Translation of the Original Operating Instructions

Universal spreader

VS 1204, VS 1604, VS 1804, VS 2004

31200904
07.12 b.000

GB

MASCHINENFABRIK

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:	Universal spreader
Function:	Distribution of all kinds of manure, compost, lime, carbo lime, pasty sewage sludge as well as dry chicken dung
Model:	Universal spreader VS
Type:	VS 1204, VS 1604, VS 1804, VS 2004
Vehicle/Machine ID number:	W09305000_0S38001 - W09312000_0S38999
Trade name:	Universal spreader VS

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

Sources of the applied harmonized standards according to article 7 paragraph 2:

EN ISO 12100:2010	Safety of machinery - Basic concepts, general principles of design - Risk assessment and risk reduction
EN ISO 13857:2008	Safety of machinery - Safety distances to prevent hazard areas from being reached by upper and lower limbs
EN ISO 4254-1:2009	Agricultural machinery - Safety - Part 1: General requirements
EN ISO 4413:2010	Fluid power - General rules and safety requirements for hydraulic systems and their components
EN 690:1994+A1:2009	Agricultural machinery - Manure spreaders - Safety
EN 953:1997+A1:2009	Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards
EN 12965:2003+A2:2009	Tractors and machinery for agriculture and forestry - Propeller shafts and their guards - Safety

Bad Laer, 09.01.2012

Dipl.-Ing. (FH) R. Evert	Dr. J. Marquering	Dr. K.-P. Strautmann
Team Manager Spreaders	Head of Development	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

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E-mail: kontakt@strautmann.com

Spare parts order service

B. Strautmann & Söhne GmbH u. Co. KG

Bielefelder Straße 53

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Phone: + 49 (0) 5424 802-31

Fax: + 49 (0) 5424 802-64

E-mail: kontakt@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:	31200904
Date of compilation:	07.12

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!

Please read and observe these operating instructions, in particular the safety instructions, before commissioning. After carefully reading the instructions, you will be 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, keep these operating instructions:

- always in the immediate vicinity of the machine or in the tractor,
- for further use.

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):

- Figure 3
- Position 6

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	… Universal spreader VS 1204, VS 1604, VS 1804, VS 2004.
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.

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 Overview – Assemblies

Illustration of the machine and identification of essential elements.

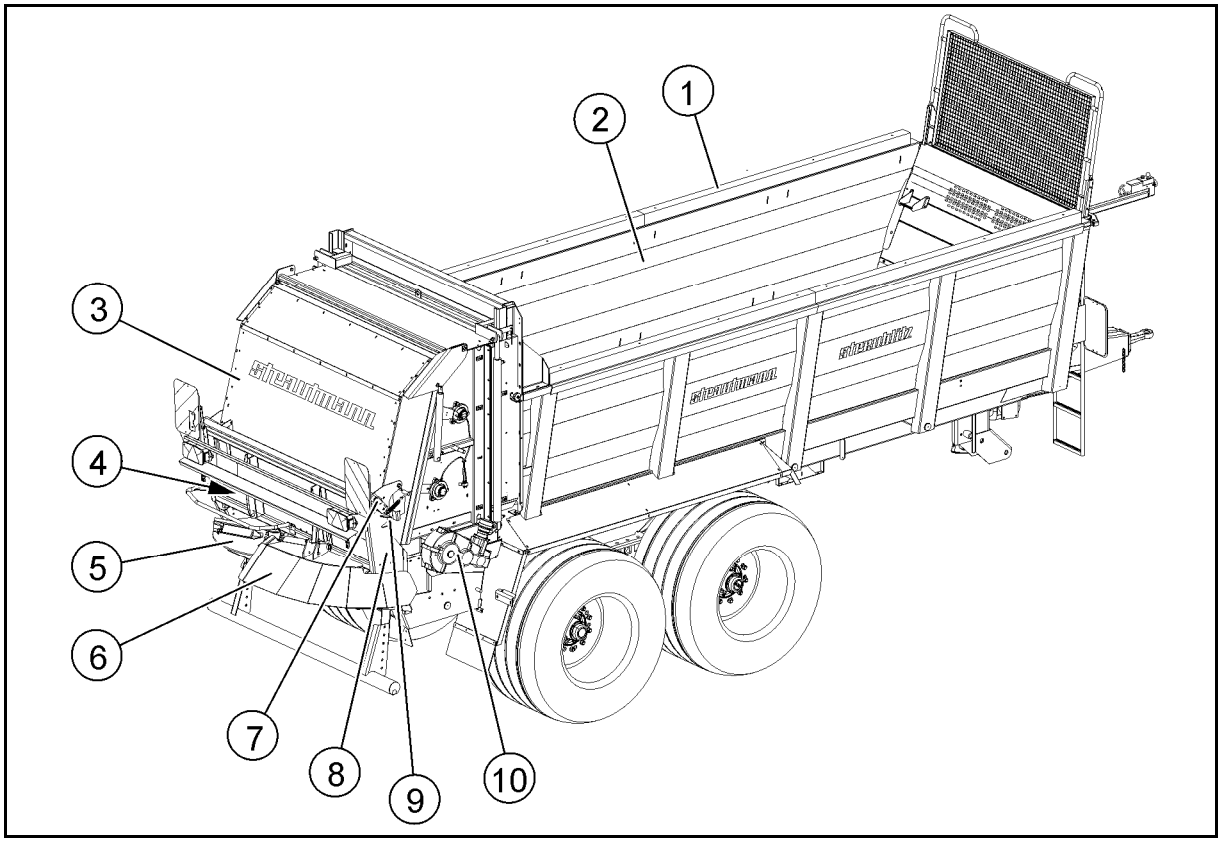


Fig. 1

(1) Edge protector
(2) Body
(3) Spreading unit bonnet for 2-beater spreading unit
(4) Spreading slide
(5) 2-disc spreading unit
(6) Limiting spreading device (only with available optional extra equipment)
(7) Height adjustment device for spreading slide
(8) Sliding door
(9) Adjustment, right-hand, for delivery point (sliding door)
(10) Feed gearing for transport floor

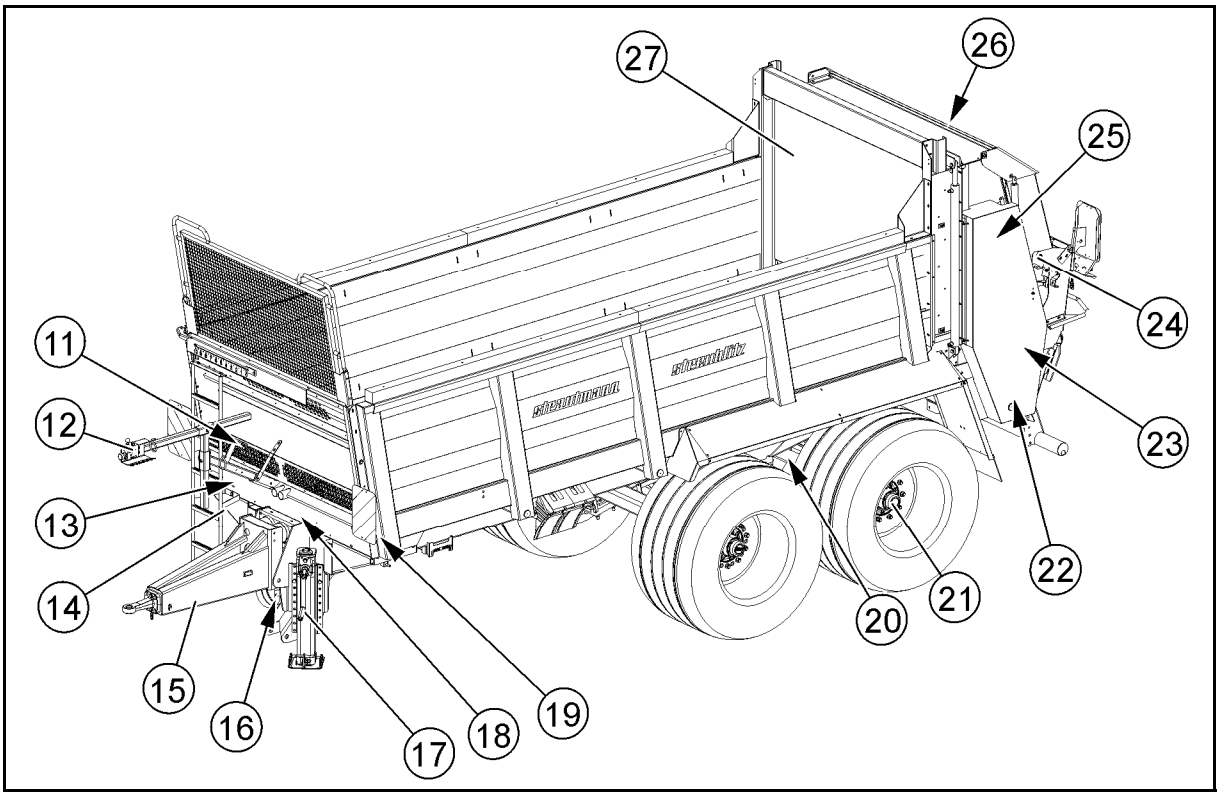


Fig. 2

(11) Trailer brake valve with release valve

(12) Retainer for hydraulic hose pipes with hose holder

(13) Platform with transport floor

(14) Parking brake

(15) Drawbar

(16) Rpm sensor for main drive shaft (only on 4-beater spreading unit)

(17) Supporting leg

(18) Stop-cock for spreading unit bonnet (only for direct control unit)

(19) Chain tensioner

(20) Chassis

(21) Steering axle

(22) 2-beater drive gear

(23) Bottom spreading beater drive

(24) Adjustment, left-hand, for delivery point (sliding door)

(25) Top spreading beater drive

(26) 2-beater spreading unit

(27) Hydraulic slurry door

2.2 Safety and protective devices

This chapter shows the location of the properly installed protective devices in protective position.

WARNING

Risk to people of being crushed, drawn in and becoming entangled during operation of machine due to unprotected moving machine parts!

- Start the machine only with the protective devices completely mounted.
- Immediately replace defective protective devices.

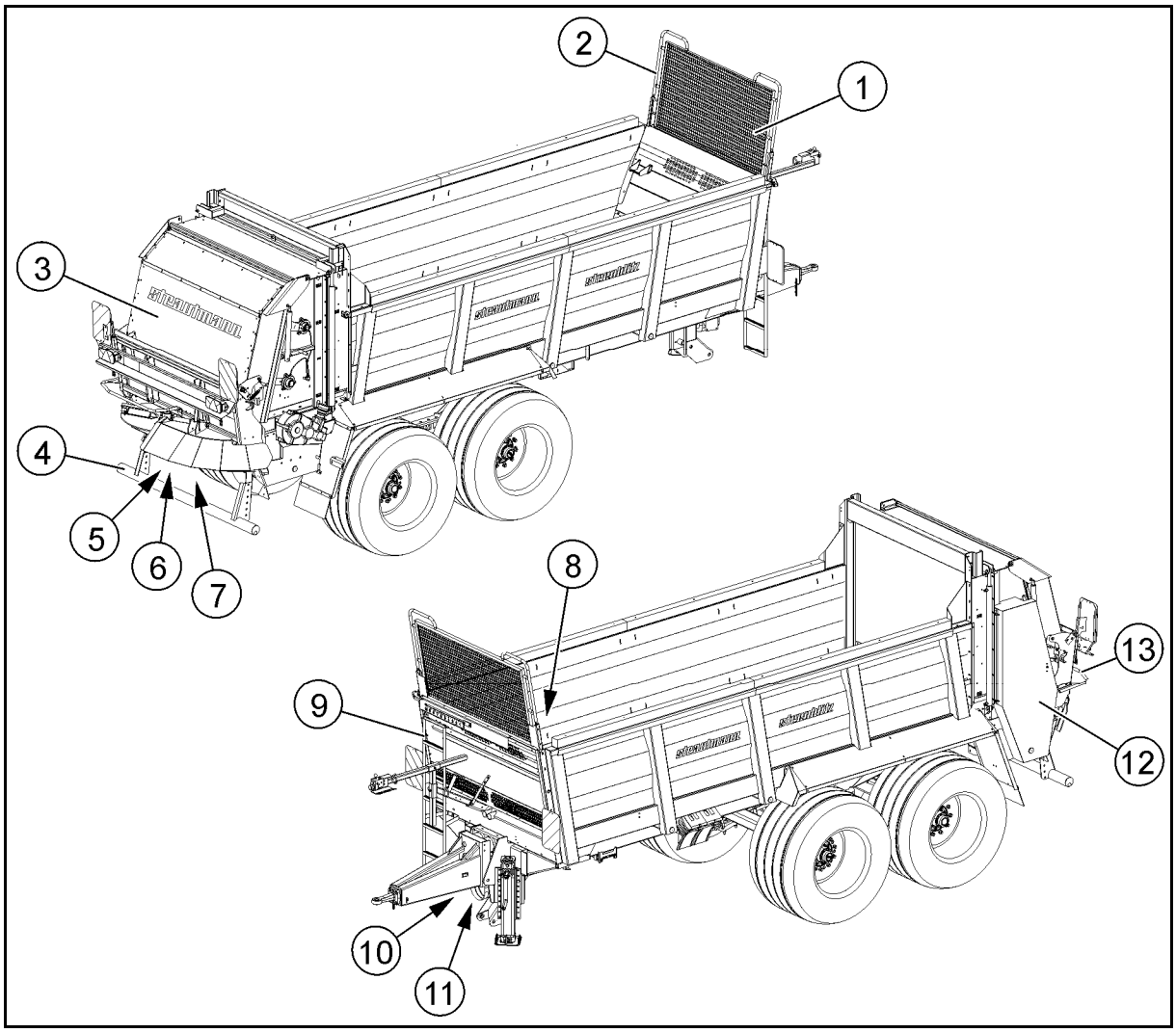


Fig. 3

(1) Protective grating
(2) Handrail
(3) Spreading unit bonnet
(4) Underride guard
(5) Guard for drive shaft at 2-disc spreading unit
(6) Shaft guard for drive shaft at 2-disc spreading unit
(7) Bottom cover plate for feed shaft
(8) Ladder rung
(9) Ladder
(10) Protective sleeves (2x) for drive shaft
(11) Protective tube (7x) for drive shaft
(12) Side protector, spreading beater drive, left-hand
(13) Protective bow

The distance between underride guard (1) and road (2):

- must not exceed 550 mm,
- may change due to a tyre change.

Check the distance after each tyre change. Change the position of the underride guard if the distance is more than 550 mm.

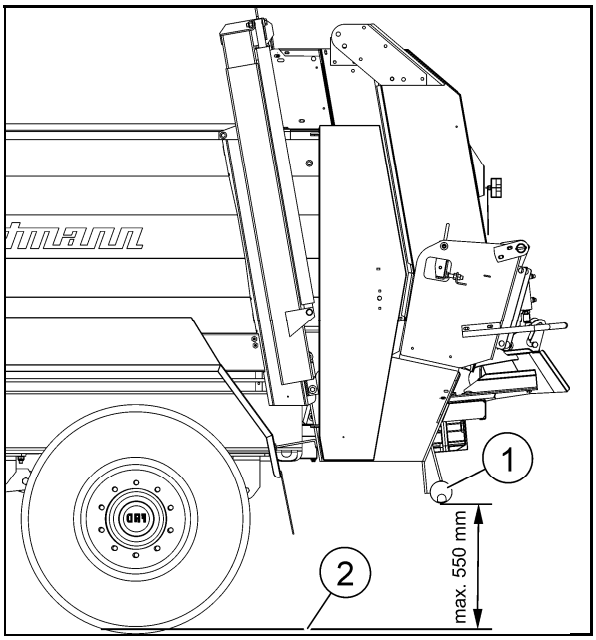


Fig. 4

2.3 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 in case of 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) Control cable for easy-to-use control unit (only with available easy-to-use control unit)

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

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

Fig. 5

2.3.1 Marking of hydraulic supply lines

Hydraulic connector "Flow line"

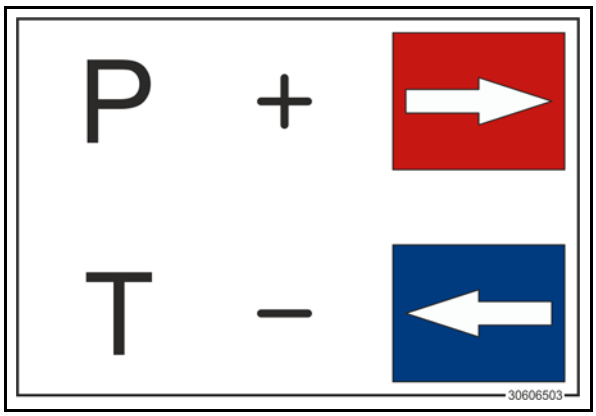
- Label
  Arrows: white
  Background: red

Hydraulic connector "Return line"

- Label
  Arrows: white
  Background: blue

Explanation of hydraulic connector symbols

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

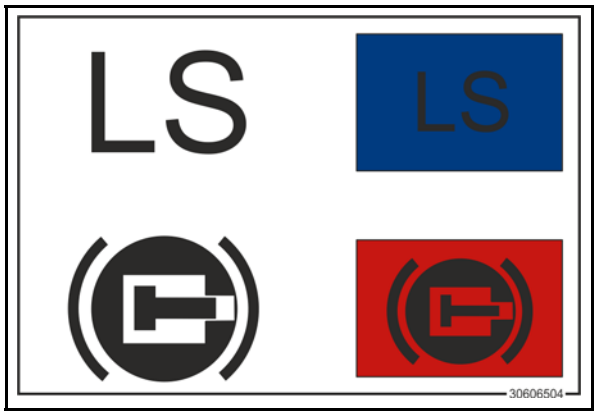


Load-sensing connector

- Label

Explanation of the following symbols:

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



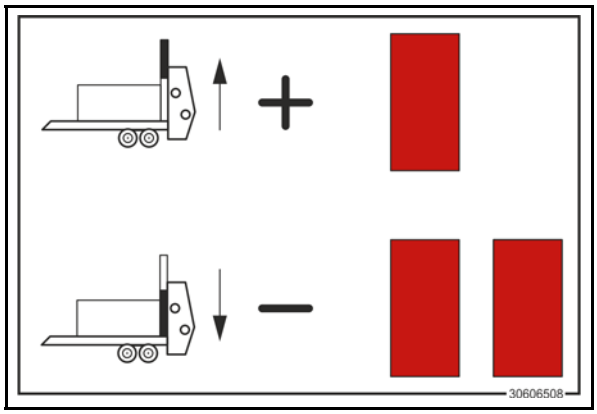
Hydraulic slurry door

- Flow line: 1 red cable tie

→ Lift hydraulic slurry door

- Return line: 2 red cable ties

→ Lower hydraulic slurry door



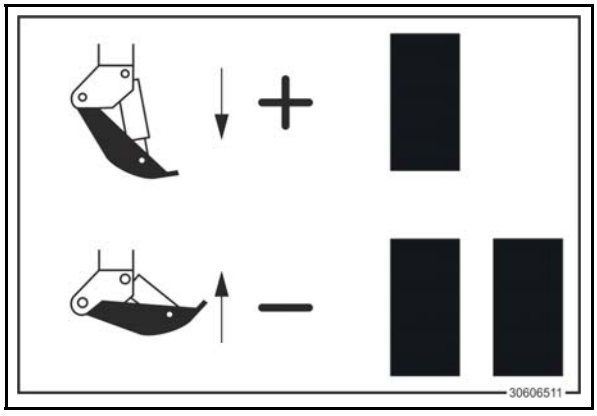
Supporting leg

- Flow line: 1 black cable tie

→ Lower supporting leg

- Return line: 2 black cable ties

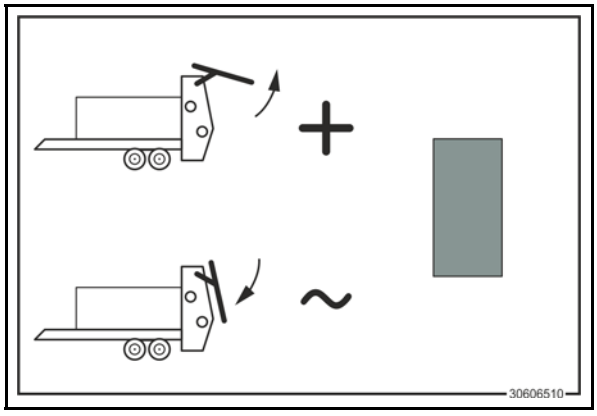
→ Lift supporting leg



Spreading unit bonnet

- Flow line, return line: 1 grey cable tie

→ Lift or lower spreading unit bonnet



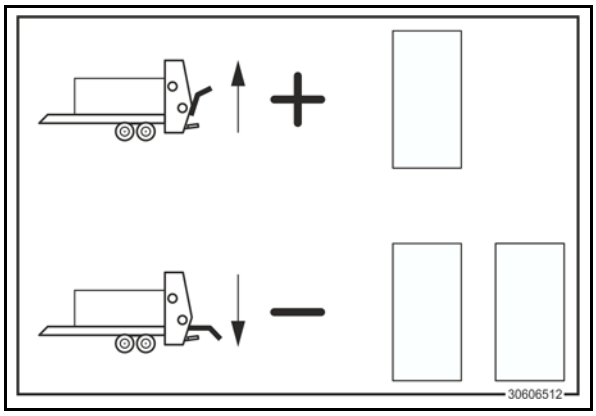
Limiting spreading device

- Flow line: 1 white cable tie

→ Lift limiting spreading device

- Return line: 2 white cable ties

→ Lower limiting spreading device



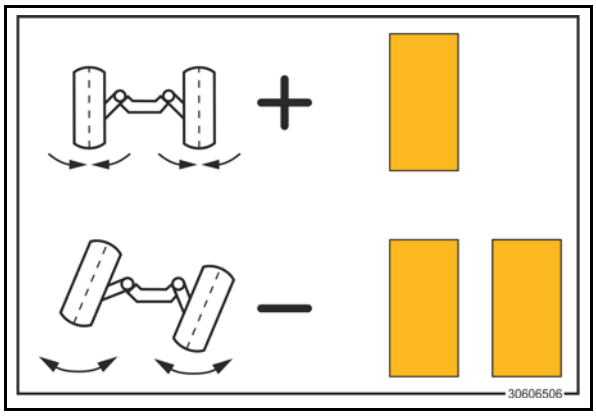
Steering axle

- Flow line: 1 yellow cable tie

→ Lock steering axle

- Return line: 2 yellow cable ties

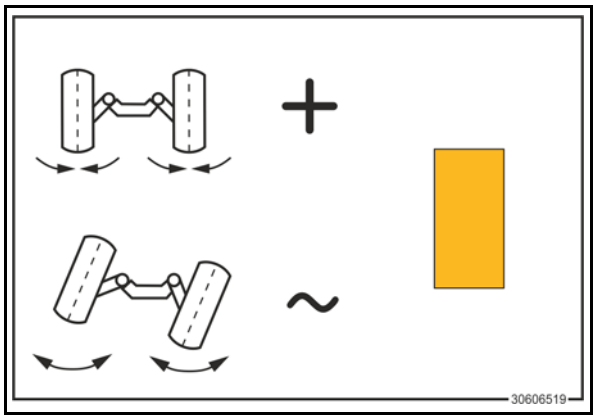
→ Unlock steering axle



Steering axle

- Flow line, return line: 1 yellow cable tie

→ Lock or unlock steering axle



2.4 Traffic-related equipment

Properly fix and check the traffic-related equipment for proper functioning before travelling on public roads and paths.

(1) Multi-function light
(2) License plate
(3) Speed sign
(4) Triangular reflectors
(5) Underride guard
(6) Rear warning plates

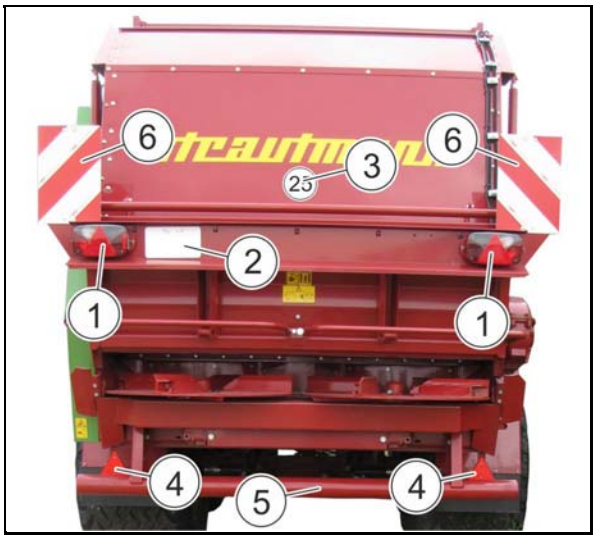


Fig. 6

(7) Side reflectors (4 on each side of machine)
(8) Chocks

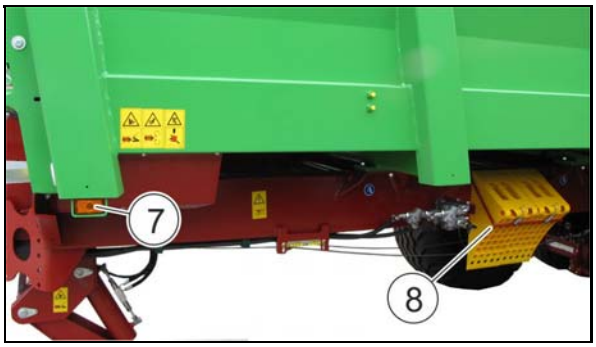


Fig. 7

(9) Front warning plates

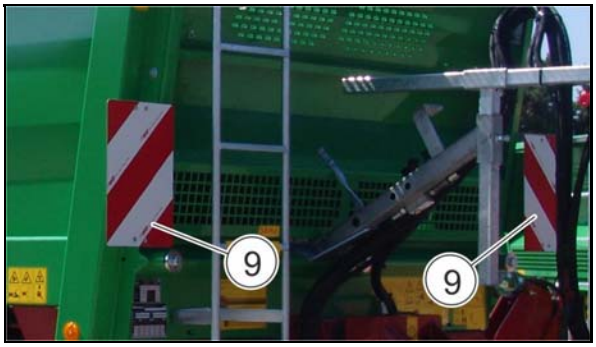


Fig. 8

2.5 Correct use

The machine:

- is exclusively intended for normal use in the course of agricultural work,
- is suitable for the distribution of manure, compost, lime, carbo lime, pasty sewage sludge as well as dry chicken dung onto the field,
- 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 %
  - Direction of motion to the right 20 %
- Slope line:
  - uphill 20 %
  - downhill 20 %

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.

2.6 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 tractor and machine.

Dangerous spots exist:

- within the drawbar area between tractor and machine,
- within the area of the powered propeller shaft,
- beneath the machine,
- beneath the lifted, unsecured spreading unit bonnet,
- within the area of the powered spreading beaters and spreading discs,
- within the area of the powered transport floor,
- in the cargo space with the machine powered.

2.7 Type plate and CE symbol

The following figures show the position of the type plate, the vehicle/machine ID number and the CE symbol.

> 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)

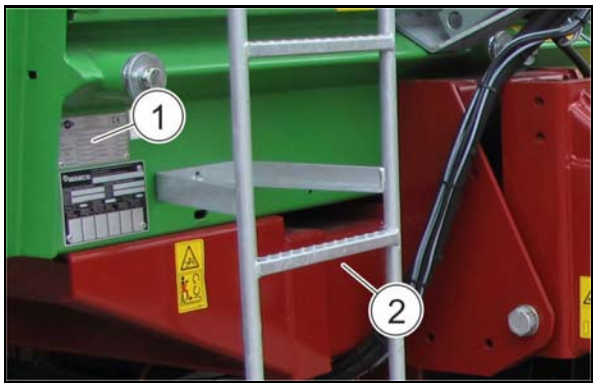


Fig. 9

The type plate includes:

(1) Hersteller = Manufacturer

(2) Fahrzeug-/Maschinen-Ident-Nr. = Vehicle/Machine ID number

(3) Typ = Type

(4) Leergewicht [kg] = Empty weight [kg]

(5) Zul. Gesamtgewicht [kg] = Gross vehicle weight rating [kg]

(6) Zul. Stützlast/Achslast vorn [kg] = Admissible tongue load/front axle load [kg]

(7) Zul. Achslast hint. [kg] = Admissible rear axle load [kg]

(8) Genehmigungs-Nr. = Approval number

(9) Baujahr = Year of manufacture

(10) Nenndrehzahl [min-^{1}] = Rated speed [min^{-1}]

(11) Zul. Hydr. Druck [bar] = Admissible hydraulic pressure [bar]

(12) Zul. Höchstgeschw. [km/h] = Maximum admissible speed [km/h]

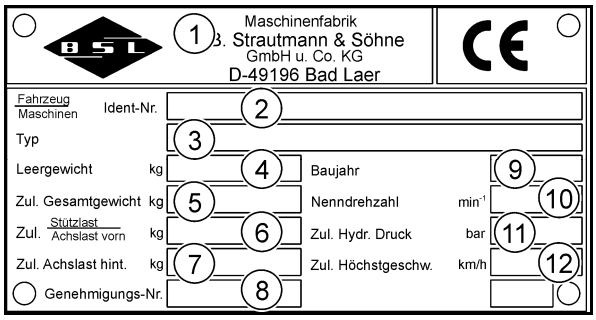


Fig. 10

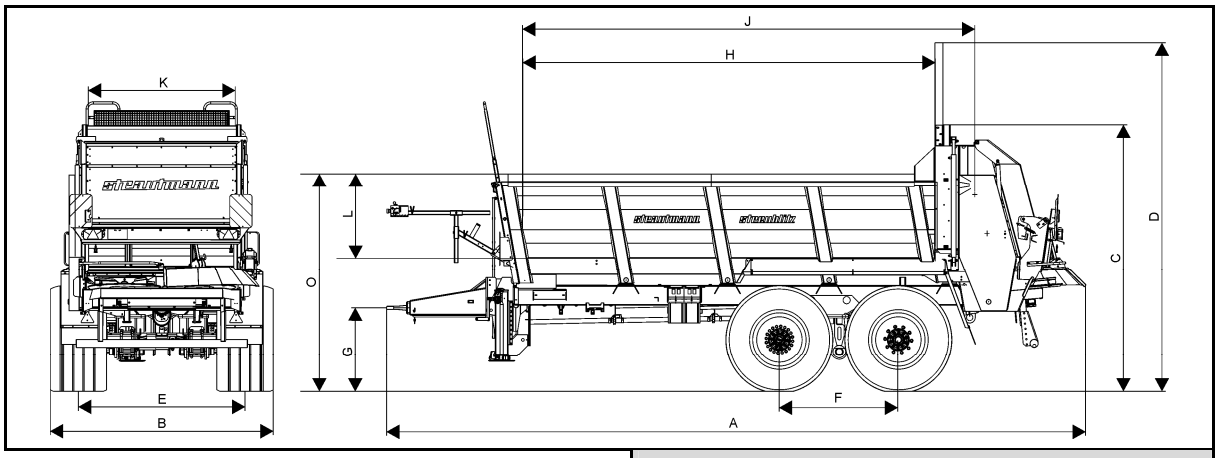
2.8 Technical data

2.8.1 General data

		Model			
		VS 1204	VS 1604	VS 1804	VS 2004
Gross vehicle weight rating					
Top hitch	kg	12000	16000	18000	20000
Bottom hitch	kg	13000	17000	19000	22000
Admissible axle load	kg	10000	14000	16000	18000
Admissible tongue load					
Top hitch	kg	2000	2000	2000	2000
Bottom hitch	kg	3000	3000	4000	4000
Empty weight, 2-disc wide-angle spreading unit	kg	5900	6700	6900	7600
Empty weight, 4-beater spreading unit	kg	5300	6100	6200	6900
Loading capacity, 2-disc wide-angle spreading unit					
Top hitch	kg	6100	9300	11100	12400
Bottom hitch	kg	7100	10300	12100	14400
Loading capacity, 4-beater spreading unit					
Top hitch	kg	6700	9900	11800	13100
Bottom hitch	kg	7700	10900	12800	15100
Maximum travel speed	km/h	40			
Maximum hydraulic pressure	bar	210			
Oil flow rate	l/min	40-70			
Min. power required	kW HP	88 120			110 150
P.t.o. speed, 2-disc wide-angle spreading unit	min^{-1}	1000			
P.t.o. speed, 4-beater spreading unit	min^{-1}	1000			
Power supply	V	12			
Sound pressure level	dB(A)	84.6			

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

2.8.2 Dimensions of wagon



		Model			
		VS 1204	VS 1604	VS 1804	VS 2004
A = Total length, 2-disc wide-angle spreading unit	m	8.14	8.14	8.14	8.64
A = Total length, 4-beater spreading unit	m	7.93	7.93	7.93	8.43
B = Total width	m	2.60	2.45*/ 2.55	2.55	2.81
C = Total height	m	3.27	3.18	3.18	3.57
D = Total height, hydraulic slurry door extended	m	4.33	4.24	4.24	4.63
E = Track, single axle	m	2.00	--	--	--
E = Track, tandem axle	m	--	1.95*/ 2.05	2.05	2.10
F = Wheelbase	m	--	1.31	1.31	1.50
G = Drawbar height, top linkage	m	1.03	1.00	1.00	1.05
G = Drawbar height, bottom linkage	m	0.56	0.53	0.53	0.58
H = Cargo space length up to hydraulic slurry door	m	4.85	4.85	4.85	5.35
J = Cargo space length up to beater spreading unit	m	5.53	5.53	5.53	6.03
K = Cargo space width	m	1.93			
L = Cargo space height	m	1.06			
L = Cargo space height with attachment	m	1.36			
M = Hydraulic slurry door clearance	m	1.25			
N = Spreading unit clearance					
2-disc wide-angle spreading unit	m	1.40			
4-beater spreading unit	m	1.46			
O = Charging height	m	2.47	2.38	2.38	2.77
O = Charging height with attachment	m	2.77	2.68	2.68	3.07

Loading capacity	m^3	15.5	15.5	15.5	17
Loading capacity up to hydraulic slurry door	m^3	13	13	13	14.5

* In the absence of a steering axle.

Tyres taken as a basis for the measured dimension:

- VS 1204: 600/55-22.5
- VS 1604, VS 1804: 500/60-22.5
- VS 2004: 710/50 R26.5

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

2.8.3 Tyre pressure

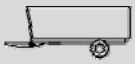
According to the StVZO (note of transl.: German Road Traffic Licensing Code), the maximum internal tyre pressure may be 1.5 bar if the vehicle width of 2.55 m is exceeded due to wide-base tyres.

