tighten the screws (7).

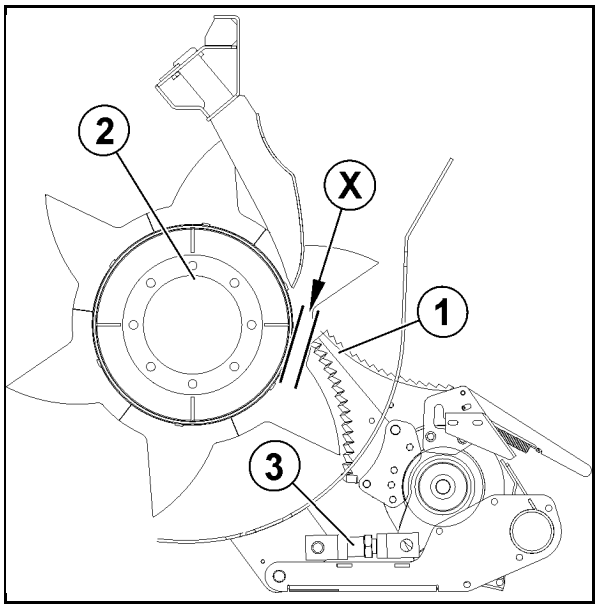


Fig. 91

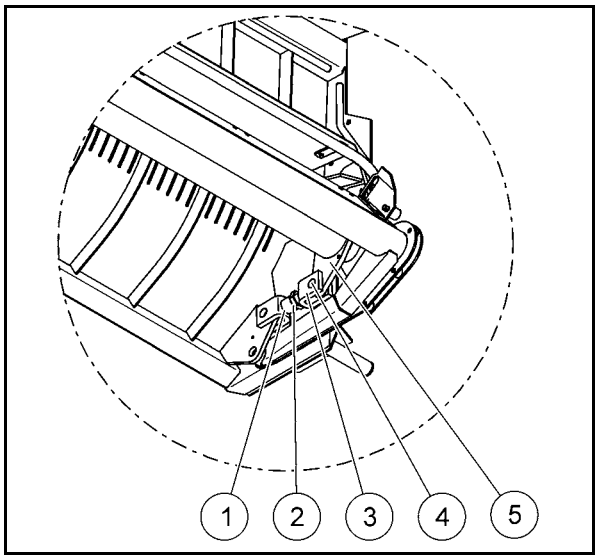


Fig. 92

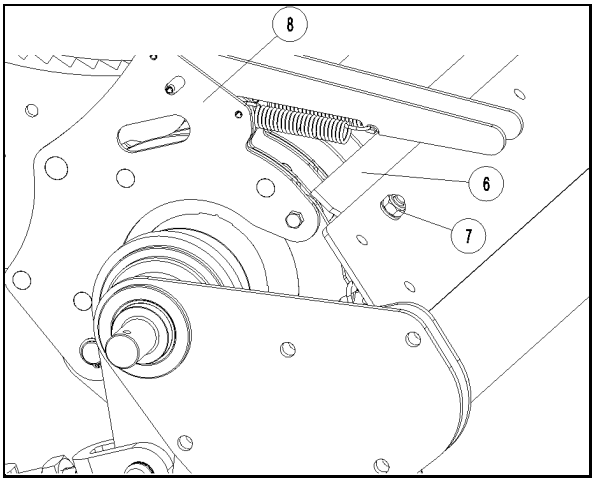


Fig. 93

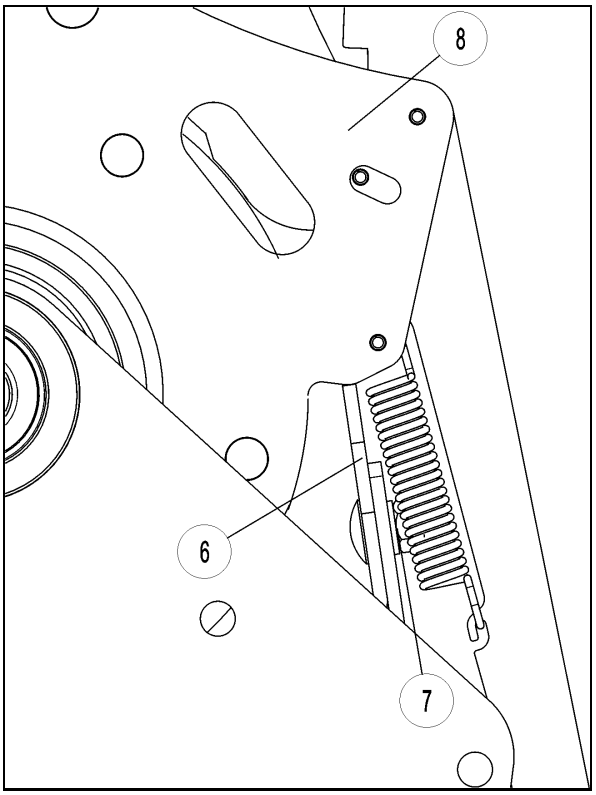


Fig. 94

9.6.5 Check distance between strippers and rotor

The minimum distance between the strippers and the rotor must be 18 mm over the entire width of the rotor. This distance will prevent the rotor from becoming clogged. The distance must not fall below the minimum value.

Reasons for a too small distance between strippers and rotor are:

- worn strippers or
- deformed stripper holders.

Deformed stripper holders must be immediately replaced by an authorised workshop! Only an authorised workshop is allowed to carry out this work!

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Enter the cargo space through the access door.
2. Measure the distance (X) between the strippers (1) and the rotor (2) in the conveyor duct from the cargo space.
3. Replace worn strippers.
   - 3.1 Unscrew the screws (3).
   - 3.2 Remove the safety rail (4) of the stripper holder by pulling it out to the side.
   - 3.3 Remove worn strippers by pulling them out to the bottom.
   - 3.4 Mount new strippers in reverse order.
4. Have deformed stripper holders replaced by an authorised workshop (shop work).

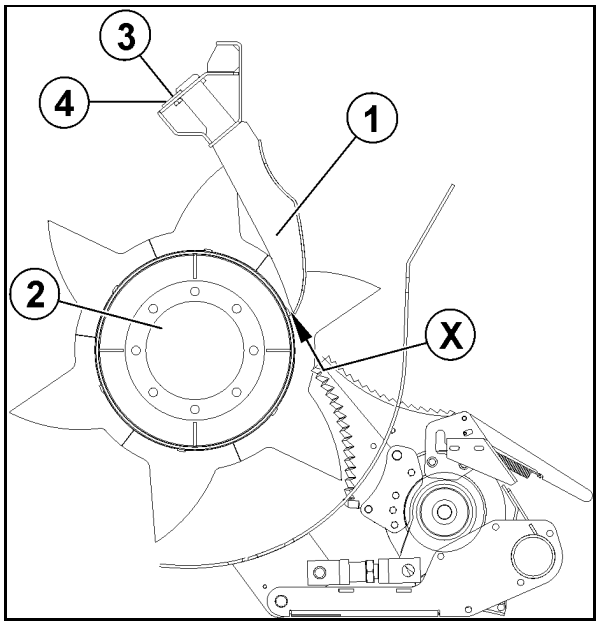


Fig. 95

9.6.6 Set "Cutting unit retracted" sensor

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Completely extend the cutting unit.
2. Turn the tractor engine off.
3. Switch the tractor ignition on.
4. Apply the parking brake of the tractor.
5. Apply the parking brake of the machine.
6. Uncouple the propeller shaft.
7. Disconnect the pressure pipe of the single-acting control device.
8. Fix the "Cutting unit retracted" sensor (1) to the holder (2) such that the distance between the sensor and the frame of the cutting unit (3) is 3-4 mm.

→ The light emitting diode (4) lights up and the "Cutting unit" symbol on the control set simultaneously changes from "Cutting unit retracted" position to "Cutting unit extended" position.

9. Screw the sensor in this position.

   Tighten the screw only at a max. tightening torque of 10 Nm. Higher torques will damage the electronics inside the sensor!

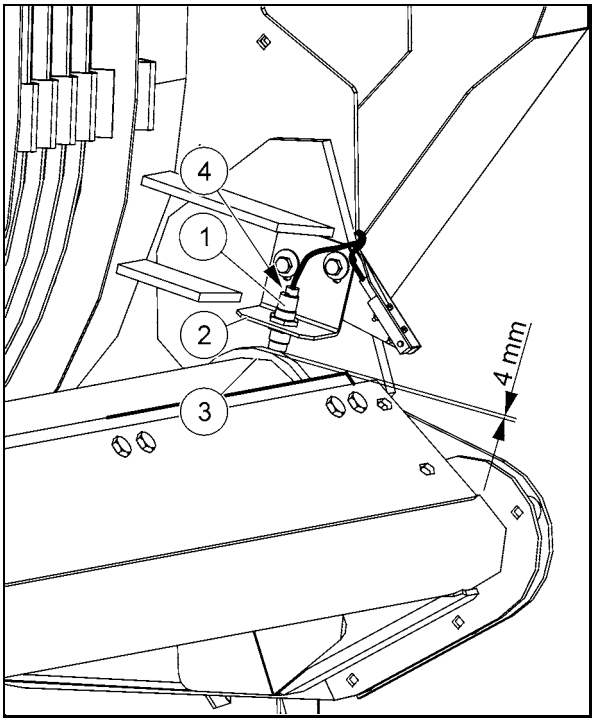


Fig. 96

9.7 CFS drum

9.7.1 Check / Retighten chain tension of CFS drum

Check the tension of the roller chain at the chain tensioner every day.

The roller chain must be retightened if the distance between washer and sleeve of the chain tensioner is more than 8 mm.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Open the left-hand side protector.
2. Unscrew the counter nut (1).
3. Turn the hexagon nut (2) such that the max. distance between washer (3) and sleeve (4) is 8 mm.
4. Retighten the counter nut.
5. Close and lock the side protector.

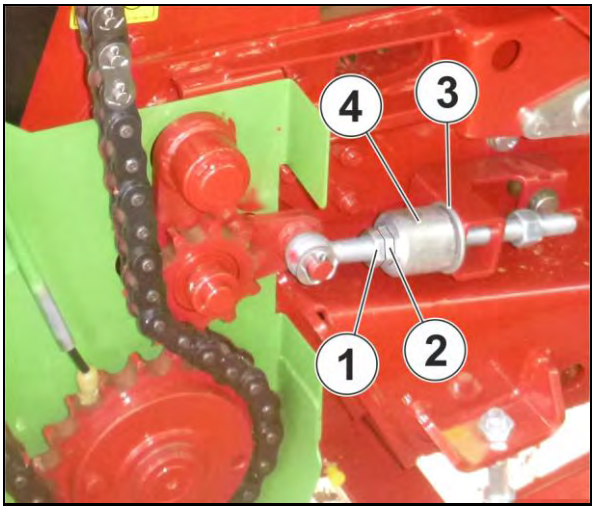


Fig. 97

9.8 Pick-up

9.8.1 Align switch rod of pick-up circuit

Align the switch rod of the pick-up circuit if the pick-up does not automatically switch off when the tailgate is lifted.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Open the left-hand side protector.
2. Take off the spring (1).
3. Unscrew and remove the screwed connection (2) and the collar bushing (3).
4. Lift the tailgate to completely extend the hydraulic cylinder (4).

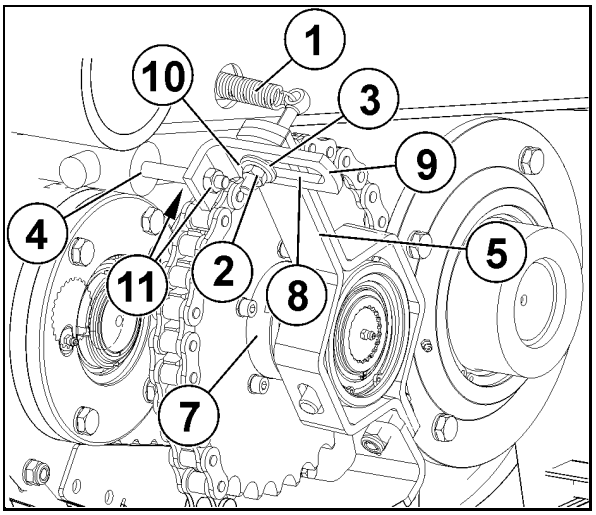


Fig. 98

5. Pull the switch lever (5) towards yourself until you feel it reach the stop such that the minimum distance between the shifting claw (6) and the hub (7) is 1 mm.
6. Check the alignment of the oblong hole (8) of the switch rod (9) with respect to the borehole in the switch lever (5).