Tyre pressures for single axle (22.5“)

				40 km/h 10 t	max.
500/60-22.5	Alliance I-328	163A8	bar	3.4	4.0
600/50 R22.5	Michelin Cargo X-BIB	159D	bar	2.7	4.0
600/55-22.5	Vredestein Flotation +	168A8	bar	2.5	2.8
620/40 R22.5	Alliance I-380	155D	bar	3.7	4.0
620/40 R22.5	Alliance I-381	154D	bar	3.9	4.0
620/40 R22.5	Vredestein Flotation Pro	154D	bar	3.9	4.0
620/50 R22.5	Vredestein Flotation Pro	161D	bar	3.2	4.0
650/50 R22.5	Alliance I-380	163E	bar	2.3	4.0
700/40-22.5	Alliance I-328 HS	158E	bar	2.0	3.6
700/40-22.5	Alliance I-328	160A8	bar	2.5	2.7
700/40-22.5	BKT Flotation 648	160A8	bar	2.0	3.0
700/50-22.5	Alliance I-328	168A8	bar	1.9	3.0
710/35 R22.5	Nokian Country King	158D	bar	3.3	4.0
710/40 R22.5	Vredestein Flotation Pro	156D	bar	3.0	3.2
710/40 R22.5	Alliance I-381	162D	bar	2.6	4.0
710/45 R22.5	Vredestein Flotation Trac	165D	bar	2.6	4.0
710/45 R22.5	Michelin Cargo X-BIB	165D	bar	2.3	4.0
710/45-22.5	Vredestein Flotation +	171A8	bar	2.2	2.8
710/45 R22.5	Nokian Country King	165D	bar	2.5	4.0
750/45 R22.5	Alliance I-380	166A8	bar	2.0	4.0

1 bar = 14.5 psi = 100 kPa

Tyre pressures for single axle (26.5“)

				 40 km/h 10 t	max.
600/55 R26.5	Michelin Cargo X-BIB	165D	bar	2.1	4.0
600/55-26.5	Alliance I-331/I-328	165A8	bar	2.0	2.7
620/55 R26.5	Vredestein Flotation Pro	166D	bar	2.6	4.0
650/55 R26.5	Alliance I-380	167E	bar	1.9	4.0
680/55 R26.5	Trelleborg Twin Radial	165D	bar	2.0	3.2
700/50-26.5	Alliance I-328	169A8	bar	2.2	2.5
700/50-26.5	Alliance I-328 HS	166C	bar	1.4	3.3
710/45-26.5	Trelleborg T404	169A8	bar	2.0	2.4
710/50 R26.5	Alliance I-390	172D	bar	1.7	4.0
710/50 R26.5	Mitas	170D	bar	2.0	4.0
710/50 R26.5	Alliance I-381	170D	bar	1.8	4.0
710/50 R26.5	Vredestein Flotation Pro	170D	bar	2.2	4.0
710/50 R26.5	Nokian Country King	170D	bar	2.1	4.0
710/50 R26.5	Michelin Cargo X-BIB	170D	bar	1.7	4.0
710/50 R26.5	Trelleborg Twin Radial	170D	bar	2.1	4.0
750/45 R26.5	Alliance I-380	170E	bar	1.6	4.0
750/45 R26.5	Vredestein Flotation Trac	170D	bar	2.2	4.0
800/45-26.5	BKT FL 648	177A8	bar	1.2	4.0
800/45-26.5	Alliance I-328	170A8	bar	1.3	2.3
800/45 R26.5	Alliance I-381	174D	bar	1.5	4.0
800/45 R26.5	Vredestein Flotation Pro	174D	bar	1.9	4.0
800/45 R26.5	Michelin Cargo X-BIB	174D	bar	1.7	4.0

1 bar = 14.5 psi = 100 kPa

Tyre pressures for tandem axle (22.5“)

				40 km/h 10 t	40 km/h 13 t	40 km/h 14 t	40 km/h 16 t	40 km/h 18 t	40 km/h 20 t	max.
500/60-22.5	Alliance I-328	163A8	bar	1,2	1,6	1,9	2,3	2,8	3,4	4,0
550/45-22.5	Alliance I-328	153A8	bar	1,1	1,8	2,0	--	--	--	2,9
560/45 R22.5	Vredestein Flotation Pro	146D	bar	1,7	2,4	2,8	3,2	--	--	3,2
560/45 R22.5	Vredestein Flotation Pro	152D	bar	1,7	2,4	2,8	3,2	3,7	--	4,0
560/45 R22.5	Alliance I-381	146D	bar	1,4	2,2	2,5	3,2	--	--	3,2
560/45 R22.5	Nokian Country King	152D	bar	1,6	2,4	2,6	3,2	3,7	--	4,0
600/50-22.5	Alliance I-328	159A8	bar	--	--	1,5	1,8	--	--	2,7
600/50-22.5	Trelleborg T404	156A8	bar	1,1	1,5	1,7	2,0	--	--	2,0
600/50 R22.5	Michelin Cargo X-BIB	159D	bar	1,0	1,4	1,6	1,9	2,2	2,7	4,0
600/55-22.5	Vredestein Flotation +	159A8	bar	--	--	1,5	1,8	--	--	2,0
600/55-22.5	Vredestein Flotation +	168A8	bar	--	--	1,5	1,8	2,2	2,5	2,8
620/40 R22.5	Alliance I-380	155D	bar	1,2	1,8	2,0	2,5	3,1	3,7	4,0
620/40 R22.5	Alliance I-381	168A8	bar	1,3	2,0	2,3	2,9	3,3	3,9	4,0
620/40 R22.5	Vredestein Flotation Pro	148D	bar	1,6	2,3	2,5	3,0	--	--	3,2
620/40 R22.5	Vredestein Flotation Pro	154D	bar	1,6	2,3	2,5	3,0	3,5	3,9	4,0
620/50 R22.5	Vredestein Flotation Pro	161D	bar	1,2	1,8	2,0	2,4	2,8	3,2	4,0
650/50 R22.5	Alliance I-380	163E	bar	0,8	1,1	1,3	1,6	1,9	2,3	4,0
700/40-22.5	Alliance I-328 HS	158E	bar	--	1,0	1,1	1,7	2,0	2,4	3,6
700/40-22.5	Alliance I-328	160A8	bar	--	--	1,3	1,7	2,0	2,5	2,7
700/40-22.5	BKT Flotation 648	160A8	bar	0,8	1,0	1,1	1,4	1,7	2,0	3,0

1 bar = 14,5 psi = 100 kPa

				40 km/h 10 t	40 km/h 13 t	40 km/h 14 t	40 km/h 16 t	40 km/h 18 t	40 km/h 20 t	max.
700/50-22.5	Alliance I-328	168A8	bar	--	--	--	1,3	1,6	1,9	3,0
710/35 R22.5	Nokian Country King	158D	bar	1,2	1,8	2,0	2,5	2,9	3,3	4,0
710/40 R22.5	Vredestein Flotation Pro	156D	bar	1,1	1,6	1,8	2,2	2,6	3,0	3,2
710/40 R22.5	Alliance I-381	162D	bar	--	--	1,5	1,8	2,2	2,6	4,0
710/40-22.5	Trelleborg T404	158A8	bar	1,0	1,4	1,6	1,9	--	--	2,0
710/45 R22.5	Vredestein Flotation Trac	165D	bar	--	1,4	1,6	1,9	2,3	2,3	4,0
710/45 R22.5	Michelin Cargo X-BIB	165D	bar	1,0	1,3	1,5	1,7	2,0	2,3	4,0
710/45-22.5	Vredestein Flotation +	171A8	bar	--	--	1,5	1,7	1,9	2,2	2,8
710/45 R22.5	Nokian Country King	165D	bar	1,0	1,5	1,6	1,9	2,2	2,5	4,0
750/45 R22.5	Alliance I-380	166A8	bar	--	1,0	1,2	1,4	1,7	2,0	4,0

1 bar = 14,5 psi = 100 kPa

Tyre pressures for tandem axle (26.5“)

				40 km/h 16 t	40 km/h 18 t	40 km/h 20 t	65 km/h 18 t	65 km/h 20 t	max.
600/55 R26.5	Michelin Cargo X-BIB	165D	bar	1.5	1.8	2.1	2.9	4.0	4.0
600/55-26.5	Alliance I-331/I-328	165A8	bar	1.4	1.6	2.0	--	--	2.7
620/55 R26.5	Vredestein Flotation Pro	166D	bar	1.9	2.3	2.6	3.3	3.8	4.0
650/55 R26.5	Alliance I-380	167E	bar	1.0	1.6	1.9	2.1	2.5	4.0
680/55 R26.5	Trelleborg Twin Radial	165D	bar	1.4	1.7	2.0	2.7	3.1	3.2
700/50-26.5	Alliance I-328	169A8	bar	1.8	2.0	2.2	--	--	2.5
700/50-26.5	Alliance I-328 HS	166C	bar	1.2	1.3	1.4	A	B	3.3
710/45-26.5	Trelleborg T404	169A8	bar	1.5	1.8	2.0	--	--	2.4
710/50 R26.5	Alliance I-390	172D	bar	1.2	1.5	1.7	2.4	2.8	4.0
710/50 R26.5	Mitas	170D	bar	1.4	1.7	2.0	2.4	2.8	4.0
710/50 R26.5	Alliance I-381	170D	bar	1.2	1.4	1.8	2.5	3.0	4.0
710/50 R26.5	Vredestein Flotation Pro	170D	bar	1.6	1.9	2.2	2.8	3.2	4.0
710/50 R26.5	Nokian Country King	170D	bar	1.4	1.7	2.1	2.7	3.2	4.0
710/50 R26.5	Michelin Cargo X-BIB	170D	bar	1.2	1.5	1.7	2.3	2.8	4.0
710/50 R26.5	Trelleborg Twin Radial	170D	bar	1.4	1.8	2.1	2.8	3.3	4.0
750/45 R26.5	Alliance I-380	170E	bar	1.3	1.5	1.6	2.2	3.6	4.0
750/45 R26.5	Vredestein Flotation Trac	170D	bar	1.6	1.9	2.2	2.8	3.2	4.0
800/45-26.5	BKT FL 648	177A8	bar	1.0	1.0	1.2	--	--	3.0
800/45-26.5	Alliance I-328	170A8	bar	1.1	1.1	1.3	--	--	2.3
800/45 R26.5	Alliance I-328	174D	bar	1.0	1.3	1.5	2.1	2.5	4.0
800/45 R26.5	Vredestein Flotation Pro	174D	bar	1.4	1.6	1.9	2.5	2.8	4.0
800/45 R26.5	Michelin Cargo X-BIB	174D	bar	1.2	1.5	1.7	2.2	2.5	4.0

A = 2.0 bar up to a max. speed of 60 km/h

B = 2.2 bar up to a max. speed of 60 km/h

1 bar = 14.5 psi = 100 kPa

2.9 Required tractor equipment

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

Tractor engine output

		VS 1204	VS 1604	VS 1804	VS 2004
Power required	kW	88	88	88	110
	HP	120	120	120	150

Electrical system

Battery voltage: 12 V

Socket for lighting: 7-pole

Socket for control set: 3-pole

Hydraulics

Check the compatibility of the hydraulic oils before connecting the machine to the hydraulic system of your tractor.

Maximum operating pressure: 210 bar

Delivery rate of hydraulic pump: min. 26 l/min at 180 bar

Hydraulic oil of machine: HLP 46

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

- a double-acting control device,
- a single-acting control device and a depressurized 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 depressurized return line.

The hydraulic hose pipes are marked by colours at the hydraulic plugs, see chapter „Marking of hydraulic supply lines“, page 16.

Control devices

Hydraulic component	Required control device
Transport floor	1 single-acting control device with return line
Spreading unit bonnet	1 single-acting control device
Hydraulic slurry door (optional extra)	1 double-acting control device
Limiting spreading device (optional extra)	1 double-acting control device
Steering axle (optional extra)	• 1 double-acting control device with double-acting steering axle • 1 single-acting control device with single-acting steering axle
Lift axle (optional extra)	1 double-acting control device
Supporting leg (optional extra)	1 double-acting control device (only required for direct operation via a control device of the tractor)
Electro-hydraulic control block (optional extra)	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

2.10 Noise specifications

The workplace-related emission value (sound pressure level) is 84.6 dB(A), measured during operating mode at the driver's ear, the cabin being closed.

The sound pressure level mainly depends on the tractor used.

3 Safety instructions

This chapter contains important information for the user and the operator on how to operate the machine in a safety-conscious and trouble-free way.

Observe all safety instructions included in these operating instructions!

Most accidents are caused by non-observance of simplest safety rules.

By observing all safety instructions included in these operating instructions, you help to prevent accidents.

3.1 Safety-conscious working

Only operate the machine in perfect safety-related condition.

WARNING

Risk of being crushed, cut, becoming entangled, being drawn in or risk of impact if the tractor and the machine are not in adequate roadworthy and reliable condition!

Check tractor and machine for their road and operational safety before each startup.

3.2 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.

3.2.1 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.

3.2.2 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 38,
  - the chapter „Warning and instructions signs", page 48, 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.

3.2.3 Qualification of staff

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 user is only allowed to carry out the work described in these operating instructions.

Only authorized workshops are allowed to carry out work on the machine which requires special expert knowledge. Authorized 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 with the annex "Shop work" in these operating instructions.

Person / Activity	Member of staff especially trained for the activity [1)]	Instructed person [2)]	Person with professional training (authorized workshop) [3)]
Loading/Transport	X	X	X
Commissioning	--	X	X
Setup	--	X	X
Operation	--	X	X
Service and maintenance	--	X	X
Trouble-shooting	--	X	X
Rescue	X	--	--
Disposal	X	--	--

Legend: X..allowed --..not allowed

1) A person who is able to take on a particular task and is allowed to carry it out for an adequately qualified company.

2) A person is considered to be instructed if he or she has been informed about the tasks assigned to him or her and possible risks in case of improper behaviour and if he or she has been instructed, if necessary, and if he or she has been advised of the necessary protective devices and measures.

3) Persons with professional training are considered to be qualified (expert). Due to their professional training and the knowledge of the relevant provisions, they are able to assess the tasks assigned to them and to identify possible risks.

   Please note: A qualification which is equivalent to professional training may also be acquired by several years of practice in the corresponding field of work.

3.3 Product safety

3.3.1 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 21.

3.3.2 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.

3.3.3 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.

3.3.4 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.

3.3.5 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.

3.4 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.

3.4.1 General safety and accident prevention instructions

- 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.

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!

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!

3.4.2 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:
  - o continuous movements of devices,
  - o automatically controlled movements of devices,
  - o movements of devices which, for functional reasons, require an open-centre or pressing position.
- Before carrying out any work on the hydraulic system:
  - o put the machine down,
  - o secure lifted movable machine parts against accidental lowering,
  - o depressurize the hydraulic system,
  - o turn the tractor engine off,
  - o pull the ignition key out,
  - o apply the parking brake.
- Hydraulic hose pipes must be replaced in case of visible defects, damage and ageing! Only use original hydraulic hose pipes!
- 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!

3.4.3 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:
  - o connection: first connect the plus pole, then the minus pole,
  - o disconnection: first disconnect the minus pole, then the plus pole!
- Avoid sparking and open fire in the vicinity of the battery! Risk of explosion!

3.4.4 Propeller shaft operation

- Observe the information included in the operating instructions for the supplied propeller shaft!
- Mounting and dismounting of the propeller shaft is only allowed:
  - with the propeller shaft switched off,
  - with the tractor engine turned off,
  - with the ignition key pulled out,
  - with the parking brake applied!
- 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!
- 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!

3.4.5 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).

3.4.6 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!
- 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!

Compressed-air brake system

- The compressed-air brake systems of the tractor and of the machine must be compatible!
- Hang the couplings of the feed and brake line on the provided blank connections with the machine unhitched!
- Only use the specified brake fluid when topping up or changing the fluid. Observe the relevant regulations when changing the brake fluid!
- 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!

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!

3.4.7 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.

3.4.8 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!

3.4.9 Operation of machine

- Operation of the machine is not allowed if the included protective grating has not been mounted on the front panel!
- Ensure that the fastening elements, in particular for the spreading discs, spreading shovels and spreading tines, fit properly before each startup of the machine!
- People are not alowed within the operating area of the machine! Risk due to blown-away spreading material/foreign objects. Make sure that people leave the throwing range of the machine before switching the spreading unit on. The throwing range may be up to 25 m!
- Do not approach rotating spreading beaters/spreading discs!
- Climbing onto the transport floor is not allowed as long as the tractor engine is running!
- Passengers are not allowed on the machine!
- Use limiting spreading devices when employing the spreading unit for spreading along field edges, waters or roads!
- Unhitch the machine from the tractor only when empty!

3.4.10 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. For detailed information, refer to the respective chapters of these operating instructions!
- Secure all operating media such as compressed air and hydraulic oil against accidental startup!
- 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!
- Spare parts must at least comply with the specified technical standards of the manufacturer! This is guaranteed when using original parts!

3.5 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.

3.5.1 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.**

3.5.2 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.

3.6 Warning and instructions 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 802-31).

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.

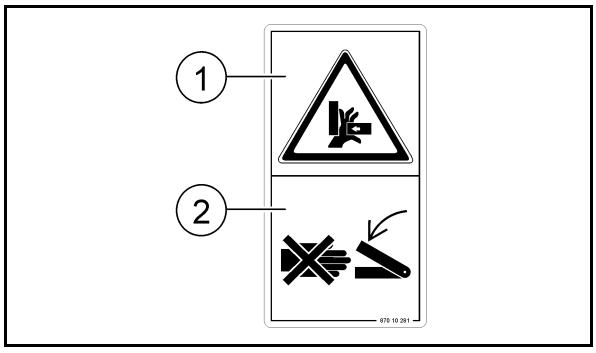
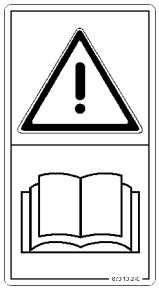
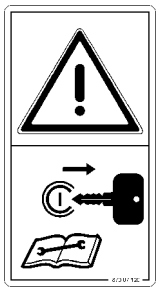
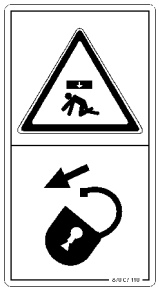


Fig. 11

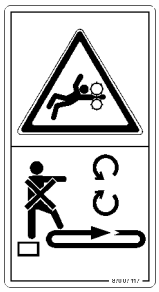
Explanations of warning signs

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

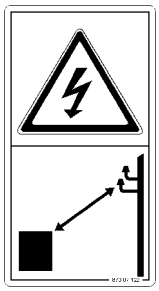


Risk to any part of the body of being drawn in or becoming entangled due to powered working tools!

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	2 m
over 110 up to 220 kV	3 m
over 220 up to 380 kV	4 m

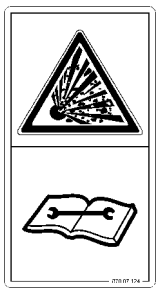
87007123

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.

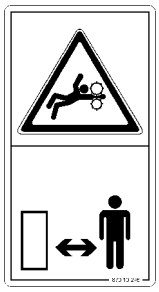
87007130

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.

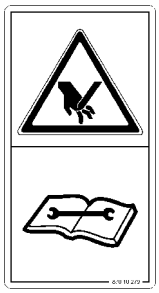
- Keep sufficient safe distance to the propeller shaft as long as the tractor engine is running with the propeller shaft coupled/the hydraulic system connected.
- Ensure that people keep sufficient safe distance to the powered propeller shaft.

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.

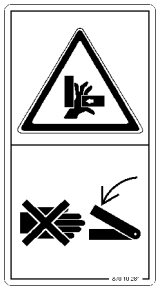
Never open nor remove protective devices as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected.

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.

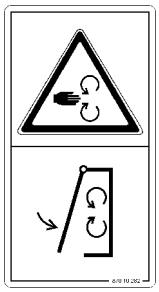


87010282

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.

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.

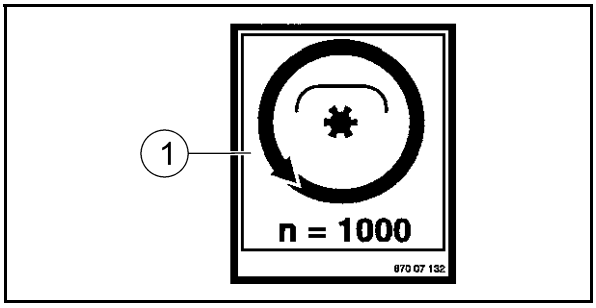
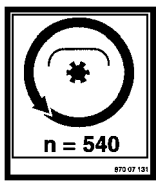


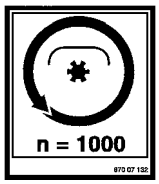
Fig. 12

Order number and explanation	Instruction signs
87007131 **The required drive speed of the machine is 540 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.	

87007132

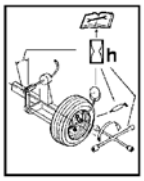
The required drive speed of the machine is 1000 min^{-1}.

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 192 when using a pressure washer/steam blaster for cleaning the machine.

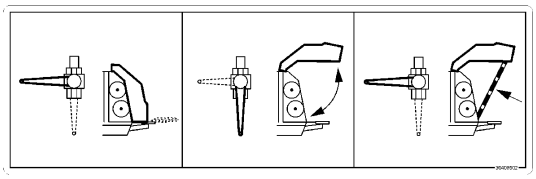
87010288

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

30406502

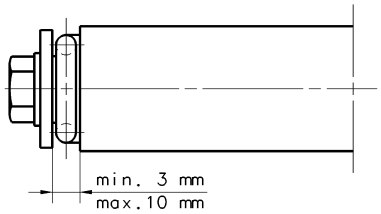
Close the stop-cock to secure the spreading unit bonnet:

- in spreading mode,
- for any work to be carried out beneath the open spreading unit bonnet.



37203500

Ensure proper tension of the transport floor chain.



372 03 500

3.6.3 Placing of warning and instruction signs

The following figures illustrate the position of the warning and instruction signs on the machine.

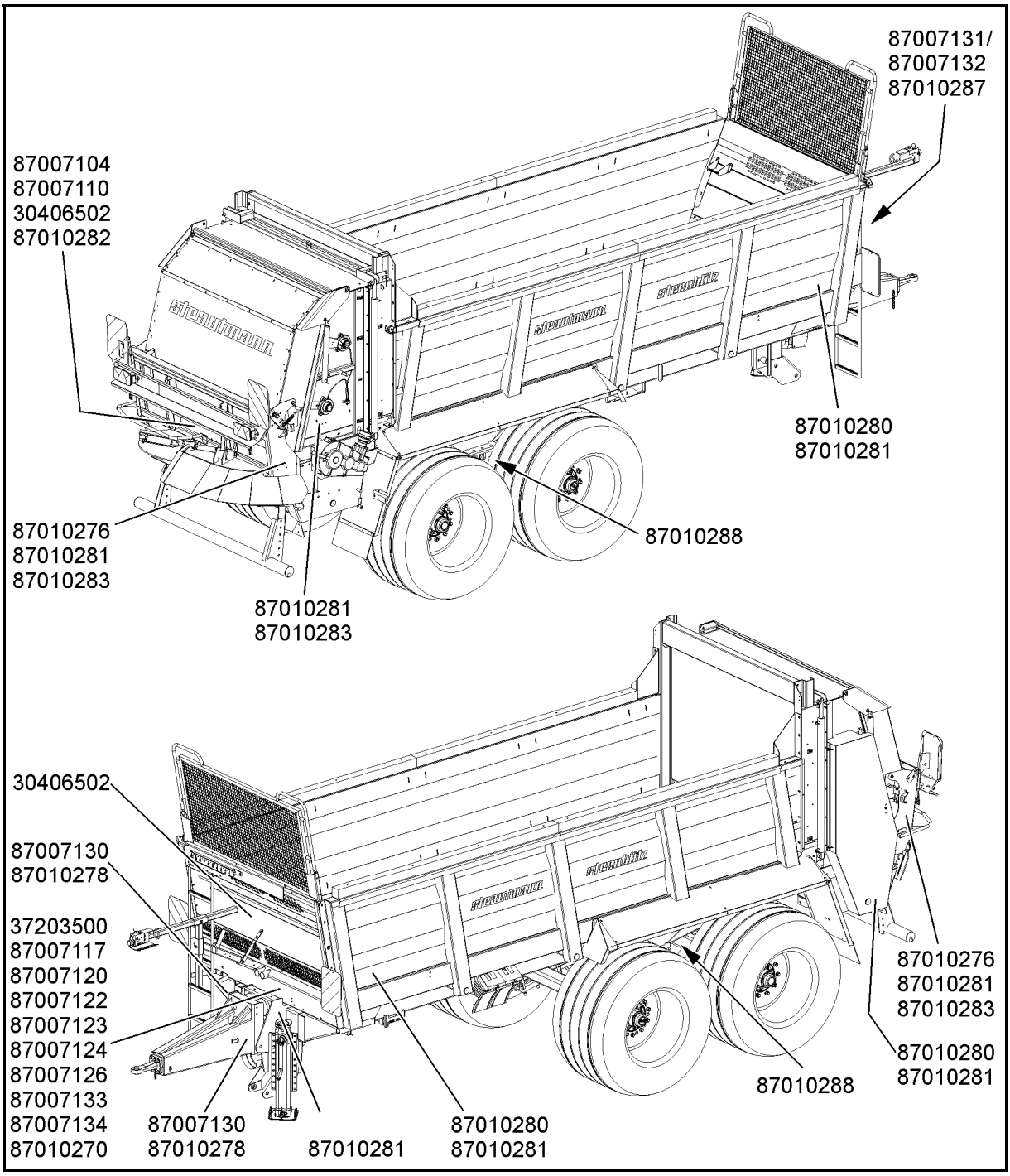


Fig. 13

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 and unloading

Observe the information in the chapter "Basic safety instructions", page 38.

Loading and unloading 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.

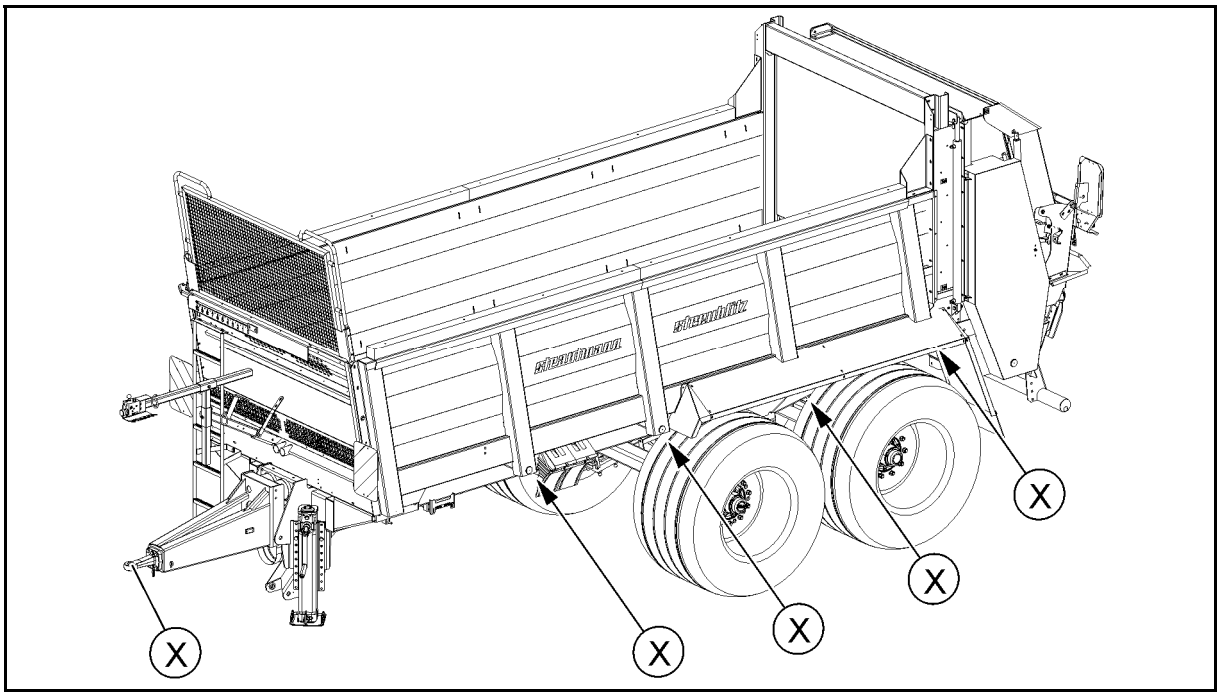


Fig. 14

(X) Load-bearing points

5 Design and function

Observe the information in the chapter "Basic safety instructions", page 38.

The following chapter provides information about the design of the machine, its function and the handling of the individual components.

Some of the machines are illustrated with optional extras. Optional extras are marked in these operating instructions and are available at extra cost.

5.1 Spreading device

The spreading device of the machine consists of:

- transport floor,
- baffle plate or hydraulic slurry door (optional extra),
- spreading unit,
- spreading unit bonnet with:
  - sliding door and
  - spreading slide.
- speed monitor (optional extra).

5.1.1 Transport floor

The chains (1) of the transport floor are equipped with U-sections (2).

The transport floor conveys the spreading material to the spreading unit (3).

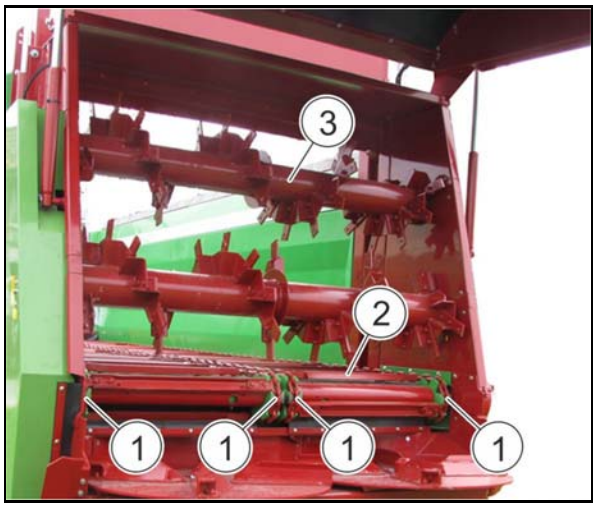


Fig. 15

Automatic chain tensioners (1) tighten the chain of the transport floor.

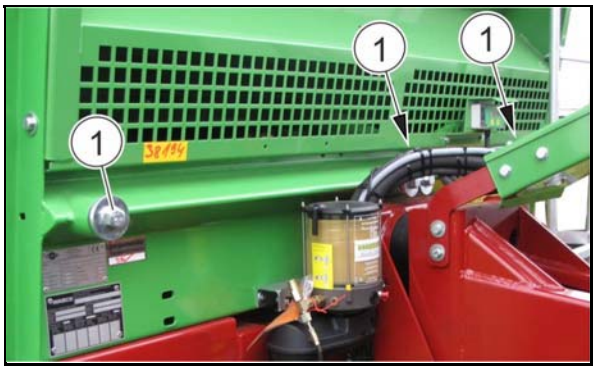


Fig. 16

The feed shaft of the transport floor is driven by the hydraulic motor and the feed gearing (1).

The control unit serves to:

- switch the transport floor on and off,
- variably adjust the feed rate of the transport floor. The controllable volume flow of the hydraulic oil is 2-60 l/min.
- reverse the feed direction of the transport floor for a short time (max. 3 seconds), e. g. to eliminate blockages occurred at the spreading beaters during discharge.

Fig. 17

5.1.1.1 Set feed rate of transport floor with direct control

The feed rate of the transport floor is set via the control dial (1) of the feed valve at the machine. Pointer (2) indicates the scale value for the set feed rate.

Scale value	Feed rate of transport floor
1	Minimum
10	Maximum

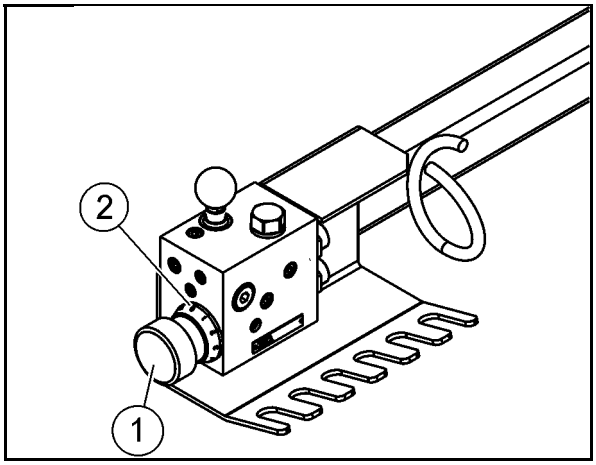


Fig. 18

The set scale value is no absolute value for the feed rate, but is only for orientation. Depending on the hydraulic system of the tractor, the set feed rate may differ even if the scale value is identical.

5.1.1.2 Set feed rate of transport floor with easy-to-use control

The feed rate of the transport floor is set via the control dial at the control set of the easy-to-use control set (optional extra). Pointer (1) indicates the scale value for the set feed rate.

Scale value	Feed rate of transport floor
1	Minimum
10	Maximum

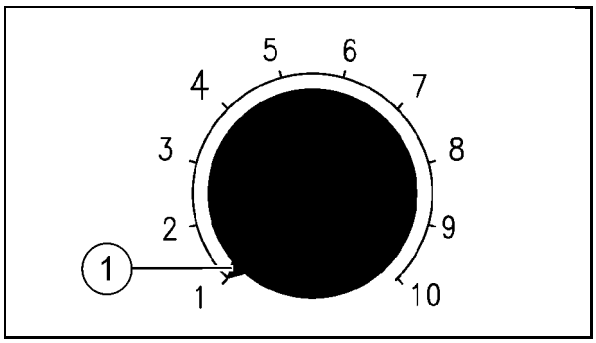


Fig. 19

The set scale value is no absolute value for the feed rate, but is only for orientation. Depending on the hydraulic system of the tractor:

- the set feed rate may differ even if the scale value is identical,
- you must have the setting range of the control dial adapted to the hydraulic system of your tractor.

5.1.1.3 Set feed rate of transport floor with ISOBUS control set Field-Operator 120

The feed rate of the transport floor depends on:

- the nominal value in weight/area (kg/ha) or volume/area (m^3/ha),
- the hydraulic slurry door clearance,
- the slip correction factor,
- the operating width,
- the current travelling speed.

5.1.2 Baffle plate/Hydraulic slurry door

Your machine is equipped with a baffle plate or a hydraulic slurry door (optional extra).

The baffle plate (1) is mounted in front of the spreading unit thus protecting against spreading material blown out in the direction of motion.

The opening width of the baffle plate is not adjustable.

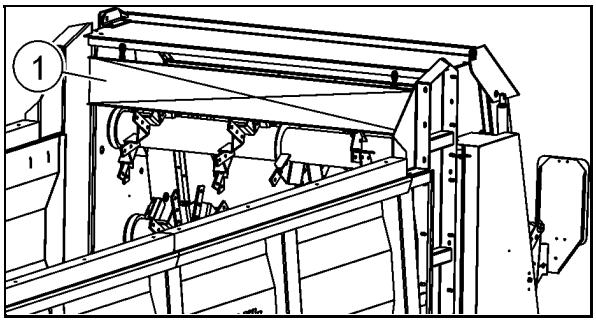


Fig. 20

Optional extra

The hydraulic slurry door (2):

- is mounted directly in front of the spreading unit and seals the vehicle trough,
- can be opened at various opening widths, depending on the material to be spread,
- is completely opened for cow dung,
- is opened at scale values between 1 to 10 for flowable or pourable spreading materials (such as chicken dung, sewage sludge, lime, compost) to predose the quantity to be spread,
- is completely closed during transport journeys, in order to prevent the road from being soiled.

Fig. 21

The hydraulic slurry door clearance:

- is infinitely variable,
- is indicated by the pointer (1) on the scale (2).

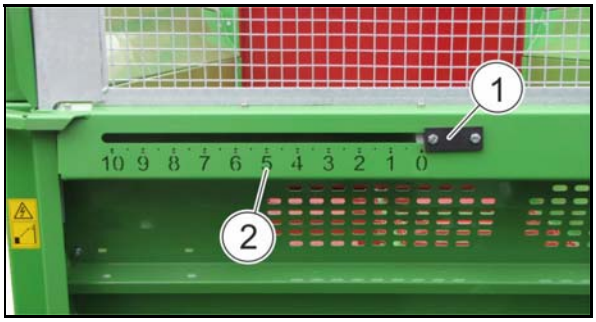


Fig. 22

Scale value	Hydraulic slurry door
0	Closed
10	Completely open

5.1.3 Spreading unit

The machine is equipped with one of the following spreading units:

- 4-beater spreading unit,
- 2-disc wide-angle spreading unit (optional extra).

Observe the fact that only an authorized workshop is allowed to remove and to mount the spreading unit!

5.1.3.1 4-beater spreading unit

The 4-beater spreading unit consists of four vertical spreading beaters (1). The spreading beaters are equipped with rotatable and replaceable spreading tines (2).

The spreading tines mill off the material to be spread with the transport floor powered and dose the spreading material with the spreading bonnet (3) lifted.

Fig. 23

Drive of 4-beater spreading unit

The spreading beaters are driven by the tractor's p.t.o. shaft via:

- the main transfer gearbox (1),
- the 4-beater drive gear (2).

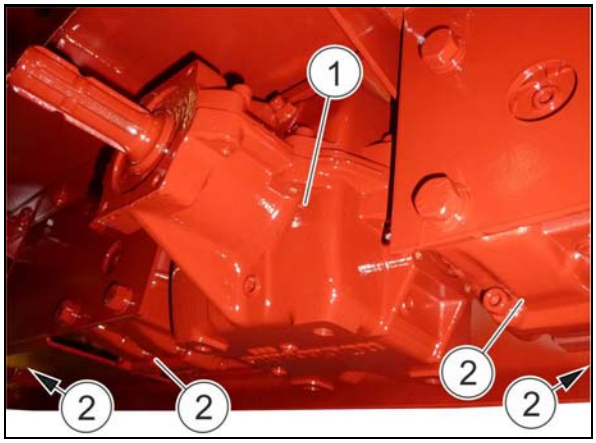


Fig. 24

5.1.3.2 2-disc wide-angle spreading unit

Optional extra

The 2-disc spreading unit consists of two horizontal spreading beaters (1) and two spreading discs (2). The spreading beaters are equipped with rotatable and replaceable spreading tines (3).

The spreading tines mill off the material to be spread with the transport floor powered and dose the spreading material onto the 2-disc spreading unit with the spreading unit bonnet (4) lowered. The 2-disc spreading unit distributes the spreading material widely.

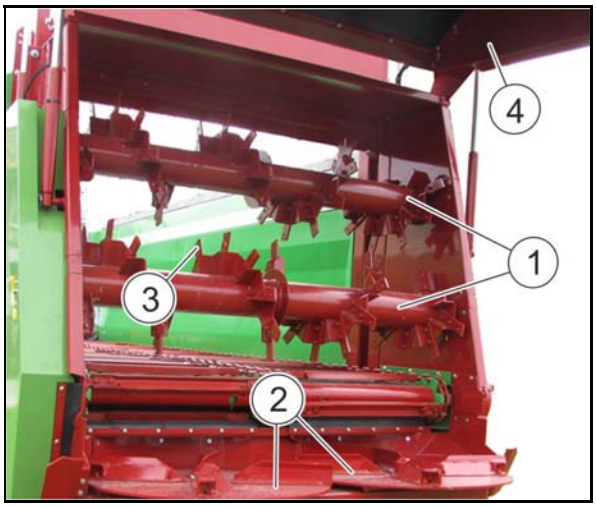


Fig. 25

2-disc spreading unit

The two spreading discs (1) of the 2-disc spreading unit:

- are equipped with 4 spreading shovels (2) each,
- distribute the material to be spread at throwing ranges of 10-20 m.

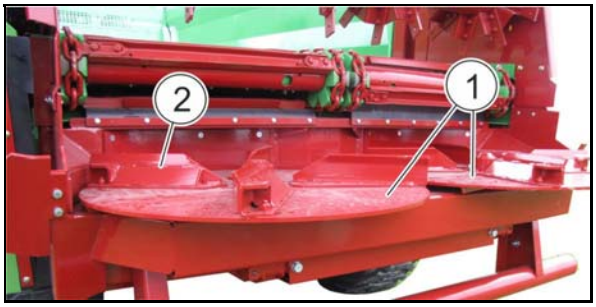


Fig. 26

After unscrewing the screwed connection (4), the spreading shovels on the spreading discs can be pivoted around the pivot point (3) in different positions A-E.

This allows:

- to compensate for the different spreading properties of the various spreading materials,
- to spread the various materials over a particular operating width with an even lateral distribution.

The spreading shovels are set to position C by the manufacturer as standard.

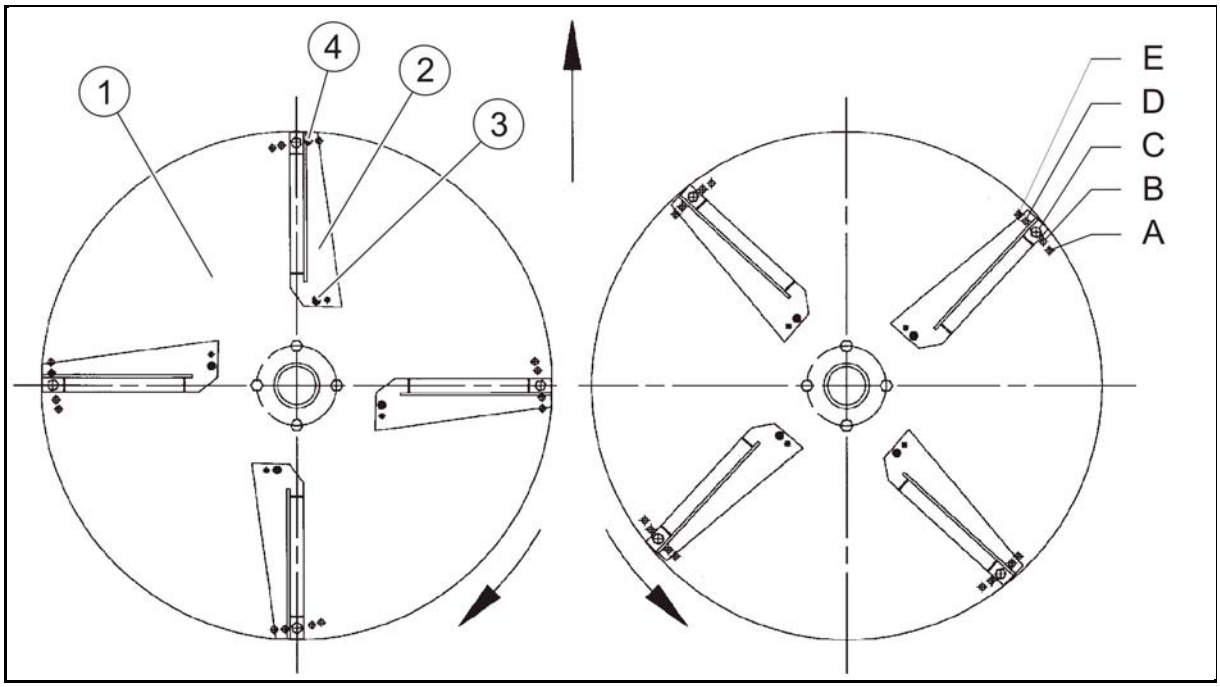


Fig. 27

Drive of 2-disc wide-angle spreading unit

The spreading beaters and the spreading discs are driven by the tractor's p.t.o. shaft via:

- the overrunning clutch (1),
- the main transfer gearbox (2),
- the 2-beater chain gear (3),
- the central gearbox of the 2-disc spreading unit (4),
- the cam-type cut-out clutches (5),
- the plate-type gearboxes (6).

Fig. 28

5.1.4 Spreading unit bonnet

WARNING

Risk of crushing, shearing and of impact to people due to moving spreading unit bonnet!

Make sure that third persons leave the hazardous area of the machine before lifting or lowering the spreading unit bonnet.

Secure the spreading unit bonnet against accidental lifting and lowering.

The spreading unit bonnet (1) can be swivelled hydraulically and closes the cargo space on the rear side.

The spreading unit bonnet is lifted and lowered by means of two single-acting hydraulic cylinders (2) via the respective control unit.

The spreading unit bonnet is lifted:

- when spreading along boundaries without limiting spreading device. Thus, the material is directly spread via the spreading unit.
- when carrying out service and maintenance work on the spreading device,
- for elimination of blockages.

The spreading unit bonnet is lowered:

- for spreading the material via the 2-disc spreading unit,
- when carrying out transport journeys.

Fig. 29

The spreading unit bonnet can be locked via the stop-cock (1) to secure it against accidental lifting and lowering.

The stop-cock is positioned:

- at the front panel if direct control is used,
- on the right-hand side of the machine if ISOBUS control is used (Fig. 30).

The table shows the meaning of the stop-cock positions.

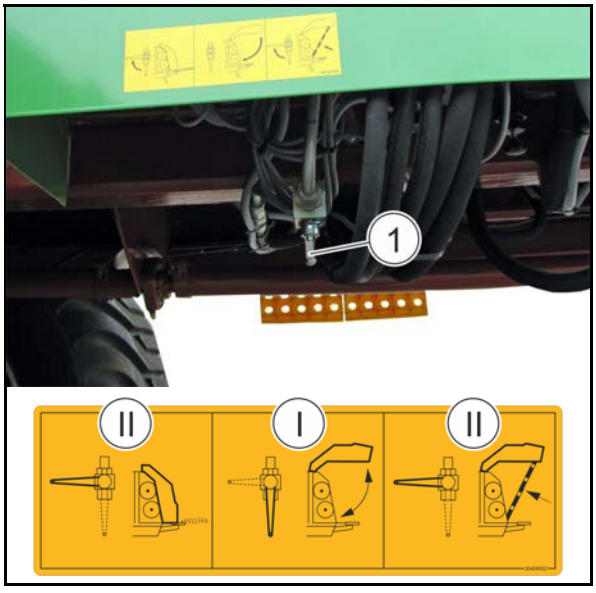


Fig. 30

Stop-cock	Spreading unit bonnet	Activity
I - open	not locked lifting and lowering possible	spreading mode via 4-beater spreading unit
II - closed	lowered and locked	spreading mode via 2-disc wide-angle spreading unit
	lifted and locked	trouble-shooting, cleaning, service and maintenance work

5.1.5 Sliding door and spreading slide

The sliding door (1) with the inner spreading slide (2) is located on the bottom of the spreading unit bonnet (3).

The inclination of the sliding door and the height of the spreading slide can be adjusted, thus allowing to spread different materials with an even lateral distribution.

The required settings for the inclination of the sliding door and the height of the spreading slide depend on the material to be spread.

For recommended settings for the inclination of the sliding door and the height of the spreading slide for spreading different materials, refer to the chapter "Settings", page 155.

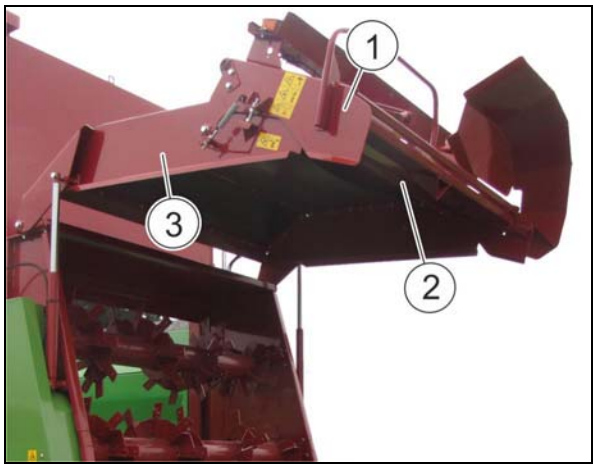


Fig. 31

5.1.6 Speed monitor

The speed monitor monitors:

- the main drive shaft if the machine is equipped with a 4-beater spreading unit.
- the operating states of the 2-beater spreading unit and the 2-disc spreading unit if the machine is equipped with a 2-disc wide-angle spreading unit (optional extra).

5.1.6.1 Speed monitoring with 4-beater spreading unit

The speed monitor:

- monitors the main drive shaft.
- consists of an rpm sensor.
- is connected with the hydraulic drive of the ransport floor.
- is activated when switching the transport floor on. Proper functioning of the speed monitor is indicated by means of a short acoustic and visual signal.
- responds in case of an inadmissible operating state and stops the transport floor feed if:
  - o the speed of the main drive shaft falls below 96 min^{-1}.

  Stopping of the hydraulic drive of the transport floor shall prevent the spreading beaters from being clogged in case of inadmissible operating states of the spreading unit.

The rpm sensor (1) determines the current speed of the main drive shaft.

The speed of the main drive shaft controls the switching of the hydraulic transport floor drive. The hydraulic drive of the transport floor switches:

- on if the main drive shaft is running at a minimum speed of 96 min^{-1}.
- off if the speed of the main drive shaft falls below 96 min^{-1}.

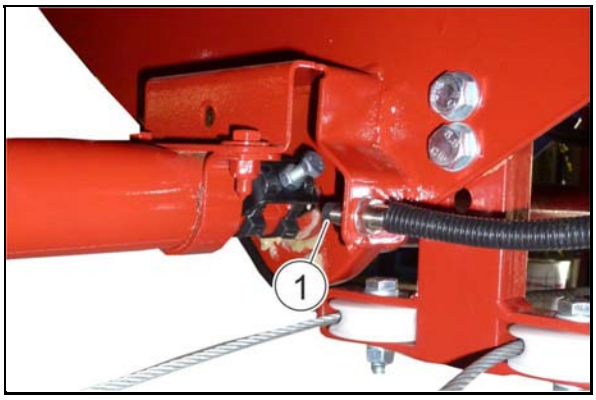


Fig. 32

5.1.6.2 Speed monitoring with 2-disc wide-angle spreading unit

Optional extra

The speed monitor:

- monitors the operating states of the 2-beater spreading unit and the 2-disc spreading unit.
- consists of 3 rpm sensors, one rpm sensor monitoring the 2-beater spreading unit and two rpm sensors monitoring one spreading disc each of the 2-disc spreading unit.
- is connected with the hydraulic drive of the ransport floor.
- is activated when switching the transport floor on. Proper functioning of the speed monitor is indicated by means of a short acoustic and visual signal.
- responds in case of an inadmissible operating state and stops the transport floor feed if:
  - the speed of the spreading beaters falls below 100 min^{-1}.
  - a cam-type cut-out clutch interrupts the powertrain to a spreading disc.

  Stopping of the hydraulic drive of the transport floor shall prevent the spreading beaters from being clogged in case of inadmissible operating states of the spreading unit.

If the speed monitor stops the transport floor feed:

- a clogging of the spreading beater due to inadmissible piling-up of spreading material in front of the spreading beaters may have occurred such that the cam-type cut-out clutch interrupts the powertrain to the spreading beaters,
- foreign objects may block the spreading discs such that the cam-type cut-out clutch interrupts the powertrain to the affected spreading disc.

5.1.6.3 Speed monitoring with direct control

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 or
- to eliminate blockages at the spreading beaters during discharge.

The speed monitor set must be mounted on the tractor. The speed monitor is switched on and off via the power supply of the tractor as soon as the 3-pole plug is inserted or pulled out.

If the speed monitor stops the transport floor feed:

- a horn sounds and the red control lamp *Transport floor stop* (1) at the speed monitor set lights up.

Fig. 33

- the transport floor may be reversed for a short time (max. 3 seconds) by pressing the push button (1) and simultaneously actuating the respective operating element.

  Short reversing of the transport floor often helps to eliminate inadmissible operating states at the spreading unit from the tractor.

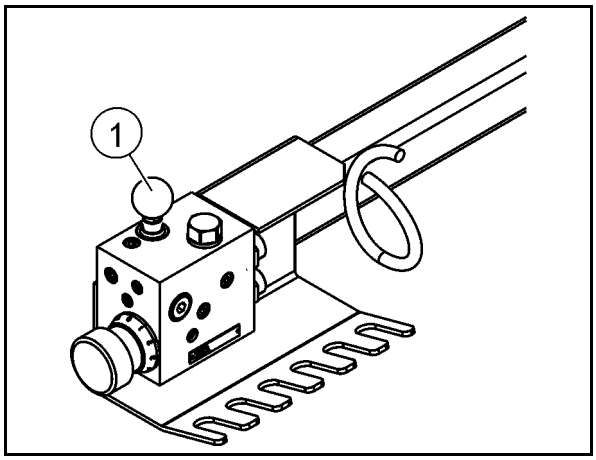


Fig. 34

5.1.6.4 Speed monitoring with easy-to-use control

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 or
- to eliminate blockages at the spreading beaters during discharge.

If the speed monitor stops the transport floor feed:

- a horn sounds and the red control lamp *Transport floor stop* (*H2*) at the control set lights up.

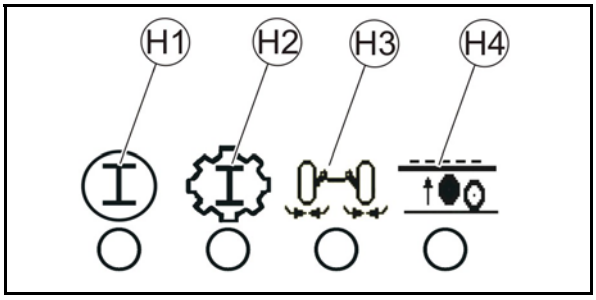
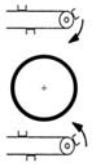


Fig. 35

- the transport floor may be reversed for a short time (max. 3 seconds) via the adjusting lever **Transport floor** at the control set (switch position "2").

  Short reversing of the transport floor often helps to eliminate inadmissible operating states at the spreading unit from the tractor.



1: Transport floor forward

2: Reverse transport floor

Fig. 36

5.1.6.5 Speed monitoring with ISOBUS control set Field-Operator 120

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 or
- to eliminate blockages at the spreading beaters during discharge.

Press the ESC key to reactivate the control set after a speed monitor response.

If the speed monitor stops the transport floor feed:

- a horn sounds and a warning symbol (1) appears on the screen.
- the transport floor may be reversed for a short time (max. 3 seconds) via the **Reverse transport floor** key at the control set.

  Short reversing of the transport floor often helps to eliminate inadmissible operating states at the spreading unit from the tractor.

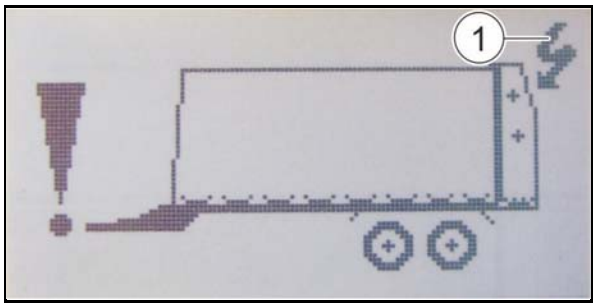


Fig. 37

5.2 Hydraulic system of machine

The hydraulic system of the machine can be operated at a maximum of 70 l/min.

All hydraulic functions of the machine are actuated via the direct control unit or a control set (optional extra). The individual hydraulic components of the machine are connected to the control valves or the electro-hydraulic control block of the machine for this purpose.

The hydraulic system of the machine is ready for operation if:

- the connectors have been connected with the control valves of the direct control unit or
- the electro-hydraulic control block has been connected to the hydraulic system of the tractor via a double-acting control device and a free reverse line (operation via control set), and
- the oil circulation between tractor and machine has been switched on via the control device on the tractor.

- 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 31. For information about the hose markings, refer to the chapter "Marking of hydraulic supply lines", page 16.

(1) Hose holder for proper deposition of supply lines.

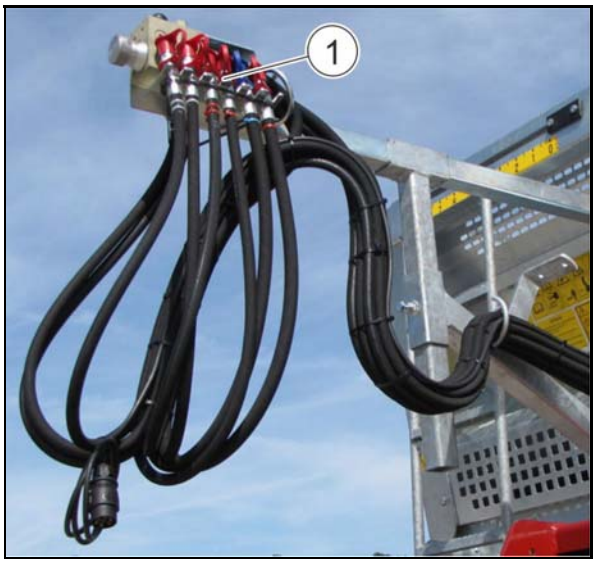


Fig. 38

5.2.1 Electro-hydraulic control block

Optional extra

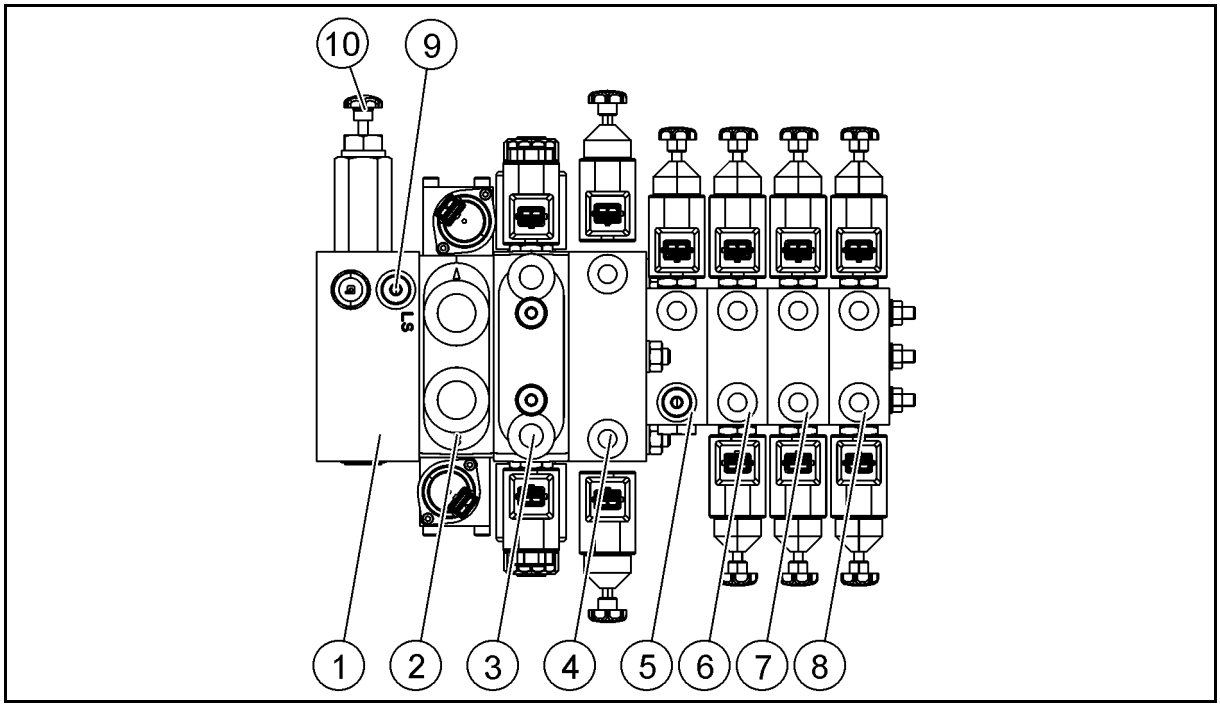


Fig. 39

(1) Entry plate with load-sensing connector

(2) Intermediate plate with proportional directional valve for transport floor

(3) Intermediate plate with directional seat valves for hydraulic slurry door

(4) Intermediate plate with directional seat valves for limiting spreading device, right-hand

(5) Intermediate plate with directional seat valves for spreading unit bonnet

(6) Intermediate plate with directional seat valves for steering axle

(7) Intermediate plate with directional seat valves for lift axle

(8) End plate with directional seat valves for limiting spreading device, left-hand

(9) Connecting aperture for load-sensing control line

(10) Load-sensing screw for locking of pressure regulator with the load-sensing control line mounted

5.2.1.1 Load-sensing hydraulic system

Optional extra

- Connect the hydraulic system only after it has been depressurized.
- Turn the tractor engine off before connecting the hydraulic system.
- Always connect the load-sensing control line (optional extra) when connecting the hydraulic connector "Flow line" directly to the hydraulic pump of the tractor.

The electro-hydraulic control block of the machine is directly connected with the hydraulic pump of the tractor via the load-sensing control line. The current machine demand for hydraulic oil determines the pressure and the delivery rate of the tractor's hydraulic pump.

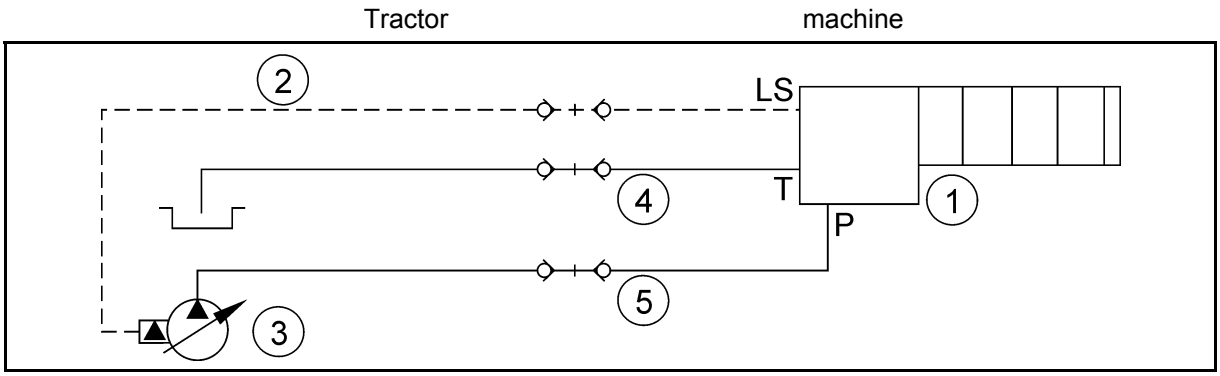


Fig. 40

(1) Electro-hydraulic control block of the machine

(2) Load-sensing control line

(3) Adjustable hydraulic pump of tractor

(4) Hydraulic connector "Return line", connected to a free return port, **not** via control device

(5) Hydraulic connector "Flow line", directly connected to hydraulic pump of tractor, oil supply **not** via control device

Connect load-sensing control line

1. Screw the load-sensing control line (2) into the connecting aperture (Fig. 39/9) of the electro-hydraulic control block.
2. Lock the pressure regulator in the electro-hydraulic control block. For this purpose
   2.1 screw the load-sensing screw (Fig. 39/10) in as far as it will go.
3. Connect the load-sensing control line (2) to the load-sensing connector of the tractor.
4. Connect the hydraulic connector "Return line" (4) to a free return port of the tractor.
5. Connect the hydraulic connector "Flow line" (5) directly to the hydraulic pump of the tractor.

Open the pressure regulator via the load-sensing screw in the electro-hydraulic control block when the hydraulic connector "Flow line" has been connected to the control device of the tractor. Unscrew the load-sensing screw as far as it will go for this purpose.

Disconnect the load-sensing control line from the load-sensing connector of the tractor before operating the machine with free pressure regulator.

5.2.1.2 Electrical system – Emergency manual operation

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.

Absolutely observe the information in the chapter "Electrical system – Emergency manual operation", page 74 when actuating the emergency manual operation function.

Unscrew the knurled screws completely again after having carried out the emergency manual operation function.

Ensure to always actuate both knurled screws or armatures of a control block plate and the respective pre-selection valve!

Exception: Only push one armature in to actuate the transport floor.

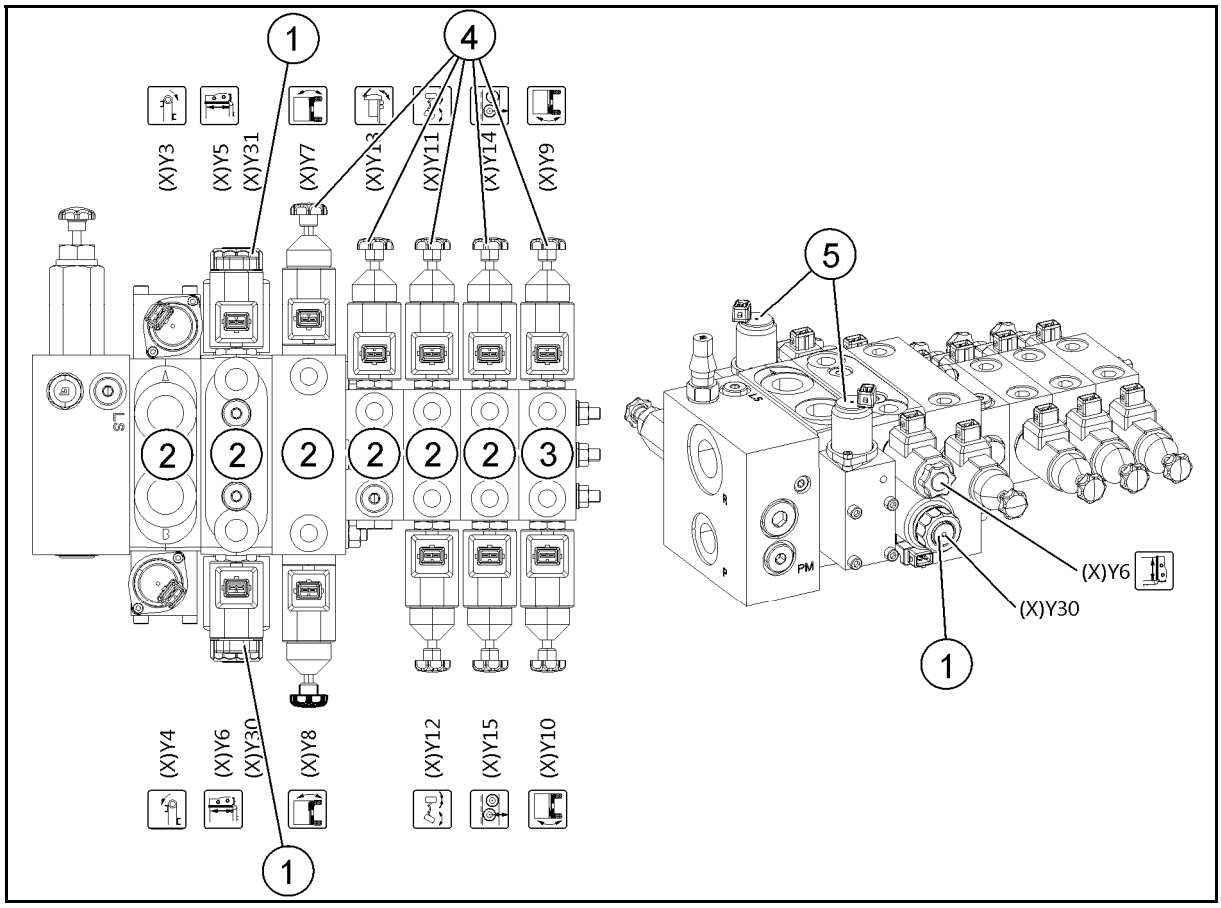


Fig. 41

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 via the emergency manual operation function.

- Depending on the type of solenoid valve triggering, proceed as follows to actuate the intermediate plates (2) and the end plate (3):
  - o screw in the knurled screws (4) at the required directional seat valve or
  - o push in the armatures of the solenoids of the required directional control/seat valves (5).
- Pre-selection valves (1):

  Use a blunt object to push in the armature of the solenoid at the respective control valve to actuate the required hydraulic functions.

5.2.1.3 Functional diagram for emergency manual operation

Solenoid valves / Functions	Lift	Lower	Lift	Lower	Lift	Lower	Lift	Lower	Forward	Reverse	Unlocked	Locked	Lift	Lower	ON	OFF	Road travel	Operating mode off
(X)Y9 (X)Y10	●	●															--	
(X)Y7 (X)Y8			●	●													--	
(X)Y5 (X)Y6					●	●											--	
(X)Y13							●	●									--	
(X)Y3									●								--	
(X)Y4										●							--	
(X)Y11 (X)Y12											●	●						
(X)Y14 (X)Y15													●	● 2)				
(X)Y16																	●	
(X)Y17									●								--	
(X)Y18															●		--	
(X)Y30		●		●		●					● 1)		●					
(X)Y31	●		●		●		●					●		●				

-- Invalid combination

1) Only for double-acting steering axle (FAD)

2) Only for double-acting lift axle (FAD)

The following example explains the procedure for actuating the emergency manual operation function.

Example:

Lift left-hand limiting spreading device

1. Screw in the knurled screws (1, 2) at the directional seat valves (X)Y9 and (X)Y10.
2. Use a blunt object to push in the armature of the solenoid (X)Y31 (3).

→ The left-hand limiting spreading device is lifted.

3. Unscrew the knurled screws completely again.

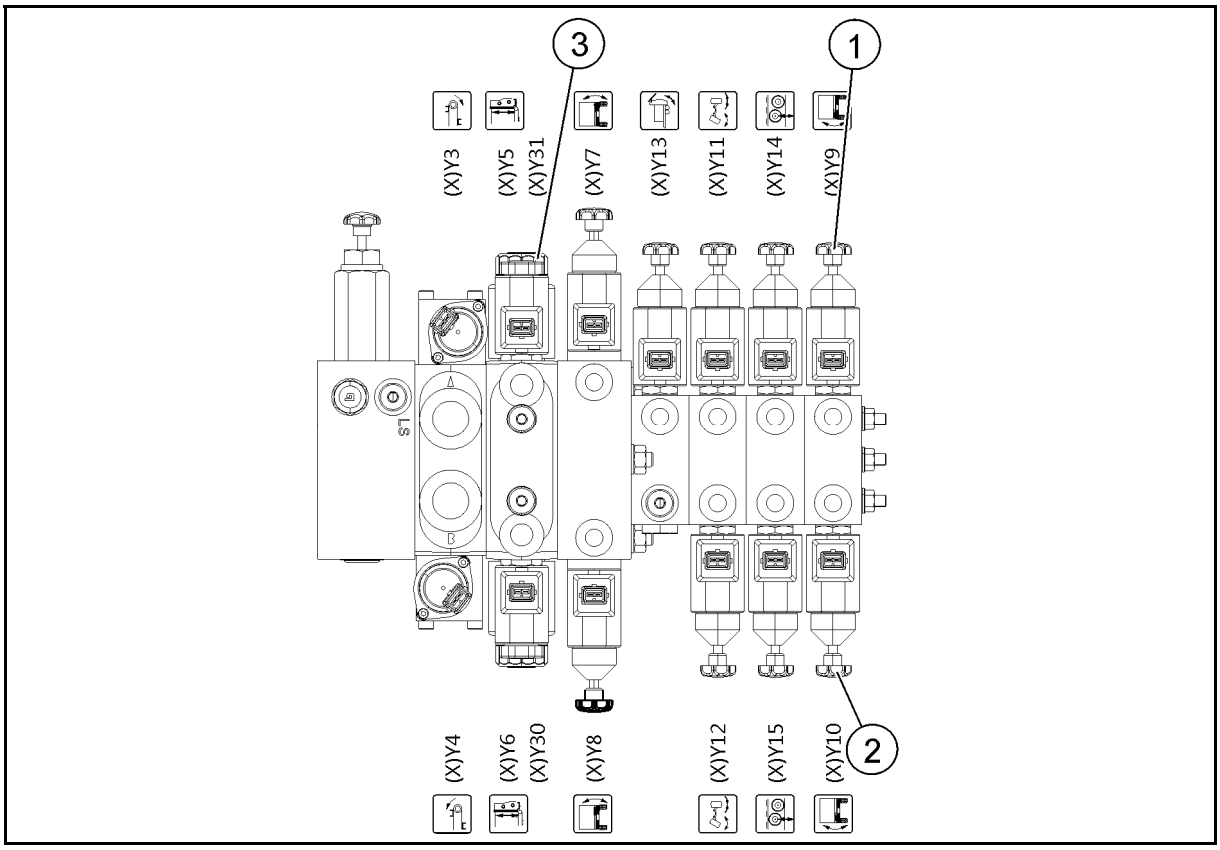


Fig. 42

5.2.2 Hydraulic hose pipes

WARNING

Risk of infection to people 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 depressurized when connecting and disconnecting the hydraulic hose pipes. Always swivel the operating element at the control device on the tractor to open-centre position.

5.2.2.1 Connect hydraulic hose pipes

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!

- Observe the coloured markings at the hydraulic plugs when connecting hydraulic hose pipes. For information refer to the chapter "Marking of hydraulic supply lines", page 16.
- 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 pipe
  - T = Return pipe

- 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. For details refer to the chapter "Required tractor equipment", page 31.
- 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.

1. Swivel the respective operating element at the control device on the tractor to open-centre position (neutral position).
2. Connect the hydraulic hose pipes to the control devices of the tractor:
   2.1 Pressure pipe to a single-acting or double-acting control device.
   2.2 Return pipe to a depressurized return port if possible.

5.2.2.2 Disconnect hydraulic hose pipes

1. Swivel the respective operating element at the control device on the tractor to open-centre position (neutral position).
2. Unlock the hydraulic plugs from the hydraulic sleeves.
3. Use the dust caps to protect the hydraulic plugs and the hydraulic sleeves against soiling.
4. Put the hydraulic hose pipes down onto the hose holder.

5.3 Chassis

Depending on the machine's equipment, the chassis consists of:

- hydraulic lift axle
- steering axle for follow-up steering
- steering axle for forced steering
- without steering
- dual-line compressed-air brake system with automatic load-sensitive brake pressure regulator (ALB regulator)
- hydraulic service brake system (only available for export)

5.3.1 Lift axle

Optional extra

The hydraulic lift axle is operated from the tractor via the available control unit.

The hydraulic lift axle helps to keep the tongue load exerted on the tractor when emptying the machine at a constant level.

When emptying the machine, the tongue load exerted on the tractor decreases which reduces also the driving power transmission at the rear wheels of the tractor. This may cause the rear wheels of the tractor to spin when the machine is half-empty.

Lifting of the hydraulic lift axle with the machine half-empty:

- relieves the lift axle,
- increases the tongue load exerted on the tractor,
- automatically locks the steering axle.

When lowering the hydraulic lift axle, the steering axle remains locked. Unlock the steering axle manually via the control unit if the steering axle function shall be used again with the lift axle lowered.

- Travelling with lifted hydraulic lift axle is only allowed:
  - o when using the half-empty machine on the field,
  - o when the steering axle is locked.
- Always completely lower the lift axle before carrying out transport journeys. Only with the lift axle completely lowered is the ALB regulator able to properly control the required braking force.

Upon actuation of the hydraulic lift axle (1), the hydraulic cylinders (2) lift or lower the front axle in relation to the machine frame (3).

With the lift axle lifted, the tongue load exerted on the tractor increases.

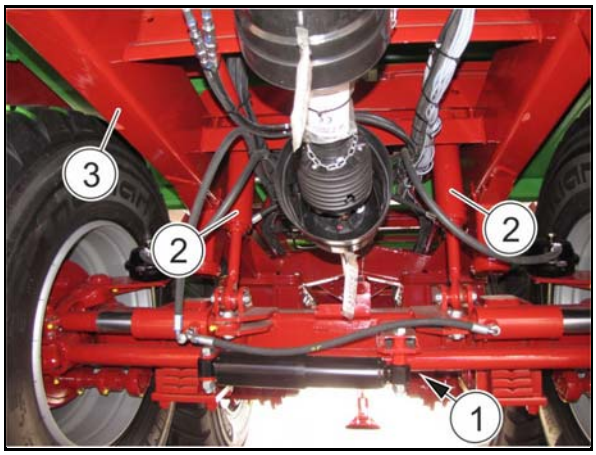


Fig. 43

The red control lamp (*H4*) lights up as soon as the lift axle has been lifted. The red control lamp (*H4*) goes out as soon as the lift axle has been lowered.

5.3.1.1 Lift lift axle

1. Swivel the operating element to "Lift lift axle" position.

→ The tongue load exerted on the tractor increases. The steering axle automatically locks.

5.3.1.2 Lower lift axle

Lower the lift axle before starting a charging procedure and before carrying out journeys with the charged machine.

1. Swivel the operating element to "Lower lift axle" position.

→ The tongue load exerted on the tractor decreases. The steering axle remains locked.

5.3.2 Steering axle for follow-up steering

Optional extra

The unlocked steering axle for follow-up steering:

- can move freely and follows the turning radius of the corner during cornering,
- ensures careful treatment of farmland during cornering,
- reduces tyre wear during cornering on paved areas.

The steering axle is unlocked and locked from the tractor via the control unit.

5.3.2.1 Unlock steering axle

WARNING 	**Risk to people due to insufficient stability and tipping over of the machine if the steering axle is not properly used!** Adapt your driving such that you have always safe control over the tractor and the machine. Never take a tight curve at excessive travelling speed.

1. Swivel the respective operating element to "Unlock steering axle" position.

→ The steering axle can move freely and follows the turning radius of the corner during cornering.

5.3.2.2 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.

1. 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.
2. Swivel the respective operating element to "Lock steering axle" position.

→ The steering axle is locked in "Straight" position.

5.3.3 Steering axle for forced steering axle system (only for bottom linkage)

Optional extra

In case of the steering axle for forced steering, the wheels of the steering axle are hydraulically controlled from the tractor via a steering rod.

The steering axle:

- has been designed for ball-type couplings, hitch hooks and Piton-Fix,
- improves the manoeuvrability of the hitched machine and prevents the tyres from being excessively worn during forward and reverse cornering,
- is a closed hydraulic system.

5.3.3.1 Couple forced steering axle

The shell/drawbar lug must be fixed to the coupling device of the tractor free of clearance if possible, such that the forced steering axle can properly work.

1. Solidly fix the ball head (1) of the steering rod (2) at equal height and at a distance of 245±5 mm at right angles to the ball-type coupling, to the tow-hook or to the draw pin at your tractor.

   Offset in the planes leads to different steering angles.
2. Hitch the machine to the tractor.
3. Couple and secure the steering rod with the ball head to the tractor.

   Set the steering rod such that the master cylinders are extended equally if tractor and machine are in one line.
4. Completely turn the steering wheel of the tractor.
5. Carefully start to move the tractor until its wheels touch the bumper buffer.
6. Check the distance between swivelling range (4) and axle.

   The swivel radius limiter must not bump against the axle. At full steering axle, the minimum remaining path of the hydraulic cylinders of the steering axle must still be 10 mm.
7. The bumper buffers must be moved to the front if the remaining path of the hydraulic cylinders of the steering axle is less than 10 mm.

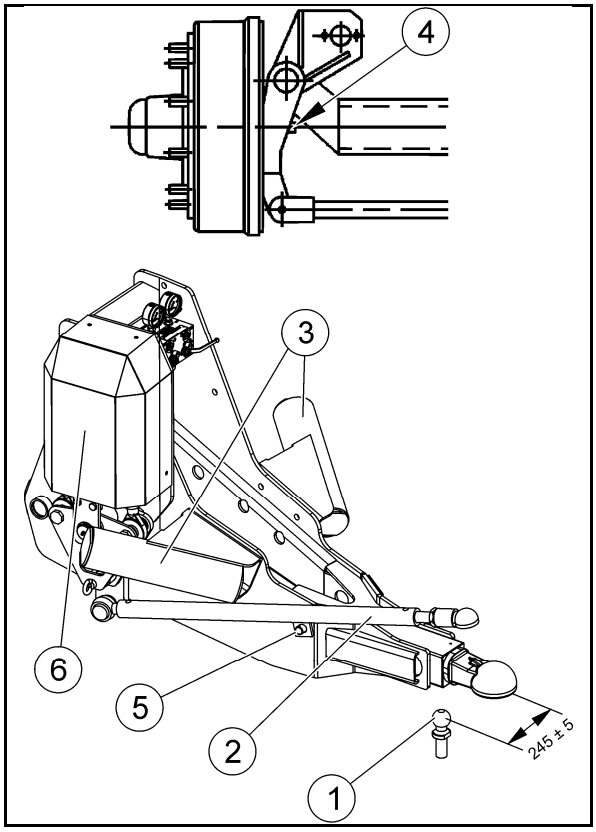


Fig. 44

8. Check any free space and possible steering angles for collision.

5.3.3.2 Lock forced steering axle

Fix the steering rod (Fig. 44/2) on the pin (Fig. 44/5):

- if the machine shall be hitched to a tractor without ball head for the steering rod,
- before manoeuvring the unhitched machine.

Thus, the movable steering axle will be locked.

1. 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.
2. Swivel the respective operating element to "Lock steering axle" position.

→ The steering axle is locked in "Straight" position.

5.3.3.3 Engage forced steering axle

Shop work

Always engage the steering system if the wheels are not in a straight line (are worn) during straight travelling.

1. Open the stop-cocks (1, 2) of the forced steering axle.

   Fig. 45 shows closed stop-cocks.
2. Swivel the valve (4) of the hydraulic hand pump (5) to "Lower position" = pos. 6.
3. Start the tractor and drive a straight line of at least 20 m.
4. Swivel the valve (4) of the hydraulic hand pump (5) to "Lift" position = pos. 9.
5. Actuate the hand lever (7) of the hydraulic hand pump (5) until the pointer of the pressure gauge (8) indicates a pressure of 60 bar.
6. Close the stop-cocks.

→ The steering system is now ready for operation.

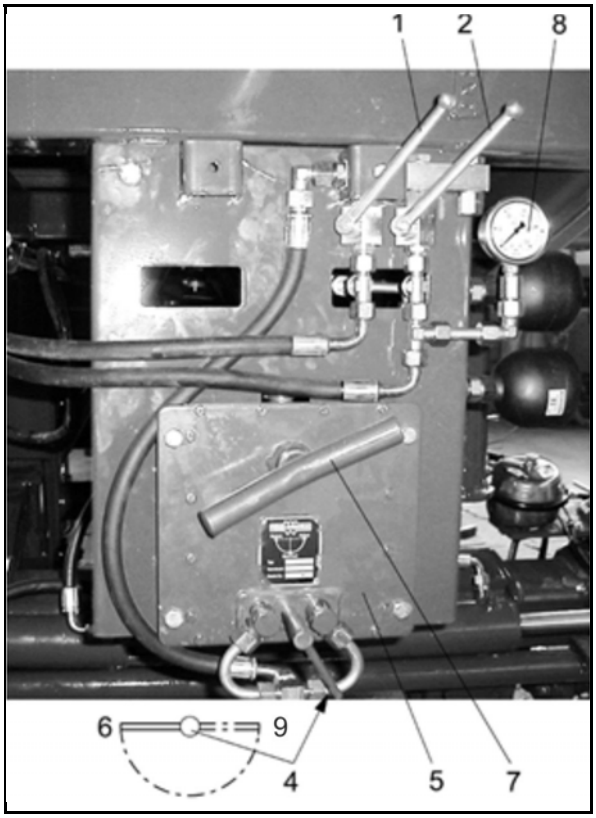


Fig. 45

5.3.3.4 Bleed forced steering axle system

Shop work

Bleed the closed hydraulic system of the forced steering axle after opening the closed hydraulic system, e.g. after replacement of hydraulic components.

A second person is required for bleeding the forced steering axle system.

When bleeding the individual hydraulic circuits of the steering system, actuate the hand lever of the hydraulic hand pump until:

- the hydraulic oil pours out of the respective openings bubble-free.
- the plugs have been screwed into the openings of the hydraulic cylinders through which the hydraulic oil pours out bubble-free.
- the respective stop-cock is closed.

1. Check the oil level of the hydraulic hand pump (1 or Fig. 45/5) via the filler neck, e. g. by means of a steel measuring tape.

   Rated oil level: approx ¾ of the container capacity. Top up hydraulic oil if necessary.
2. Uncouple the steering rod (Fig. 44/2) from the tractor.
3. Remove the protective cover for the forced steering axle system (Fig. 44/6).
4. Remove the carrier plate (9) with the master cylinders (Fig. 47/2, 3).
5. Put the carrier plate with the master cylinders in horizontal position onto a rack such that the plugs (12) are pointing upwards.
6. Place appropriate receptacles beneath the openings of the 4 hydraulic cylinders (5, 6, 7, 8) to collect the hydraulic oil which is pouring out.
7. Unscrew the plugs at all 4 hydraulic cylinders of the forced steering axle system. (Two master cylinders (7, 8) at the drawbar and two steering cylinders (5, 6) at the steering axle.)
8. Open both stop-cocks (2).