   The switch rod must be aligned such that the borehole of the switch lever has a distance of 3 mm to the inner edge (10) of the oblong hole (8).
7. Align the switch rod (9) with the switch lever (5) if necessary.

   Change the fitting length of the hydraulic cylinders (4) and the switch rod (9) via the adjusting screws (11).
8. Screw the switch lever (5) and the switch rod (9) together by means of the screwed connection (2) and the collar bushing (3).
9. Mount the spring (1).
10. Close and lock the side protector.
11. Lower the tailgate.

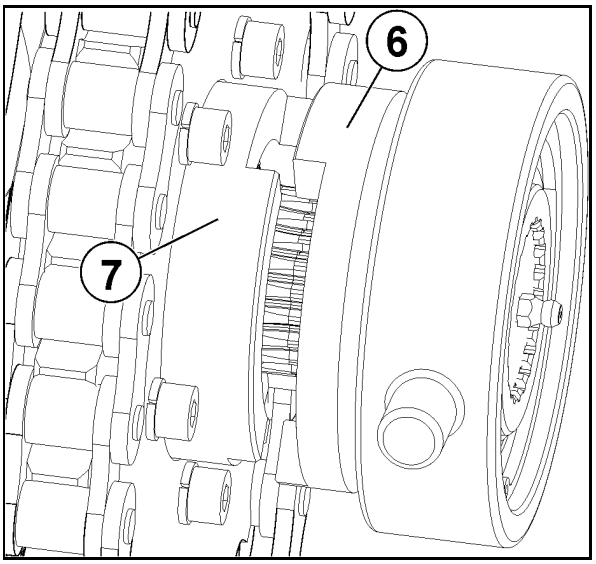


Fig. 99

9.8.2 Bleed friction clutch of pick-up

The friction clutch must be bled before the first start-up and after longer downtimes to ensure its proper functioning.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Remove the protective casing of the pick-up.
2. Unlock and unscrew the groove nut (1).

Remember exactly the number of turns made to unscrew the groove nut to ensure that the friction clutch can be properly pre-tightened again!

3. Refix the protective casing of the pick-up to the machine.
4. Start the tractor engine.
5. Charge the machine with material to be loaded for a short time such that the stuck friction clutch slips for 2 to 3 seconds and is freed (excessive slipping will damage the friction linings).

   Repeat this procedure up to three times if the friction clutch does not slip.
6. Turn the tractor engine off.
7. Pull the ignition key out.
8. Remove the protective casing of the pick-up.
9. Retighten the groove nut with the exact number of turns made for unscrewing.

   Torque of friction clutch: 900-1000 Nm
10. Lock the groove nut.
11. Refix the protective casing of the pick-up to the machine.

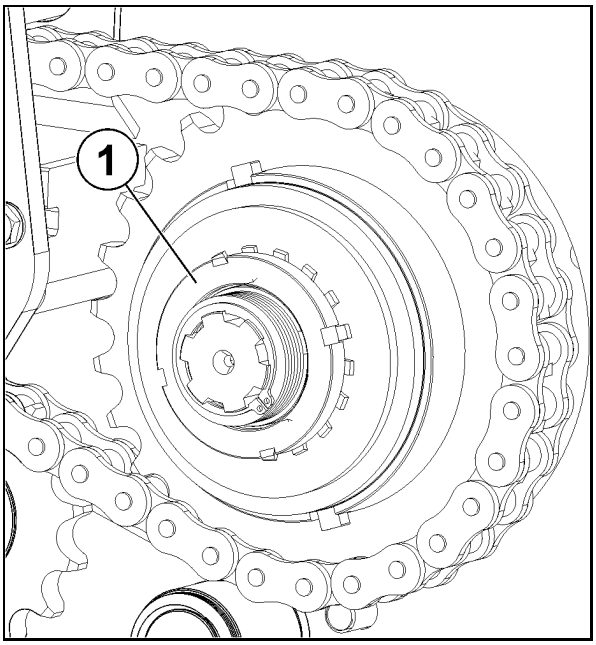


Fig. 100

9.8.3 Check/Retighten tension of roller chain for pick-up drive

Check the tension of the roller chain at the chain tensioner every day.

The roller chain must be retightened if the distance between washer and sleeve of the chain tensioner is more than 8 mm.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Lower the pick-up completely.
2. Secure tractor and machine against accidental starting and rolling.
3. Unscrew the counter nut (1).
4. Turn the nut (2) such that the distance between washer (3) and sleeve (4) is less than 8 mm.
5. Tighten the counter nut.

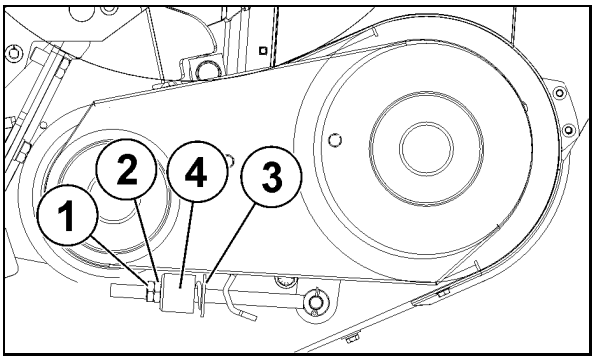


Fig. 101

9.9 Beaters

9.9.1 Check/Retighten tension of roller chains of beaters

The roller chains must be retightened if they can be pushed in by more than 5 mm.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Open the side protector (1) of the roller chain (2).
2. Check the tension of the roller chain.

   If the roller chain can be pushed in by more than 5 mm on the side (3) opposite the chain tightening wheel (4), it must be retightened.
3. Loose the tightening wheel bolt (5)

   Place an open-end wrench behind the chain tightening wheel (4) for this purpose.

On the **left-hand side** of the machine, the tightening wheel bolt has a **left-hand thread**.

On the **right-hand side** of the machine (with 3 beaters), the tightening wheel bolt has a **right-hand thread.**

4. Move the chain tightening wheel such that the roller chain can only be pushed in by less than 5 mm.

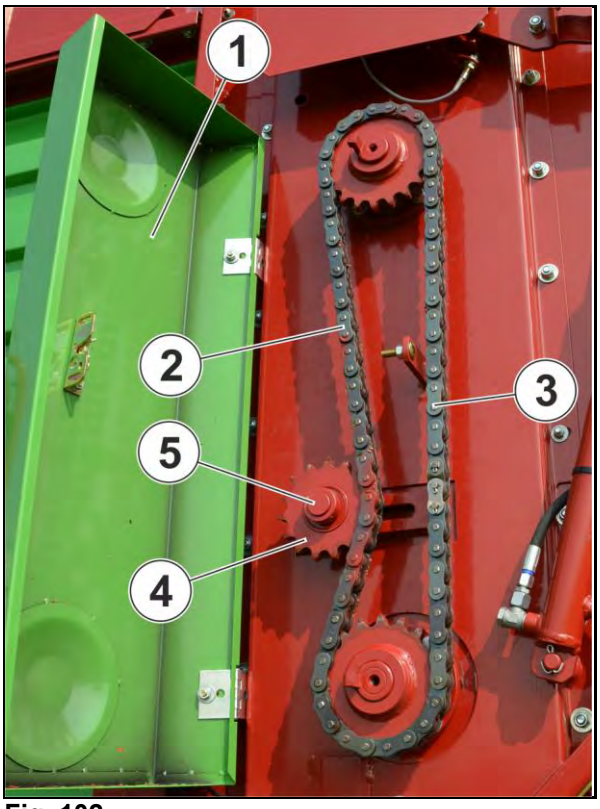


Fig. 102

5. Retighten the tightening wheel bolt.
6. Close and lock the side protector.

9.9.2 Readjust jaw clutch of beater circuit

Readjust the jaw clutch of the beater circuit if the beaters do not automatically switch off when the tailgate is lowered.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Open the right-hand side protector.
2. Lower the tailgate completely such that the hydraulic cylinder (1) extends entirely.
3. Check the distance between the jaws (2).

   The minimum distance must be 3 mm.
4. Adjust the distance by turning the nuts (3) if necessary.
5. Close and lock the side protector.

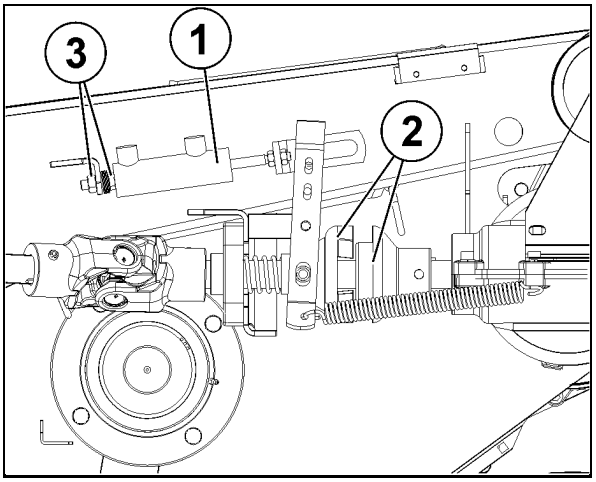


Fig. 103

9.10 Transport floor

9.10.1 Shorten and tighten transport floor chain

The chains of the transport floor:

- are automatically pre-tightened,
- must be tightened equally, but not too firmly,
- are only allowed to sag slightly.

Ensure that the transport floor strips on the right-hand and left-hand side do not bump against the frame (1)!

Equally shorten the chains of the transport floor if the tension path of the chain tensioners is no longer sufficient to retighten the chains!

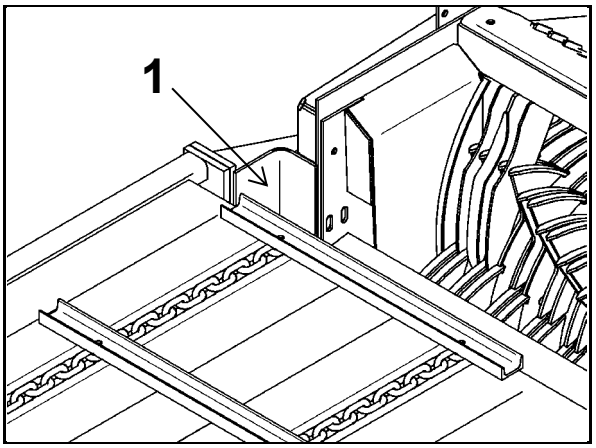


Fig. 104

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

WARNING

Risk to eyes due to blown-away abrasive particles when cutting chain links by means of a right-angle grinder!

Wear protective goggles when cutting the chain links by means of the right-angle grinder.

1. Align the chains of the transport floor such that the chain connecting links (Fig. 106) are within the central and rear area of the cargo space.
2. Secure tractor and machine against accidental starting and rolling.
3. Tighten the nut (2) to loosen the paw (1) of the chain tensioners beneath the machine.
4. Unscrew the counter nut (3) of the clamping screw (4).
5. Turn the 4 clamping screws counterclockwise.

→ The chain tension is released and the chains sag.

6. Enter the cargo space through the access door to shorten the chains.
7. Open and remove the chain connecting links.
8. Cut out the same even number of chain links (2, 4, 6) at all chains by means of a right-angle grinder.