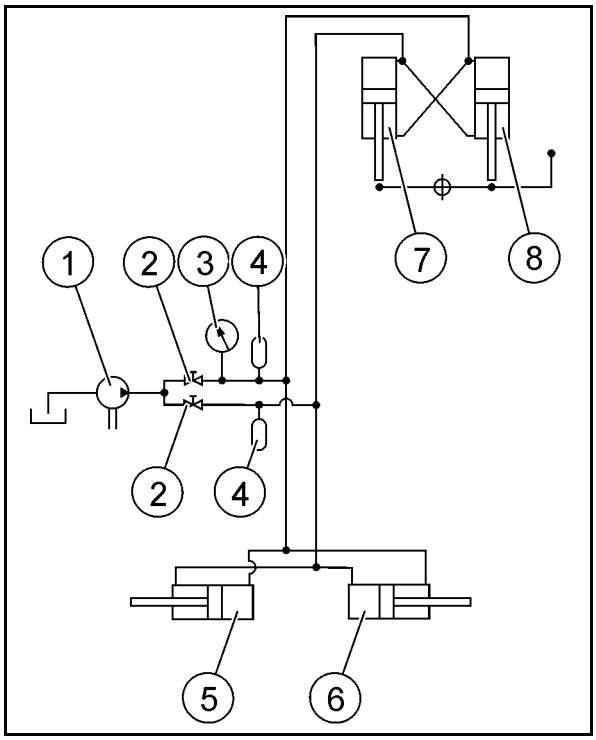


Fig. 46

9. Swivel the valve (Fig. 45/4) of the hydraulic hand pump (5 or Fig. 45/5) to "Lift" position.
10. One person now actuates the hand lever (Fig. 45/7) of the hydraulic hand pump (5 or Fig. 45/5).

→ Hydraulic oil pours out of the openings on the piston side of the hydraulic cylinders.

11. The second person screws the plugs on the piston side into the openings of the hydraulic cylinders as soon as the hydraulic oil is pouring out of these openings bubble-free.
12. Close both stop-cocks (2).
13. Check whether the master cylinders (7, 8) and the steering cylinders (5, 6) have been equally extended.

    In case of unequally extended master and/or steering cylinders, engage the forced steering axle again. Observe the information in the chapter "Engage forced steering axle", page 83.
14. Mount the carrier plate (9) with the master cylinders.
15. Fix the protective cover for the forced steering axle system (Fig. 44/6).

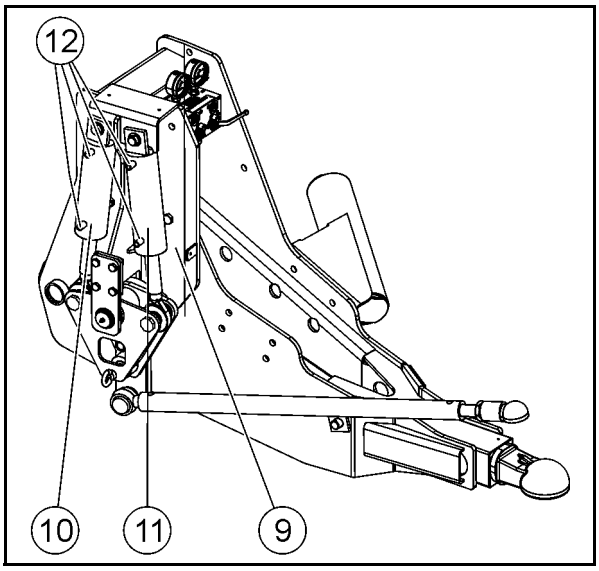


Fig. 47

5.4 Drawbar

The machine is equipped with a drawbar for top or bottom linkage.

5.4.1 Top linkage

Depending on the design of the tractor's coupling device, the drawgear of the top hitch may be:

- drawbar lug 40 mm (1) according to DIN 74054-1/2, ISO 8755 (40 km/h),
- drawbar lug 40 mm reinforced according to DIN 11026, ISO 5692-2,
- a drawbar lug (hitch ring) for a tow-hook (hitch hook) or a draw pin (Piton-Fix) according to ISO 5692-1, ISO 20019,
- a shell 80 for a ball-type coupling 80.

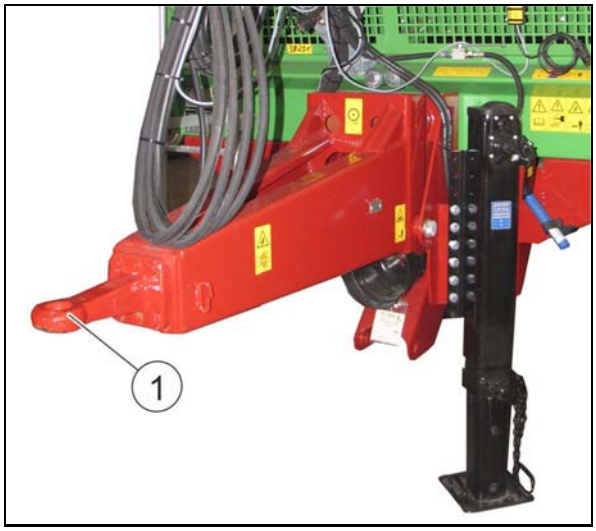


Fig. 48

5.4.2 Bottom linkage

Optional extra

Depending on the design of the tractor's coupling device, the drawgear of the bottom hitch may be:

- a drawbar lug (hitch ring) for a tow-hook (hitch hook) or a draw pin (Piton-Fix) according to ISO 5692-1, ISO 20019,
- a shell 80 (1) for a ball-type coupling 80.

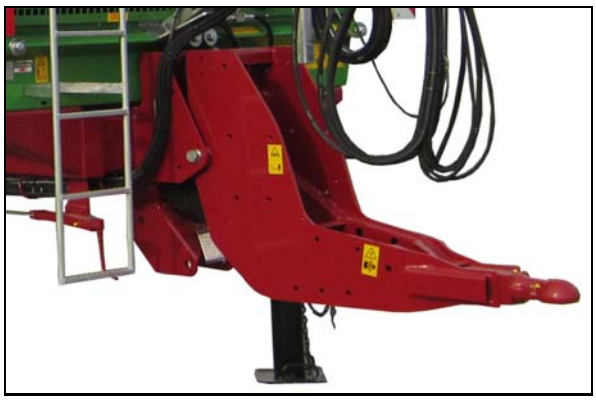


Fig. 49

5.4.3 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 145.
- Properly hitch the machine to the tractor and secure it.
- Never use damaged or deformed trailer systems.

5.4.3.1 Bolt-type coupling

1. Prepare for coupling:
   1.1 Remove the coupling bolt (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:
   - such that tractor and machine can be coupled by means of the coupling bolt (non-automatic bolt-type coupling).
   - until the bolt-type coupling engages into the drawbar lug (automatic bolt-type coupling).
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.

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

1. Lower the tow-hook.
2. Approach the machine as closely as possible such that the lowered tow-hook can take up the drawbar lug.
3. 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).

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

5.4.3.3 Draw pin (Piton-Fix) and drawbar lug (hitch ring)

1. Remove the holding-down device (cross bolt) above the draw pin.
2. Connect the supply lines.
3. Approach the machine as closely as possible such that the draw pin can take up the drawbar lug.
4. Lower the drawbar by means of the supporting leg until the draw pin engages in the drawbar lug.
5. Fix and secure the holding-down device (cross bolt) above the draw pin.
6. Release the parking brake of the machine.
7. Lift the supporting leg to transport position.

5.4.3.4 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

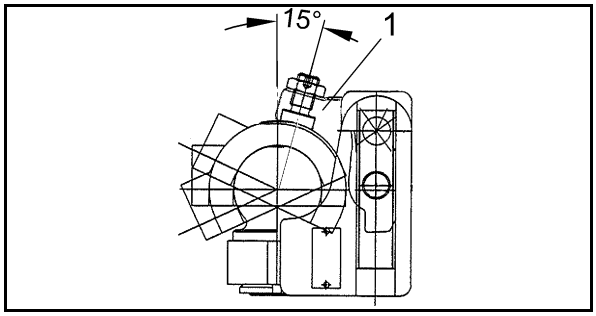


Fig. 50

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.

5.4.4 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.

5.4.4.1 Bolt-type coupling

1. Lower the supporting leg to support position such that the drawbar no longer transmits any tongue load to the tractor.
2. Disconnect the supply lines.
3. Place the supply lines onto the hose holder.
4. Prepare for coupling:
   - 4.1 Remove the coupling bolt (non-automatic bolt-type coupling).
   - 4.2 Open the trailer hitch (automatic bolt-type coupling).
5. Move the tractor forward.

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

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

5.4.4.3 Draw pin (Piton-Fix) and drawbar lug (hitch ring)

1. Remove the holding-down device (cross bolt) above the draw pin.
2. Lower the supporting leg to support position such that the drawbar lug disengages from the draw pin.
3. Move the tractor forward (approx. 25 cm).
4. Secure tractor and machine against accidental starting and rolling.
5. Fix and secure the holding-down device (cross bolt) above the draw pin.
6. Disconnect the supply lines.
7. Place the supply lines onto the hose holder.
8. Move the tractor forward.

5.4.4.4 Ball-type coupling and shell

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

5.5 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 unhitched machine is supported by the supporting leg. Depending on the machine's equipment, it is fitted with:

- a mechanical supporting leg
- a hydraulic supporting leg

5.5.1 Mechanical supporting leg

Slowly relieve the crank handle at the end of a turn.

Secure the crank handle after each use in the crank handle holder.

The mechanical supporting leg with spindle adjustment and telescopic quick adjustment (1) is rotated via the crank handle (2).

Sense of rotation of crank handle	Supporting leg
clockwise	lift (transport position)
anticlockwise	lower (support position)

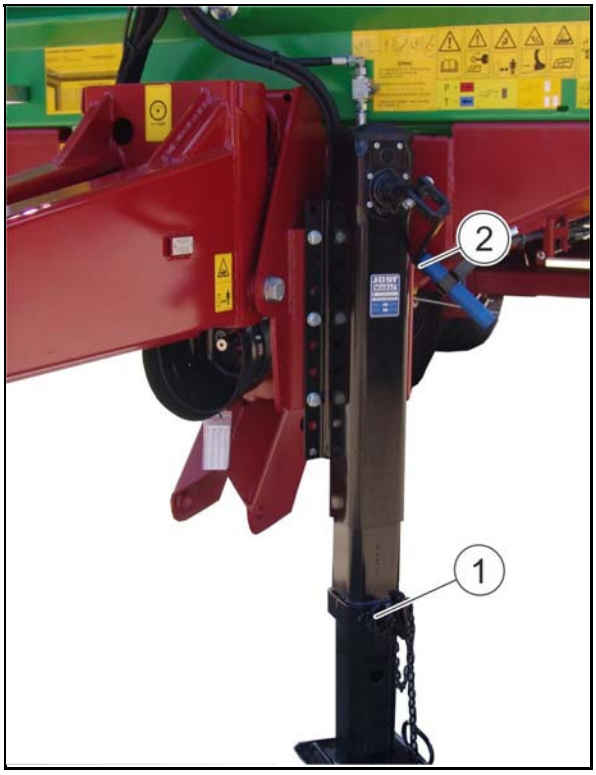


Fig. 51

Mechanical supporting leg with two gears

Shifting gear is carried out by adjusting the manual crankshaft.

Manual crankshaft	Gear
pressed in	quick motion gear
in middle position	neutral
pulled out	heavy-duty gear

5.5.1.1 Lift mechanical supporting leg to transport position

1. Hitch the machine to the tractor.
2. Relieve the supporting leg via the crank handle (1).
3. Use one hand to grip the handle (2) of the telescopic quick adjustment (3).
4. Use the other hand to unlock and remove the locking bolt (4).
5. Lift the telescopic quick adjustment of the supporting leg as far as it will go.
6. Secure the supporting leg in the lifted transport position by means of the locking bolt.
7. Secure the locking bolt against accidental losing by means of the spring cotter (5).

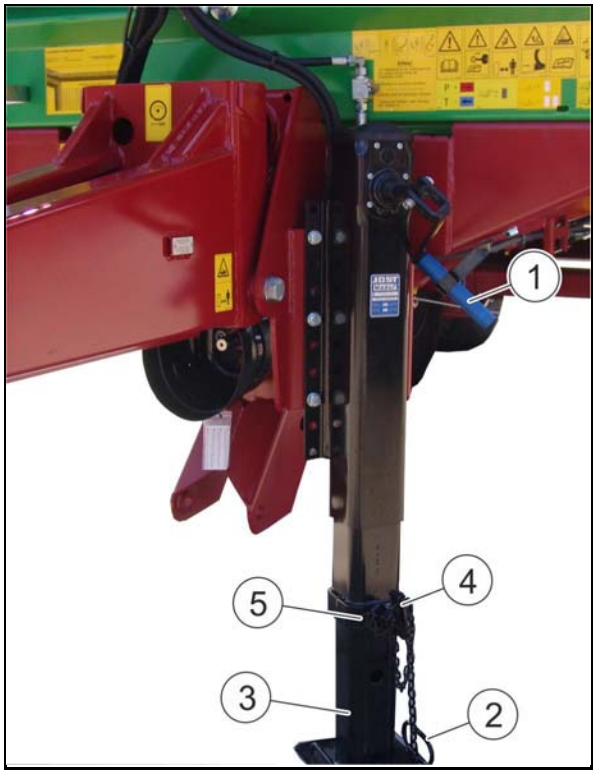


Fig. 52

5.5.1.2 Lower mechanical supporting leg to support position

1. Use one hand to grip the handle (Fig. 52/2) of the telescopic quick adjustment (Fig. 52/3).
2. Use the other hand to unlock and remove the locking bolt (Fig. 52/4).
3. Lower the supporting leg.
4. Secure the supporting leg in the lowered position by means of the locking bolt.
5. Secure the locking bolt against accidental losing by means of the spring cotter (Fig. 52/5).
6. Use the crank handle (Fig. 52/1) to lower the supporting leg to support position.

5.5.2 Hydraulic supporting leg

The hydraulic supporting leg is actuated via a double-acting control device of the tractor when direct control is used.

Fig. 53

5.5.2.1 Lift hydraulic supporting leg to transport position

1. Keep hold of the operating element for actuation of the supporting leg in "Lift" position until the supporting leg has been lifted from support to transport position.

5.5.2.2 Lower hydraulic supporting leg to support position

1. Keep hold of the operating element for actuation of the supporting leg in "Lower" position until the supporting leg has lowered from transport to support position.

5.6 Propeller shaft

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

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.

- 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 150,
  - 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 siwtching the p.t.o. shaft on, observe the safety instructions for p.t.o. shaft operation included in the chapter "Basic safety instructions", page 38.

5.6.1 Couple propeller shaft

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. 54

5.6.2 Uncouple propeller shaft

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).

Clean and lubricate the propeller shaft before longer downtimes.

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).

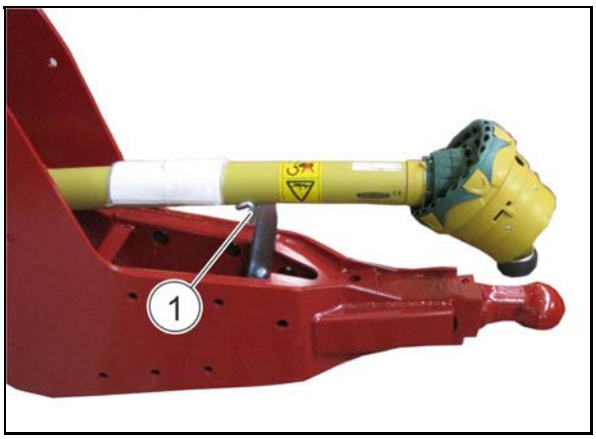


Fig. 55

5.7 Brake system

Depending on the machine's equipment, the brake system consists of:

- a dual-line compressed-air brake system possibly equipped with automatic load-sensitive brake pressure regulator and parking brake for an admissible maximum speed of 25 km/h or 40 km/h.
- a hydraulic service brake system (optional extra for export) with parking brake for an admissible maximum speed of 25 km/h or 40 km/h respectively. The hydraulic service brake system has been designed for connection to a controlled hydraulic service brake system of a tractor.

5.7.1 Dual-line compressed-air brake system

The brake system consists of:

- a braking axle with a dual-line compressed-air brake system and parking brake for an admissible maximum speed of 25 km/h or 40 km/h.
- an automatic load-sensitive brake pressure regulator (ALB regulator) if applicable. The ALB regulator automatically controls the required braking force depending on the loading condition of the hitched machine.

The brake system acts on the braking axle/s.

- 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.

Observance of the maintenance intervals is indispensable for proper functioning of the dual-line compressed-air brake system.

5.7.1.1 Dual-line compressed-air brake system with manually operated brake pressure regulator

In case of a manually operated brake pressure regulator (1), the required braking force must be set depending on the loading condition of the hitched machine. The set braking force is indicated beneath the arrow (2). The following four braking forces can be set by turning the hand lever (3):

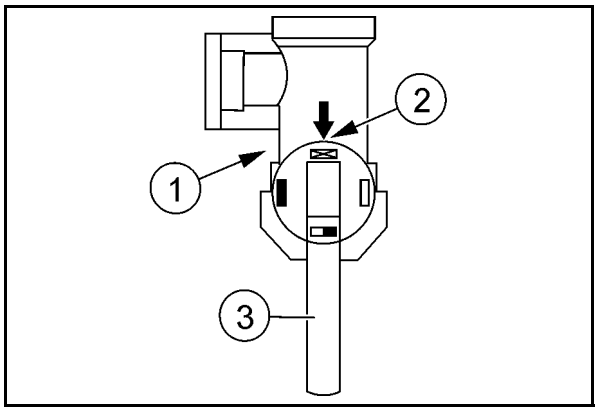
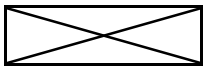


Fig. 56

- Release position; for manoeuvring the machine without the brake and feed line being coupled to the tractor.



> The service brake system only releases at a minimum operating pressure of 3.5 bar.

- Low braking force

  Loading condition – empty machine

- Medium braking force

  Loading condition – machine half full

- Full braking force

  Loading condition – full machine

(A) With single axle

(A+B) With tandem axle

(1) Feed line with hose coupling (red)

(2) Brake line with hose coupling (yellow)

(3) Air filter

(4) Trailer brake valve with brake pressure regulator

(5) Drain valve

(6) Compressed-air reservoir

(7) Test connection, compressed-air reservoir

(8) Diaphragm brake cylinder

(9) Test connection, diaphragm brake cylinder

(10) Parking brake

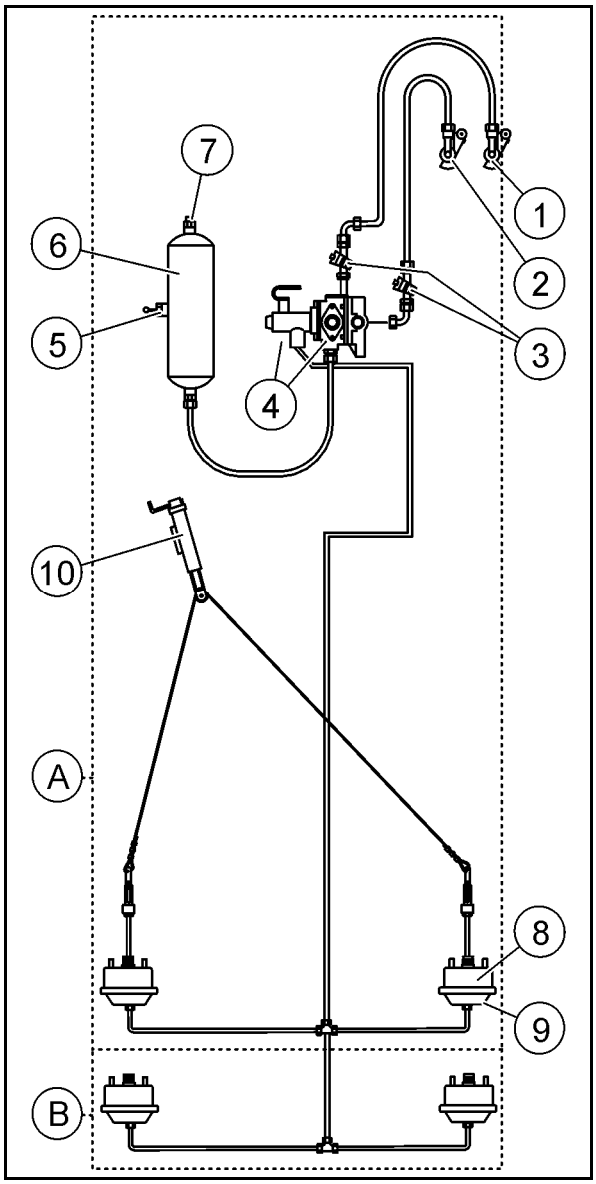


Fig. 57

5.7.1.2 Dual-line compressed-air brake system with automatic load-sensitive brake pressure regulator (ALB regulator)

VS 1604, VS 1804, VS 2004

(1) Feed line with hose coupling (red)

(2) Brake line with hose coupling (yellow)

(3) Air filter

(4) Actuating mechanism for release valve:

- o push in as far as it will go and the service brake releases, e. g. for manoeuvring the unhitched machine
- o pull out as far as it will go and the machine is braked again by means of the system pressure coming from the air reservoir

(5) Release valve

(6) Trailer brake valve

(7) Drain valve

(8) Compressed-air reservoir

(9) Test connection, compressed-air reservoir

(10) Test connection in front of ALB

(11) Pressure proportioning valve

(12) Quick bleed valve

(13) Test connection, diaphragm brake cylinder

(14) Diaphragm brake cylinder

(15) Parking brake

(16) ALB regulator

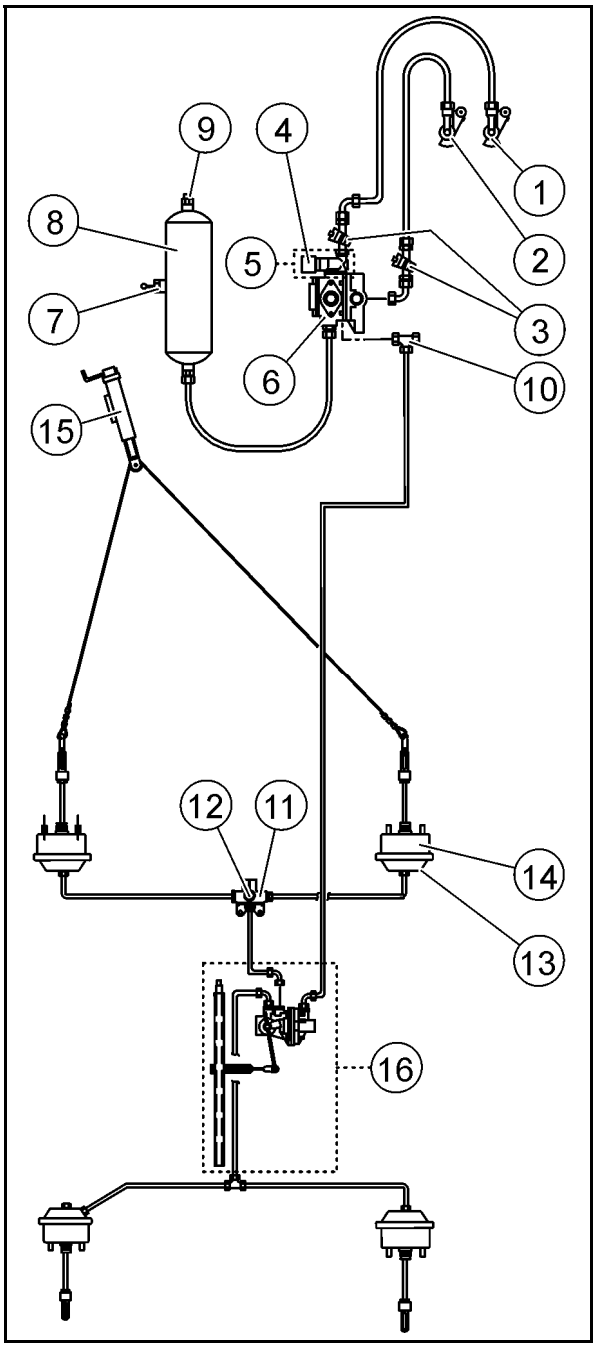


Fig. 58

5.7.1.3 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

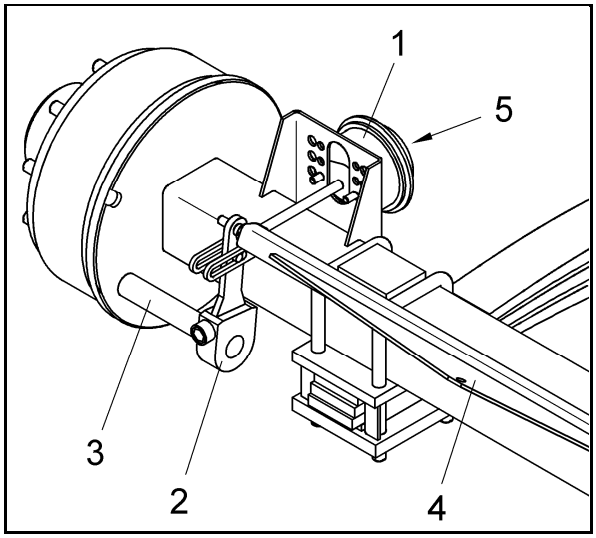


Fig. 59

5.7.1.4 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.

5.7.1.5 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.

5.7.2 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

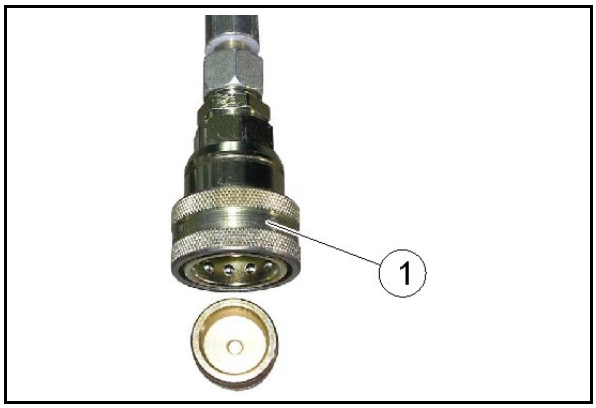


Fig. 60

(2) Hydraulic cylinder of braking axle

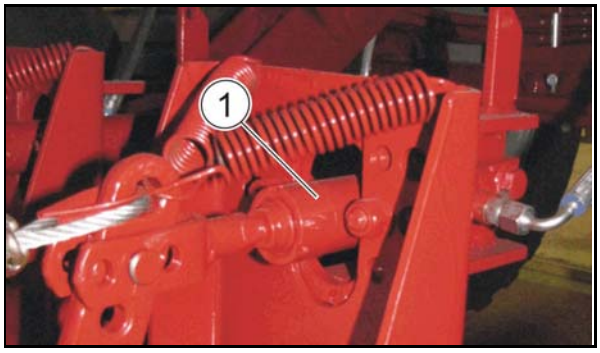


Fig. 61

5.7.2.1 Emergency brake valve

Optional extra

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.

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

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.

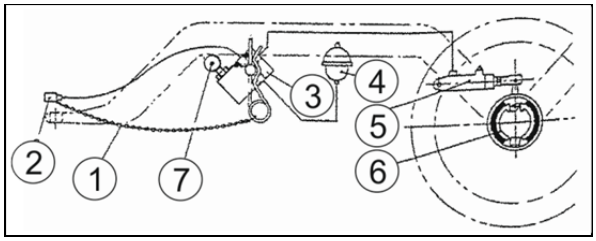


Fig. 62

(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 service brake system

- Only couple clean hydraulic clutches.
- Clean hydraulic plug and hydraulic sleeve if necessary.
- 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 service 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.

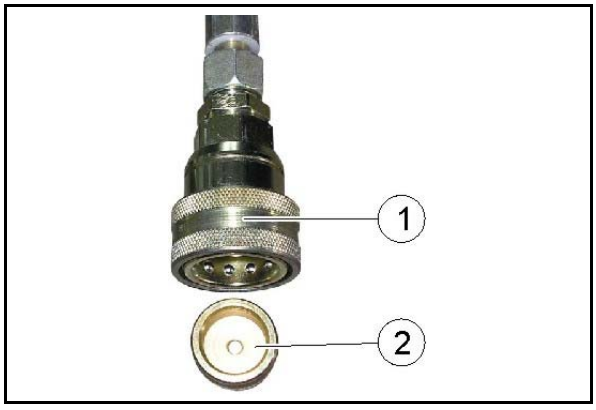


Fig. 63

5.7.2.3 Disconnect hydraulic service brake system

1. Apply the parking brake of the machine.
2. Uncouple the hydraulic sleeve (Fig. 63/1).
3. Slip the hydraulic sleeve onto the machine's blanked-off connecting piece (Fig. 63/2).

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.

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

(2) Adjusting position

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

(4) Spindle

(5) Cable

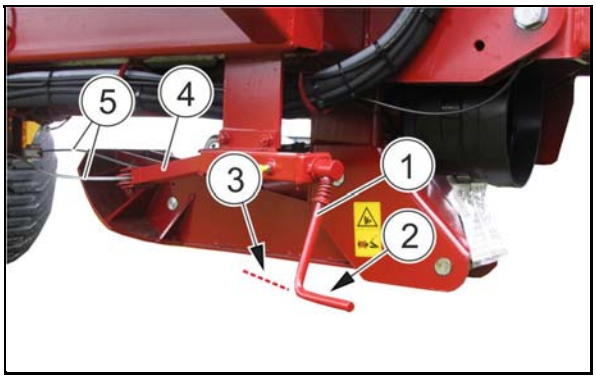


Fig. 64

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 (5).

5.8 Weighing device

Optional extra

If the machine is equipped with a non-calibratable weighing device, the actual weight of the loaded spreading material can be indicated and, if appropriate hardware is available, be saved.

The actual weight of the loaded spreading material is determined by means of 6 weighing rods (1) mounted between frame and platform.

For further details, refer to the separate operating instructions for the weighing device.

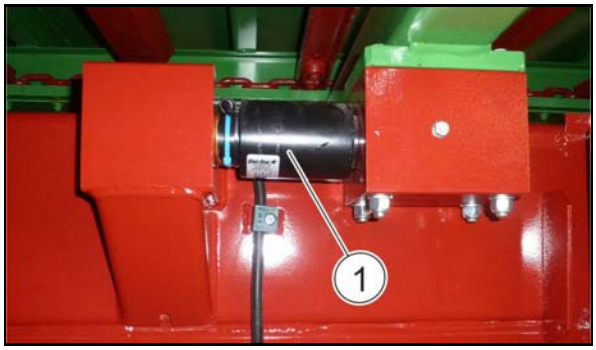


Fig. 65

Set weighing device display to zero with ISOBUS control Field-Operator 120

1. Press the 

key to move to the **Working** menu.

→ The **Working** menu appears.

2. Press the 

key for approx. 5 seconds.

→ The value of the weighing device display is set to zero.

6 Operation

Depending on the machine's equipment, the hydraulic functions of the machine are actuated:

- via the control devices of the tractor,
- via a control set (optional extra).

A hydraulic supporting leg (optional extra) is exclusively actuated via the tractor's control devices.

6.1 Operation with easy-to-use control

Optional extra

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!

6.1.1 Design

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) via the 3-pole plug (DIN 9680),
- is equipped with several operating elements such as adjusting lever (touch-control or latch-in design) and a control dial,
- is equipped with several control lamps for monitoring individual operating states.

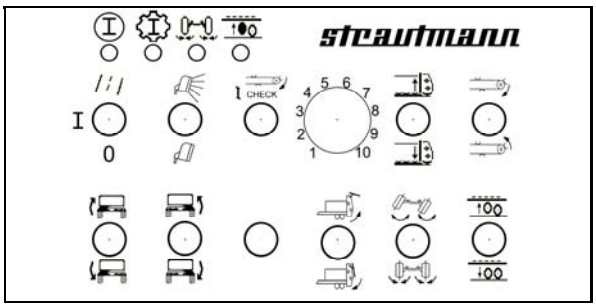


Fig. 66

The operating elements are in touch-control or in latch-in design:

- In touch-control design for folding, swivelling or sliding movable machine parts, e. g. hydraulic slurry door, spreading unit bonnet etc. The function is only carried out when the operating element is 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 for constant loads e. g. hydraulic motors.

Designation in case of 3 switch positions:

- Switch position 1 – Function I
- Switch position 0 – Neutral position
- Switch position 2 – Function II

Designation in case of 2 switch positions:

- Switch position 1 – Function I
- Switch position 0 – Neutral position

6.1.2 Functions and their symbols

The following paragraphs show the symbols of the operating elements of the control set and their functions.

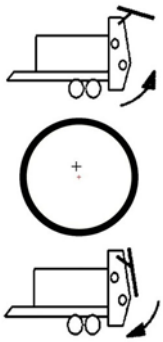
Switch control set on/off

Symbol	Switch position	Control set
	1	road travel mode → green control lamp (*H1*) flashes
	0	on → green control lamp (*H1*) lights up
	2	off

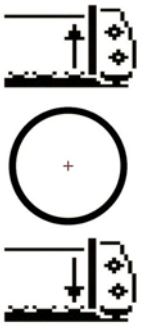
Switch work lights on/off

Symbol	Switch position	Work lights
	1	on
	0	off

Lift/Lower spreading unit bonnet

Symbol	Switch position	Spreading unit bonnet
	1 (keep hold of)	lift
	0	stop
	2 (keep hold of)	lower

Lift/Lower hydraulic slurry door

Symbol	Switch position	Hydraulic slurry door
	1 (keep hold of)	lift
	0	stop
	2 (keep hold of)	lower

Move transport floor

CAUTION

Risk of material damage to transport floor due to improperly tightened chains!

The chains of the transport floor:

- must be tightened equally, but not too firmly,
- are only allowed to sag slightly.

Observe the information in the chapter "Retighten chains of transport floor", page 201.

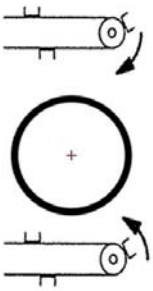
Risk due to failure of components caused by frequent or long reverse of transport floor!

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

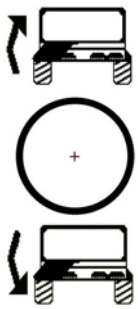
Check the transport floor chains for proper tension every day, in order to prevent material damage.

Reverse:

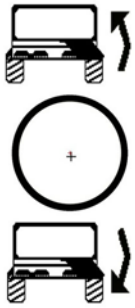
- only for a short time,
- only in case of emergency or
- to eliminate blockages at the spreading beaters during discharge.

Symbol	Switch position	Transport floor
	1	forward
	0	stop
	2 (keep hold of)	reverse

Lift/Lower left-hand limiting spreading device

Symbol	Switch position	Limiting spreading device
	1 (keep hold of)	lift
	0	stop
	2 (keep hold of)	lower

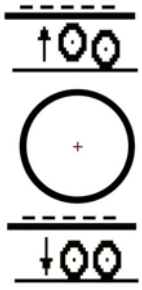
Lift/Lower right-hand limiting spreading device

Symbol	Switch position	Limiting spreading device
	1 (keep hold of)	lift
	0	stop
	2 (keep hold of)	lower

Lift/Lower lift axle

Lower the lift axle before starting a charging procedure and before carrying out journeys with the charged machine.

The red control lamp (*H4*) lights up as soon as the lift axle has been lifted. The red control lamp (*H4*) goes out as soon as the lift axle has been lowered.

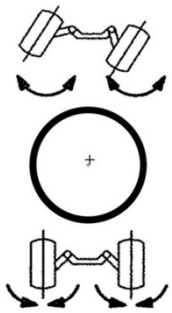
Symbol	Switch position	Lift axle
	1 (keep hold of)	lift
	0	stop
	2 (keep hold of)	lower

Lock/Unlock steering axle

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

The green control lamp (*H3*) lights up as soon as the steering axle is completely locked. The green control lamp (*H3*) goes out as soon as the steering axle is no longer locked.

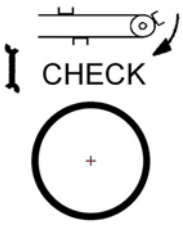
For locking the steering axle, keep hold of the operating lever in "Lock steering axle" position until the green control lamp (*H3*) lights up.

Symbol	Switch position	Steering axle
	1 (keep hold of)	unlock
	0	stop
	2 (keep hold of)	lock

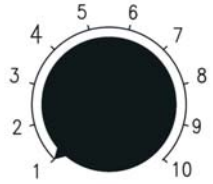
Transport floor CHECK

Use the Transport floor CHECK function only when carrying out maintenance work, for test purposes or as emergency operation function.

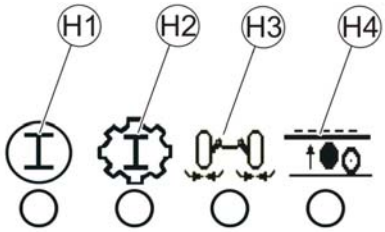
With the **Transport floor CHECK** function activated, the transport floor is always driven at maximum speed. The spreading unit speed is not monitored.

Symbol	Switch position	Transport floor
	1 (keep hold of)	forward
	0	off

Set feed rate for transport floor

Symbol	Switch position	Feed rate
	1	minimum
	10	maximum

6.1.3 Control lamps and their meaning

	**H1**	is flashing (green)	road travel mode on
		lights up (green)	control set on
		does not light up	control set off
	H2	is flashing (red)	no speed at spreading unit and operating lever **Transport floor** to Forward (switch position: 1)
		lights up (red)	p.t.o. shaft of tractor on
		does not light up	p.t.o. shaft of tractor off or speed too low
	H3	lights up (green)	steering axle locked
		does not light up	steering axle unlocked
	H4	lights up (red)	lift axle Lifted
		does not light up	lift axle lowered

6.2 Operation with ISOBUS control Field-Operator 120

Optional extra

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

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.

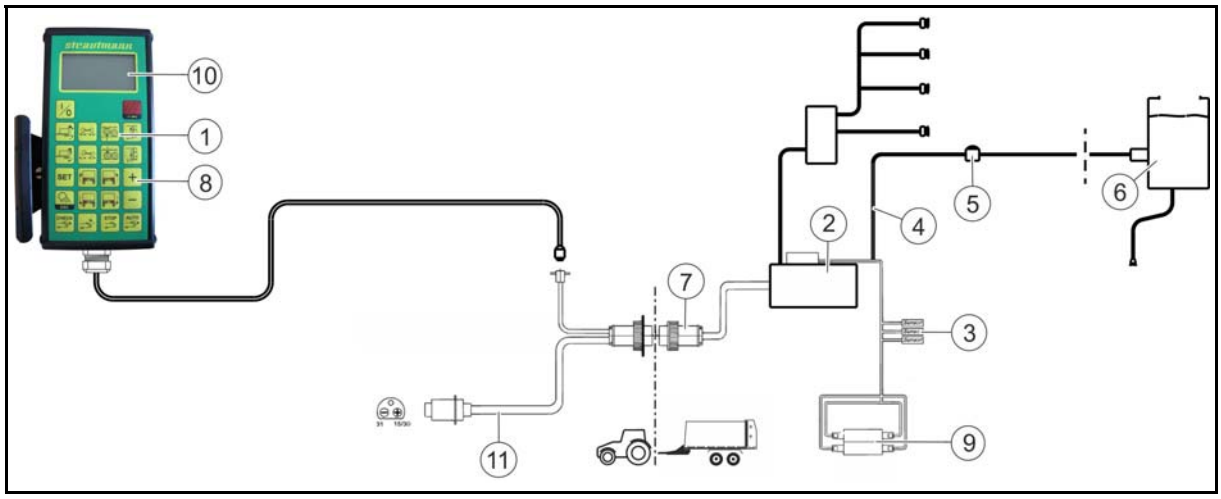


Fig. 67

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 central lubrication (5) (optional extra),
- the LIN module (6) (optional extra for work lights/warning beacon).

The control set (1) is mounted on the tractor and is connected to the control unit (2) of the machine via the connecting cable (7).

All functions required for operating the machine as well as for transport journeys are actuated via the keys (8) 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 (9) 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 (10).

(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.
- **Counter** menu. The **Counter** menu displays the daily counter and the total counter.
- **SET 1** menu. The **SET 1** menu displays machine parameters.
- **SET 2** menu. The **SET 2** menu displays further machine parameters.

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

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

(4) Lift spreading unit bonnet

(5) Lock steering axle

(6) Lift lift axle

(7) Lift hydraulic slurry door

(8) Lower spreading unit bonnet

(9) Unlock steering axle

(10) Lower lift axle

(11) Lower hydraulic slurry door

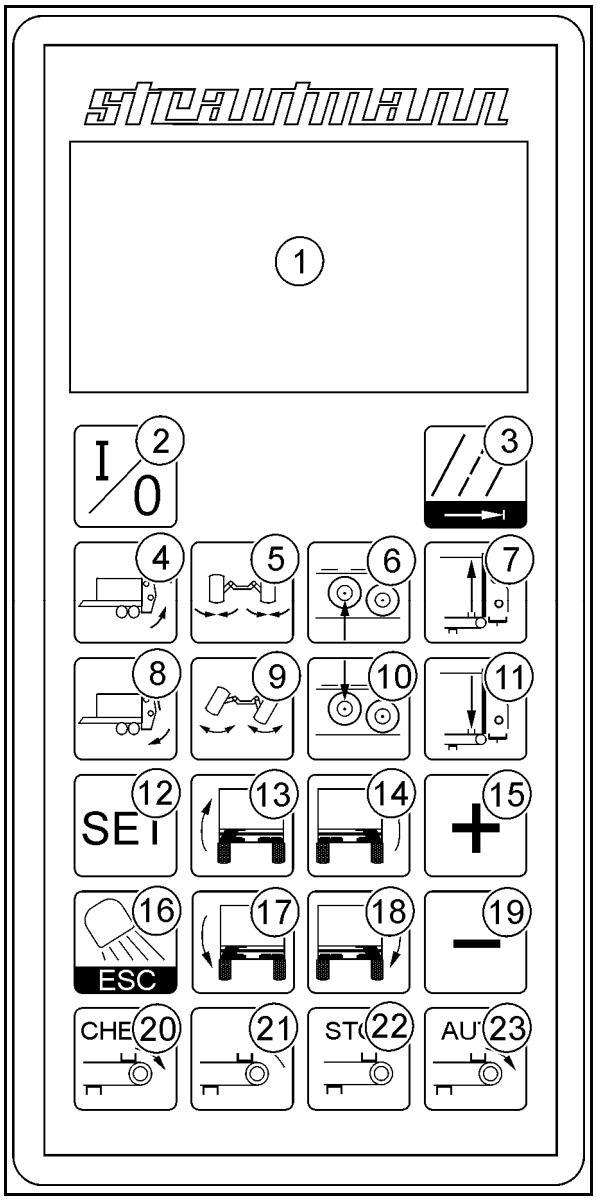


Fig. 68

(12) Call up **Counter** menu (counter of operating hours, service hours, transported loads and covered area)

Call up **SET 1** menu (quantity to be discharged, slip correction factor, operating width, switch weighing system on/ off, hydraulic slurry door clearance)

Call up **SET 2** menu (driving pulses, software version, limiting spreading device, axle models)

(13) Lift left-hand limiting spreading device

(14) Lift right-hand limiting spreading device

(15) Increase value/Change entry data

(16) Switch work lights on/off/ Return to **Working menu**

(17) Lower left-hand limiting spreading device

(18) Lower right-hand limiting spreading device

(19) Reduce value/Change entry data

(20) Power transport floor at maximum speed when carrying out maintenance work, for test purposes or when used as emergency operation function

(21) Reverse transport floor

(22) Stop transport floor

(23) Transpor floor AUTO

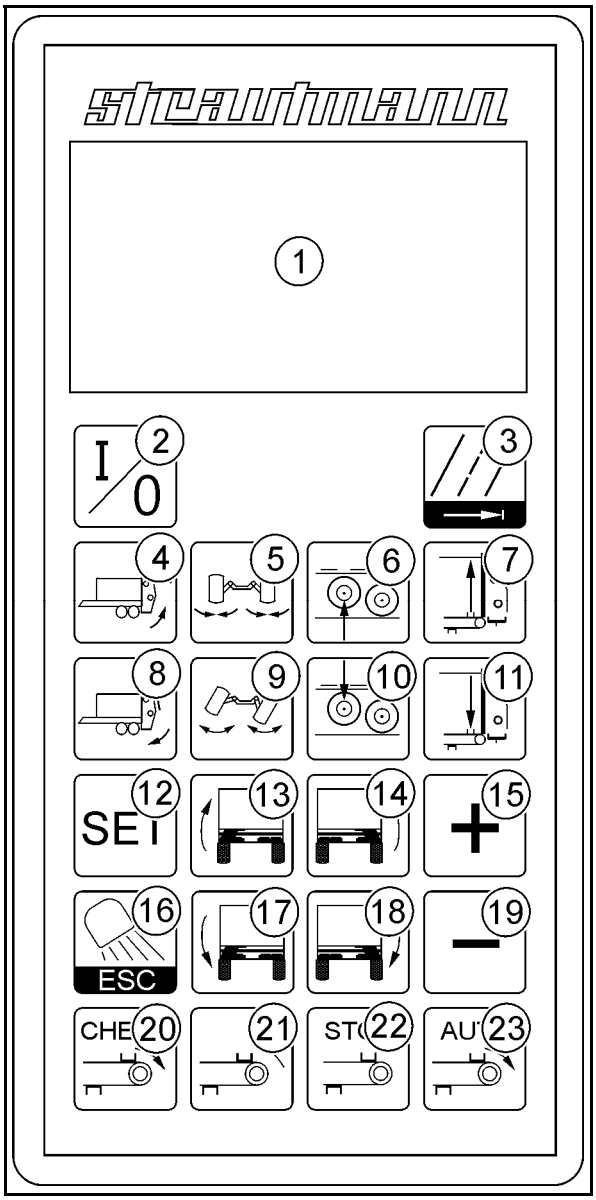
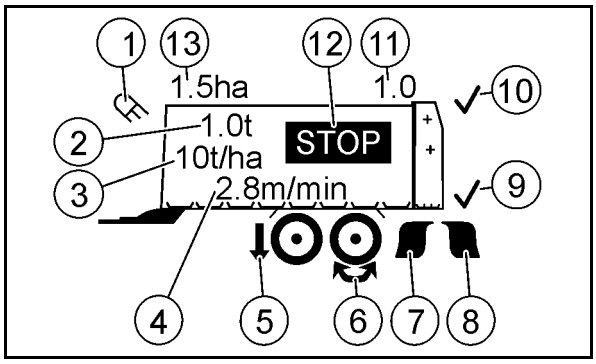


Fig. 69

6.2.2 Display information in Working menu



(1) Operating state "Work lights on/off", here "Work lights on"

(2) Display of carrying capacity

(3) Entry of nominal value of the spreading quantity/spreading mass, here nominal value of spreading mass

(4) Display of current transport floor speed

(5) Operating state "Lift axle lifted/lowered", here "Lift axle lowered"

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

(7) Operating state "Left-hand limiting spreading device lifted/lowered", here "Left-hand limiting spreading device lowered"

(8) Operating state "Right-hand limiting spreading device lifted/lowered", here "Right-hand limiting spreading device lowered"

(9) Operating state "Spreading discs powered/not powered", here "Spreading discs powered"

(10) Operating state "Spreading beaters powered/not powered", here "Spreading beaters powered"

(11) Display of current opening width of hydraulic slurry door

(12) Operating state "Transport floor AUTO/STOP/Reverse/CHECK", here "Transport floor STOP"

(13) Display of covered area

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

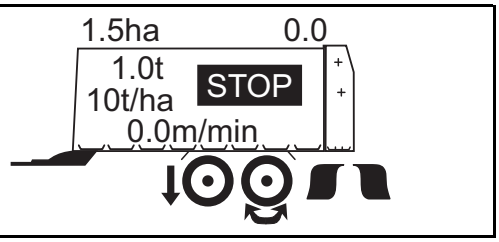
At the same time, this key serves as emergency stop. After the control set has been switched off, all hydraulic functions are also switched off.

1. Press the I/0 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:



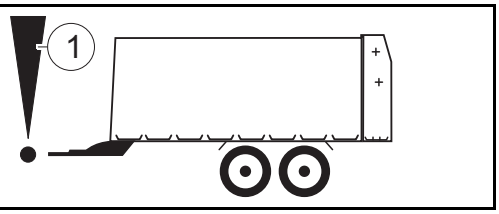
Switch road travel mode on

The road travel mode can only be switched on:

- with the lift axle lowered and
- with the hydraulic slurry door closed.

If these requirements are not fulfilled, a beep is emitted and a corresponding warning message (1) appears on the screen.

The screen shows:



With the road travel mode switched on:

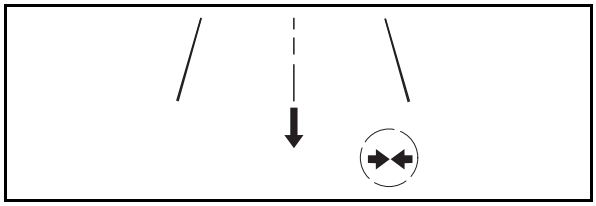
- the **Road travel menu appears,**
- apart from the functions "Lock steering axle" and "Unlock steering axle", all other functions of the control set are blocked,
- the hydraulic drawbar suspension (optional extra), the axle suspension of the hydro-pneumatic tandem chassis (optional extra) and the warning beacon (optional extra) are switched on,
- the work light (optional extra) is switched off.

1. Press the  key once.

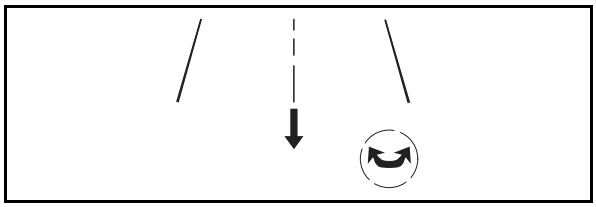
→ Road travel mode is switched on. The **Road travel** menu appears with

- the "Steering axle locked" symbol or

The screen shows:



- the "Steering axle unlocked" symbol.



Switch road travel mode off

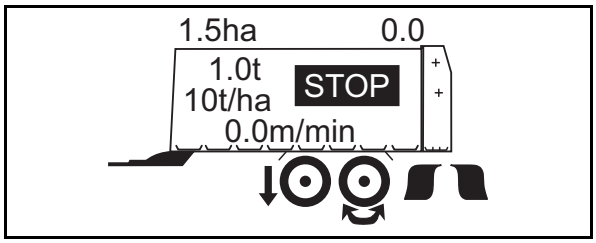
With the road travel mode switched off:

- the **Working menu appears**,
- all functions of the control set are released,
- the hydraulic drawbar suspension (optional extra), the axle suspension of the hydro-pneumatic tandem chassis (optional extra) and the warning beacon (optional extra) are switched off,
- the work light (optional extra) is switched on if the work light was 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 transport floor on

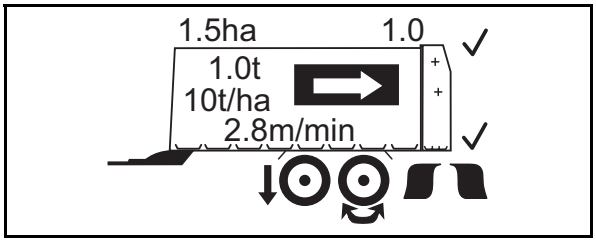
The feed rate of the transport floor depends on:

- the nominal value in weight/area (kg/ha) or volume/area (m^3/ha),
- the hydraulic slurry door clearance,
- the slip correction factor,
- the operating width,
- the current travelling speed.

1. Press the AUTO key once.

→ The transport floor moves. The "Feed on" symbol appears.

The screen shows:

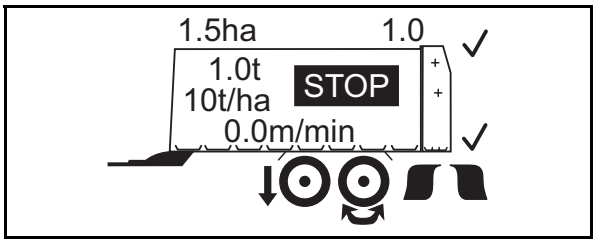


Switch transport floor off

1. Press the STOP key once.

→ The transport floor stops. The "Feed stop" symbol appears.

The screen shows:



Set weighing device display to zero

1. Press the ESC key to move to the **Working** menu.

→ The **Working** menu appears.

2. Press the STOP key for approx. 5 seconds.

→ The value of the weighing device display is set to zero.

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.

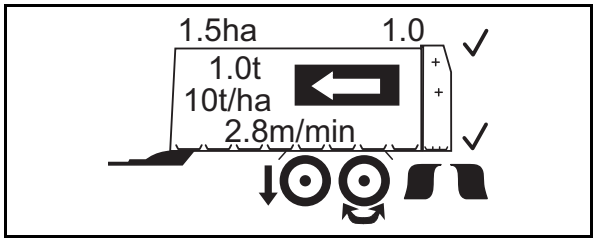
Reverse:

- only for a short time,
- only in case of emergency or
- to eliminate blockages at the spreading beaters during discharge.

1. Press the  key.

→ The transport floor starts running and conveys the spreading material away from the spreading beaters for a maximum of 3 seconds. The pressing power which is applied to the spreading beaters by the spreading material is reduced. The "Reverse feed" symbol appears.

The screen shows:



Transport floor CHECK

Use the Transport floor CHECK function only when carrying out maintenance work, for test purposes or as emergency operation function.

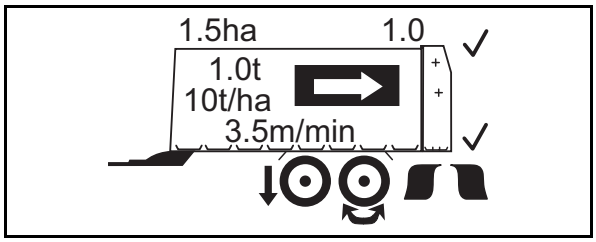
With the **Transport floor CHECK** function activated, the transport floor is always driven at maximum speed. The spreading unit speed is not monitored.

1. Press the 

key once.

→ The transport floor moves at maximum feed rate. The "Feed on" symbol appears.

The screen shows:

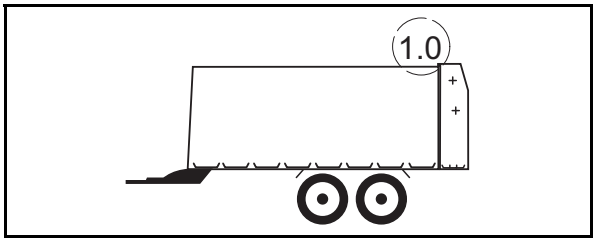


Lift hydraulic slurry door

1. Press the  key until the hydraulic slurry door has reached the desired or its maximum opening degree.

→ The hydraulic slurry door rises. The reading "Hydraulic slurry door" changes.

The screen shows:

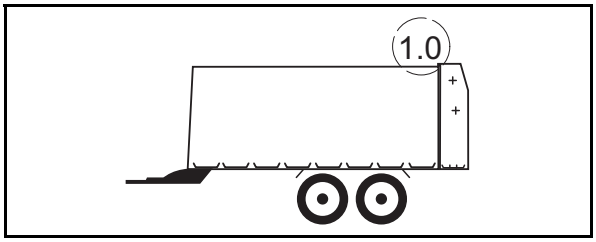


Lower hydraulic slurry door

1. Press the  key until the hydraulic slurry door has reached the desired or its minimum opening degree.

→ The hydraulic slurry door lowers. The reading "Hydraulic slurry door" changes.

The screen shows:

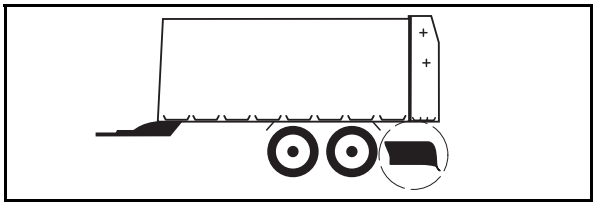


Lift left-hand limiting spreading device

1. Press the  key once.

→ The left-hand limiting spreading device rises. The "Left-hand limiting spreading device lifted" appears.

The screen shows:

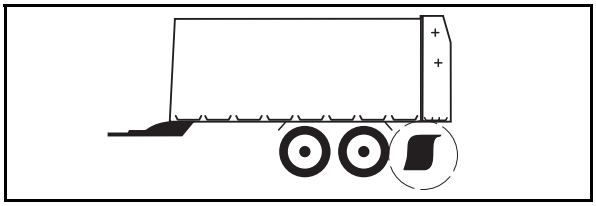


Lower left-hand limiting spreading device

1. Press the  key once.

→ The left-hand limiting spreading device lowers. The "Left-hand limiting spreading device lowered" symbol appears.

The screen shows:

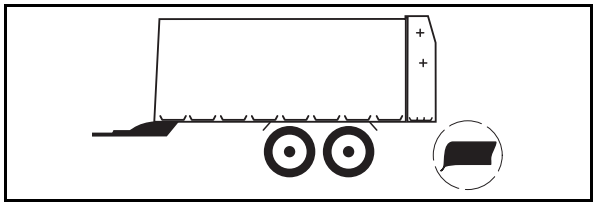


Lift right-hand limiting spreading device

1. Press the  key once.

→ The right-hand limiting spreading device rises. The "Right-hand limiting spreading device lifted" symbol appears.

The screen shows:

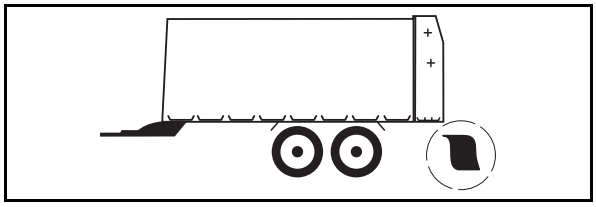


Lower right-hand limiting spreading device

1. Press the  key once.

→ The right-hand limiting spreading device lowers. The "Right-hand limiting spreading device lowered" symbol appears.

The screen shows:

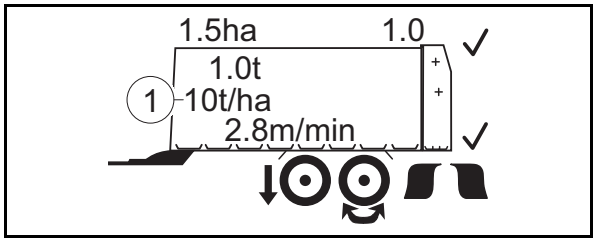


Change discharge quantity during spreading

1. Press the + or the − key.

→ The display of the currently set discharge quantity (1) on the screen changes.

The screen shows:



Lift spreading unit bonnet

1. Press the  key until the spreading unit bonnet has reached its end position.

→ The spreading unit bonnet is opened.

The screen shows:

no additional symbol

Lower spreading unit bonnet

1. Press the  key until the spreading unit bonnet has reached its end position.

→ The spreading unit bonnet is closed.

The screen shows:

no additional symbol

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.

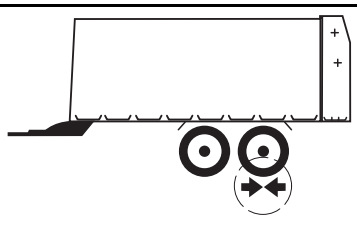
When switching the control set on, the single-acting steering axle is always in unlocked condition.

1. Press the  key once.

→ The steering axle is locked in "Straight" position. The "Steering axle locked" symbol appears.

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

The screen shows:



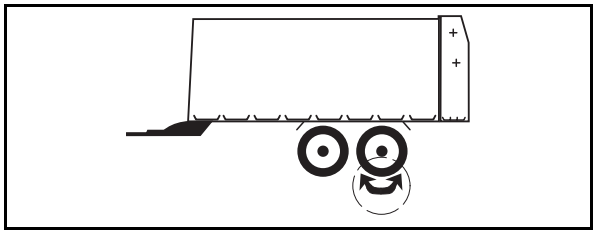
Unlock steering axle

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.

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

The screen shows:

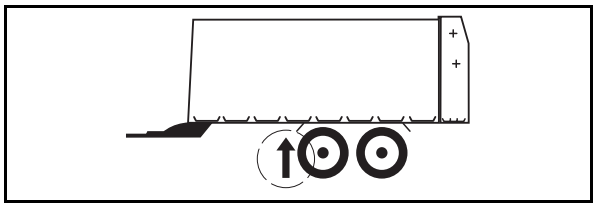


Lift lift axle

1. Press the  key once.

→ The lift axle rises. The "Lift axle lifted" symbol appears.

The screen shows:



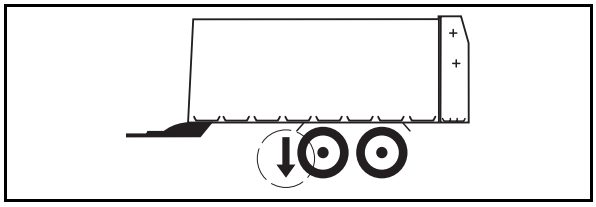
Lower lift axle

Lower the lift axle before starting a charging procedure and before carrying out journeys with the charged machine.

1. Press the  key once.

→ The lift axle lowers. The "Lift axle lowered/Open-centre position" symbol appears.

The screen shows:



Switch work lights on/off

When the work light 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.

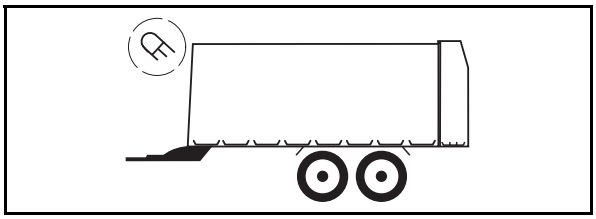
1. Press the ESC key once.

→ The work light is switched on. The "Work light" symbol appears.

2. Press the ESC key again.

→ The work light is switched off. The "Work light" symbol goes out.

The screen shows:



6.2.4 Set machine parameters

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

The machine parameters are set in the **SET 1** and **SET 2** menus. 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 1 menu

1. Press and hold the SET key once.

→ After switching to the **SET 1** 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.

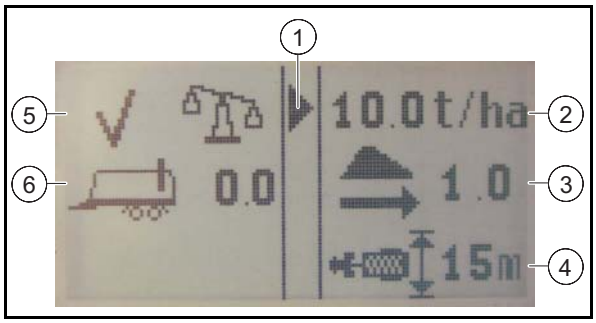
→ Now the left-hand functions 5 to 6 can be selected.

4. Use the + and − keys to change the values:
   - o Briefly press key = value changes by 0.1
   - o Press and hold key = value changes by 1.0

5. Press the ESC key.

→ The **Working** menu appears.

The screen shows:



(1) Arrow

(2) Entry of quantity to be discharged per hectare

(3) Entry of slip correction factor (value must be equal to or greater than "1.0")

(4) Entry of operating width

(5) Entry of "Weighing device on/off", here "Weighing device on"

(6) Entry of current hydraulic slurry door clearance

6.2.4.2 Call up SET 2 menu

1. Actuate the SET key by one long and one short press.

→ After switching to the **SET 2** menu, the arrow (1) is at the top and is pointing to the right. Now the right-hand functions 2 to 3 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.

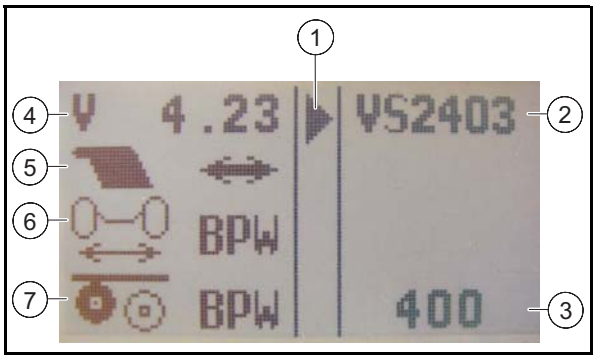
→ Now the left-hand functions 5 to 6 can be selected.

4. Use the + and − keys to change the values/entries.

5. Press the ESC key.

→ The **Working** menu appears.

The screen shows:



(1) Arrow

(2) Entry of machine model

(3) Entry of drive pulses per 100 m

(4) Display of software version

(5) Entry of available limiting spreading device (left-hand, right-hand, two-sided), here "Two-sided limiting spreading device"

(6) Entry of available steering axle model (BPW, FAD):

- o single-acting hydraulic cylinder = axle model BPW
- o double-acting hydraulic cylinder = axle model FAD

(7) Entry of available lift axle model (BPW, FAD):

- o single-acting hydraulic cylinder = axle model BPW
- o double-acting hydraulic cylinder = axle model FAD

6.2.5 Operating hours, service hours, transported loads and traversed area counters

The operating hours, service hours, transported loads and traversed area counters are designed each as daily and total counters.

- Daily operating hours counter (operating hours until reset (h)). The machine's operating hours during which the spreading unit is powered are recorded.
- Daily service hours counter (service hours until reset (h)). The hours during which the ISOBUS control is in switched-on mode are recorded.
- Daily transported loads counter (transported loads until reset). The number of transported loads is recorded by counting the number of opening cycles of the spreading unit bonnet.
- Daily traversed area counter (traversed area until reset). The traversed area is recorded.
- Total operating hours counter. The total operating hours counter registers the overall period of use of the machine during which the spreading unit is powered.
- 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 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.
- Total traversed area counter. The total traversed area counter registers the area traversed during the overall period of use of the machine.

- Daily counters can be reset at any time.
- Daily counters must be reset manually. They are not automatically deleted every day.
- Total counters cannot be reset.

6.2.6 Call up Counter menu

1. Briefly press the SET key once.

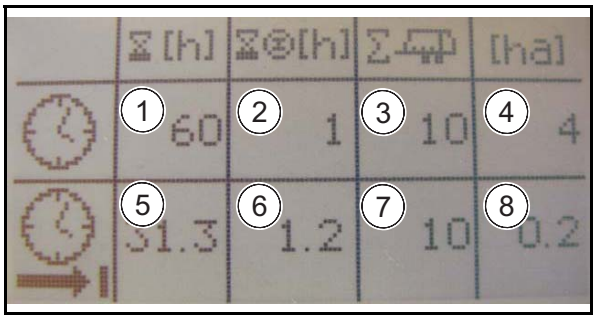
→ The **Counter** menu appears:

(1) Daily service hours counter
(2) Daily operating hours counter
(3) Daily transported loads counter
(4) Daily traversed area counter
(5) Total service hours counter
(6) Total operating hours counter
(7) Total number of transported loads counter
(8) Total traversed area counter

9. Press the ESC key.

→ The screen shows the **Working** menu.

The screen shows:



6.2.7 Reset daily counters

1. Briefly press the SET key once.

→ The **Counter menu appears.**

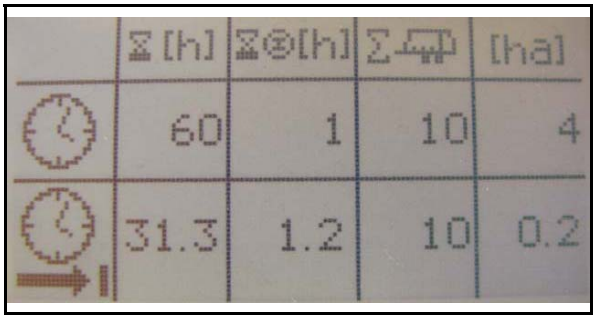
2. Press and hold the SET key once.

→ The daily operating hours counter, daily service hours counter, daily transported loads counter and daily traversed area counter are reset.

3. Press the ESC key.

→ The screen shows the **Working** menu.

The screen shows:



6.2.8 Calibration

6.2.8.1 Calibrate slip correction factor

Only calibrate the slip correction factor with the machine fully charged!

Ensure that the value of the slip correction factor is equal or greater than "1.0"!

1. Switch the weighing device on.
2. Press and hold the SET key once.

→ After switching to the **SET 1** menu, the arrow is at the top and is pointing to the right.

3. Check whether the value of the slip correction factor (1) is equal or greater than "1.0".
4. Briefly press the key once if necessary to select and correct the entry of the slip correction factor (1).
5. Use the + and − keys to change the value if necessary:
   - o Briefly press key = value changes by 0.1
   - o Press and hold key = value changes by 1.0
6. Press the key for 5 seconds.

→ The **Working** menu appears. The arrow (2) indicates that the calibration procedure can be started.

7. Switch the p.t.o. shaft on.

→ The spreading unit is powered.

8. Press the AUTO key.

→ The transport floor is powered.

9. Start the calibration run and travel at constant speed.

→ The calibration procedure has been started.

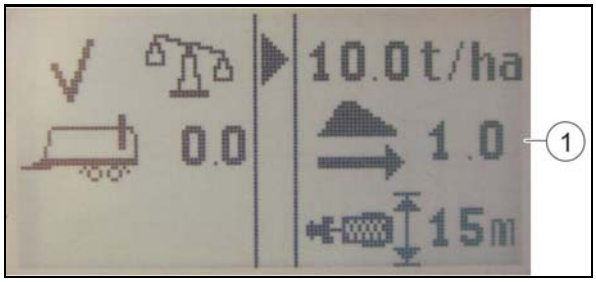


Fig. 70

Fig. 71

10. Stop the machine as soon as the "Finish/Calibration run end" (3) appears.
11. Wait 3 seconds.
12. Press the STOP key.

→ The transport floor stops.

→ The slip correction factor has been calibrated.

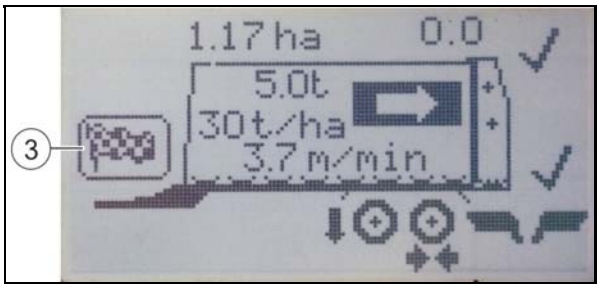


Fig. 72

6.2.8.2 Calibrate hydraulic slurry door

1. Press and hold the SET key once.

→ After switching to the **SET 1** menu, the arrow is at the top and is pointing to the right.

2. Actuate the key by one long and one short press to calibrate the value of the hydraulic slurry door clearance (1).
3. Make sure that the hydraulic slurry door has been completely lowered.
4. Press the key for 5 seconds.

→ The screen shows "KAL" (2) which indicates that the calibration procedure can be started.

5. Press the key until the hydraulic slurry door has been completely lifted.
6. Press the key for 5 seconds.

→ The hydraulic slurry door has been calibrated.

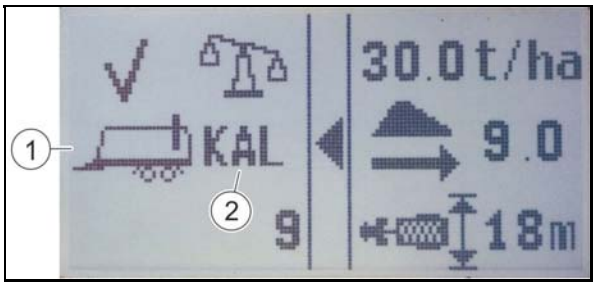


Fig. 73

6.2.8.3 Calibrate distance alignment

1. Actuate the SET key by one long and one short press.

→ After switching to the **SET 2** menu, the arrow is at the top and is pointing to the right.

2. Briefly press the  key once to calibrate the value of the drive pulses per 100 m (1).

3. Press the  key for 5 seconds.

→ The value of the drive pulses is set to zero. The calibration procedure can be started.

4. Move the machine exactly 100 m.

→ The value of the drive pulses is incremented.

5. Press the  key for 5 seconds.

→ The distance alignment has been calibrated.

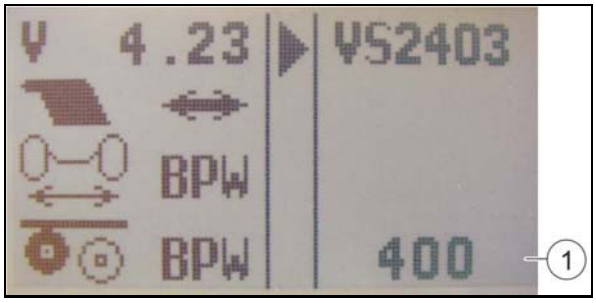


Fig. 74

6.3 Transported loads counter

Optional extra

6.3.1 Design

The transported loads counter is equipped with several menus:

- "Total transported loads counter" menu,
- "Daily transported loads counter" menu (resettable),
- "Total service hours counter" menu,
- "Daily service hours counter" menu (resettable),
- "Settings" menu.

Use the right-hand key  to jump between the menus.

The transported loads counter is switched on by actuating any key or by means of a pulse at the sensor. After the transported loads counter has been switched on, the following information is displayed one after the other:

- the software version (for approx. 2 seconds),
- the "Total transported loads counter" menu (Fig. 75).

6.3.2 Total transported loads counter menu

The **Total transported loads counter** menu displays the total number of finished transported loads (jobs). The total transported loads counter cannot be reset.

Fig. 75 „Jobs gesamt“ = Total number of transported loads

6.3.3 Daily transported loads counter menu

The **Daily transported loads counter** menu displays the number of transported loads (jobs) that have been finished since the last reset. The daily transported loads counter can be reset.

Reset daily transported loads counter

1. Press the left-hand key  .

→ The screen shows the query "Reset?" (Fig. 77).

2a. Confirm your selected function by pressing the left-hand key  .

→ The screen shows a confirmation message for approx. 2 seconds (Fig. 78).

2b. Press the right-hand key  to cancel the process.

→ The **Total transported loads counter** menu (Fig. 75) appears.

Fig. 76 „Jobs Tag“ = Daily transported loads
„Reset“ = Reset

Fig. 77 „Rücksetzen?“ = Reset?

Fig. 78 „Änderung erfolgreich“ = Change successful

Fig. 79 „Rücksetzen?“ = Reset?

6.3.4 Total service hours counter menu

The **Total service hours counter** menu displays the total number of active hours of the sensor in minutes. The total service hours counter can be reset in the **Factory setting** menu.

Fig. 80 „Betrieb gesamt“ = Total number of service hours

6.3.5 Daily service hours counter menu

The **Daily service hours counter** menu displays the number of hours in minutes during which the sensor has been active since the last reset. The daily service hours counter can be reset.

Reset daily service hours counter

1. Press the left-hand key ✓.

→ The screen shows the query "Reset?" (Fig. 82).

2a. Confirm your selected function by pressing the left-hand key ✓.

→ The screen shows a confirmation message for approx. 2 seconds (Fig. 83).

Fig. 81 „Betrieb Tag“ = Daily service hours
„Reset“ = Reset

Fig. 82 „Rücksetzen?“ = Reset?

Fig. 83 „Änderung erfolgreich“ = Change successful

2b. Press the right-hand key ▼ to cancel the process.

→ The **Total transported loads counter** menu (Fig. 75) appears.

Fig. 84 „Rücksetzen?“ = Reset

6.3.6 Settings menu

The **Settings** menu permits:

- the change of the break time. The value indicates the period after which a transported load (job) is considered to have been finished.
- the change of the number of pulses. The value indicates from which number of pulses the detection of a transported load (job) is initiated.
- the return to the factory settings; the reset of all counter values (except for total transported loads counter) to the settings upon delivery.

  Values upon delivey:

  - Break time: 8 min
  - Number of pulses: 400

6.3.6.1 Change break time

Observe the fact that the transported loads counter must be switched off first before the **Settings** menu can be selected. The transported loads counter switches off as soon as the spreading unit has not been powered for 4 minutes.

1. Press any key to switch on the transported loads counter.

→ The current software version is displayed.

2. Press the left-hand key ✓ and the right-hand key ▼ simultaneously as soon as the current software version is displayed.

→ The **Settings – Break betw. jobs** menu (Fig. 85) appears.

Fig. 85 „Pause zw. Jobs ändern“ = Change break time between transported loads

The **Settings – Break time betw. jobs** menu only appears if the software version has been displayed during pressing.

The procedure must be repeated if any other mask has been displayed during pressing. Please switch the transported loads counter on again for this purpose and restart.

3. Confirm your selected function by pressing the left-hand key .

→ The **Break time** menu (Fig. 86) appears. The currently selected digit is flashing.

4. Press the left-hand key to change the value of the currently selected digit.

→ The value of the currently selected digit is incremented.

5. Press the right-hand key to select the next digit.

6. Press the left-hand key to change the value of the currently selected digit.

→ The value of the currently selected digit is incremented.

7. Press the right-hand key to confirm the entry.

→ The screen shows the query "Accept?" (Fig. 87).

8a. Confirm your entry by pressing the left-hand key .

→ The screen shows a confirmation message for approx. 2 seconds.

8b. Press the right-hand key to cancel the process.

→ The **Settings – Break betw. jobs menu appears.**

Fig. 86 „Zeit“ = Time

Fig. 87 „Übernehmen?“= Accept?

6.3.6.2 Change number of pulses

Observe the fact that the transported loads counter must be switched off first before the **Settings** menu can be selected. The transported loads counter switches off as soon as the spreading unit has not been powered for 4 minutes.

1. Press any key to switch on the transported loads counter.

→ The current software version is displayed.

2. Press the left-hand key ✓ and the right-hand key ▼ simultaneously as soon as the current software version is displayed.

→ The **Settings – Break betw. jobs** menu (Fig. 85) appears.

Fig. 88 „Impulse ändern“ = Change pulses

The **Settings – Break time betw. jobs** menu only appears if the software version has been displayed during pressing.

The procedure must be repeated if any other mask has been displayed during pressing. Please switch the transported loads counter on again for this purpose and restart.

3. Press the right-hand key ▼ once to move to the **Pulses** menu (Fig. 88).
4. Confirm your selected function by pressing the left-hand key ✓.

→ The **Change pulses** menu (Fig. 89) appears. The currently selected digit is flashing.

5. Press the left-hand key ✓ to change the value of the currently selected digit.

→ The value of the currently selected digit is incremented.

Fig. 89 „Impulse“ = Pulses

6. Press the right-hand key ▼ to select the next digit.

7. Press the left-hand key ✓ to change the value of the currently selected digit.

→ The value of the currently selected digit is incremented.

8. Press the right-hand key ▼ to confirm the entry.

→ The screen shows the query "Accept?" (Fig. 90).

9a. Confirm your entry by pressing the left-hand key ✓ .

→ The screen shows a confirmation message for approx. 2 seconds.

9b. Press the right-hand key ▼ to cancel the process.

→ The **Settings – Break betw. jobs** menu appears.

Fig. 90 „Übernehmen?“= Accept?

6.3.6.3 Return to factory setting

Observe the fact that the transported loads counter must be switched off first before the **Settings** menu can be selected. The transported loads counter switches off as soon as the spreading unit has not been powered for 4 minutes.