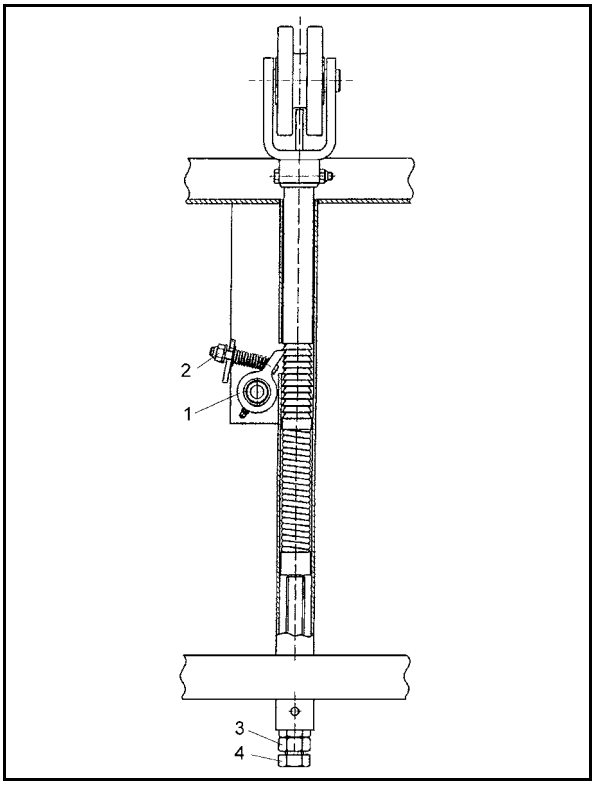


Fig. 105

9. Put the shortened chains together again by means of the chain connecting links.

At any rate, secure the chain connecting links by means of a new, unbent locking wire!

A locking wire bent once may already break when bending it the second time.

Only bend the locking wire slightly at its ends (5)!

The locking wire may break if bent more strongly.

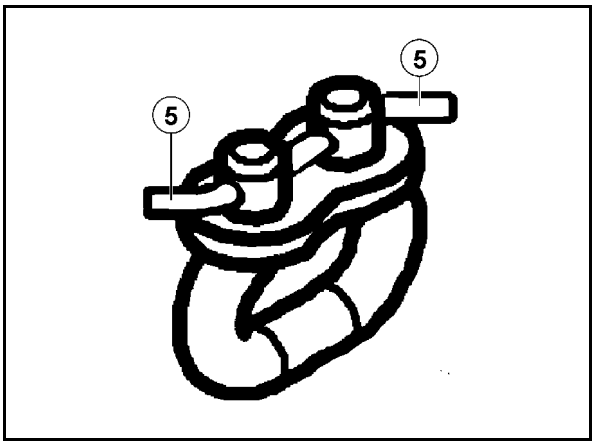


Fig. 106

10. Turn the 4 clamping screws clockwise.

→ The chains are tightened.

11. Unscrew the nuts of the pawls.
12. Check the screw-in depth of the clamping screws.

    The transport floor springs must always be tensioned to maximum.

    All clamping screws must have the same screw-in depth.

13. Retighten the counter nuts.

9.11 Crossover conveyor

9.11.1 Tighten / Adjust crossover conveyor

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Unscrew the counter nut (1) at both radial insert ball bearings (2).
2. Equally turn the two clamping screws (3) such that
   - the crossover conveyor sags by approx. 10-15 mm in its centre and
   - the distance X is equal on both sides of the crossover conveyor.

   Only then is the crossover conveyor in straight alignment.
3. Carry out a test run to check whether the crossover conveyor has an equal distance

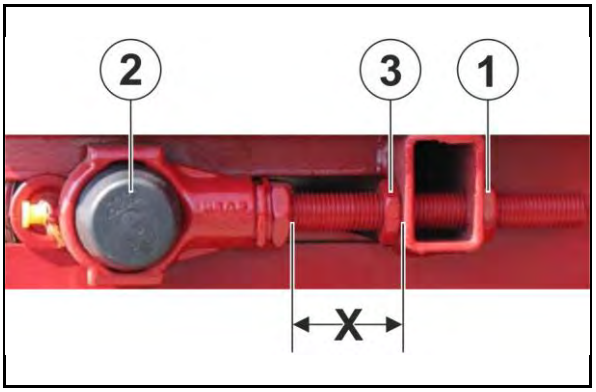


Fig. 107

to the frame at the return rollers on both sides.

Adjust the distance by turning the clamping nuts (3) if necessary.

4. Retighten the counter nut (1) at both radial insert ball bearings (2).

9.12 Hydraulic system

Observe the information in the chapter "Basic safety instructions", page 29.

WARNING

Risk of infection to people due to hydraulic oil squirting out under high pressure and entering the body!

- Only an authorized workshop is allowed to carry out work on the hydraulic system.
- Working on the hydraulic system with the system under operating pressure is not allowed.
- Risk of explosion in case of improper working on hydraulic accumulators.

  Welding, soldering, drilling or other work on hydraulic accumulators which might affect the mechanical properties is not allowed.

- Regularly check all hydraulic hose pipes and hydraulic plugs for damage and contamination.
- Have the hydraulic hose pipes checked for their operational safety by an expert at least once a year.
- The period of use of the hydraulic hose pipes should not exceed six years, including a maximum possible shelf life of two years.
- Dispose of hydraulic oil according to regulations. Contact your oil supplier in case of disposal problems.
- Beware that no hydraulic oil penetrates the soil or water.

9.12.1 Depressurize hydraulic system

WARNING

Risk of accidental contact with hydraulic oil due to hydraulic oil squirting out under high pressure and entering the body, in particular in case of hydraulic systems with membrane pressure accumulator!

- Working on the hydraulic system with the system under operating pressure is not allowed.
- Depressurize the hydraulic system before carrying out work on the hydraulic system.

1. Relieve the respective hydraulic cylinder via the corresponding operating element with the hydraulic pump switched off.

9.12.1.1 Depressurise folding drawbar with drawbar suspension

WARNING	**Risk of injury due to movements of tractor and machine or machine parts!**
	Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine! Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Completely lower the folding drawbar.
2. Set the adjusting lever at the double-acting control device of the tractor to "Open-centre" position if a free return line is not available.
3. Unscrew the plug screw (1).

→ The hydraulic oil flows through the free return line or the double-acting control device to the tractor.

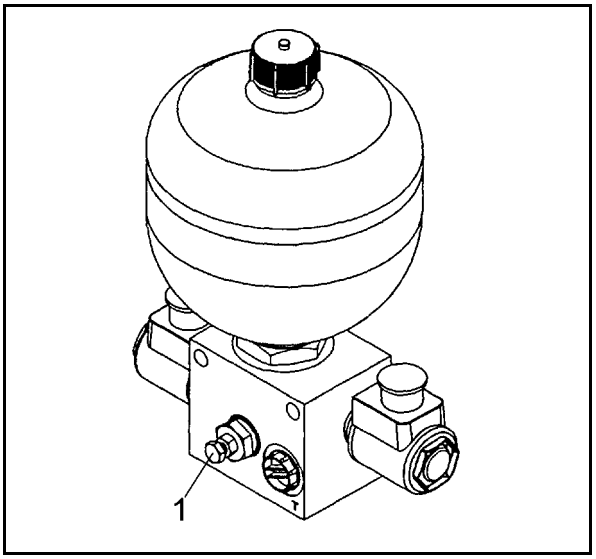


Fig. 108

9.12.2 Hydraulic hose pipes

9.12.2.1 Marking and period of use of hydraulic hose pipes

The marking on the fitting provides the following information:

(1) Identification of the hydraulic hose pipe manufacturer (A1HF)

(2) Date of manufacture of the hydraulic hose pipe (14/04 = year/month = April 2014)

(3) Maximum admissible operating pressure (210 bar)

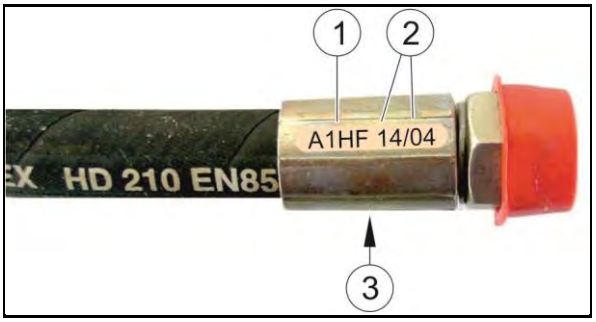


Fig. 109

9.12.2.2 Inspection criteria for hydraulic hose pipes

For your own safety:

Immediately have hydraulic hose pipes replaced (shop work) as soon as you detect any of the following defects:

- Damaged outer layer down to the liner (e. g. due to chafing points, cuts, fissures).
- Embrittled outer layer (visible by cracking of hose material).
- Unnatural deformations of the hydraulic hose pipe in depressurized as well as in pressurized state or when bent (e. g. separation of layers, blistering, pinches, kinks).
- Leaks.
- Damaged, deformed or leaking fitting. Small surface damage is no reason for replacement.
- Hose slipping out of the fitting.
- Corroded fitting which may affect the function and the strength.
- Improperly laid hydraulic hose pipes, e. g. ignored bending radii, laying over sharp edges.
- The period of use of 6 years has been exceeded.

9.12.3 Replace hydraulic filter

Shop work

Replace the filter element (1) after approx. 250 service hours, then as necessary, but at least every 1000 service hours.

Soiled filters cause stronger heating-up of oil.

WARNING

Risk of accidental contact with hydraulic oil due to hydraulic oil squirting out under high pressure and entering the body!

- Replacement of the hydraulic filter is not allowed with the hydraulic system being under operating pressure.
- Only replace the hydraulic filter when the hydraulic system of the machine is not connected to the tractor.

1. Disconnect the hydraulic system of the machine from the tractor.

→ The machine is depressurized.

2. Unscrew the filter casing (3) from the filter head.
3. Remove the soiled filter element (1).
4. Clean the filter casing.
5. Grease the thread at the filter casing.
6. Check the O-ring (2) for damage. Replace a damaged O-Ring (ø 67.95 mm x 2.62 mm).
7. Lubricate the O-ring of the new filter element.
8. Slip the new filter element on as far as it will go.
9. Screw the filter casing into the filter head as far as it will go and turn it back by a one quarter of a turn.
10. Tighten the screwed connection at a torque of 150 Nm.
11. Switch the hydraulic system on and bleed the filter at an appropriate point.
12. Check the filter for leaks.

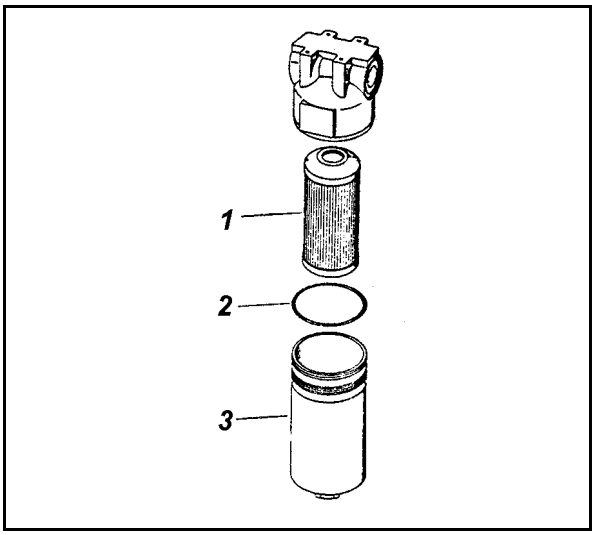


Fig. 110

9.13 Brake system and chassis

9.13.1 Check/Clean in-line filters of compressed-air brake system

The in-line filters incorporated in the hose couplings of the brake and feed line protect the compressed-air brake system from being soiled by solid particles.

The air supply to the brake system should have priority over the protection of the brake system against soiling and shall be ensured in all conditions. In case of the filter element being clogged due to soiling, an internal bridging-over element opens and unfiltered air passes through the hose coupling.

- Regularly check the degree of soiling of the filter elements in the hose couplings.
- Clean heavily soiled filter element approx. every 3-4 months, depending on the operating conditions.

Check degree of soiling

1. Check the degree of soiling of the filter elements (1) in the hose couplings of the brake and feed line before connecting the hose couplings to the tractor. The filter element can be inspected through the opening (2) beneath the plastic lid.