1. Press any key to switch on the transported loads counter.

→ The current software version is displayed.

2. Press the left-hand key ✓ and the right-hand key ▼ simultaneously as soon as the current software version is displayed.

→ The **Settings – Break betw. jobs** menu (Fig. 85) appears.

Fig. 91 „Werkseinstellung ändern“ = Change factory setting

The **Settings – Break time betw. jobs** menu only appears if the software version has been displayed during pressing.

The procedure must be repeated if any other mask has been displayed during pressing. Please switch the transported loads counter on again for this purpose and restart.

3. Press the right-hand key ▼ twice to switch to the **Factory setting** menu (Fig. 91).
4. Confirm your selected function by pressing the left-hand key ✓.

→ The screen shows the query "Accept?" (Fig. 92).

Fig. 92 „Übernehmen?“= Accept?

5a. Press the left-hand key ✓ to return to the factory setting.

→ The screen shows the message "Change successful".

5b. Press the right-hand key ▼ to cancel the process.

→ The **Settings – Break betw. jobs** menu appears.

6.3.6.4 Exit Settings menu

1. Press the right-hand key ▼ in the **Settings** menu until the query **Exit?** (Fig. 93) appears.

2a. Confirm your entry by pressing the left-hand key ✓.

→ The **Total transported loads counter** menu (Fig. 75) appears.

Fig. 93 „Verlassen?“ = Exit?

2b. Press the right-hand key ▼ to cancel the process.

→ The **Settings – Break betw. jobs** menu appears.

7 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 34,
  - "Qualification of staff", page 35,
  - "Basic safety instructions", page 38,
  - "Warning and instructions signs", page 48,
  - "Service and maintenance of machine", page 183.

  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 150,
  - Setting of pressure regulator. Observe the information in the chapter "Load-sensing hydraulic system", page 73.

  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.

7.1 Check tractor's compatibility

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.

7.1.1 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.

7.1.2 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.

7.1.2.1 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

7.1.2.2 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:

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

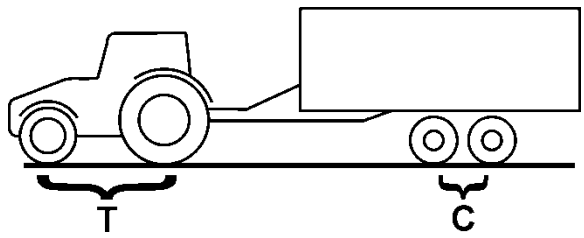


Fig. 94 D_C value of combination

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

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

7.1.2.3 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.

7.2 Mount control set on the tractor

7.2.1 Mount control set of easy-to-use control

- 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. 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 control cable (3) of the control set into the socket of the power unit.

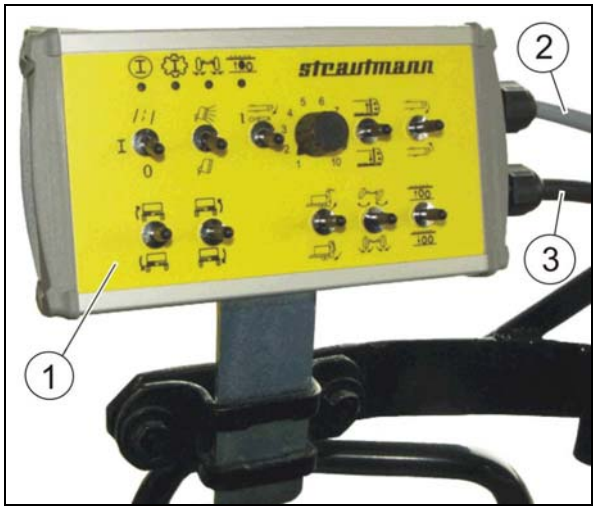


Fig. 95

7.2.2 Mount control set of ISOBUS control Field-Operator 120

- 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 of the mobile cable harness or with the signal socket of the tractor (if available).
3. Plug the 3-pole plug (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, plug:
   - o the ISO socket of the mobile cable harness into the ISO plug of the control unit on the machine.
   - o the ISO plug of the control unit into the ISO socket of the tractor.

Fig. 96

7.3 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.

- The propeller shaft reaches its shortest operating position during extreme cornering. The propeller shaft reaches its longest operating position during straight travelling.
- 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 on the protective tube onto the p.t.o. shaft of the tractor until the locking mechanism noticeably engages.
5. Slip the locking mechanism of the other propeller shaft half onto the p.t.o. shaft of the machine until the locking mechanism noticeably engages.
6. Observe the included operating instructions for the propeller shaft when determining the length and when shortening the propeller shaft.
7. Reinsert the shortened propeller shaft halves into each other.
8. Lubricate the p.t.o shaft of the tractor and the machine's p.t.o. shaft before coupling the propeller shaft.

7.4 Check machine for proper functioning

Check the machine for proper functioning before the first startup and each time before starting work.

1. Hitch the machine to the tractor.
2. Completely lubricate the machine and the propeller shaft. Observe the information in the chapter "Lubrication of machine", page 193.
3. Check the oil level of the individual gearboxes. Observe the information in the chapter "Check/Top up oil level", page 200.
4. Check all functions of the machine before charging the machine for the first time:
   - Switch work lights on and off.
   - Lift and lower spreading unit bonnet.
   - Lift and lower hydraulic slurry door.
   - Switch on and reverse transport floor (max. 3 seconds).
   - Check brake system for proper functioning.
   - Lift and lower limiting spreading device (if available).
   - Lift and lower lift axle (if available).
   - Lock and unlock steering axle (if available).
5. Remove the baler twines from the spreading beaters every day.

8 Hitch and unhitch machine

- Additionally observe the information in the chapter "Basic safety instructions", page 38, when hitching and unhitching the machine.
- Check the machine for visible defects during each hitching and unhitching procedure. Observe the information in the chapter "Operator's obligation", page 34.

8.1 Hitch machine

WARNING

Risk due to incorrect use of the tractor if the attached/ hitched machine causes insufficient stability or insufficient steerability and braking ability of the tractor!

Only attach/hitch the machine to appropriate tractors. Observe the information in the chapter "Check tractor's compatibility", page 144.

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.

WARNING

Risk of crushing, cuts, being drawn in, becoming entangled and risk of impact if the machine accidentally loosens from the tractor!

- Observe the maximum admissible tongue loads, towing capacities and axle loads of the tractor.
- Properly use and secure the provided coupling devices of the tractor and the machine.

WARNING

Risk to people due to a failure of the power supply between tractor and machine, caused by defective supply lines!

Observe the course of the supply lines during hitching. The supply lines:

- must easily give way to any movements during cornering without any stress, buckling or chafing,
- must not chafe against external components.

Only in case of load-sensing hydraulic system:

- Check the pressure regulator for correct setting. Observe the information in the chapter "Load-sensing hydraulic system", page 73.
  - Lock the pressure regulator in the electro-hydraulic control block if the hydraulic connector "Flow line" is directly connected to the tractor's hydraulic pump.
  - Open the pressure regulator in the electro-hydraulic control block if the hydraulic connector "Flow line" is connected to the control device of the tractor.

1. Always check the machine for visible defects during hitching. Observe the information in the chapter "Operator's obligation", page 34.
2. Couple the drawbar. Observe the information in the chapter "Couple drawbar", page 87.
3. Connect the hydraulic hose pipes. Observe the information in the chapter "Connect hydraulic hose pipes", page 78.
4. Connect the service brake system. Observe the information in the chapter "Connect brake and feed line", page 100.
5. Couple the propeller shaft. Observe the information in the chapter "Couple propeller shaft", page 95.
6. Connect the lighting system.
7. Connect the control set (if available). Observe the information in the chapter "Mount control set on the tractor", page 148.
8. Lift the supporting leg to transport position. Observe the information in the chapter "Supporting leg", page 90.
9. Release the parking brake. Observe the information in the chapter "Parking brake", page 105.

8.2 Unhitch machine

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.

1. Lower the lift axle completely (if available).
2. Lower the supporting leg to support position. Observe the information in the chapter "Supporting leg", page 90.
3. Apply the parking brake. Observe the information in the chapter "Parking brake", page 105.
4. Always check the machine for visible defects during unhitching. Observe the information in the chapter "Operator's obligation", page 34.
5. Uncouple the drawbar. Observe the information in the chapter "Uncouple drawbar", page 89.
6. Disconnect the hydraulic hose pipes. Observe the information in the chapter "Disconnect hydraulic hose pipes", page 79.
7. Disconnect the brake system. Observe the information in the chapter "Disconnect brake and feed line", page 101.
8. Uncouple the propeller shaft. Observe the information in the chapter "Uncouple propeller shaft", page 95.
9. Disconnect the lighting system.
10. Disconnect the control set (if available). Observe the information in the chapter "Mount control set on the tractor", page 148.
11. Move the tractor forward.

9 Settings

When carrying out adjusting work, additionally observe the information included in the chapters:

- "Basic safety instructions", page 38.
- "Warning and instructions signs", page 48.

Observance of these instructions serves your safety.

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.

9.1 General information

When using the machine, observe:

- the directive 91/676/EEC (in Germany implemented by means of the fertilizer regulations) when spreading livestock manure and secondary raw material fertilizer,
- the biological waste regulations in addition to the fertilizer regulations in Germany when spreading secondary raw material fertilizer such as compost,
- good professional fertilizing practice. According to good professional fertilizing practice, fertilizers must, with respect to time and quantity, be applied such that the plants can fully absorb and benefit from the nutrients.

  The required fertilizer quantity must be determined such that a balance between the expected nutrient needs and the nutrient supply is ensured.

The required spreading quantities tailored to the needs are determined:

- by the nutrient needs of the plants to be fertilized,
- by the nutrient supply and the nutrient determination in the soil (determined by means of soil analyses),
- by the nutrient content of the manure to be spread. The following table specifies average nutrient contents of some kinds of manure.

Nutrient contents of livestock manures and secondary raw material fertilizers vary substantially:

- depending on the kind of animal, feeding, keeping and storing,
- due to different degrees of litter or sedimentation processes.

Due to these variations, the average nutrient content values specified in the following table can only be considered as reference values for determining the required spreading quantities for fertilizing tailored to the needs. However, these reference values provide an overview about orders of magnitude and tendencies.

The nutrient contents of soils and manures can only be exactly established by means of laboratory tests. For this reason, you should have your soils and the manures used examined at regular intervals.

Average nutrient contents of some types of manure

Type of manure	TS %	Nutrient					
		N_{tot}	NH_4-N	P_2O_5	K_2O	MgO	CaO
Litter manure	**Contents [kg/t]**						
Cow dung	23	5.5	--	3.1	9.2	1.4	--
Pig dung	22	7.0	--	6.7	7.2	2.2	--
Horse dung	26	4.5	--	3.7	8.0	2.1	--
Sheep dung	25	8.0	--	3.0	7.0	2.0	--
Turkey dung	50	14.4	4.7	18.7	14.8	4.8	20.0
Broiler dung	55	28.0	--	21.0	23.0	6.0	21.0
Chicken dung	48	26.9	7.1	17.2	16.1	4.5	13.8
Poultry droppings							
Fresh chicken manure	28	17.1	3.0	10.9	8.3	4.0	26.0
Dry chicken dung	50	28.6	10.9	23.0	20.1	7.7	56.1
Dried chicken dung	70	32.1	11.0	30.9	21.8	7.9	90.1
Organic fertilizer							
Verdant compost/Biocompost	50	4.9	0.2	2.6	4.5	3.6	17.4
Sewage sludge, set	34	9.5	1.2	15.8	0.8	2.4	55.5
Mushroom compost	30	8.2	0.2	4.7	6.0	2.0	30
Lime							
Converter lime, humid and grainy	--	--	--	--	--	20.0	500.0
Calcium carbonate	--	--	--	--	--	--	480.0
Mixed lime with magnesium	--	--	--	--	--	140.0	600.0

TS = dry matter

(Source: Landwirtschaftskammer Nordrhein-Westfalen (note of transl.: Chamber of Agriculture of North Rhine-Westphalia))

The main criteria for assessing the quality of spreaders' work are the lateral and lengthwise distribution of the spreading material and the adherence to the desired spreading quantities.

The following parameters are adjustable:

- the spreading unit,
- the sliding door and the spreading slide,
- the spreading quantity.

9.2 2-disc spreading unit

The specific spreading properties of the spreading material determine its throwing range. The swivelling spreading shovels (2) mounted on the spreading discs (1) of the 2-disc spreading unit permit compensation for the specific spreading properties of the spreading material such that the material can be spread with even lateral distribution. The spreading shovels on both spreading discs can be set to different positions A-E around the pivot point (3) for that purpose. The following table provides "Recommendations for setting the spreading shovels for different spreading materials".

Upon delivery, position C is set by the manufacturer as standard.

Due to non-uniform behaviour of the spreading materials when being spread, different operating widths are partly obtained. Also observe the table "Possible operating widths of different spreading materials".

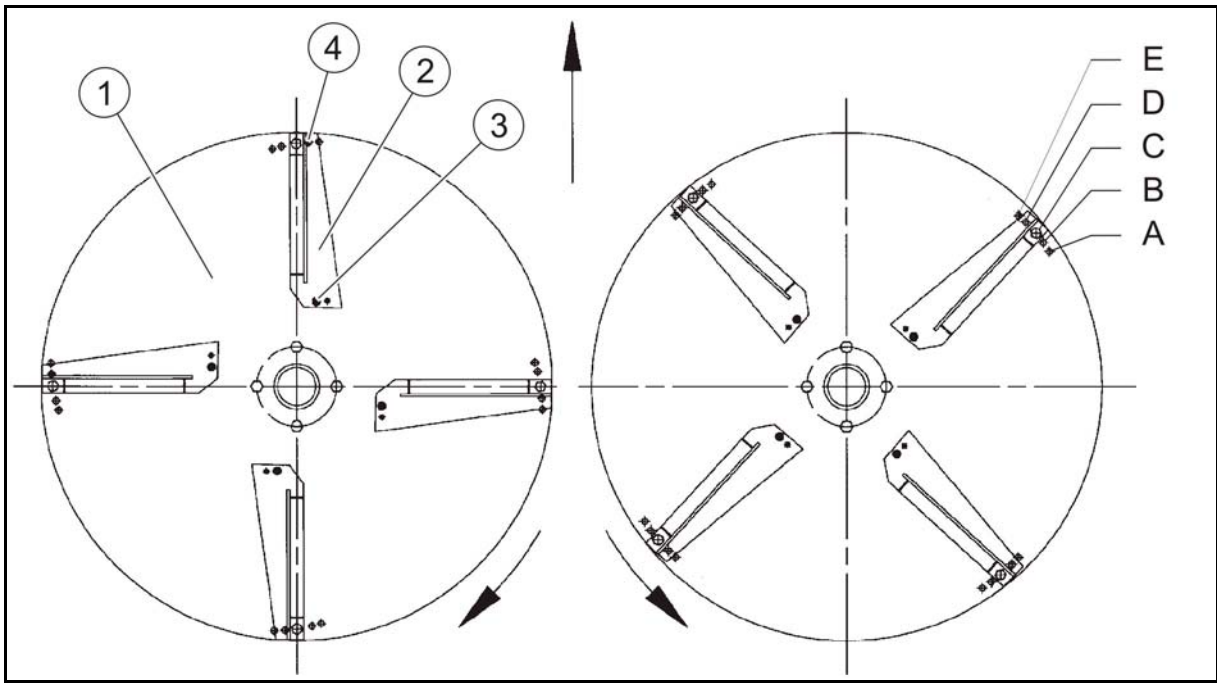


Fig. 97

Recommendations for setting the spreading shovels for different spreading materials

Spreading material	Specific spreading properties	Position of spreading shovels
Deep-litter manure, mature compost	Heavy, strongly soaked, sticky	A, B
Mature cow dung, compost, broiler dung, dry chicken dung, turkey dung	Normal weight, chopped straw, normal dung humidity, mature to medium or pourable	C *, D, E

* Basic setting

Possible operating widths of different spreading materials

Spreading material	Bulk density [kg/m^3] *	Operating width [m]
Cow dung, fresh	700-800	13
Cow dung, mature	800-1000	18
Open stall manure (approx. 5-6 months old)	approx. 700	15
Litter manure (approx. 1-4 weeks old)	approx. 310	12
Pig dung	750-850	18
Compost, biological waste (light) Screen fraction 0-2.4 mm (approx. 35% of dry matter)	550-600	14
Compost (heavy)	800-850	15
Sewage sludge	1000	18
Turkey dung, dry/poultry droppings	approx. 500	12
Dry poultry droppings	1150	12
Poultry manure (deep litter)	750	12
Sheep dung	720	15
Lime marl	approx. 1500	12

* The bulk density:

- is strongly influenced by the degree of humidity and the straw content of the spreading material,
- can be subject to large fluctuations due to different keeping and feeding methods.

The following data serve as reference values:

- Compost with low bulk density – operating width 10-14 m,
- Compost with high bulk density – operating width 15-18 m,
- Manure and chicken dung (small spreading quantity) – Operating width 15-18 m, manure even up to an operating width of approx. 20 m.

The operating width:

- depends on the spreading material and is not equal to the throwing range,
- can be determined by means of a visual check and a measurement on the field.

9.2.1 Swivel spreading shovels on spreading discs

1. Unlock the spreading unit bonnet. Observe the information in the chapter "Spreading unit bonnet", page 65.
2. Open the spreading unit bonnet completely.
3. Secure the spreading unit bonnet against accidental lowering.
4. Remove the screwed connections (4) of the spreading shovels.
5. Swivel the spreading shovels to the required position A-E. Observe the table "Recommendations for setting the spreading shovels", page 158.
6. Fasten the spreading shovels (2) in their new position by means of the screwed connections (4).
7. Check all screwed connections for tightness.
8. Unlock the spreading unit bonnet.
9. Close the spreading unit bonnet.
10. Secure the spreading unit bonnet against accidental opening.
11. Check the selected setting of the spreading shovels by means of a spreading test on the field and a subsequent visual check of the lateral distribution and a measurement of the achieved operating width. During the spreading test, adjoining spreading patterns must overlap. Observe the information in the chapter "Recommendations for driving during spreading mode", page 178.
12. Adjust the setting of the spreading shovels in case of an unsatisfactory lateral distribution.

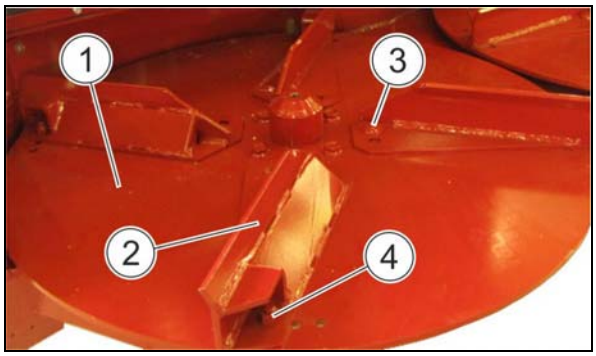


Fig. 98

9.3 Sliding door and spreading slide

In order to achieve an even lateral distribution for different spreading materials, we recommend:

- the inclined surface of the sliding door and thus the delivery point on the spreading discs:
  - to be shifted as far as possible to the front, thus achieving an even lateral distribution. The throughput rate decreases at the same time. This setting is required for all well spreadable and pourable spreading materials in low spreading quantities.
  - to be shifted further to the rear to increase the throughput rate. This makes the lateral distribution more uneven. This setting is required for long-fibre, interconnected stalk spreading materials in larger spreading quantities.
- the height of the spreading slide:
  - as a basic principle, to be set as low as possible to achieve an even lateral distribution. This setting is required for all well spreadable and pourable spreading materials such as compost, dry chicken dung, lime, sewage sludge etc. in low spreading quantities.
  - to be set higher, in order to prevent a blockage of the spreading material on the spreading discs. The throughput rate is increased at the same time. This setting is required for long-fibre, interconnected stalk spreading materials such as litter manure (long straw, deep litter) in larger spreading quantities.

Inclined surface of sliding door (Delivery point)	**Spreading slide**	
	lower	**higher**
Shift to the front	For all well spreadable and pourable spreading materials such as compost, dry chicken dung, lime, sewage sludge etc. in low spreading quantities . Better lateral distribution.	For long straw manure: prevent blockage of spreading material For long-fibre, interconnected stalk spreading materials in larger spreading quantities.
Shift to the rear	For long-fibre, interconnected stalk spreading materials in larger spreading quantities. Too large shifting will lead to a worse lateral distribution.	--

9.3.1 Set sliding door

The inclined surface of the sliding door (1) determines the delivery point where the spreading material is delivered onto the spreading discs (2).

In order to achieve an even lateral distribution, the delivery point on the spreading discs should be located as far as possible to the front.

If the delivery point is shifted to the rear:

- the throughput rate increases,
- the lateral distribution worsens.

The sliding door must be equally set on both sides such that both spreading discs have the same delivery points:

1. Unscrew the counter nut (3) of the adjusting screw (4).
2. Turn the adjusting nut (5) such that the distance X between the stop (6) and the adjusting bracket (7):
   - o decreases, the delivery point shifting to the front,
   - o increases, the delivery point shifting to the rear.
3. Retighten the counter nut to secure the sliding door in its new position.

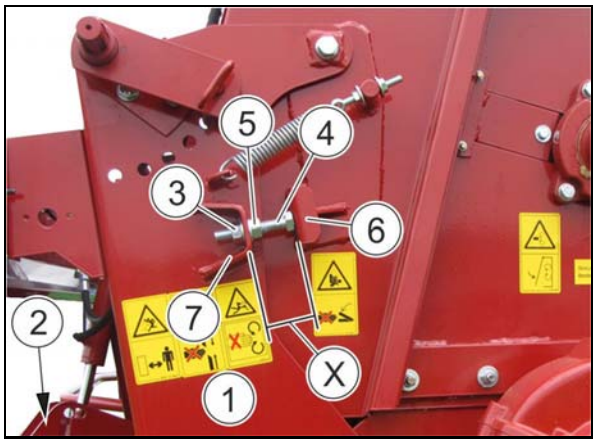


Fig. 99

9.3.2 Set spreading slide

The spreading slide (1) is mounted in the sliding door (2) above the spreading discs (3).

The height of the spreading slide can be adjusted with respect to the sliding door. The set height of the spreading slide determines the clearance between sliding door and spreading discs.

In order to achieve an even lateral distribution, the height of the spreading slide should be set as low as possible.

If the clearance between the spreading slide and the spreading discs is increased:

- the throughput rate increases,
- the lateral distribution worsens.

The different heights of the spreading slide/of the clearance are set by turning the height adjustment device (4) and by sticking the coupling bolt (5) into one of the boreholes A-H at the adjusting segment.

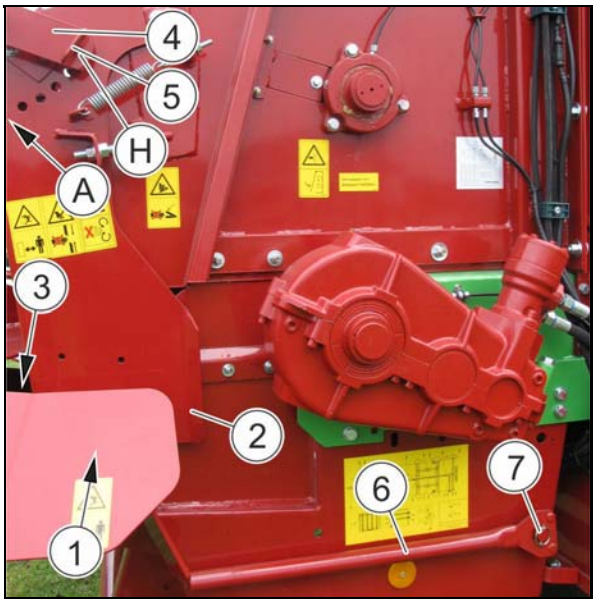


Fig. 100

Position of coupling bolt	Overhead clearance
A	minimum
H	maximum

1. Unlock the hand lever (6) and remove it from the holder (7).
2. Slip the hand lever onto the height adjustment device (4).
3. Use one hand to slightly turn the height adjustment device.

→ The coupling bolt (5) is relieved.

Keep hold of the hand lever to ensure that the spreading slide (1) will not shift due to its own weight.

4. Use the other hand to pull the spring-loaded coupling bolt out of the borehole at the adjusting segment and keep hold of the coupling bolt.
5. Swivel the hand lever until the desired overhead clearance has been reached.
6. Release the coupling bolt.

→ The coupling bolt engages in one of the boreholes A-H at the adjusting segment thus securing the spreading slide at the set height.

Ensure that the coupling bolt completely engages in the borehole at the adjusting segment.

7. Pull the hand lever from the height adjustment device.
8. Place the hand lever on the holder and secure it.

9.4 Spreading quantity

The spreading quantity per area in [m^3/ha] depends on:

- the charging height (hydraulic slurry door clearance) and the cargo space width of the machine,
- the feed rate of the transport floor,
- the operating width and
- the travelling speed.

The spreading quantity is set according to the specifications included in the spreading table.

Information for applying the spreading table:

- The data listed in the spreading table are reference values. They have been calculated by members of the Strautmann staff and tested by means of spot tests on the field. Different values may be the result of other conditions in individual cases.
- For spreading material in normally humid, well rotted condition, the values can be directly taken from the table, because almost no "slip" has been determined for this kind of material.
- For humid or badly rotted spreading material, the feed rate of the transport floor should be set at a value slightly above those specified in the table, in order to achieve the spreading quantities listed in the spreading table.
- The settings for the control dial for adjustment of the feed rate of the transport floor have been determined by means of a tractor with a hydraulic performance of 60 l/min and 180 bar.
- The values for the feed rate of the transport floor have been determined in empty condition.
- The operating width can be best determined by means of a spreading test on the field and a subsequent visual check of the lateral distribution and a measurement of the achieved operating width.
- The values for the spreading quantity have been determined with the hydraulic slurry door completely open (charging height = 1.45 m). Partly opening the hydraulic slurry door will reduce the spreading quantity to approximately the same portion:

  At e. g. 10% open hydraulic slurry door, the spreading quantity will also be approx. 10% of the value specified in the table.

Spreading table for 4-beater spreading unit on the VS 1204, VS 1604, VS 1804 models

Position of control dial for transport floor						
	Feed rate [m/min]					
		Operating width 6 m				
		Travelling speed [km/h]				
		4	6	8	10	12
		Discharged spreading quantity [m^3/ha] at a charging height of 1.50 m				
3.0	**0.3**	22.1	14.7	11.0	8.8	7.4
4.0	**0.8**	60.0	40.0	30.0	24.0	20.0
5.0	**1.4**	104.2	69.4	52.1	41.7	34.7
6.0	**2.1**	154.7	103.1	77.3	61.9	51.6
7.0	**2.8**	205.8	137.2	102.9	82.3	68.6
8.0	**3.5**	252.6	168.4	126.3	101.0	84.2
9.0	**4.2**	303.0	202.0	151.5	121.2	101.0
10.0	**4.4**	315.6	210.4	157.8	126.2	105.2

Spreading table for 4-beater spreading unit on the VS 2004 model

Position of control dial for transport floor						
	Feed rate [m/min]					
		Operating width 6 m				
		Travelling speed [km/h]				
		4	6	8	10	12
		Discharged spreading quantity [m^3/ha] at a charging height of 1.50 m				
3.0	**0.2**	14.5	9.6	7.3	5.8	4.8
4.0	**0.6**	43.4	29.0	21.7	17.4	14.5
5.0	**1.0**	72.4	48.2	36.2	29.0	24.1
6.0	**1.5**	108.6	72.4	54.3	43.4	36.2
7.0	**2.0**	144.8	96.9	72.4	57.9	48.3
8.0	**2.4**	173.7	115.8	86.9	69.5	57.9
9.0	**2.9**	209.9	140.0	105.0	84.0	70.0
10.0	**3.1**	224.4	149.6	112.2	89.8	74.8

Spreading table for 2-disc wide-angle spreading unit on the VS 1204, VS 1604, VS 1804 models

Position of control dial for transport floor	Feed rate [m/min]	Operating width [m]																							
		12					15					18					20								
		Travelling speed [km/h]																							
		4	6	8	10	12	4	6	8	10	12	4	6	8	10	12	4	6	8	10	12	4	6	8	10	12
		Discharged spreading quantity [m³/ha] at a charging height of 1.25 m																							
3.0	0.3	9.2	6.1	4.6	3.7	3.1	7.4	4.9	3.7	2.9	2.5	6.1	4.1	3.1	2.5	2.0	5.5	3.7	2.8	2.2	1.8					
4.0	0.8	25.0	16.7	12.5	10.0	8.3	20.0	13.3	10.0	8.0	6.7	16.7	11.1	8.3	6.7	5.6	15.0	10.0	7.5	6.0	5.0					
5.0	1.4	43.4	28.9	21.7	17.4	14.5	34.7	23.1	17.4	13.9	11.6	28.9	19.3	14.5	11.6	9.6	26.0	17.4	13.0	10.4	8.7					
6.0	2.1	64.4	43.0	32.2	25.8	21.5	51.6	34.4	25.8	20.6	17.2	43.0	28.6	21.5	17.2	14.3	38.7	25.8	19.3	15.5	12.9					
7.0	2.8	85.8	57.2	42.9	34.3	28.6	68.6	45.7	34.3	27.4	22.9	57.2	38.1	28.6	22.9	19.1	51.5	34.3	25.7	20.6	17.2					
8.0	3.5	105.2	70.2	52.6	42.1	35.1	84.2	56.1	42.1	33.7	28.1	70.2	46.8	35.1	28.1	23.4	63.2	42.1	31.6	25.3	21.1					
9.0	4.2	126.2	84.2	63.1	50.5	42.1	101.0	67.3	50.5	40.4	33.7	84.2	56.1	42.1	33.7	28.1	75.7	50.5	37.9	30.3	25.3					
10.0	4.4	131.5	87.7	65.7	52.6	43.8	105.2	70.1	52.6	42.1	35.1	87.7	58.4	43.8	35.1	29.2	78.9	52.6	39.4	31.6	26.3					

Spreading table for 2-disc wide-angle spreading unit on the VS 2004 model

Position of control dial for transport floor	Feed rate [m/min]	Operating width [m]	Travelling speed [km/h]	Discharged spreading quantity [m^3/ha] at a charging height of 1.1 m																							
		12						15						18						20							
		4	6	8	10	12	4	6	8	10	12	4	6	8	10	12	4	6	8	10	12	4	6	8	10	12	
		6.0	4.0	3.0	2.4	2.0	4.8	3.2	2.4	1.9	1.6	4.0	2.6	2.0	1.6	1.3	3.6	2.4	1.8	1.4	1.2						
3.0	**0.2**	18.1	12.0	9.0	7.2	6.0	14.5	9.6	7.2	5.8	4.8	12.1	8.0	6.0	4.8	4.0	10.8	7.2	5.4	4.3	3.6						
4.0	**0.6**	30.2	20.2	15.1	12.1	10.1	24.1	16.0	12.0	9.6	8.0	20.1	13.4	10.0	8.0	6.7	18.1	12.0	9.0	7.2	6.0						
5.0	**1.0**	45.2	30.2	22.6	18.1	15.1	36.2	24.2	18.1	14.5	12.1	30.1	20.2	15.1	12.1	10.1	27.1	18.0	13.6	10.8	9.0						
6.0	**1.5**	60.3	40.2	30.2	24.1	20.1	48.3	32.2	24.1	19.3	16.1	40.2	26.8	20.1	16.1	13.4	36.1	24.0	18.0	14.4	12.0						
7.0	**2.0**	72.4	48.2	36.2	29.0	24.1	57.9	38.6	28.9	23.2	19.3	48.2	32.2	24.1	19.3	16.1	43.3	29.0	21.7	17.4	14.5						
8.0	**2.4**	87.5	58.4	43.7	35.0	29.2	70.0	46.6	35.0	28.0	23.3	58.3	38.8	29.1	23.3	19.4	52.4	35.0	26.2	21.0	17.5						
9.0	**2.9**	93.5	62.4	46.8	37.4	31.2	74.8	49.8	37.4	29.9	24.9	62.3	41.6	31.1	24.9	20.8	56.0	37.4	28.0	22.4	18.7						
10.0	**3.1**																										

9.4.1 Set spreading quantity according to spreading table

Example based on the spreading table for 4-beater spreading unit on the VS 1204, VS 1604, VS 1804 models

Set the desired spreading quantity as follows:

1. First determine the operating width by means of a spreading test on the field and a subsequent visual check of the lateral distribution and a measurement of the achieved operating width. During the spreading test, adjoining spreading patterns must overlap. Observe the information in the chapter "Recommendations for driving during spreading mode", page 178.
2. Define the desired spreading quantity in m^3/ha fest (e. g. 30 m^3/ha).
3. Look for the selected spreading quantity in the column "Operating width 6 m". For a spreading quantity of 30 m^3/ha, the spreading table provides the following settings:
   - Travelling speed: 8 km/h,
   - Position of control dial for tansport floor: 4.

9.4.2 Conversion of spreading quantity [m^3/ha] into spreading mass [t/ha]

The following table specifies the bulk density in [kg/m^3] for different spreading materials. Take these values to convert the spreading quantity [m^3/ha] into the spreading mass [t/ha].

Spreading material	Bulk density [kg/m^3]	Bulk density [dt/m^3]
Cow dung, fresh	700-800	7.0-8.0
Cow dung, mature	800-1000	8.0-10.0
Pig dung	750-850	7.5-8.5
Compost, biological waste Screen fraction 0-2.4 mm (approx. 35% of dry matter)	approx. 500	approx. 5.0
Sewage sludge	1000	10.0
Turkey dung, dry/poultry droppings	approx. 500	approx. 5.0
Converter lime, humid and grainy	1200-1400	1.2-1.4

$$\text{Spreading mass [t/ha]} = \frac{\text{Spreading quantity [m}^3\text{/ha]} \times \text{bulk density [kg/m}^3\text{]}}{1000}$$

$$\text{Spreading mass [t/ha]} = \frac{\text{Spreading quantity [m}^3\text{/ha]} \times \text{bulk density [dt/m}^3\text{]}}{10}$$

9.4.3 Conversion of spreading quantity with hydraulic slurry door partly open

$$\text{Spreading quantity [m}^3\text{/ha]} = \frac{\text{Charging width [m]} \times \text{charging height [m]} \times \text{feed rate [m/min]} \times 600}{\text{Operating width [m]} \times \text{travelling speed [km/h]}}$$

9.5 Adapt setting range of control dial to hydraulic system of tractor with easy-to-use control

The setting range of the control dial set by the manufacturer must be modified if the transport floor:

- does not reach its minimum feed rate at scale value 1,
- reaches its maximum feed rate earlier than at scale value 10.

Adapt setting range to bottom and top feed rate

Operate the machine at the required drive speed when adjusting the setting range such that the settings are not affected by the performance of the hydraulic system.

Switch the control set off for at least 10 seconds to stop the adjusting of the setting range to the bottom and top feed rate.

1. Put all operating levers to their switch position "0".
2. Put the **Control set** operating lever (Fig. 101) to switch position "2".

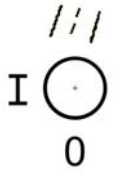
→ The control set is switched off.

3. Put the **Transport floor** operating lever (Fig. 102) to switch position "2" and keep hold of it, while simultaneously putting the **Steering axle** operating lever (Fig. 103) to switch position "1" and keeping hold of it.
4. Additionally put the **Control set** operating lever to switch position "0".

→ Control lamps light up/ flash.

5. Release the held operating levers.
6. Put the **Transport floor CHECK** operating lever (Fig. 104) to switch position "1" for a short time.

→ A beep is emitted. The feed setting mode is activated.



1: Road travel

0: On

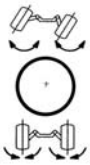
2: Off

Fig. 101

1: Transport floor forward

2: Reverse transport floor

Fig. 102



1: Unlock steering axle

2: Lock steering axle

Fig. 103

7. Put the **Transport floor** operating lever to switch position "1".

→ The transport floor moves. The bottom feed rate can be set.

8. Turn the control dial:
   - o until the transport floor runs at the desired minimum feed rate or
   - o until the feed rate no longer decreases.

9. Put the **Work lights** operating lever (Fig. 105) to switch position "1".

→ The top feed rate can be set.

10. Turn the control dial:
    - o until the transport floor runs at the desired maximum feed rate or
    - o until the feed rate no longer increases.

11. Put the **Transport floor** operating lever to switch position "2".

→ A short beep is emitted. The control lamp *H1* (Fig. 106) is flashing. The bottom and top feed rate are saved.

→ If no beep is emitted, the adjustment of the setting range has not been successful. In this case, repeat the steps.

12. Put the **Control set operating lever to switch position** "2".

→ The control lamp *H1* goes out.

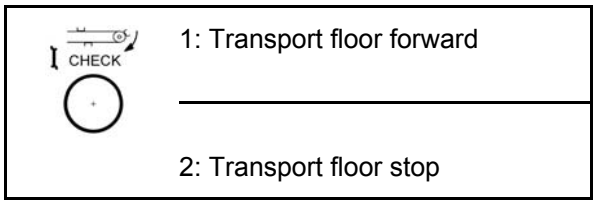


Fig. 104

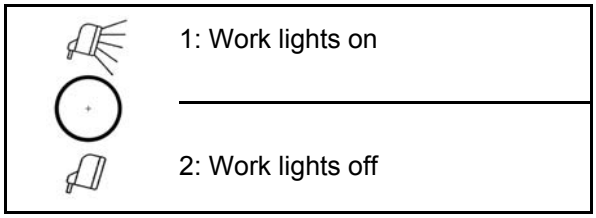


Fig. 105

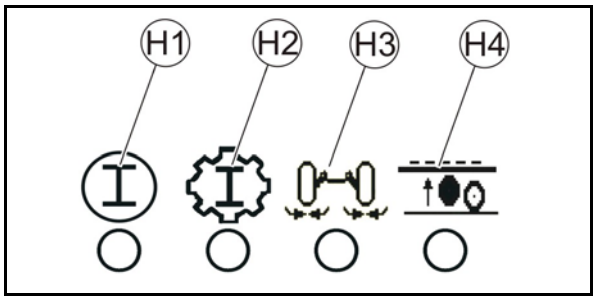


Fig. 106

10 Use of machine

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

- "Operator's obligation", page 34,
- "Qualification of staff", page 35,
- "Basic safety instructions", page 38,
- "Warning and instructions signs", page 48.

Observance of these chapters serves your safety.

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 and shearing to people within the hazardous area of the powered scraper floor!

- Keep sufficient safe distance to the scraper floor, as long as the tractor engine is running with the propeller shaft coupled / the hydraulic system connected.
- Make sure that people leave the hazardous area of the scraper floor before powering the scraper floor.

WARNING

Risk for the operator due to materials or foreign objects (e.g. stones) blown out of the machine if the operator on the tractor seat is hit by dangerous items!

Only start the machine if the included protective grating has been mounted at the front panel.

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.

Check the machine for visible defects every day.

Immediately remedy or have remedied visible defects.

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

10.1 Charging

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.

- Before charging the machine:
  - o always lower the lifted lift axle (if available),
  - o close the hydraulic slurry door.
- Ensure that there are no larger solid matters/foreign objects such as stones or other foreign objects in the spreading material.
- Charge the machine as evenly as possible to achieve an optimum spreading pattern. If hollows occur or if the bulk density of the spreading material is very inhomogeneous, the lengthwise distribution of the spreading material considerably worsens.
- Observe the admissible charging heights above the transport floor when charging the machine:
  - o The charging height must not exceed the overhead clearance of the spreading unit.
  - o In case of spreading materials from a bulk weight of approx. 800 kg/m^3 , the machine will be overloaded if it is filled up to the top edge of the side panels.

- Charge the cargo space by means of wheeled or telescopic loaders, mobile cranes or tractors equipped with a front loader.
- Do not fill in any material interspersed with baler twines or wrapping material. Baler twines and wrapping material wrap themselves around the spreading beaters and must be manually removed.
- Strawy manure being charged high over the panel may lead to blockages at the hydraulic slurry door thus causing malfunctions during spreading. Reduce the charging height or charge a top layer of heavy manure.

10.2 Spreading mode

DANGER

Risk of electrical shock or burns due to the open hydraulic slurry door accidentally touching electrical overhead lines or approaching high-voltage overhead lines in an inadmissible manner!

Keep sufficient safe distance to high-voltage overhead lines.

WARNING

Risk due to substances or foreign objects (e.g. stones) blown out of the machine if people are present within the hazardous area of the machine!

- Ensure that people keep sufficient safe distance to the hazardous area of the machine:
  - before switching the drive for the transport floor and the spreading discs on,
  - as long as the tractor engine is running.
- Ensure to not endanger people or damage any items when spreading along boundaries in residential areas/along roads. Keep sufficient safe distance or use appropriate devices for spreading along boundaries and/or reduce the drive speed of the spreading discs.

WARNING

Risk due to spreading shovel components being blown out if worn spreading shovels are not replaced in good time!

Check all spreading shovels for visible defects every day before starting/when finishing spreading work. Observe the criteria for the replacement of wearing parts in the chapter "Check/Replace spreading shovels", page 207.

CAUTION

Risk due to damage of machine components if the spreading unit locks and the overload clutch responds!

- Immediately switch the hydraulic drive for the transport floor and the tractor's p.t.o. shaft off if the speed monitor responds. This will prevent damage of the machine.
- Eliminate blockages at the spreading unit.

Set the feed rate for the transport floor such that the spreading material does not pile up at the hydraulic slurry door or the spreading beaters. If the spreading material piles up in front of the spreading beaters, the spreading beaters may clog (block).

- The spreading quantity depends on:
  - the hydraulic slurry door clearance,
  - the feed rate of the transport floor,
  - the travelling speed of the tractor.

Small spreading quantity:	• small hydraulic slurry door clearance, • low feed rate of the transport floor, • high travelling speed of the tractor.
Large spreading quantity:	• large hydraulic slurry door clearance, • high feed rate of the transport floor, • low travelling speed of the tractor.

- Obtain even lengthwise distribution when the machine is almost empty:

  Increase the feed rate of the transport floor and/or reduce the travelling speed of the tractor if a significant drop in the spreading quantity can be noticed when the machine is almost empty.

The spreading shovels mounted on the spreading discs and the wearing plates at the spreading units are wearing parts:

- Spreading material, number of service hours and spreading quantities determine the service life of the spreading shovels and wearing plates.
- The technical condition of the spreading shovels and the wearing plates considerably contributes to even lateral distribution of the spreading material on the field. Worn spreading shovels and wearing plates reduce the throwing range and the distribution accuracy of the spreading material.
- Risk of accident due to worn spreading shovels. Regularly check the spreading shovels. Replace worn parts in good time.

1. Set the spreading shovels (if available) to the required position. Observe the information in the chapter "2-disc wide-angle spreading unit", page 63.
2. Set the sliding door and the spreading slide. Observe the information in the chapter "Sliding door and spreading slide", page 161.
3. Switch the oil circulation between tractor and machine on (set operating element at the control device to "Lift" position; continuous action for constant loads).
4. Switch the tractor's p.t.o. shaft on.
5. Switch the control device or the control set on.
6. Set the required feed rate for the transport floor at the easy-to-use control (if available). Observe the information in the chapter "Adapt setting range of control dial to hydraulic system of tractor with easy-to-use control", page 169.
7. Lift the supporting leg.
8. Lift the hydraulic slurry door to the required hydraulic slurry door clearance. Observe the information in the chapter "Baffle plate/Hydraulic slurry door", page 61.
9. Switch the hydraulic drive for the transport floor on.
10. Start moving when a sufficient quantity of spreading material reaches the spreading beaters.
11. Constantly keep to the provided travelling speed of the tractor during spreading mode.
12. Continually lower the hydraulic slurry door by some scale values as soon as the top spreading beater throws spreading material in the tractor's direction.
13. Switch the hydraulic drive for the transport floor off at the headland. Observe the information in the chapter "Recommendations for switching the transport floor on and off at the headland", page 179.
14. Increase the feed rate for the transport floor and/or reduce the travelling speed of the tractor if a significant drop in the spreading quantity can be noticed when the machine is almost empty.

→ Thus, even lengthwise distribution is achieved when the machine is almost empty.

15. Switch the hydraulic drive for the transport floor off when the machine is empty.
16. Lower the hydraulic slurry door completely.
17. Switch the tractor's p.t.o. shaft off.
18. Lower the hydraulic lift axle completely again (if available).
19. Switch the oil circulation between tractor and machine off.
20. Switch the control device or the control set off.

10.2.1 Measures in case of speed monitor response

If the speed monitor stops the transport floor feed:

- a clogging of the spreading beaters due to inadmissible piling-up of spreading material in front of the spreading beaters may have occurred such that the clutch interrupts the powertrain to the spreading beaters.
- a horn sounds, the red control lamp *Transport floor stop* at the speed monitor set or the control set (optional extra) lights up/is flashing.
- in case of 2-disc wide-angle spreading unit (optinal extra): foreign objects may block the spreading disc(s) such that the cam-type cut-out clutch interrupts the powertrain to the affected spreading disc.
- in case of control set (optional extra): the transport floor may be reversed for a short time (max. 3 seconds) via the operating element **Reverse transport floor**.

  Short reversing of the transport floor often helps to eliminate inadmissible operating states at the spreading unit from the tractor seat.

Measures in case of speed monitor response with direct control

1. Immediately switch the hydraulic drive for the transport floor and the tractor's p.t.o. shaft off.
2. Reverse the transport floor for a short time (max. 3 seconds).
3. If the speed monitor:
   - o does not respond again, the hydraulic drive for the transport floor can be switched on again and the spreading work can be continued.
   - o responds again, the clogging/blockage must be manually eliminated.

Measures in case of speed monitor response with control set

1. Immediately switch the hydraulic drive for the transport floor and the tractor's p.t.o. shaft off.
2. Actuate the operating element **Reverse transport floor** for a short time (max. 3 seconds) and let the transport floor reverse.
3. Switch the tractor's p.t.o. shaft on. Let the tractor's p.t.o. shaft smoothly start to run such that the spreading beaters are able to loosen themselves.
4. If the speed monitor:
   - o does not respond again, the hydraulic drive for the transport floor can be switched on again and the spreading work can be continued.
   - o responds again, the clogging/blockage must be manually eliminated.

10.2.2 Eliminate clogging/blockages manually

1. Open the stop-cock of the spreading unit bonnet.
2. Open the spreading unit bonnet.
3. Secure the spreading unit bonnet against accidental lowering. Observe the information in the chapter "Spreading unit bonnet", page 65.
4. Eliminate the clogging/blockages..
5. Open the stop-cock of the spreading unit bonnet.
6. Close the spreading unit bonnet.
7. Secure the spreading unit bonnet against accidental opening.
8. Continue spreading work.

10.3 Recommendations for driving during spreading mode

- The settings specified in the different tables are only recommendations, because the spreading properties of the various spreading materials may considerably vary and require other settings.
- The specified setting recommendations for an even lateral distribution (operating width) exclusively refer to the weight distribution and do not refer to the nutrient distribution.
- We expressly point out that the manufacturer will not assume any liability for damage resulting from spreading mistakes.

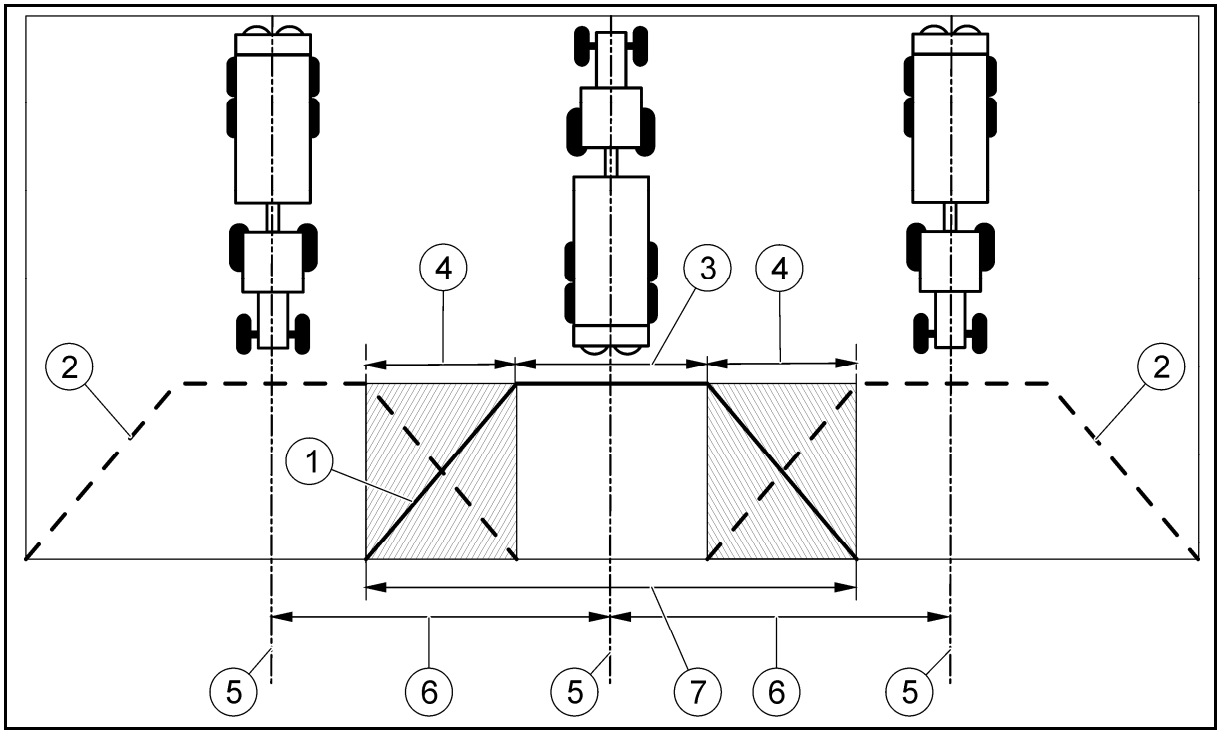


Fig. 107

Schematic lateral distribution of the machine

(1) Spreading pattern, single run

(2) Spreading pattern, subsequent run

(3) Area without overlapping

(4) Area with overlapping of adjoining spreading patterns

(5) Tracks

(6) Operating width = Distance between two adjoining tracks

(7) Throwing range = Distance between the left-hand and the right-hand end of the lateral distribution

The 4-beater spreading unit

- distributes the spreading materials at throwing ranges between 6-8 m,
- produces a homogeneous spreading pattern during single run.

The 2-disc wide-angle spreading unit (optional extra):

- distributes the spreading materials at throwing ranges between 10-20 m,
- produces a spreading pattern strongly diminishing to the outside during single run.

The distance between the tracks (operating width) must be chosen such that adjoining spreading patterns overlap, in order to ensure an even lateral distribution of the spreading material. Due to the different spreading properties of the various spreading materials, operating widths between 6-8 m or 10-20 m respectively can be achieved.

10.3.1 Recommendations for switching the transport floor on and off at the headland

The machine is equipped with a wide-angle propeller shaft. Therefore, it is not necessary to switch the p.t.o. shaft off during turning. Switching the hydraulic drive for the transport floor off is enough.

Ensure that the tractor wheels do not come into contact with the machine's drawbar during turning.

Proper setting-up of tracks is a precondition for accurate work along field boundaries or edges. When using the limiting spreading device, the first track (F1) is usually set up at half the track distance to the edge of the field. A similar track is set up in the same manner at the headland. Two other tracks (dashed line) at the headland are very useful to serve as a reference – at full operating width distance.

Always distribute the spreading material onto the area on the field first and finish by spreading onto the area at the headland.

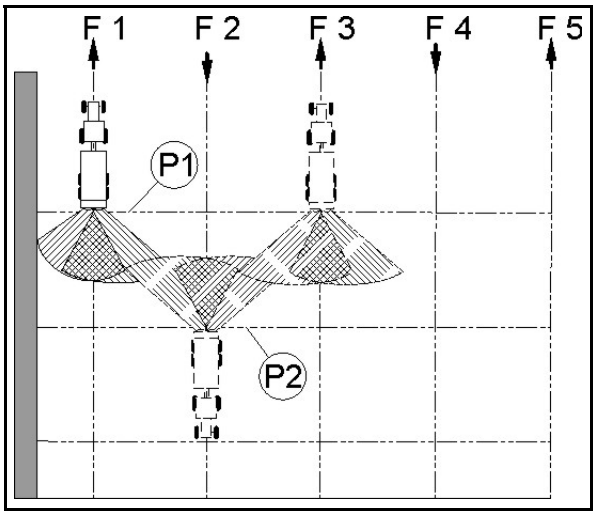


Fig. 108

As the spreading discs discharge the spreading material also to the rear, it is imperative to observe the following for accurate distribution at the headland:

- Switch the hydraulic drive for the transport floor on or off when travelling to (tracks F1, F3 etc.) and fro (tracks F2, F4 etc.) at different distances to the field edge.
- Switch on the hydraulic drive for the transport floor approximately at point P1 during travels towards the field when the tractor passes the third track at the headland (dashed line).
- Switch off the hydraulic drive for the transport floor during travels towards the headland approximately at point P2 when the spreading unit is close to the second track at the headland.

10.3.2 Recommendations to achieve even lengthwise distribution

In order to achieve the best possible lengthwise distribution of the spreading material, ensure to overlap usually large lengths when beginning to distribute the next load. In case of manure, the required overlapping increases with growing spreading quantity. Manually increase the feed rate of the transport floor and/or reduce the travelling speed if a significant drop in the spreading quantity can be noticed when the machine is almost empty. This will ensure consistent spreading quantity.

10.4 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 machine against rolling

Secure the machine against rolling:

- on even ground by means of the parking brake or the chocks,
- on extremely uneven ground or downhill gradients by means of the parking brake and the chocks.

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.

11 Transport journeys

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

Observe the information in the chapter "Basic safety instructions", page 38.

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 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.

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

1. Lower the lift axle (if available) completely.

   Only with the lift axle completely lowered is the ALB regulator able to properly control the required braking force.
2. Lock the follow-up steering axle (if available) when travelling at a speed of more than 40 km/h.
3. Switch the oil circulation between tractor and machine off.
4. Secure used control devices on the tractor against accidental actuation.
5. Activate the **Road travel mode** on your control set (if available).
6. Start your transport journey.

11.1 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.

12 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 34,
  - "Qualification of staff", page 35,
  - "Basic safety instructions", page 38,
  - "Warning and instructions signs", page 48.
- 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 supply 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.

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up and being drawn in to people due to unprotected, powered driving elements!

- Close or mount protective devices which have been opened or removed for carrying out service and maintenance work on the machine before powering the machine.
- Immediately replace defective protective devices.

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. Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling", page 181.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

WARNING

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

As a basic principle, the following is not allowed:

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

WARNING

Risk of crushing and impact to people due to accidental lowering of the open spreading unit bonnet.

Secure the open spreading unit bonnet against accidental lowering by means of the stop-cock before entering the hazardous area beneath the open spreading unit bonnet.

12.1 Service and maintenance plan - Overview

- Carry out the maintenance intervals according to the time limit reached first.
- The time intervals, service hours and maintenance intervals specified in the included sub-supplier documentation shall prevail.

Before first startup

Check:

- the wheel nuts for tightness, retighten if necessary.
- all screwed connections for:
  - drawbar,
  - chassis,
  - spreading unit,
  - 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.

After first startup

- FAD chassis:
  - Check spring clamps for tightness, retighten alternately and in several steps if necessary.
  - Check spring bearing bolts for tightness, retighten alternately and in several steps if necessary.
  - Check axle bolts for tightness, retighten alternately and in several steps if necessary.
- BPW chassis:
  - Check spring clamps for tightness, retighten alternately and in several steps if necessary.
  - Check bushings of spring bolts for tightness, retighten screwed connection if necessary.

Daily

Check:

- the machine for visible defects:
  - strippers at the spreading beaters,
  - spreading tines,
  - spreading unit gearbox,
  - lubrication lines,
  - spreading shovels,
  - universal joints.

  Immediately remedy or have remedied visible defects.
- 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 transport floor:
  - check tension of the transport floor chains, shorten chain if necessary,
  - check screwed connection of transport floor strips, retighten if necessary.

Remove baler twines from the spreading beaters.

Drain the compressed-air reservoir of the compressed-air brake system via the drain valve.

After 50 service hours

- All daily maintenance work and the additional work specified below.
- Chassis:
  - Check brake lever setting, readjust if necessary (shop work),
  - lubricate bearing of brake camshafts,
  - check tyre pressure, readjust if necessary,
  - check wheel nuts for tightness, retighten if necessary,
  - readjust float of wheel hub bearing:
    Remove cap and split-pin,
    screw on hub axle nut until run of hub slightly stops,
    unscrew hub axle nut again up to the next split-pin hole,
    secure hub axle nut against accidental loosening by means of a split-pin and check run.
- Spreading unit:
  - Readjust strippers at spreading beater, replace if necessary,
  - check spreading tines, replace if necessary,
  - check spreading beater bearing for clearance,
  - check connection bushing at gearbox,
  - check rubber in the bonnet,
  - check rubber at 2-disc spreading unit.
- Hydraulic system:
  - Check hydraulic hose pipes for visible defects, remedy defects if necessary,
  - retighten screwed connections of hydraulic system.

Change the gear lubricant oils.

After 250 service hours

- All maintenance work after 50 service hours and the additional work specified below.
- Axles:
  - Check wheel nuts for tightness, retighten if necessary,
  - lubricate brake camshaft bearing (not applicable to nylon bushings),
  - check brake lever setting, readjust if necessary,
  - check brake linings, replace if necessary.
- FAD chassis:
  - Check spring clamps for tightness, retighten alternately and in several steps if necessary,
  - check spring bearing bolts for tightness, retighten alternately and in several steps if necessary,
  - check axle bolts for tightness, retighten alternately and in several steps if necessary.
- BPW chassis:
  - Lubricate dash pot,
  - check all parts for visible defects,
  - check spring clamps for tightness, retighten alternately and in several steps if necessary.
- 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,
  - tightening torque of rubber buffers M20: max. 70 Nm, free of clearance.
- Check thickness of scraper floor strips on the platform, replace if necessary:
  - Minimum thickness: 2 mm
- Check:
  - all bearings,
  - the screwed connections of the spreading discs and the spreading shovels, retighten if necessary,
  - the oil level of all gearboxes, top up if necessary,
  - all cables for visible defects, replace if necessary.

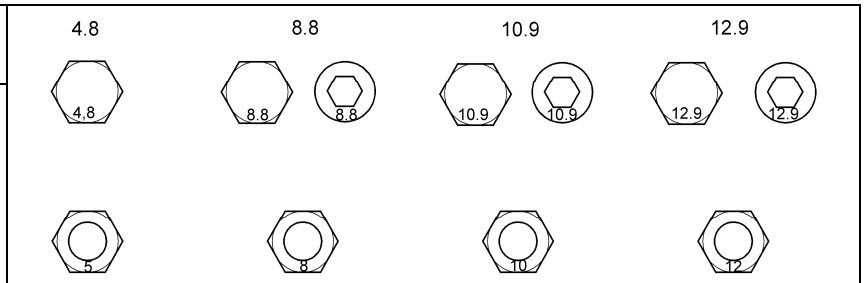
After 500 service hours or once a year

Carry out the work at least every 500 service hours or once a year, depending on which change time limit is reached first.

- All maintenance work after 250 service hours and the additional work specified below.
- 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 oils. Observe the information in the chapter "Quantities when filled and change intervals", page 195.
- Lubricate the chain tensioner screws of the scraper floor. Observe the information in the chapter "Lubricate chain tensioners and deflection points of transport floor", page 203.
- Axles:
  - Check brake linings, replace if necessary,
  - lubricate wheel hub bearing by means of rolling bearing grease,
  - readjust float of wheel hub bearing:
    Remove cap and split-pin,
    screw on hub axle nut until run of hub slightly stops,
    unscrew hub axle nut again up to the next split-pin hole,
    secure hub axle nut against accidental loosening by means of a split-pin and check run.
- FAD chassis:
  - Check rubber pad and central bolt for wear, have replaced if necessary,
  - check bushings of axle bolts for wear, have replaced if necessary.
- BPW chassis:
  - Check dash pots for tightness, seal if necessary,
  - check fastening device of dash pots for tight fit and wear, retighten or have replaced if necessary,
  - check bushings of spring bolts for tightness, retighten screwed connection if necessary.
- Have the hydraulic hose pipes checked for their operational safety by an expert.

12.2 Tightening torques

12.2.1 Tightening torques for metric screws

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.

The tightening torques listed in the above table are reference values. They apply provided that these operating instructions do not specify other tightening torques for certain screws or nuts.

- Regularly check screws and nuts for tightness.
- Shear bolts are designed such that they shear off at a certain stress. Only use bolts of equal grade when replacing shear bolts.
- When replacing screws and nuts, make sure to use respective parts of equal or higher grade.
- Tighten screws and nuts of higher grade at the same torque as those originally used.
- Ensure that the threads are clean and the screws have been properly fitted before tightening the screwed connections, thus preventing damage during tightening.
- Tighten counter nuts (not the screws) 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.

12.2.2 Tightening torques of wheel nuts

	ADR	FAD	BPW black	BPW galvanized
M18 x 1.5 Spherical collar nut	270 Nm	330 Nm	--	--
M20 x 1.5 Flat collar nut with spring washer	350 Nm	360 Nm	380 Nm	420 Nm
M22 x 1.5 Spherical collar nut	--	630 Nm	--	--
M22 x 1.5 Flat collar nut with spring washer	450 Nm	460 Nm	460 Nm	505 Nm

12.3 Enter cargo space

WARNING

Risk of becoming entangled, wound up and risk of shearing due to the transport floor accidentally starting!

Only enter the cargo space with the machine switched off and the transport floor secured against accidental starting.

Entering the cargo space may be necessary for carrying out service and maintenance work. Use the ladder (1), the handrail (2) and the inner ladder rung (3) to safely enter and exit the cargo space.

Fig. 109

12.4 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.

If it is necessary for carrying out cleaning work to turn over the spreading beaters, this must be done manually!

Cleaning by means of pressure washer/steam blaster

Absolutely 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 direct the cleaning nozzle jet at machine parts at right angles.
- Never aim the cleaning nozzle jet of the pressure washer/steam blaster:
  - at lubrication points and bearings,
  - at hydraulic components.
- Do not clean electrical components such as control set, weighing rods, distributor boxes, weighing computer etc.
- Do not clean chromium-plated components.
- Do not use any chemical additives.

12.5 Lubrication of machine

- Lubricate all bearings and lubrication points according to the lubrication plan.
- Remove dirt from the lubricating nipples.
- Use environmentally friendly, biodegradable oils and greases where lubricants may penetrate the fodder or the ground. For further information, contact your specialist for agricultural machinery.
- Beware not to exceed a lubricating pressure of 250 bar, when using high-pressure grease guns for lubricating. Damage to bearings, seals etc. may occur if the grease gun used is not equipped with a protective device.

12.5.1 Lubrication plan

Observe the included sub-supplier documentation for lubrication of the propeller shaft(s)!

The points to be lubricated are high-lighted by means of detailed, enlarged views and location details in the lubrication plan. In the detailed and enlarged views, the lubrication points are identified by means of arrows (1). The lubrication intervals (2) and the total number of lubrication points (3) are specified in the legend of each view.

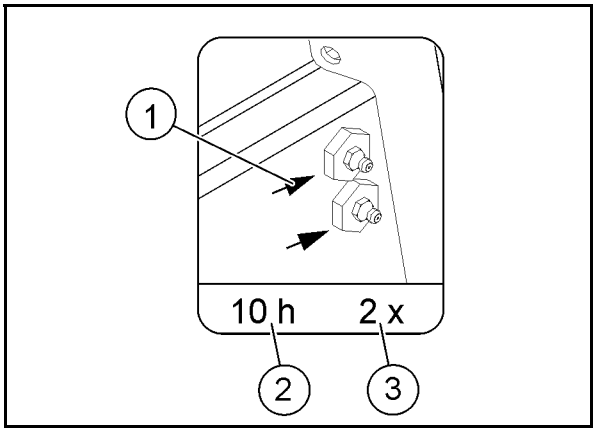


Fig. 110

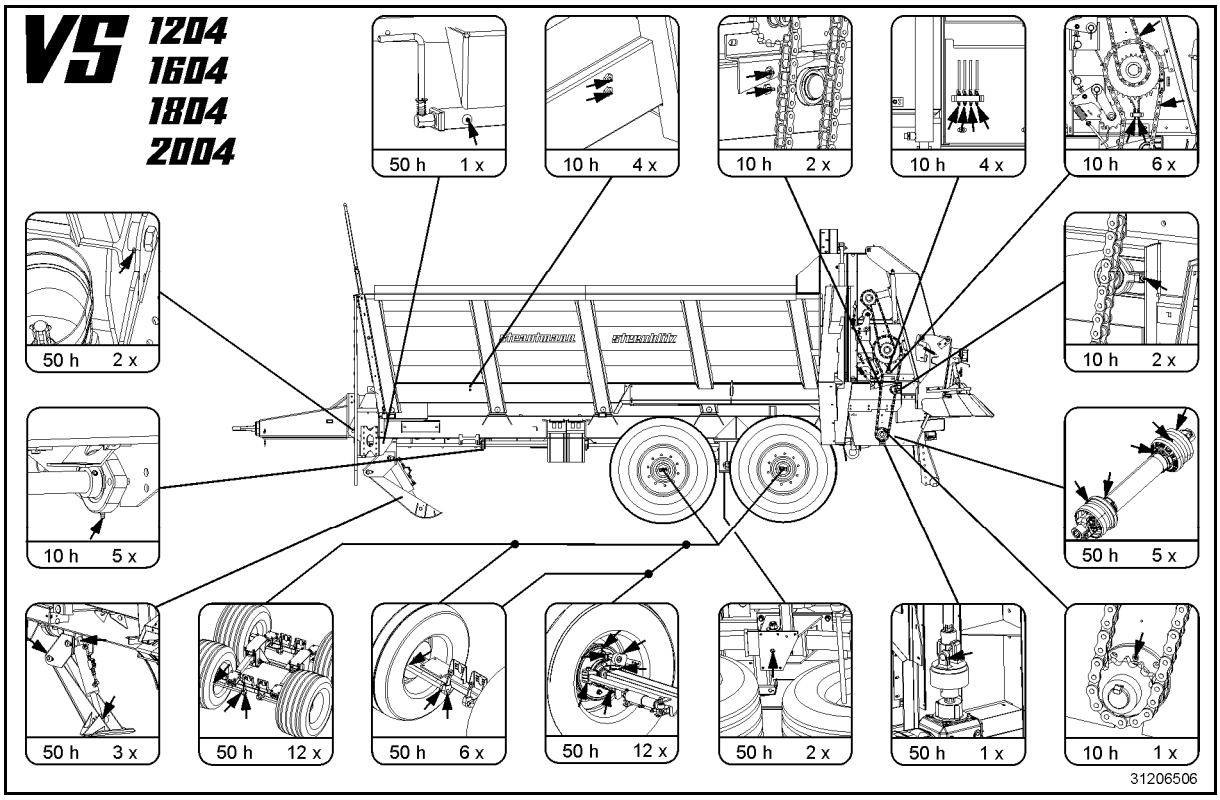

VS 1204
1604
1804
2004
50 h 1 x
10 h 4 x
10 h 2 x
10 h 4 x
10 h 6 x
50 h 2 x
10 h 2 x
10 h 5 x
50 h 5 x
50 h 3 x
50 h 12 x
50 h 6 x
50 h 12 x
50 h 2 x
50 h 1 x
10 h 1 x
31206506

Fig. 111

12.6 Preservation/Longer downtimes

Preparing the machine for longer downtimes shall include:

- thorough cleaning of machine,
- lubrication and greasing of machine,
- touching up of paintwork.

12.7 Check/top up/change gear lubricant oil

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.

The gearboxes require:

- regular check/topping-up of oil level,
- change of gear lubricant oil,
- the first oil change after 50 service hours.

12.7.1 Quantities when filled and change intervals

Change the lubricant:

- for the first time after 50 service hours,
- then every 500 or 2000 service hours,
- at least once a year (depending on which change interval limit occurs first).

Required gear lubricant oil:

- EP80W-90 SAE or VG 150-200 (ISO 3448)

Unit	Gearbox	Lubricant	Quantity when filled [l]	Interval
Transport floor (VS 1204-1804)	Feed gearing	EP80W-90 SAE	3.5	2000 h
Transport floor (VS 2004)	Feed gearing	EP80W-90 SAE	4.3	2000 h
2-disc spreading unit	Main transfer gearbox	EP80W-90 SAE	2.3	500 h or once a year
	Central gearbox	EP80W-90 SAE	1.4	
	Plate-type gearbox	EP80W-90 SAE	1.2	
2-beater spreading unit	Main transfer gearbox	EP80W-90 SAE	1.2	
4-beater spreading unit	Main transfer gearbox	EP80W-90 SAE	2.2	
	Spreading beater gearbox, inner	EP80W-90 SAE	1.6	
	Spreading beater gearbox, outer	EP80W-90 SAE	1.6	

12.7.2 Feed gearing of transport floor

(1) Oil filling screw with dipstick
(2) Oil drain plug

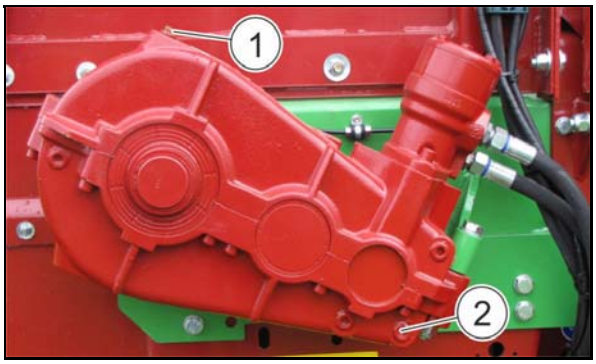


Fig. 112

12.7.3 Main transfer gearbox of 2-disc wide-angle spreading unit

(1) Oil filling screw
(2) Oil inspection plug
(3) Oil drain plug

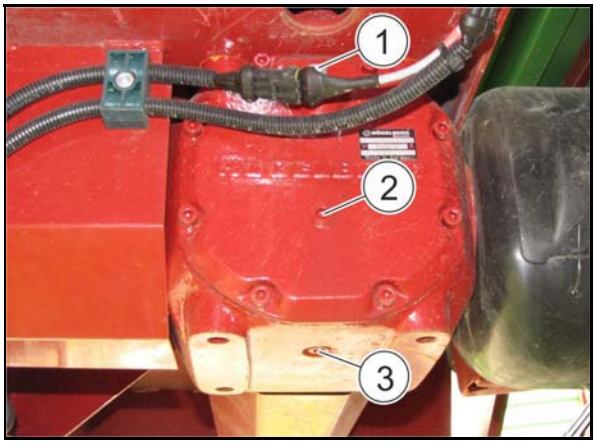


Fig. 113

12.7.4 Central gearbox of 2-disc spreading unit

(1) Oil filling screw
(2) Oil inspection plug
(3) Oil drain plug

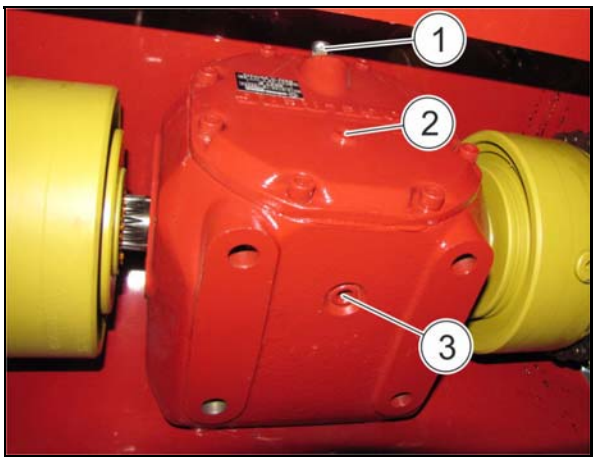


Fig. 114

12.7.5 Plate-type gearbox of 2-disc spreading unit

(1) Oil filling screw
(2) Oil inspection plug
(3) Oil drain plug

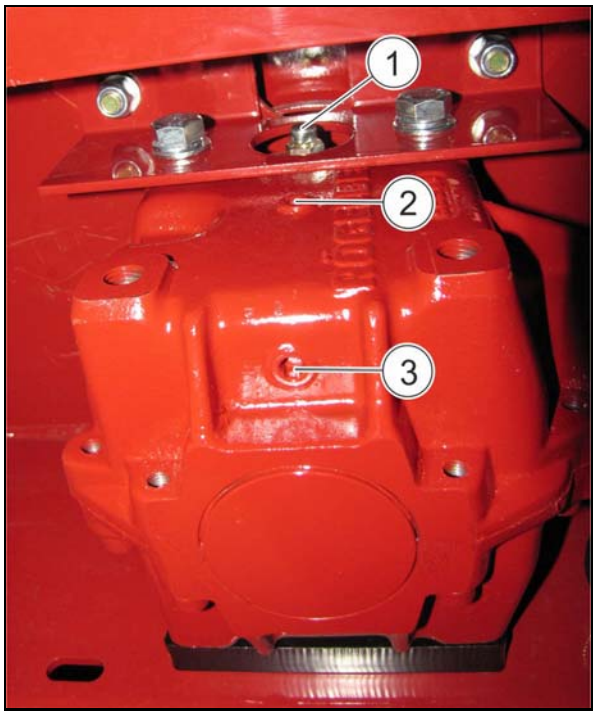


Fig. 115

12.7.6 Chain gear of 2-beater spreading unit

(1) Automatic chain lubricators (optional extra)

Fig. 116

12.7.7 Main transfer gearbox of 4-beater spreading unit

(1) Oil filling screw
(2) Oil drain plug
(3) Oil inspection plug

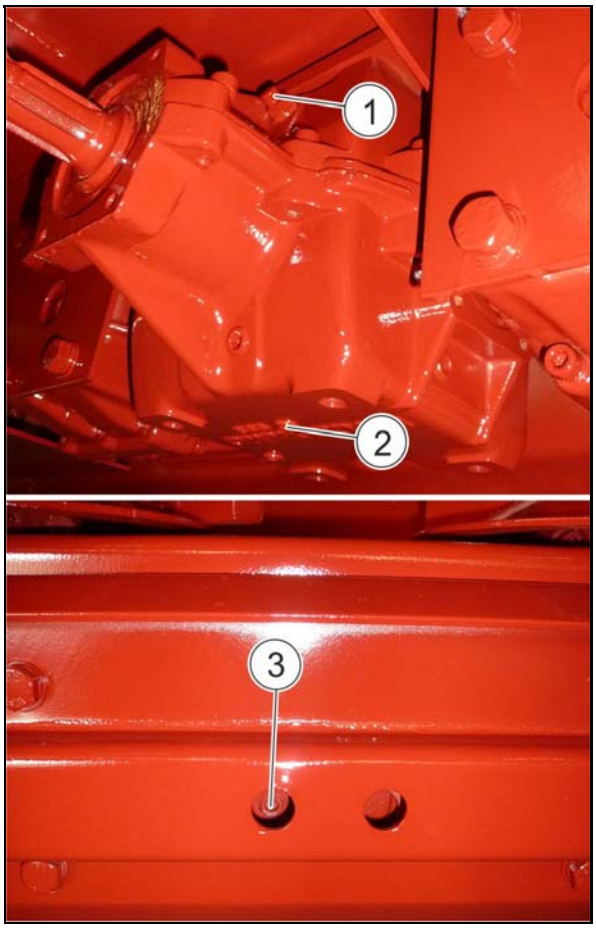


Fig. 117

12.7.8 4-beater spreading unit gearbox, inner

(1) Oil filling screw, oil inspection plug
(2) Oil drain plug

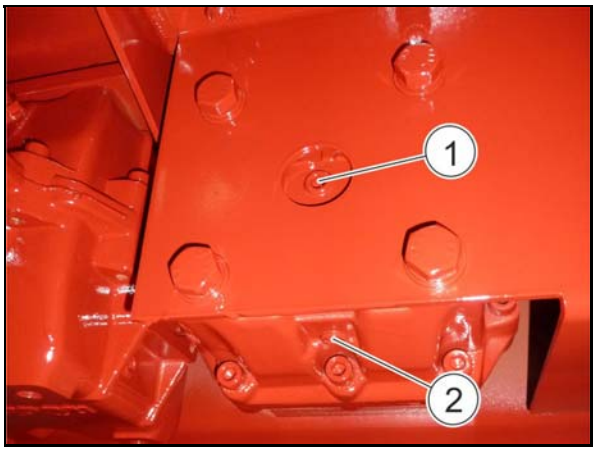


Fig. 118

12.7.9 4-beater spreading unit gearbox, outer

(1) Oil filling screw, oil inspection plug

(2) Oil drain plug

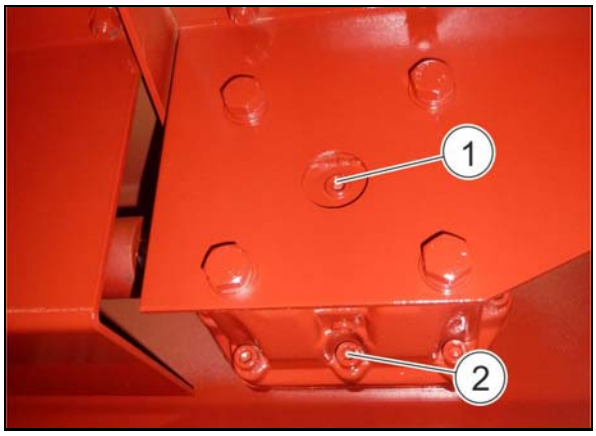


Fig. 119

12.7.10 Check/Top up oil level

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.

12.7.11 Change gear lubricant oil

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.

12.8 Transport floor

WARNING

Risk of becoming entangled, wound up and risk of shearing due to the transport floor accidentally starting!

Only enter the cargo space with the machine switched off and the transport floor secured against accidental starting.

The chains of the transport floor:

- must be equally retightened by means of the automatic chain tensioners if the set initial tension is no longer sufficient for tightening the chains properly.
- must be equally shortened if the tension path of the chain tensioners is no longer sufficient for retightening the chains.

The chains of the transport floor:

- are automatically pre-tightened,
- must be tightened equally, but not too firmly,
- are only allowed to sag slightly.

12.8.1 Retighten chains of transport floor

The four chain tensioners (1) are mounted at the front of the machine.

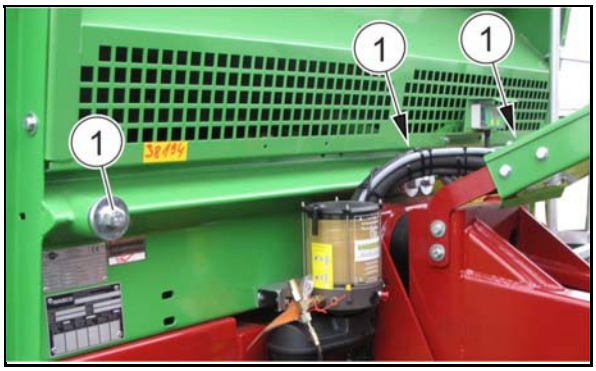


Fig. 120

The chains of the transport floor are properly tightened if the minimum distance between the spacer tube (3) and the thrust plate (4) is 3 mm and the maximum distance is 10 mm.