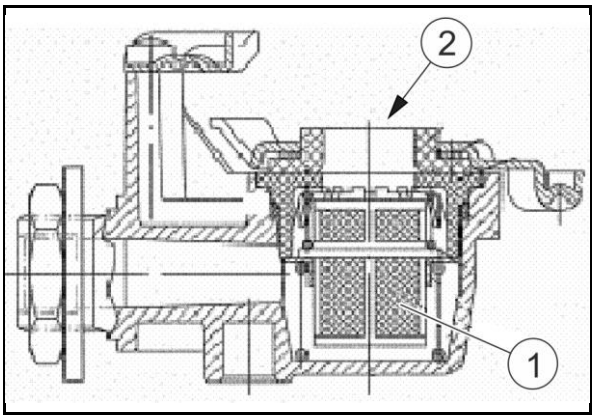


Fig. 111

Clean filter element

1. Open the lid (3).
2. Remove the two Phillips screws (4).
3. Open the cover (5) by swivelling.
4. Remove the filter element (2) from the hose coupling.
5. Clean the filter element with benzene or thinner (rinse).
6. Use compressed air to blow the filter element dry.
7. Reinsert the filter element into the hose coupling.
8. Close the cover.
9. Screw the cover by means of the two Phillips screws.
10. Connect the feed and brake line to the tractor.
11. Check the hose couplings for tightness.

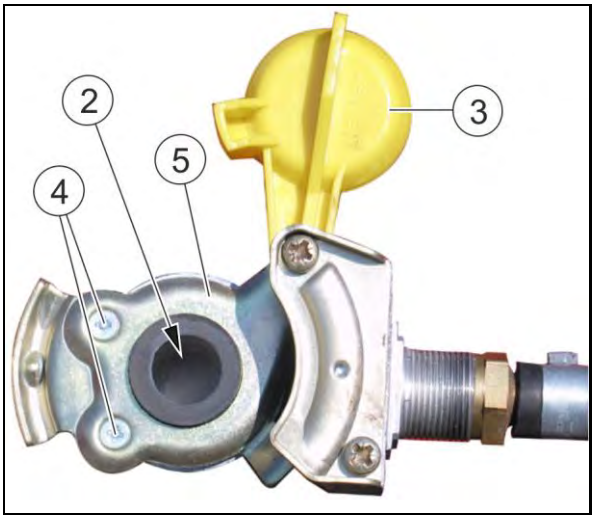


Fig. 112

9.13.2 Set compressed-air brake system

Shop work

The brake system must be readjusted if the free travel (x) is greater than or equal to 30 mm.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Disconnect the brake and feed line of the brake system.
2. Manually actuate the brake lever in pressing direction.
3. Press the circlip at the adjusting screw (1) down and set the free travel (X) by means of the adjusting screw:

   Free travel (X) = 0.1 x length of brake lever (Y)
4. Check the brake linings (2).

   The brake linings must be replaced in case of a remaining lining thickness of:

   - 5 mm in case of riveted linings,
   - 2 mm in case of glued linings.
5. Replace the brake linings if necessary.

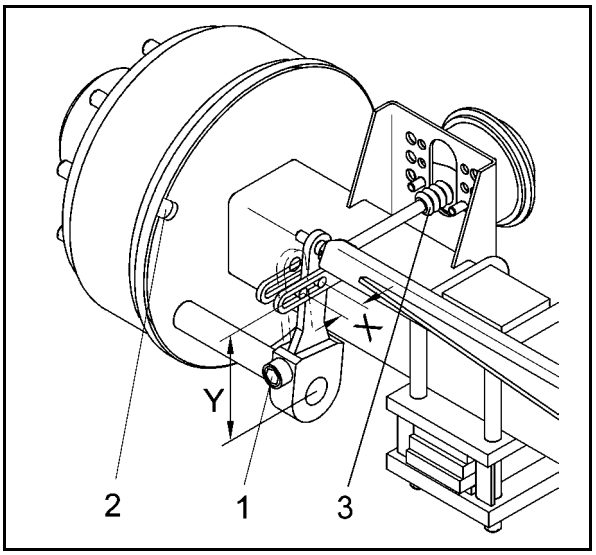


Fig. 113

9.13.3 Drain compressed-air reservoir of compressed-air brake system

Drain the compressed-air reservoir every day before the first journey!

The compressed-air reservoir is situated beneath the machine in front of the axle support.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

Take the ring (2) and pull the drain valve of the compressed-air reservoir (1) down until water is no longer pouring out of the compressed-air reservoir.

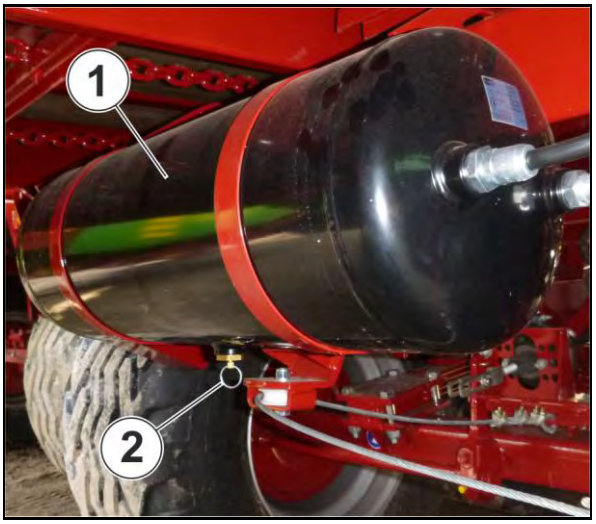


Fig. 114

9.13.4 Set hydraulic brake system

Shop work

The brake system must be readjusted if the free travel (X) is greater than or equal to 40 mm.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Disconnect the hydraulic hose pipe of the brake system.
2. Manually actuate the brake lever in pressing direction.
3. Press the circlip at the adjusting screw (1) down and set the free travel (X) by means of the adjusting screw:

   Free travel (X) = 0.1 x length of brake lever (Y)
4. Check the brake linings (2).

   The brake linings must be replaced in case of a remaining lining thickness of:

   - 5 mm in case of riveted linings,
   - 2 mm in case of glued linings.
5. Replace the brake linings if necessary.

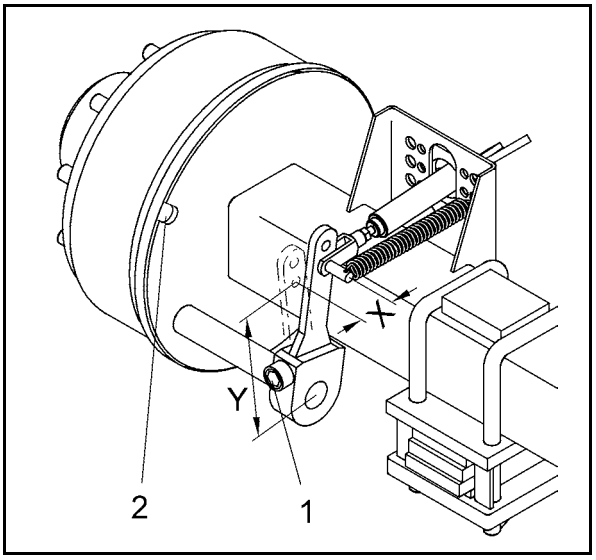


Fig. 115

9.13.5 Check tyres

- Check the tyre pressure at least every 2 weeks. If the machine has not been used for a longer time, the tyre pressure should be checked before putting the machine into operation again.

  Always ensure that the tyre pressure is properly adapted to the load and the kind of work which has generally to be carried out by the machine.
- Never overload the tyres.
- Ensure that the caps are seated on the valves and have been tightened.
- Preferably check the tyres during operation for "folds" or other abnormal deformation.

  Remove stones, pebbles, nails and other foreign objects stuck in the tyre, as otherwise they further penetrate the tyre.

  Have deeper cuts repaired as soon as possible.
- Store "loose" tyres at a dark place, free of oil and other chemicals.
- Do not let tyres come near electric motors. The ozone produced by the electric motors slowly dessicates the rubber.

WARNING

Risk to people due to repair work on tyres and wheels not being carried out in a professional way!

- Only qualified personnel equipped with appropriate fitting tools is allowed to carry out repair work on tyres and wheels.
- Never use or repair damaged rims.

9.13.6 Change tyres

Observe the information in the chapter "Basic safety instructions", page 29.

WARNING

Risk of crushing and impact to people due to the machine accidentally lowering when changing wheels!

- Use lifting equipment suitable and approved for the machine's weight with sufficient lifting power.
- Place the lifting device only at the marked fixing points.
- Ensure sufficient ground stability before lifting the machine by means of a lifting device and securing the machine against accidental lowering by means of safety stands. Additionally use solid, load-distributing supports if necessary.
- Never stand under a lifted, unsecured machine.

1. Place the lifting device at the marked fixing points.

Fig. 116

2. Keep to the specified order when loosening and tightening the wheel nuts.
3. Tighten the wheel nuts at the required tightening torque.
4. Check the wheel nuts for tightness after 10 service hours. Retighten wheel nuts if necessary

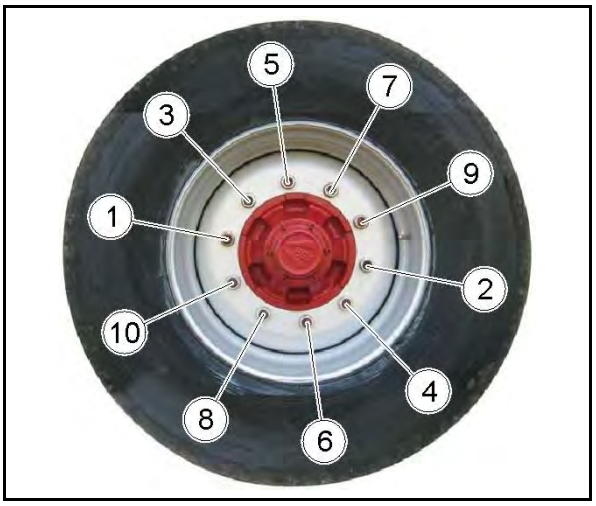


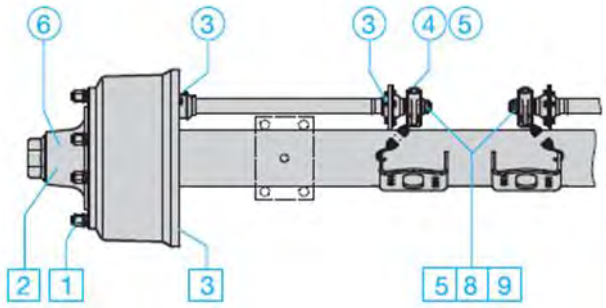
Fig. 117

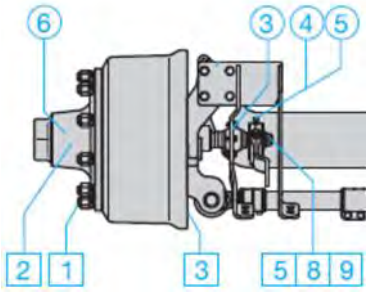
9.13.7 Lubrication and maintenance plan – Chassis

► See also chapter "Service and maintenance plan - Overview", page 139!

► See also chapter "Lubrication plan", page 143!

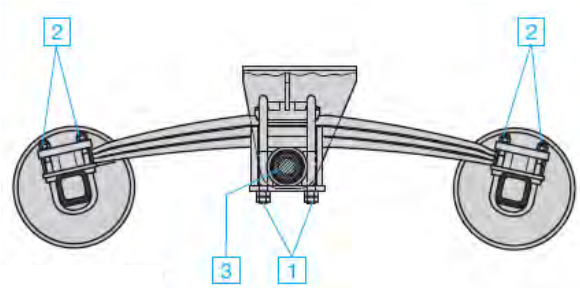
Relubricate all lubrication points after cleaning the machine by means of pressure washers.





		Before start-up and after longer downtimes	After first journey with loaded material	Every 40 service hours	Every 200 service hours	Every 500 service hours or once a year	Every 1000 service hours or once a year
Lubricate with long-life grease							
(1)	Lubricate knuckle arm bearing. ***			X			
(3)	Lubricate brake shaft bearing. ***	X			X		
(4)	Lubricate standard slack adjuster. ***					X	
(5)	Lubricate automatic slack adjuster. ***					X*	
(6)	Have grease of wheel hub bearing changed (shop work!).						X
Maintenance work							
[1]	Check wheel nuts for tightness, retighten if necessary.	X**	X			X	
[2]	Check clearance of wheel hub bearing, have it readjusted if necessary (shop work!).				X		
[3]	Check brake linings for damage and wear, have them replaced if necessary (shop work!).				X		
[4]	Check brake setting at brake lever, have it adjusted if necessary (shop work!).				X		
[5]	Check brake setting at standard slack adjuster, have it adjusted if necessary (shop work!).				X		
[8]	Check brake setting at automatic slack adjuster, have it adjusted if necessary (shop work!).					X	
[9]	Check automatic slack adjuster for proper function					X*	

* Also after each change of brake linings.
** Also after each wheel change.
*** Lubricating nipples possibly grouped at another point

		After first journey with loaded material	Every 500 service hours or every 6 months
			
Maintenance work			
	Check all components for damage and wear (visual check).		X
[1]	Have spring clamps at the supporting axle checked for tightness (shop work!).	X	X
[2]	Have axle connection at the spring tension casings checked for tightness (shop work!).		X
[3]	Have the bearing bolt at the spring tension casings checked for tightness and readjusted if necessary (shop work!).	X	X

9.13.8 Lubricate brake shaft bearing

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

Lubricate the outer and inner lubrication points (3) of the brake shaft bearing with long-life grease until fresh grease comes out of the bearings.

Only use lithium-saponified grease with a drop point above 190°C.

Make sure that no grease or oil enters the brake system!

Depending on the series, the cam bearing may not be sealed on the brake side.

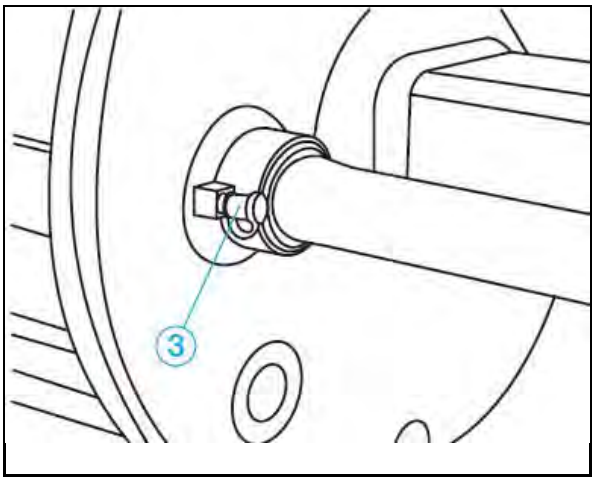


Fig. 118

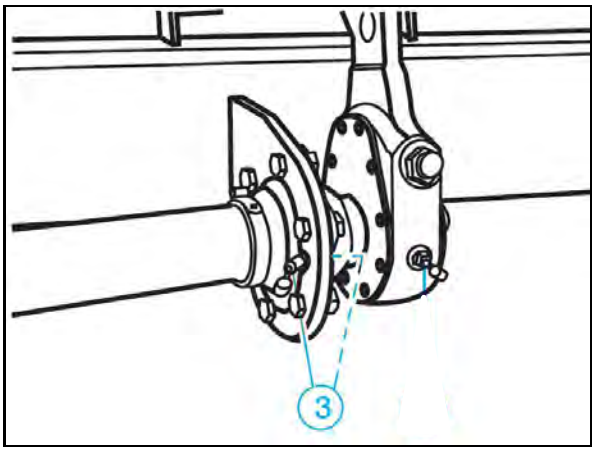


Fig. 119

9.13.9 Lubricate standard slack adjuster

WARNING	**Risk of injury due to movements of tractor and machine or machine parts!**
	Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!
	Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

Lubricate the lubrication points (4) of the slack adjuster with long-life grease until fresh grease comes out.

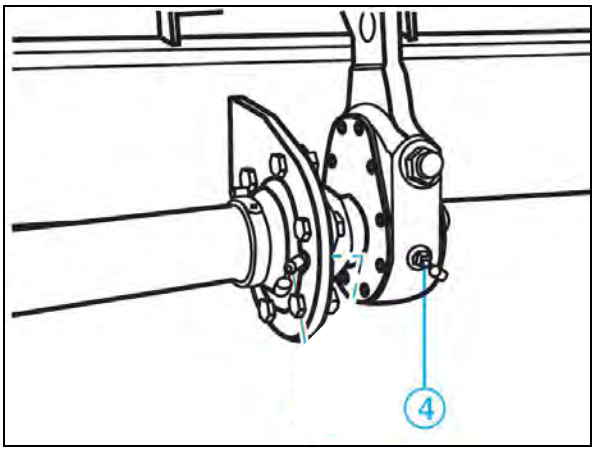


Fig. 120

9.13.10 Check clearance of wheel hub bearing

WARNING	**Risk of injury due to movements of tractor and machine or machine parts!**
	Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!
	Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Lift the axle until the tyres are free.
2. Release the brake.
3. Place two levers between tyres and ground and check the bearing clearance.

   If there is a noticeable bearing clearance, have it readjusted (shop work!).

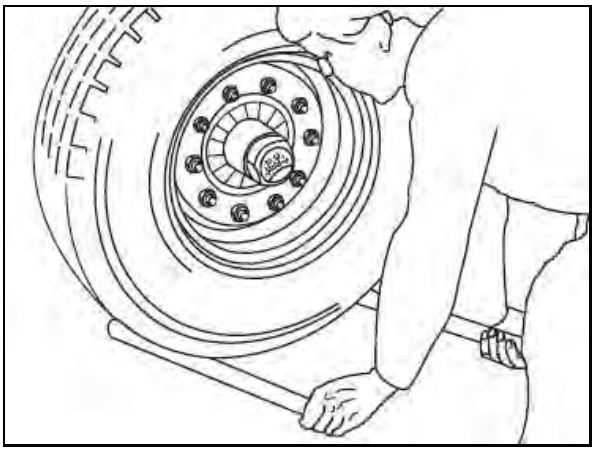


Fig. 121

9.13.11 Check brake linings

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Open the inspection hole (3) by pulling out the rubber plug (if available).

   Have the brake linings replaced (shop work!) in case of a remaining lining thickness of:

   5 mm (riveted linings)

   3 mm (N 2504 linings)

   2 mm (glued linings).
2. Reinsert the rubber plug after the check.

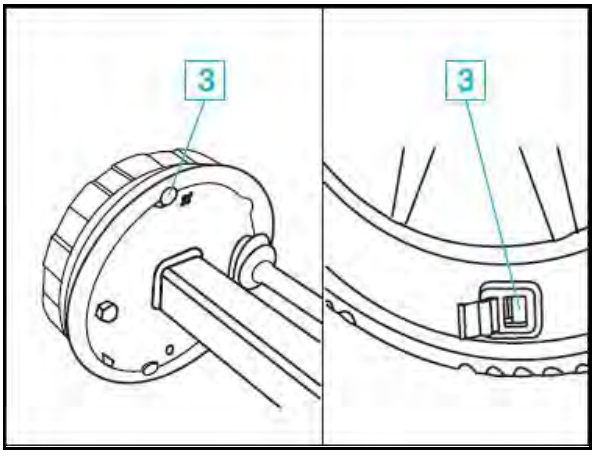


Fig. 122

9.13.12 Check brake

Regularly check the brake for proper functioning and wear.

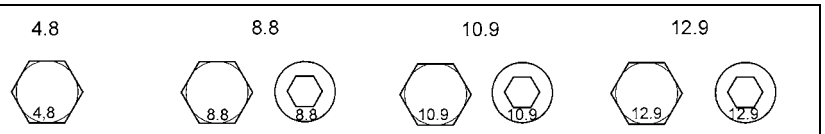
Have the brake readjusted (shop work!) in case of a use of approx. 2/3 of the maximum cylinder stroke in case of full brake application.

9.14 Tightening torques

9.14.1 Tightening torques for metric screws

► See also chapter "Tightening torques for wheel nuts", page 177!

These tightening torques are reference values. Differing data specified elsewhere in the operating instructions or the included sub-supplier documentation shall always prevail!

Grade and marking of screw heads	
Grade and marking of nuts	

Size	Grade 4.8				Grade 8.8				Grade 10.9				Grade 12.9			
	lubricated*		dry **		lubricated*		dry **		lubricated*		dry **		lubricated*		dry **	
	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

* "Lubricated“ means that the screws are treated with a lubricant such as e.g. engine oil, or that phosphatized or oiled screws are used.

** "Dry" means that normal or galvanized screws without any lubrication are used.

- Regularly check the screwed connections for tightness.
- Always replace screws and nuts by parts of the same quality.
- Tighten counter nuts with plastic insert and bordered steel counter nuts at approx. 50% of the “dry” value specified in the table.
- Tighten gear or crown nuts at full torque.
- Shear bolts are designed such that they shear off (break) at a certain stress. Only use bolts of equal quality when replacing shear bolts.

9.14.2 Tightening torques for wheel nuts

Thread	Wrench size (mm)	Number of bolts per hub (pcs.)	Max. tightening torque		
			black	Dacromet	galvanised
M 12 x 1.5	19	4/5	95 Nm (90-100 Nm)	--	95 Nm (90-100 Nm)
M 14 x 1.5	22	5	125 Nm (120-130 Nm)	--	125 Nm (120-130 Nm)
M 18 x 1.5	24	6	290 Nm (275-305 Nm)	270 Nm (250-290 Nm)	320 Nm (300-340 Nm)
M 20 x 1.5	27	8	380 Nm (360-400 Nm)	380 Nm (360-400 Nm)	420 Nm (400-440 Nm)
M 22 x 1.5	32	8/10	510 Nm (485-535 Nm)	510 Nm (485-535 Nm)	560 Nm (535-585 Nm)
M 22 x 2	32	10	460 Nm (435-485 Nm)	--	505 Nm (480-530 Nm)

10 Remedy of malfunctions

10.1 Eliminate clogging at the pick-up and the feeder rotor

- The clogging/blockages must be manually eliminated if they cannot be eliminated from the tractor seat.
- Only extend the cutting unit with the feeder rotor running.

Elimination from the tractor seat:

1. Retract the cutting unit from the conveyor duct.
2. Carefully couple the p.t.o. shaft at low tractor engine speed.

→ The feeder rotor transports the loaded material together with any foreign objects into the cargo space without resistance from the cutting unit.

3. Extend the cutting unit back into the conveyor duct when the clogging/blockages have been eliminated.

Elimination not from the tractor seat:

WARNING

Risk to the operator of being drawn in or becoming entangled if the pick-up accidentally starts to run during manual elimination of clogging/blockages!

Secure tractor and machine against accidental starting and rolling before manually eliminating clogging/blockages.

1. Switch the p.t.o. shaft off.
2. Secure tractor and machine against accidental starting and rolling.
3. Eliminate the clogging/blockages..

10.2 Replace bolt of shear bolt coupling

CFS drum and pick-up are protected against breakage due to overload by means of a shear bolt coupling.

If CFS drum and pick-up are at a standstill with the propeller shaft running, the bolt of the shear bolt coupling might be sheared off and has to be replaced.

1. Open the guard of the chain drive at the left-hand front of the machine.
2. Remove the sheared-off bolt.
3. Place a new bolt (1) into the borehole of hub (2) and chain wheel (3).

   Use exclusively a machine bolt M10 x 40 of property class 8.8.
4. Secure the bolt by means of a new self-locking nut.

   Retighten the nut finger-tight. Chain wheel and hub must be able to slightly rotate against each other when the bolt is shearing off.
5. Close the guard of the chain drive.

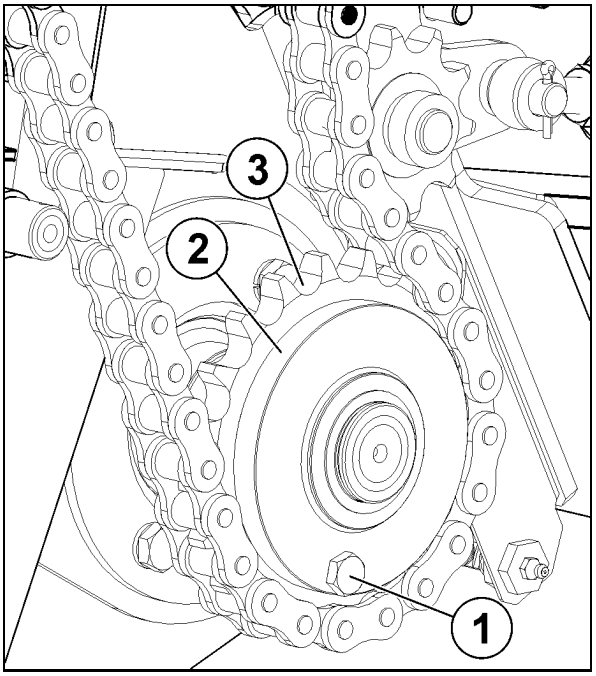


Fig. 123

10.3 Emergency manual operation in case of failure of electrical system

In case of failure of the electrical system, the solenoids for switching the directional control/seat valves can be actuated directly at the electro-hydraulic control block (emergency manual operation function).

Electro-hydraulic control block – Overview

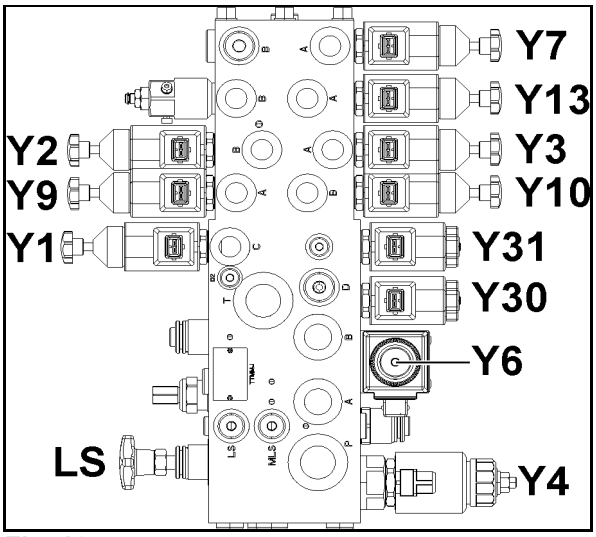


Fig. 124

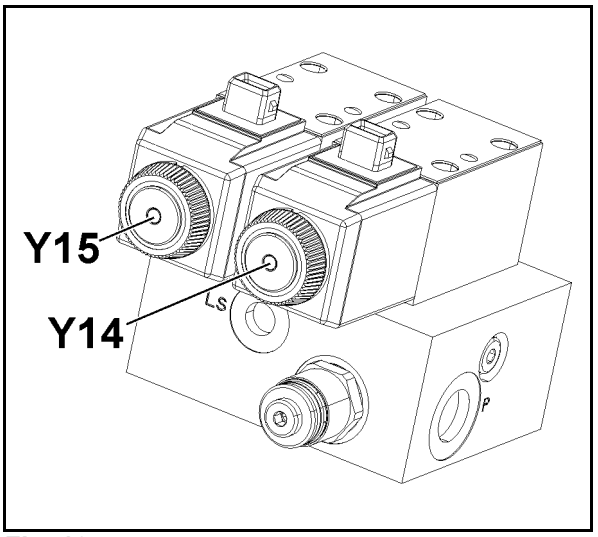


Fig. 125

Y1 Lift/Lower pick-up

Y2 Lift/Lower tailgate

Y3 Lift/Lower tailgate

Y4 Bleed valve

Y6 Reverse transport floor

Y7 Lock/Unlock steering axle

Y9 Lift/Lower folding drawbar

Y10 Lift/Lower folding drawbar

Y13 Retract/Extend cutting unit

Y30 Pre-selection valve 30

Y31 Pre-selection valve 31

LS Load-sensing screw for conversion to load-sensing mode (Closed-Centre hydraulic system)

Y14 Power crossover conveyor (cw rotation)

Y15 Power crossover conveyor (ccw rotation)

DANGER

Risk due to dangerous movements of movable components when actuating the emergency manual operation function!

Before actuating the emergency manual operation function, make sure that third persons leave the machine's hazardous area.

Retract cutting unit

1. Screw the knurled screws Y12.1 and Y12.2 at the cutting unit completely in.
2. Screw the knurled screw Y13 at the electro-hydraulic control block completely in.
3. Use a blunt object (Ø ≤ 3 mm) to push in the pre-selection valve Y31.

   → The cutting unit retracts.
4. Unscrew the knurled screws Y13, Y12.1 and Y12.2 completely again.

Fig. 126

Extend cutting unit

1. Screw the knurled screws Y12.1 and Y12.2 at the cutting unit completely in.
2. Screw the knurled screw Y13 at the electro-hydraulic control block completely in.
3. Use a blunt object (Ø ≤ 3 mm) to push in the pre-selection valve Y30.

   → The cutting unit extends.
4. Unscrew the knurled screws Y13, Y12.1 and Y12.2 completely again.

Fig. 127

Lift pick-up

1. Screw the knurled screw Y1 completely in.
2. Use a blunt object (Ø ≤ 3 mm) to push in the pre-selection valve Y31.

   → The pick-up lifts.
3. Unscrew the knurled screw completely again.

Lower pick-up

1. Screw the knurled screw Y1 completely in.

   → The pick-up lowers.
2. Unscrew the knurled screw completely again.

Lift tailgate

1. Screw the knurled screws Y2 and Y3 completely in.
2. Use a blunt object (Ø ≤ 3 mm) to push in the pre-selection valve Y31.

   → The tailgate lifts.
3. Unscrew the knurled screws completely again.

Lower tailgate

1. Screw the knurled screws Y2 and Y3 completely in.
2. Use a blunt object (Ø ≤ 3 mm) to push in the pre-selection valve Y30.
   → The tailgate lowers.
3. Unscrew the knurled screws completely again.

Lift folding drawbar

1. Screw the knurled screws Y9 and Y10 completely in.
2. Use a blunt object (Ø ≤ 3 mm) to push in the pre-selection valve Y31.
   → The folding drawbar lifts.
3. Unscrew the knurled screws completely again.

Lower folding drawbar

1. Screw the knurled screws Y9 and Y10 completely in.
2. Use a blunt object (Ø ≤ 3 mm) to push in the pre-selection valve Y30.
   → The folding drawbar lowers.
3. Unscrew the knurled screws completely again.

Reverse transport floor

Use a blunt object (Ø ≤ 3 mm) to push in the valve Y6.

→ The transport floor reverses.

Unlock steering axle

1. Screw the knurled screw Y7 completely in.
   → The steering axle is unlocked.
2. Unscrew the knurled screw completely again.

Lock steering axle

1. Screw the knurled screw Y7 completely in.
2. Use a blunt object (Ø ≤ 3 mm) to push in the pre-selection valve Y31.
   → The steering axle is locked.
3. Unscrew the knurled screw completely again.

Power crossover conveyor (ccw rotation)

Use a blunt object (Ø ≤ 3 mm) to push in the valve Y15.

→ The crossover conveyor rotates counterclockwise.

Power crossover conveyor (cw rotation)

Use a blunt object (Ø ≤ 3 mm) to push in the valve 14.

→ The crossover conveyor rotates clockwise.

10.4 Overview of other malfunctions and remedial actions

10.4.1 Hydraulics

Malfunction	Cause	Remedy
No hydraulic function available	Interrupted hydraulic oil circulation	Switch hydraulic oil circulation between tractor and machine on
		Check hydraulic plugs for wear
	Hydraulic hose pipes not correctly connected (return line to pressure connection)	Connect hydraulic hose pipes correctly
	Hydraulic plugs not correctly locked in the hydraulic sleeves	Insert hydraulic plugs into the hydraulic sleeves until hydraulic plugs noticeably lock
	System screw at hydraulic control block not properly set	Check setting and readjust if necessary
Transport floor feed does not start	Machine overload	Partly discharge machine manually
	Transport floor blocked by foreign objects	Eliminate foreign objects
Transport floor feed only works temporarily	Jamming control piston of transport floor valve	Clean control piston and check for smoothness during installation
Tailgate does not open	Closed stop-cock	Open stop-cock
Control block leaking	Defective O-rings	Replace O-rings
	Loose tie rod	Tighten tie rod at 22 Nm
	Leaking screwed plugs	Seal screwed plugs by means of liquid threadlocker or sealing tape.
In the flow line, the pressure rises to 180 bar, although no valve is being actuated (open system)	Screwed-in load-sensing screw for locking of pressure regulator	Unscrew load-sensing screw
Hydraulic system excessively heating up	Volume flow from tractor too large	Adjust volume flow to tractor valve
	Hydraulic plugs too small	Provide appropriately large hydraulic plugs
	Worn hydraulic plugs	Replace hydraulic plugs
Too little hydraulic power in load-sensing mode	Hydraulic plugs too small	Provide appropriately large hydraulic plugs
	Load-sensing control pressure too low	Possibly use pressure intensifier; consult the manufacturer

10.4.2 Electrics

Malfunction	Cause	Remedy
No function working	No power at the control set	Provide a voltage of 12 V at the tractor
	Defective fuse	Replace fuse
	Loose contact in socket	Remedy loose contact
	Operating element On/Off not switched	Set operating element to On
Functions work irregularly	Cable cross section of feed line too small	Select larger cable cross section
Fuse at tractor often defective	Fuse protection too weak	Install a fuse of min. 25 A, check cable cross sections (rated cable cross section = min. 4 mm^2)
	Damaged cable	Replace cable
Feed function cannot be controlled	No power, 12 V at the control set	Provide a voltage of 12 V at the tractor
	Cable cross section of feed line too small	Select larger cable cross section
	Defective control set	Have control set checked
	Defective solenoid of a hydraulic valve	Replace solenoid
Feed function can only temporarily be controlled	Loose contact at solenoid	Remedy loose contact
	Cable cross section of feed line too small	Select larger cable cross section
Feed function does not work	Defective solenoid of feed	Replace solenoid
2 or more functions work simultaneously	Damaged cable	Replace cable
	Several simultaneously energised solenoids	Check cable
	Emergeny manual operation function actuated	Check whether knurled screws of control block are unscrewed, unscrew if necessary
Function does not work although a voltage of 12 V is available at the solenoid	Defective solenoid	Replace solenoid
Display of control set does not work	No 12 V voltage	Provide a voltage of 12 V at the control set
	Defective fuse at the tractor	Replace fuse
The display of a function does not show a status message on the control set	Defective wiring (short-circuit)	Check wires, replace them if necessary
	Sensor not properly set	Adjust sensor
	Defective sensor	Replace sensor

The displays of all functions do not show a status message on the control set	Defective wiring (short-circuit)	Check wires, replace them if necessary
	Sensors not properly set	Adjust sensors
	Defective sensor/s	Replace sensor/s
Automatic charging system switches too late	Range not set	Recalibrate automatic charging system
	Interrupted hydraulic oil circulation	Switch hydraulic oil circulation between tractor and machine on
System does not work	Malfunction in the system	Restart system
Discharge mode A I does not switch	Steering axle not completely locked due to blocked wheels	Move machine slightly forward

10.4.3 Working

Malfunction	Cause	Remedy
Blockages in the taking-in area	Unequal or too large swathes	Pick up smaller, more equal swathes
	Excessive travelling speed	Reduce travelling speed
	Too little flow in the taking-in area	Keep to hitching height
Response of overload clutch during charging	Excessive travelling speed	Reduce travelling speed
	Blunt cutting knives	Sharpen/Replace cutting knives
	Loaded material too heavily compressed	Switch transport floor feed function on in good time
Bad cutting quality	Blunt cutting knives	Sharpen/Replace cutting knives
	Cutting unit extended not far enough	Clean and completely extend cutting unit
	Swathe size too small	Increase swathe or travelling speed
	Cutting knives evade too early	Check springs of knife protection system, replace if necessary
Cutting knives break frequently	Defective knife security system	Check knife security system
	Roller stuck in lever, lever does not retract	Lubricate roller (must turn easily) or replace lever
	Cutting unit extended not far enough	Clean and completely extend cutting unit
Individual cutting knives retracted from the conveyor duct	Cutting knives evaded foreign objects	Swivel the cutting unit completely out of the conveyor duct and in again with the feeder rotor running

Malfunction	Cause	Remedy
Cutting unit cannot be extended	Cutting unit soiled between cutting knives and conveying trough	Clean cutting unit
	Conveyor duct clogged	Clean conveyor duct
	Cutting knives bent	Align or replace cutting knives
	Knurled screws of hydraulic cylinders at cutting unit unscrewed	Completely screw in knurled screws
Slip clutch of pick-up responds frequently	Pick-up set too low	Readjust setting
	Pick-up heavily soiled in its interior	Clean pick-up
Folding drawbar does not move up	Machine overload	Adapt charging degree
	Hydraulic pressure at tractor too low	Set hydraulic pressure at tractor to a minimum value of 180 bar
Pick-up, folding drawbar and tailgate sink during work	Hydraulic cylinder leaking	Seal hydraulic cylinder
Cutting unit slowly retracting during work	Piston in hydraulic cylinder leaking	Seal piston
	Hydraulic cylinder leaking	Seal hydraulic cylinder
	Hydraulic oil pressure too low	Actuate key longer
Machine wobbles heavily during road travel	Tyre pressure too low	Adjust tyre pressure according to table
	Machine overload	Adapt charging degree
Transport floor often switches off during discharge	"Forage wagon full" sensor or tension spring of beater switch-off device not set properly	Adjust settings

11 Disassembly / Disposal

Shop work

WARNING

Risk due to overturning or falling machine parts and operating media harmful to environment and health!

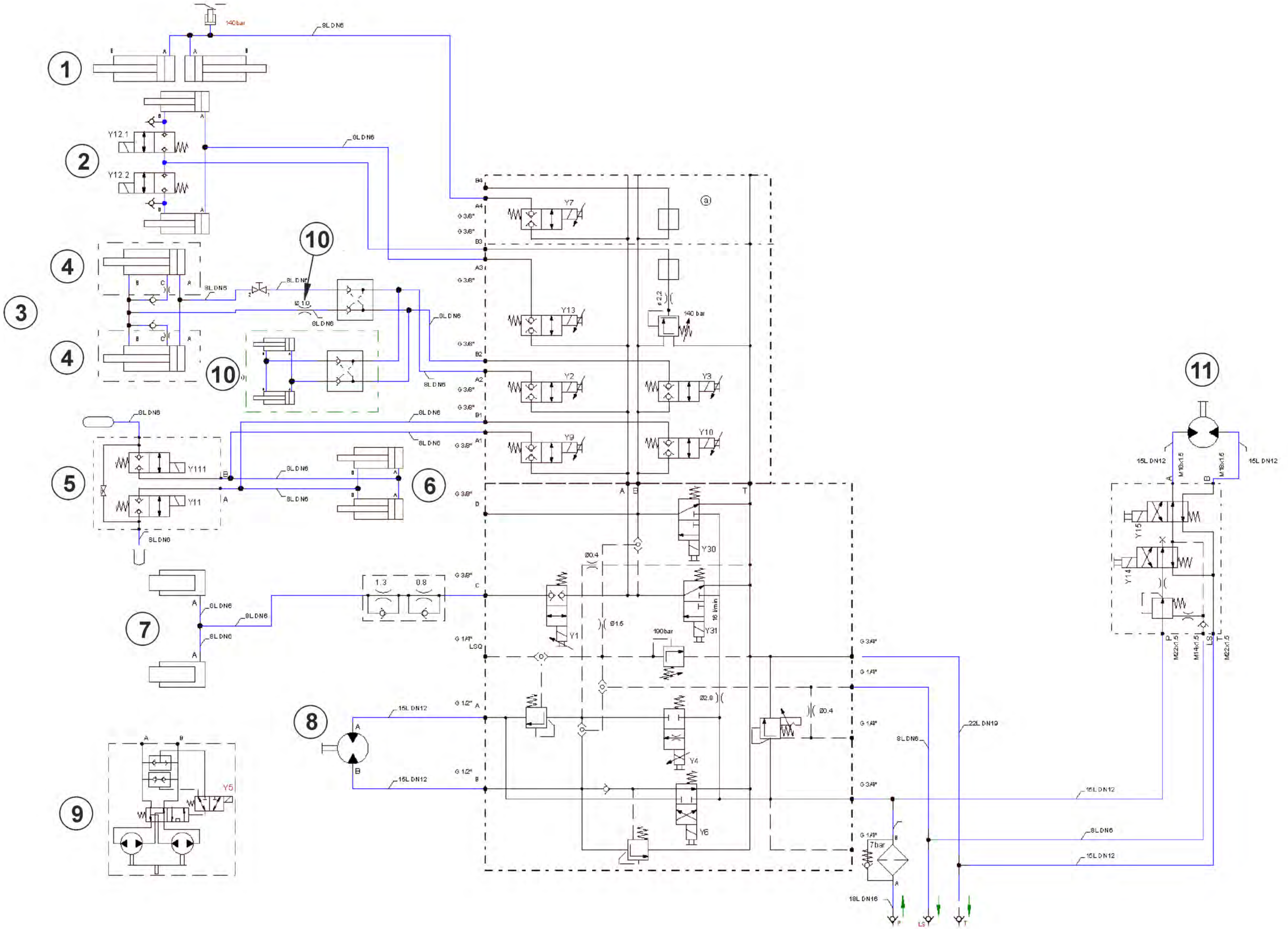
Only qualified staff is allowed to disassemble the machine.

Machine parts and operating media (oils, greases etc.) must be disposed of in accordance with national and international environmental regulations.

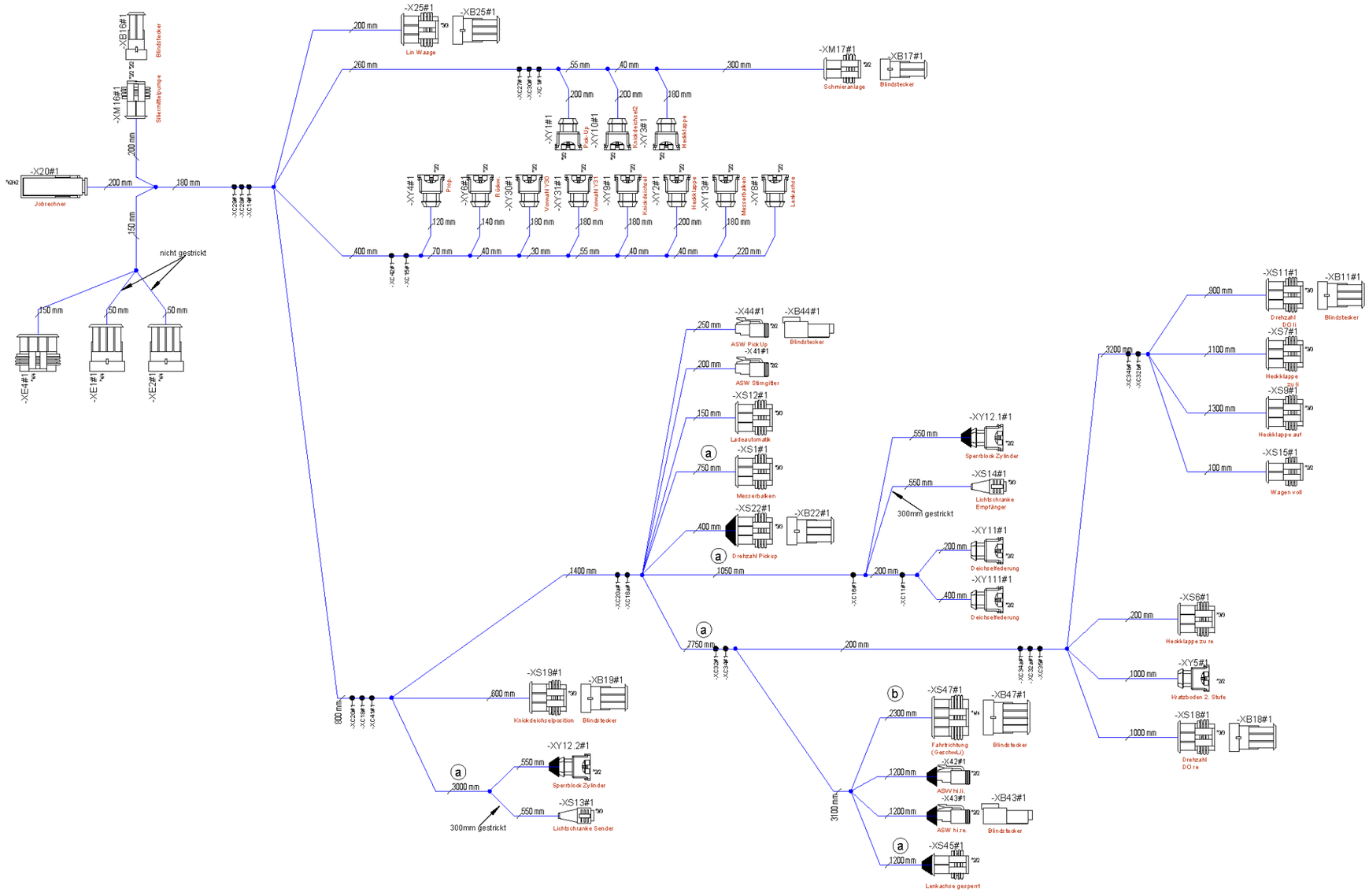
12 Circuit diagrams

12.1 Hydraulics

(1) Passive steering axle
(2) Cutting unit
(3) Tailgate
(4) Tailgate cylinder
(5) Drawbar suspension
(6) Folding drawbar
(7) Pick-up
(8) Transport floor
(9) Transport floor, 2-level
(10) Only with beaters
(11) Crossover conveyor


1
2
3
4
5
6
7
8
9
10
11
Y12.1
Y12.2
Y7
Y13
Y2
Y3
Y9
Y10
Y111
Y11
Y30
Y31
Y1
Y4
Y6
Y5
Y15
Y14
140 bar
190bar
7bar

12.2 Electronics – Cable harness overview



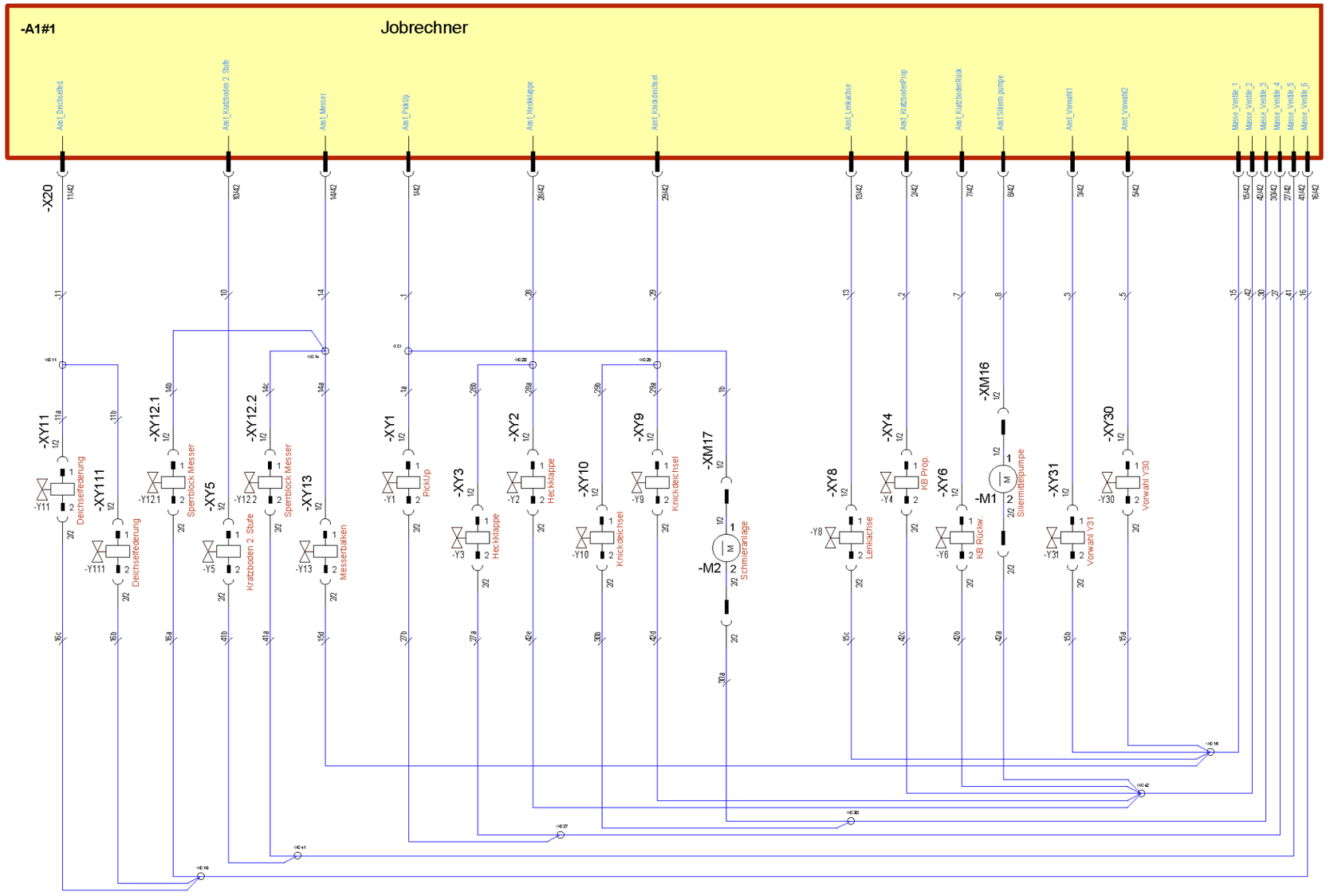
X20	Control unit
X25	LIN module, weighing device
X41	Work lights, front grating
X42	Work light, rear, left-hand
X43	Work light, rear, right-hand
X44	Work light, pick-up
XM16	Silage additive pump
XM17	Central lubrication
XS1	Cutting unit
XS6	Tailgate lowered, right-hand
XS7	Tailgate lowered, left-hand
XS9	Tailgate lifted
XS11	Speed, beaters, left-hand
XS12	Automatic charging system
XS13	Knife protection system (transmitter)
XS14	Knife protection system (receiver)
XS15	Forage wagon full
XS18	Speed, beaters, right-hand
XS19	Folding drawbar position
XS22	Speed, pick-up
XS45	Steering axle locked
XS47	Direction of motion (speed)

XY1	Pick-up
XY2	Tailgate
XY3	Tailgate
XY4	Transport floor forward
XY5	Transport floor forward level II
XY6	Reverse transport floor
XY8	Steering axle
XY9	Folding drawbar 1
XY10	Folding drawbar 2
XY11	Drawbar suspension 1
XY12.1	Double check valve, cylinder
XY12.2	Double check valve, cylinder
XY13	Cutting unit
XY30	Pre-selection valve 30
XY31	Pre-selection valve 31
XY111	Drawbar suspension 2
XB…	Dummy plug

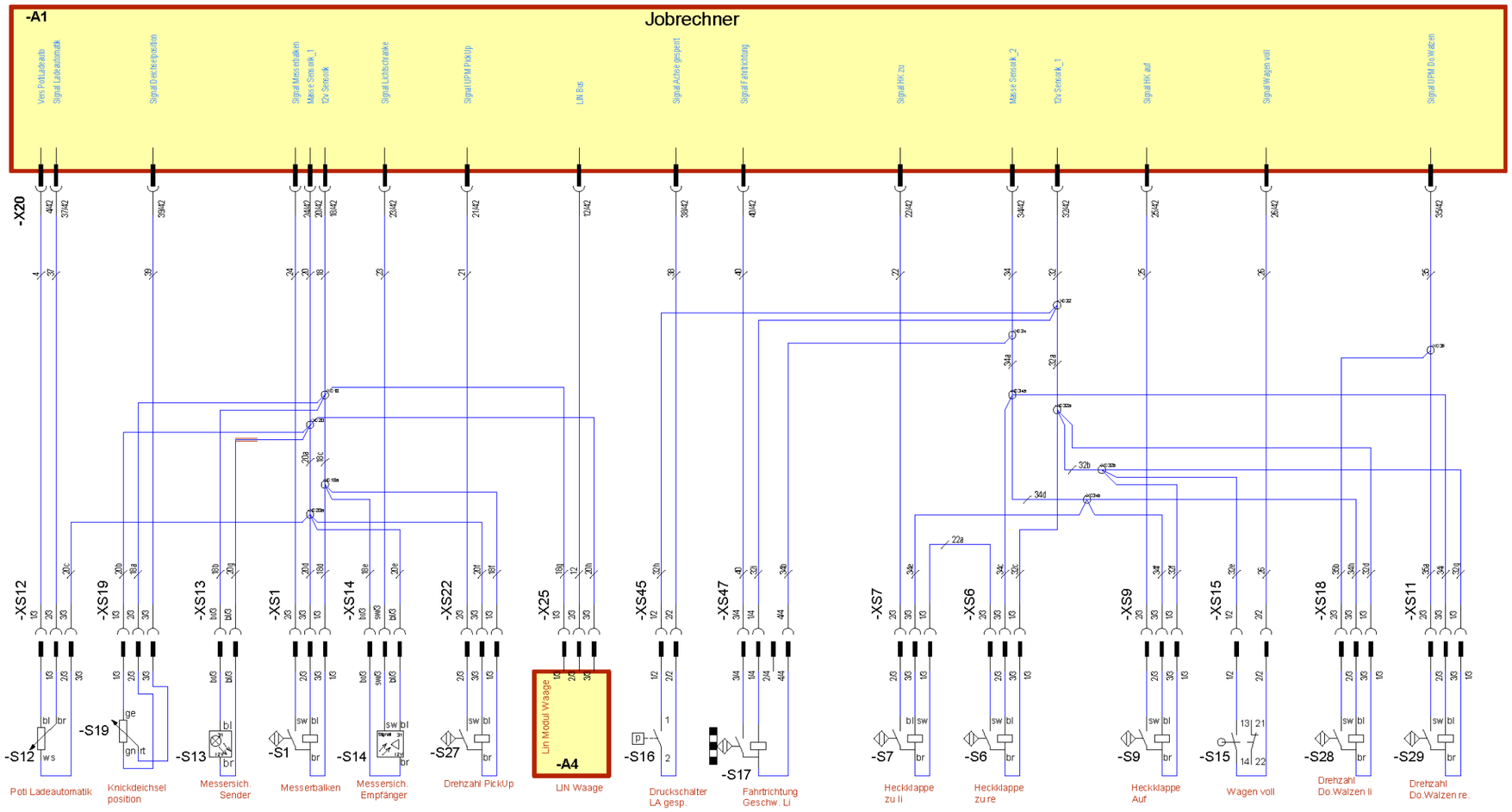
12.3 Electronics – Valves

A1#1	Control unit
M1	Silage additive pump
M2	Central lubrication
XM16	Silage additive pump
XM17	Central lubrication
XY1	Pick-up
XY2	Tailgate 1
XY3	Tailgate 2
XY4	Transport floor forward
XY5	Transport floor forward level II
XY6	Reverse transport floor
XY8	Steering axle
XY9	Folding drawbar 1
XY10	Folding drawbar 2
XY11	Drawbar suspension 1
XY12.1	Double check valve, cutting unit
XY12.2	Double check valve, cutting unit
XY13	Cutting unit
XY30	Pre-selection valve 30
XY31	Pre-selection valve 31
XY111	Drawbar suspension 2

1/42	Pick-up
2/42	Transport floor forward
3/42	Pre-selection valve 31
5/42	Pre-selection valve 30
7/42	Reverse transport floor
8/42	Silage additive pump
10/42	Transport floor level II
11/42	Drawbar suspension
13/42	Lock steering axle
14/42	Cutting unit
15/42	Ground, valves 1
16/42	Ground, valves 6
27/42	Ground, valves 4
28/42	Tailgate
29/42	Folding drawbar
30/42	Ground, valves 3
41/42	Ground, valves 5
42/42	Ground, valves 2


-A1#1
Jobrechner
Aset_Deichselfed
Aset_Kratzboden 2. Stufe
Aset_Messer
Aset_PickUp
Aset_Heckklappe
Aset_Knickdeichsel
Aset_Lenkachse
Aset_KratzbodenProp
Aset_KratzbodenRück
Aset_Silierm.pumpe
Aset_Vorwahl1
Aset_Vorwahl2
Masse_Ventile_1
Masse_Ventile_2
Masse_Ventile_3
Masse_Ventile_4
Masse_Ventile_5
Masse_Ventile_5
-X20
-XY11
Deichselfederung
-XY111
Deichselfederung
-XY12.1
Sperrblock Messer
-XY5
Kratzboden 2. Stufe
-XY12.2
Sperrblock Messer
-XY13
Messerbalken
-XY1
PickUp
-XY3
Heckklappe
-XY2
Heckklappe
-XY10
Knickdeichsel
-XY9
Knickdeichsel
-XM17
-M2
Schmieranlage
-XY8
Lenkachse
-XY4
KB Prop.
-XY6
KB Rückw.
-XM16
-M1
Silierm.pumpe
-XY31
Vorwahl Y31
-XY30
Vorwahl Y30

12.4 Electronics – Sensors



A1	Control unit
A4	LIN module, weighing device
4/42	Supply, potentiometer, automatic charging system
12/42	LIN bus
18/42	12 V sensors 1
20/42	Ground, sensors 1
21/42	Signal, speed, pick-up
22/42	Signal "Tailgate lowered"
23/42	Signal, light barrier
24/42	Signal, cutting unit
25/42	Signal "Tailgate completely lifted"
26/42	Signal "Forage wagon full"
32/42	12 V sensors 2
34/42	Ground, sensors 2
35/42	Signal, speed, beaters
37/42	Signal, automatic charging system
38/42	Signal "Steering axle locked"
39/42	Signal, folding drawbar position
40/42	Signal, direction of motion
S1	Cutting unit
S6	Tailgate lowered, right-hand
S7	Tailgate lowered, left-hand
S9	Tailgate completely lifted
S12	Potentiometer, automatic charging system
S13	Knife protection system (transmitter)
S14	Knife protection system (receiver)
S15	"Forage wagon full"
S16	Pressure switch "Steering axle locked"
S17	Direction of motion (speed)
S19	Folding drawbar position
S27	Speed, pick-up
S28	Speed, beaters, left-hand
S29	Speed, beaters, right-hand

12.5 Electronics – Work lights

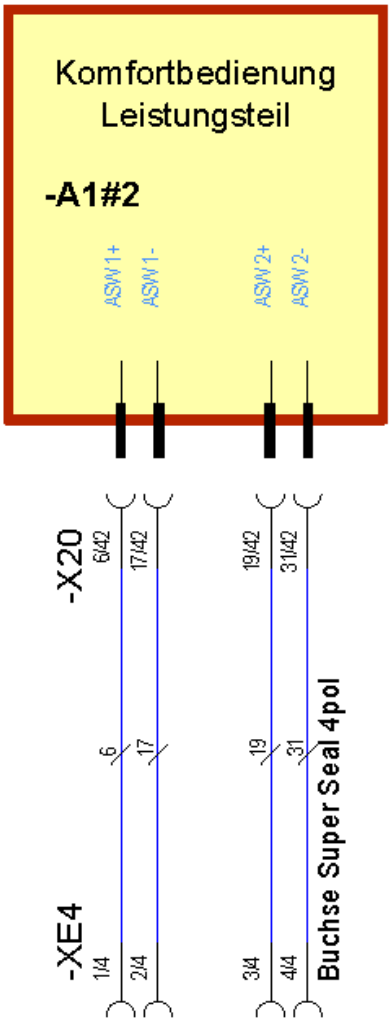
A1#2 Easy-to-use control, power unit

6/42 Work light 1+

17/42 Work light 1-

19/42 Work light 2+

31/42 Work light 2-



Index

Verfasser	Freigeber	Datum	Sprache
AxF	AxF	27.07.2015	EN

Zuordnung	
PG	Ladewagen
WG	Zelon CFS
Modell	Zelon CFS 2501, 2901, 3301 / 2501 DO, 2901 DO, 3301 DO