The chains of the transport floor must be retightened if the distance between the spacer tube (3) and the thrust plate (4) is more than 10 mm to prevent considerable material damage at the transport floor.

Adjust distance:

1. Equally tighten the clamping screws (2) at all chain tensioners.

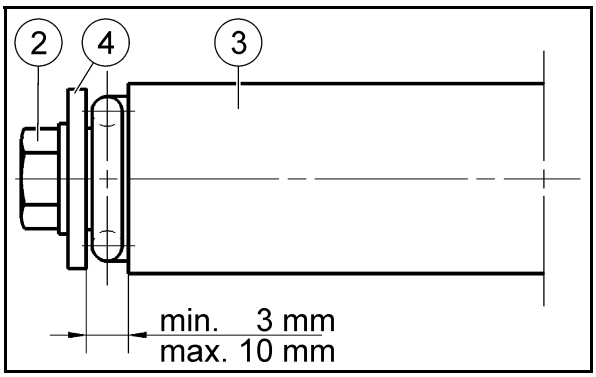


Fig. 121

12.8.2 Shorten transport floor chain

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.

Equally shorten the chains of the transport floor if the tension path of the chain tensioners is no longer sufficient to retighten the chains.

The tension path of the chain tensioners is not sufficient to retighten the chains if the distance X between the chain tensioner (1) and the front panel (2) is less than 10 mm.

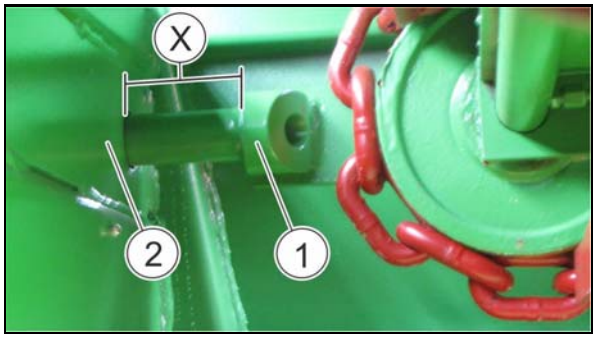


Fig. 122

1. Align the chains of the transport floor such that the chain connecting links are within the central and rear area of the cargo space.
2. Unscrew the 4 clamping screws (1).

→ The chain tension is released and the chains sag.

3. Use the ladder to enter the cargo space and shorten the chains.
4. Open and remove the chain connecting links.
5. Always cut out an even number of chain links (2, 4, 6) at all chains by means of a right-angle grinder.
6. Put the shortened chains together by means of new chain connecting links.
7. Tighten the chains.

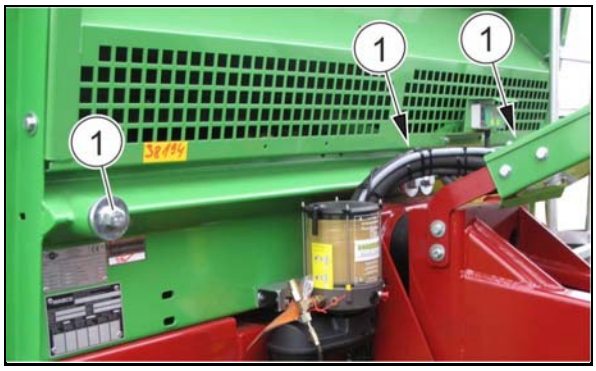


Fig. 123

12.8.3 Lubricate chain tensioners and deflection points of transport floor

1. Lubricate the chain tensioner screws (1):
   1.1 Unscrew the screw.
   1.2 Clean the screw.
   1.3 Lubricate the screw.
   1.4 Insert the screw.

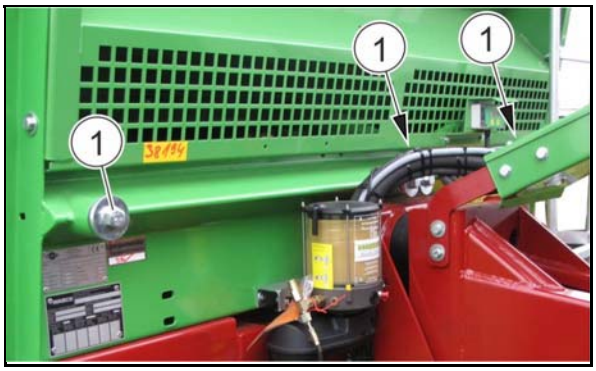


Fig. 124

2. Lubricate the following deflection points of the transport floor chain by means of the respective lubricating nipples:
   - front deflection points (2) on both sides

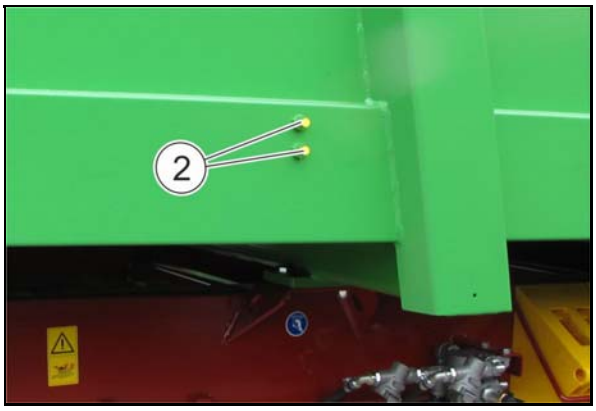


Fig. 125

   - central deflection points (3)
   - rear deflection points (4) on both sides

Fig. 126

12.9 Beater spreading unit

12.9.1 Remove baler twines from spreading beaters

Remove the baler twines from the spreading beaters every day.

1. Open the stop-cock of the spreading unit bonnet. Observe the information in the chapter "Spreading unit bonnet", page 65.
2. Open the spreading unit bonnet (1).
3. Secure tractor and machine against accidental starting and rolling.
4. Secure the spreading unit bonnet against accidental lowering. Observe the information in the chapter "Spreading unit bonnet", page 65.
5. Remove the baler twines from the spreading beaters (2).
6. Open the stop-cock of the spreading unit bonnet.
7. Close the spreading unit bonnet.
8. Secure the spreading unit bonnet against accidental opening. Observe the information in the chapter "Spreading unit bonnet", page 65.

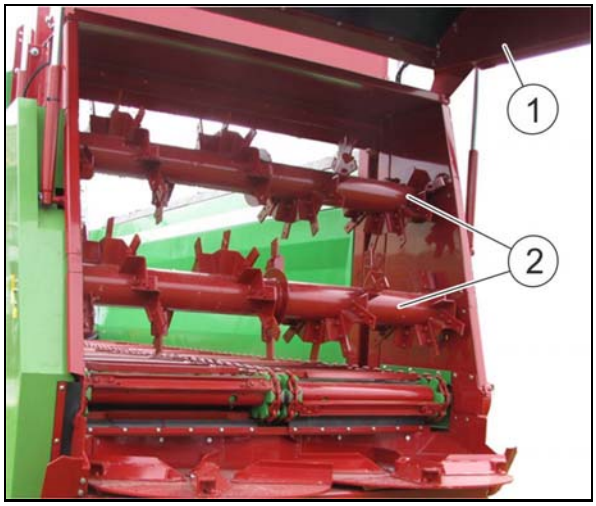


Fig. 127

12.9.2 Turn over/Replace spreading tines

Shop work

WARNING

Risk due to objects (screws, spreading tines) blown out of the machine if screwed connections accidentally loosen!

- It is imperative to replace the used self-locking nuts of the screwed connections by unused self-locking nuts when turning over or replacing the spreading tines. A used self-locking nut lacks the clamping force required for properly securing a screwed connection.
- Observe the information in the chapter "Tightening torques", page 189.

WARNING

Risk of slipping, stumbling or falling when climbing on inappropriate machine parts for replacing or turning over the spreading tines!

Absolutely use a mobile service platform with ladder for turning over or replacing the spreading tines.

Turn over or replace the spreading tines when they reach the following wear limits at the latest.

The boreholes of the spreading tines are arranged symmetrically. Thus, the spreading tines can be turned over once in case of wear.

Fig. 128 shows the wear limits of the spreading tines.

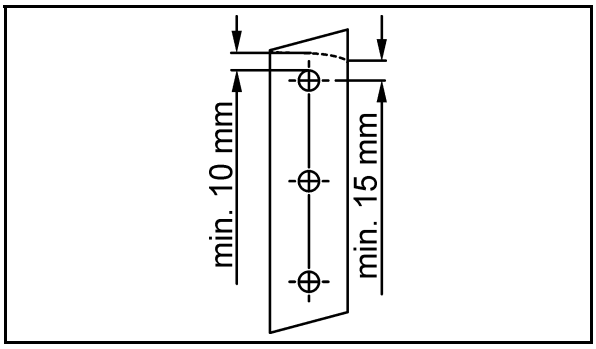


Fig. 128

1. Open the stop-cock of the spreading unit bonnet. Observe the information in the chapter "Spreading unit bonnet", page 65.
2. Open the spreading unit bonnet.
3. Secure tractor and machine against accidental starting and rolling.
4. Secure the spreading unit bonnet against accidental lowering. Observe the information in the chapter "Spreading unit bonnet", page 65.
5. Unscrew and remove the screwed connections (1) of the spreading tines (2).
6. Replace the spreading tines.
7. Replace the used self-locking nuts with unused self-locking nuts.
8. Tighten the screwed connections. Observe the information in the chapter "Tightening torques", page 189.
9. Open the stop-cock of the spreading unit bonnet.
10. Close the spreading unit bonnet.
11. Secure the spreading unit bonnet against accidental opening. Observe the information in the chapter "Spreading unit bonnet", page 65.

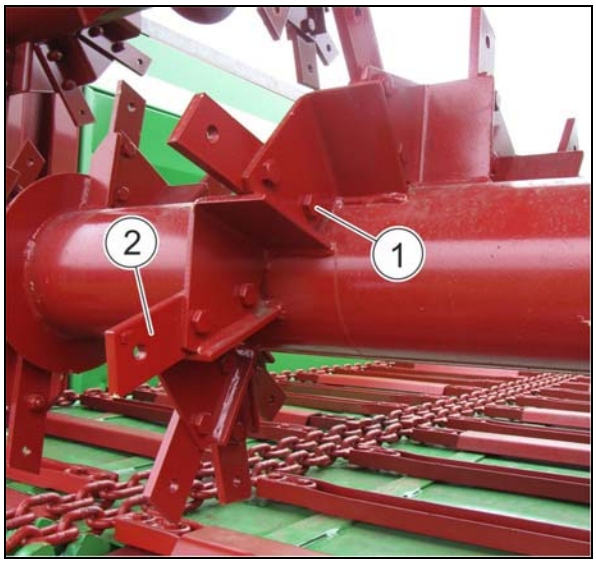


Fig. 129

12.10 2-disc spreading unit

12.10.1 Check/Replace spreading shovels

- Worn spreading shovels reduce the throwing range and the distribution accuracy.
- The spreading shovels are made of particularly wear-resistant steel. However, the spreading shovels are wearing parts.

- Replace the spreading shovels as soon as you detect noticeable signs of wear.
- Always replace all 8 spreading shovels at the same time.
- Ensure proper mounting of spreading shovels. The open side (2) of the slightly U-shaped spreading shovel is pointing in the direction of rotation.

1. Open the stop-cock of the spreading unit bonnet. Observe the information in the chapter "Spreading unit bonnet", page 65.
2. Open the spreading unit bonnet.
3. Secure tractor and machine against accidental starting and rolling.
4. Secure the spreading unit bonnet against accidental lowering. Observe the information in the chapter "Spreading unit bonnet", page 65.
5. Unscrew and remove the screwed connections of the spreading shovels (1).
6. Replace the spreading shovels.
7. Tighten the screwed connections. Observe the information in the chapter "Tightening torques", page 189.
8. Open the stop-cock of the spreading unit bonnet.
9. Close the spreading unit bonnet.
10. Secure the spreading unit bonnet against accidental opening. Observe the information in the chapter "Spreading unit bonnet", page 65.

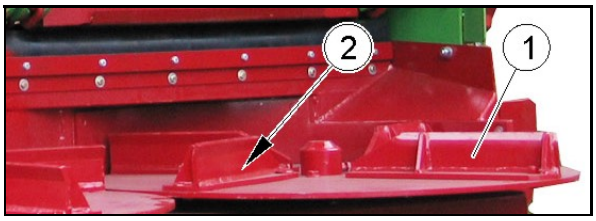


Fig. 130

12.10.2 Replace wearing plates

Replace the wearing plates (1) if:

- the thickness of the wearing plates is less than 5 mm,
- the distance between spreading disc and wearing plate exceeds 23 mm,
- the wearing plate is bent. Adjust the mounting plate if necessary.

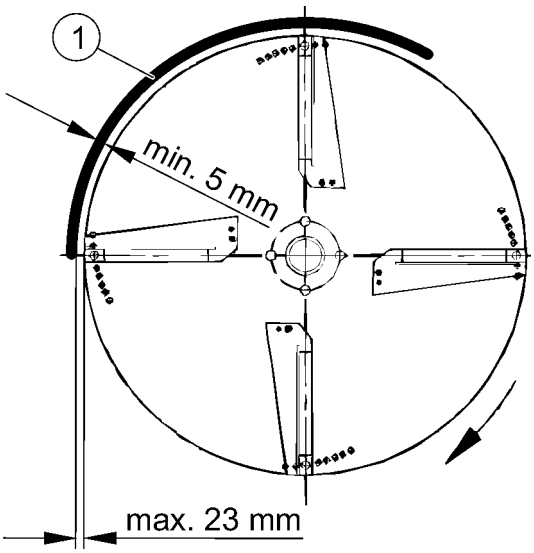


Fig. 131

12.11 Hydraulic system

Observe the information in the chapter "Basic safety instructions", page 38.

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.

12.11.1 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.

12.11.1.1 Depressurize forced steering axle system

1. Open the stop-cocks of the forced steering axle system (1, 2).

   Fig. 132 shows closed stop-cocks.

2. Swivel the valve (4) of the hydraulic hand pump (5) to *Lower* position (6).

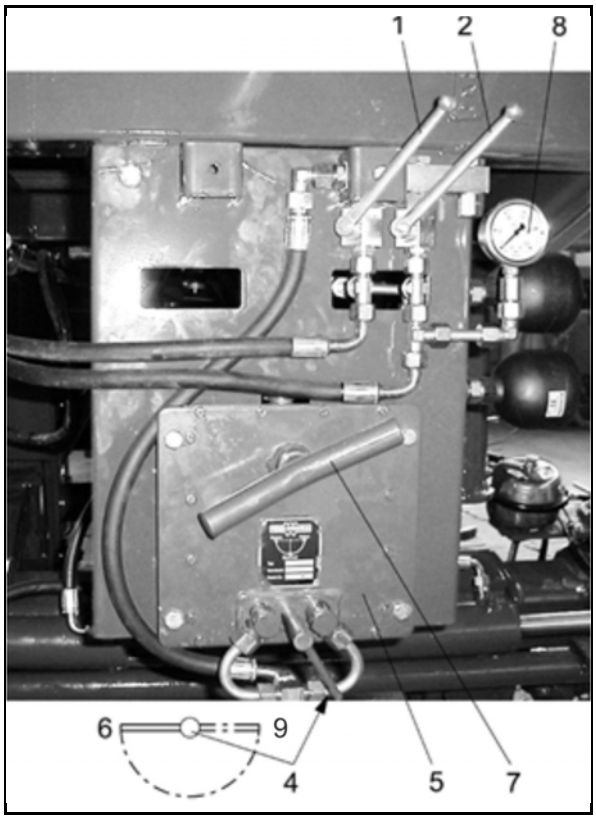


Fig. 132

12.11.2 Hydraulic hose pipes

12.11.2.1 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 (07/10 = year/month = October 2007)

(3) Maximum admissible operating pressure (210 bar)

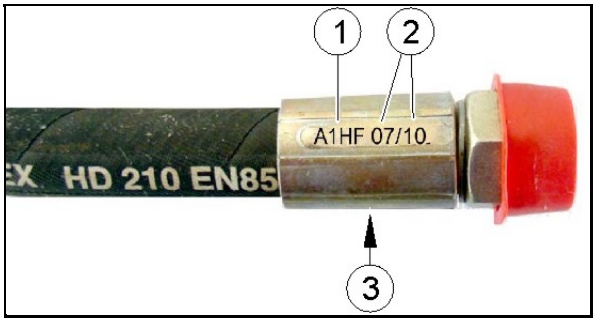


Fig. 133

The period of use of a hydraulic hose pipe expires when the date of manufature (2) of the hydraulic hose pipe is exceeded by more than 6 years.

Example:

Date of manufacture	Period of use expires
07/10 = October 2007	October 2013

After expiration of the period of use, the hydraulic hose pipe must no longer be used.

12.11.2.2 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. Observe the information in the chapter "Marking and period of use of hydraulic hose pipes", page 211.

12.11.3 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.

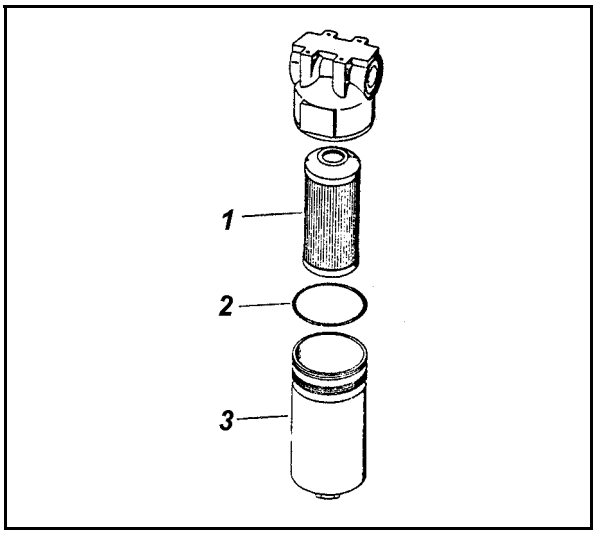


Fig. 134

12.12 Tyres

12.12.1 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.

12.12.2 Change tyres

Observe the information in the chapter "Basic safety instructions", page 38.

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.

Check the distance between underride guard and road after each tyre change! The distance must not exceed 550 mm.

Change the position of the underride guard if the distance is more than 550 mm.

1. Place the lifting device at the marked fixing points.

Fig. 135

2. Keep to the specified order when loosening and tightening the wheel nuts.
3. Tighten wheel nuts at the required tightening torque:
   - o M18 x 1.5 at 270^{+20+0} Nm
   - o M22 x 1.5 at 450^{+60+0} Nm
4. Check the wheel nuts for tightness after 10 service hours. Retighten the wheel nuts if necessary.

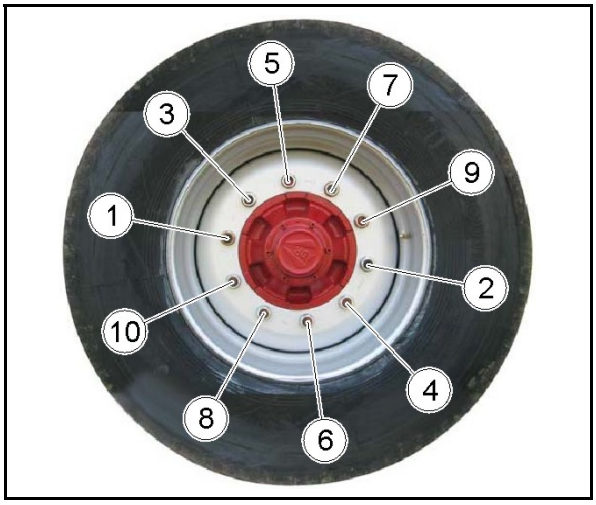


Fig. 136

12.13 Brake system

Only an authorized workshop is allowed to carry out work on the brake system!

12.13.1 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.
- Replace damaged filter elements.

Check degree of soiling

1. Disconnect the feed and brake line from the tractor.
2. Push the base plate in (1).
3. Release the slide (2).
4. Remove the base plate with O-Ring (3), the pressure spring (4) and the filter element (5) from the casing.
5. Check the degree of soiling of the filter element.

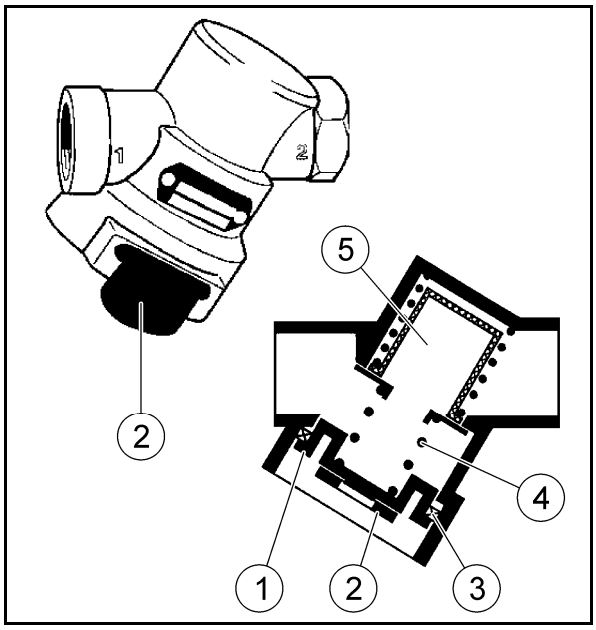


Fig. 137

Clean filter element

6. Clean the filter element with benzine or thinner (rinse).
7. Use compressed air to blow the filter element dry.
8. Reinsert the filter element, the pressure spring and the base plate with O-ring into the casing.

Ensure that the O-ring will not get jammed in the guiding slot during insertion.

9. Close the slide.
10. Connect the feed and brake line to the tractor.
11. Check the in-line filters for tightness.

12.13.2 Set compressed-air brake system

The brake system must be readjusted if the free travel (x) is greater than or equal to 30 mm.

1. Manually actuate the brake lever in pressing direction.
2. 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)
3. 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.
4. Replace the brake linings if necessary.

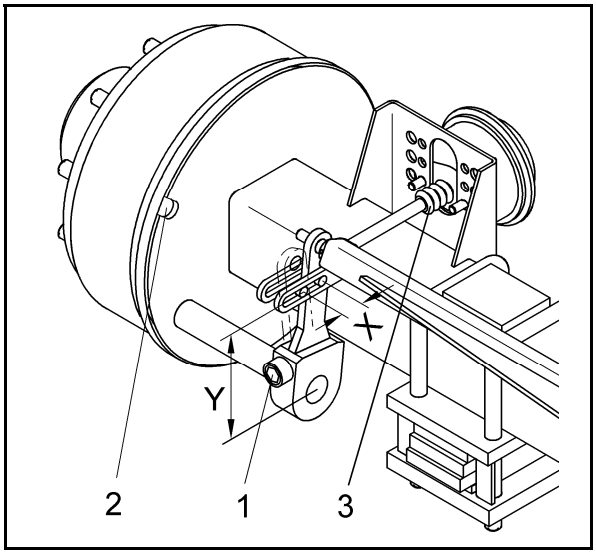


Fig. 138

12.14 Chassis

12.14.1 Maintenance instructions for FAD chassis

(1) Spring fixing
(2) Spring bearing bolt
(3) Rubber pad
(4) Central bolt
(5) Axle bolt

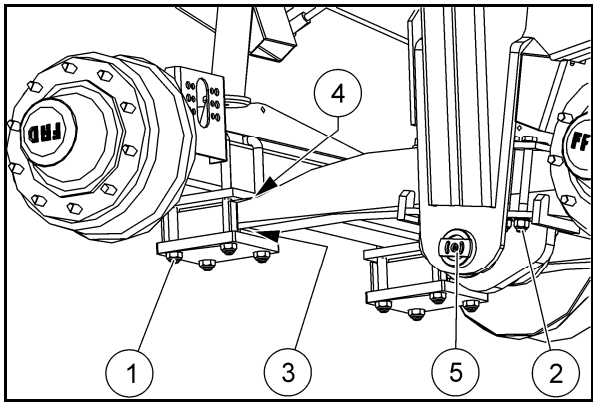


Fig. 139

Spring fixing

Check the spring clamps for tightness after the first journey with loaded material and every 250 service hours!

Observe the fact that welding work on the link spring is not allowed!

1. Check the counter nuts of the spring clamps for tightness.
2. In case of a loosened screwed connection, tighten the nuts alternately and in several steps.

   M24: Torque = 510 Nm (460-560 Nm)

Spring bearing bolts

Check the spring bearing bolts for tightness after the first journey with loaded material and every 250 service hours!

1. Check the counter nuts of the spring bearing bolts for tightness.
2. In case of a loosened screwed connection, tighten the nuts alternately and in several steps.

   M20: Torque = 375 Nm (325-425 Nm)

Rubber pad and central bolt

Check the rubber pad and the central bolt for wear at least every 500 service hours or once a year, depending on which change time limit is reached first!

Axle bolts

Check the axle bolts for tightness after the first journey with loaded material and every 250 service hours!

Check the bushings for wear at least every 500 service hours or once a year, depending on which change time limit is reached first!

Check axle bolts for tightness:

1. Remove the safety bolt.
2. Check the crown nuts of the axle bolts for tightness.
3. Tighten the nuts in case of a loosened screwed connection.

   M30: Torque = 1150 Nm (1000-1300 Nm)
4. Secure the crown nuts by means of the safety bolt.

Check bushings for wear:

1. Remove the axle bolts.
2. Check the bushings for wear.
3. Insert the axle bolts with grease.

12.14.2 Maintenance instructions for BPW chassis

After first startup:

- Check spring clamps for tightness,
- check bushings of spring bolts for tightness.

Every 250 service hours:

- Lubricate dash pots,
- check all parts for visible defects,
- check spring clamps for tightness.

Every 500 service hours or once a year, depending on which change time limit is reached first:

- Check dash pot for tightness,
- check fastening device of dash pots for tightness and wear,
- check bushings of spring bolts for tightness.

(1) Lubrication points of dash pot

1. Grease the lubrication points at the top and bottom of the dash pot on the empty machine until fresh grease is coming out of the bearings.

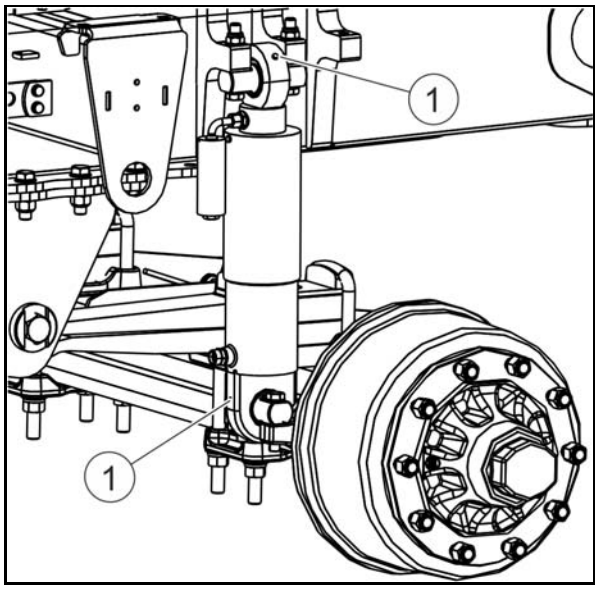


Fig. 140

(2) Fastening device of dash pots

1. Check the fastening device of the dash pots for tightness and wear.

   Before reinserting the screws, provide the screw thread with liquid threadlocker (Loctite 243).

   M16: Torque = 230 Nm (214-253 Nm)

   M18x1.5: Torque = 230 Nm (214-253 Nm)

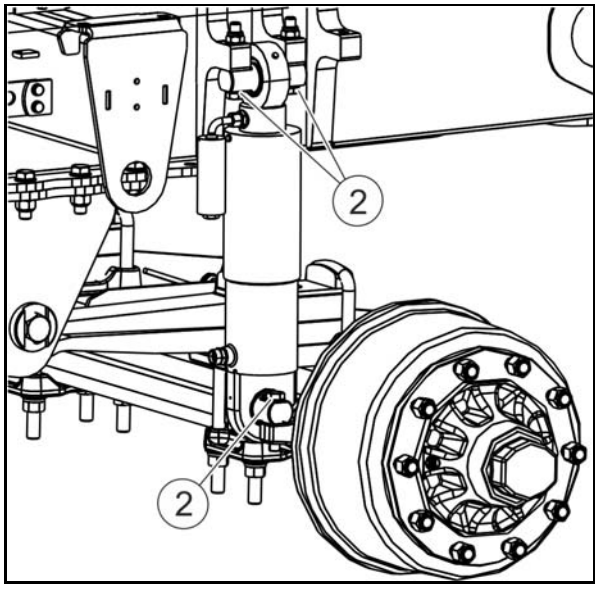


Fig. 141

Type A: Double-sided Seeger circlip

Type B: One-sided Seeger circlip

When mounting the bolt, observe the fact that with type B, the Seeger circlip ø50 must be mounted on the exterior!

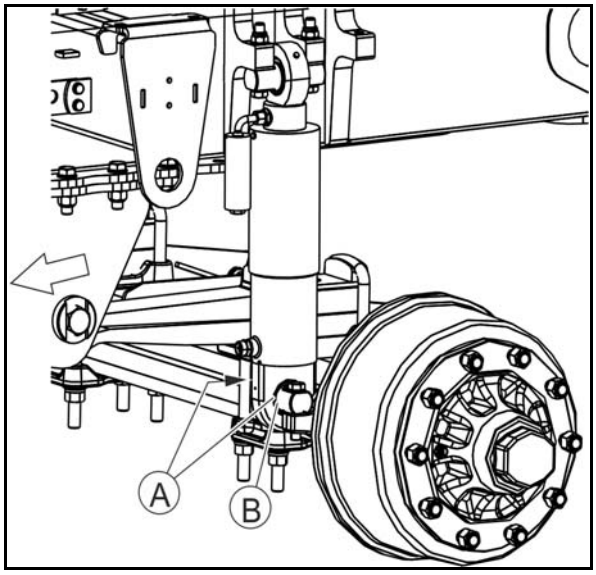


Fig. 142

(3) Spring fixing

1. Check the counter nuts of the spring clamps for tightness.
2. In case of a loosened screwed connection, tighten the nuts alternately and in several steps.

   M24: Torque = 650 Nm (605-715 Nm)

Observe the fact that welding work on the link spring is not allowed!

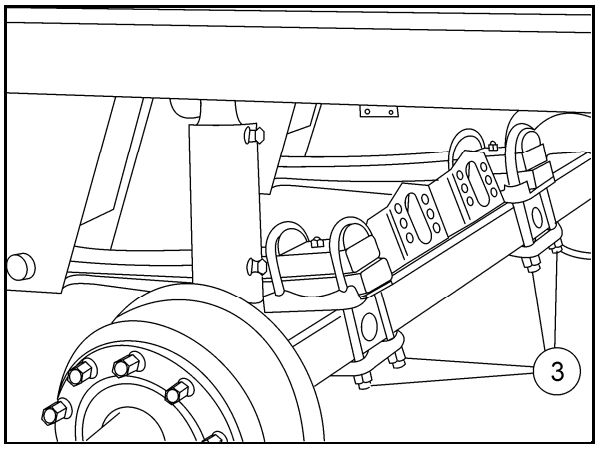


Fig. 143

(4) Spring bolt

Check bushings of spring bolts:

1. Move the machine slightly forward and backwards with the brake system applied or move the spring eyes by means of the mounting lever.

   The spring eye must not show any clearance. In case of loose fixing, the spring bolt may be damaged.
2. Check the lateral wearing washers in the support.
3. Tighten the nuts in case of a loosened screwed connection.

   M30: Torque = 900 Nm (840-990 Nm)

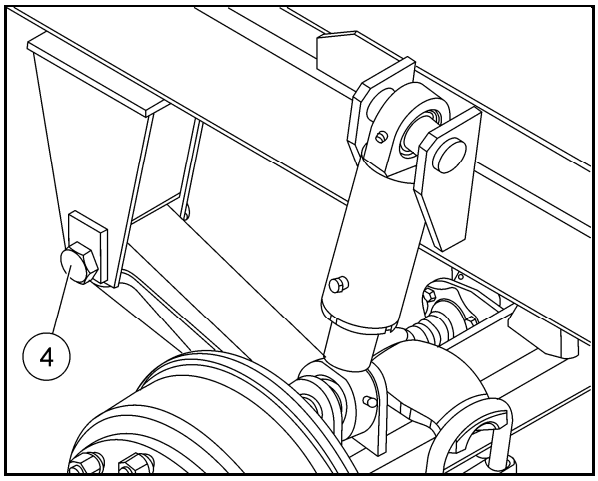


Fig. 144

(1) Spring bolt in antitwist protection groove.

(2) Washer

(3) Loose wearing plates

(4) Lateral wearing washers

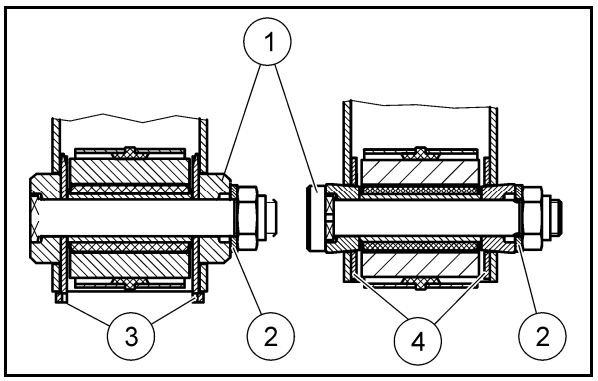


Fig. 145

13 Malfunctions and remedy

13.1 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
All functions extend, but (cylinders)do not retract	No return flow to tractor	Check control device on the tractor
	Worn hydraulic plug	Replace hydraulic plug
Transport floor feed does not start	Machine overload	Set control dial for feed rate to 10 for a short time
	Transport floor blocked by foreign objects	Set control dial for feed rate to 10 for a short time
Transport floor feed only works temporarily	Jamming control piston of transport floor valve	Clean control piston and check for smoothness during installation
	Jamming pilot piston of transport floor valve	Clean pilot piston and check for smoothness during installation
Spreading unit bonnet does not open	Closed stop-cock	Open stop-cock
Spreading unit bonnet slowly opens during spreading	Opened stop-cock	Close stop-cock
Control block leaking	Defective O-rings	Replace O-rings
	Loose tie rod	Tighten tie rod at 25-28 Nm
	Leaking srewed plugs	Seal screwed plugs by means of Loctite 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

13.2 Electrics

Malfunction	Cause	Remedy
No function working	No power, 12 V 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
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
	Defective operating element	Replace operating element
Feed function can only temporarily be controlled	Loose contact at solenoid	Remedy loose contact
Feed function cannot be controlled	Cable cross section of feed line too small	Select larger cable cross section
	Mixed-up plus/minus polarity at tractor connection	Connect line properly: Plus to terminal 15/30, minus to terminal 31
	Defective solenoid of a hydraulic valve	Replace solenoid
Feed function does not work	Defective solenoid of feed	Replace solenoid
2 or more functions work simultaneously	Damaged cable	Replace cable
	2 simultaneously energized solenoids	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
Control lamps at the control set do not light up	No 12 V voltage	Provide a voltage of 12 V at the control set
	Defective fuse at the tractor	Replace fuse

Malfunction	Cause	Remedy
Acoustic signal generator/red control lamp (*H2*) of speed monitor do not work	Mixed-up plus/minus polarity at tractor connection	Connect line properly: Plus to terminal 15/30, minus to terminal 31
	rpm sensor not set properly	Set distance between sensor and actuator to 4 mm
	Defective rpm sensor	Replace rpm sensor
Acoustic signal generator and red control lamp (*H2*) of speed monitor always working	Incorrect distance between rpm sensors and solenoids at the spreading beater (1x) or the disc-type spreading unit (2x)	Set distance between sensors and solenoids to 5-8 mm
Control lamp of steering axle/ lift axle does not work	Hydraulic pressure switch not set properly	Set hydraulic pressure switch to switch point 170±5 bar
	Hydraulic cylinder not moved to stop position	Move hydraulic cylinder to stop position

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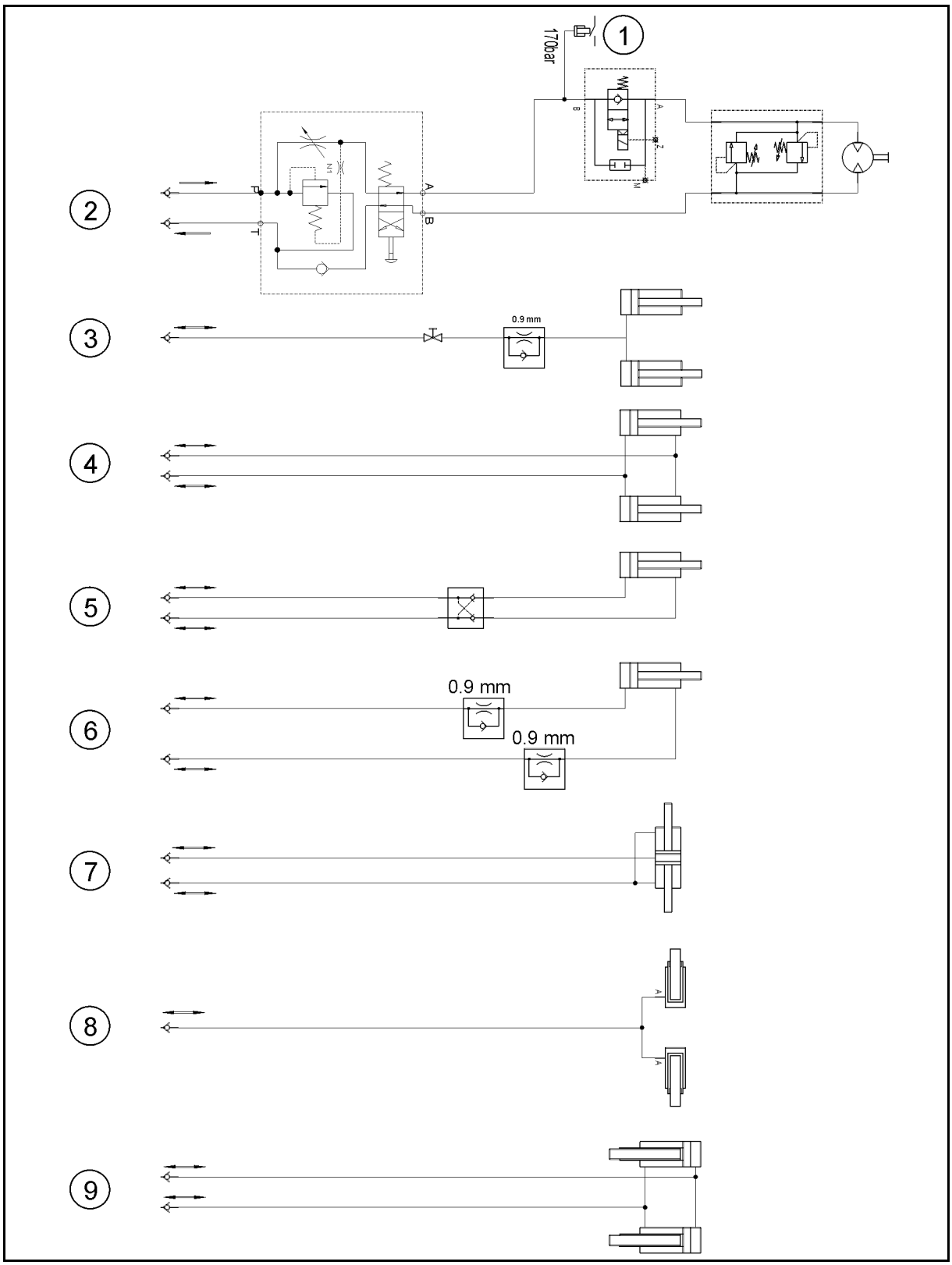
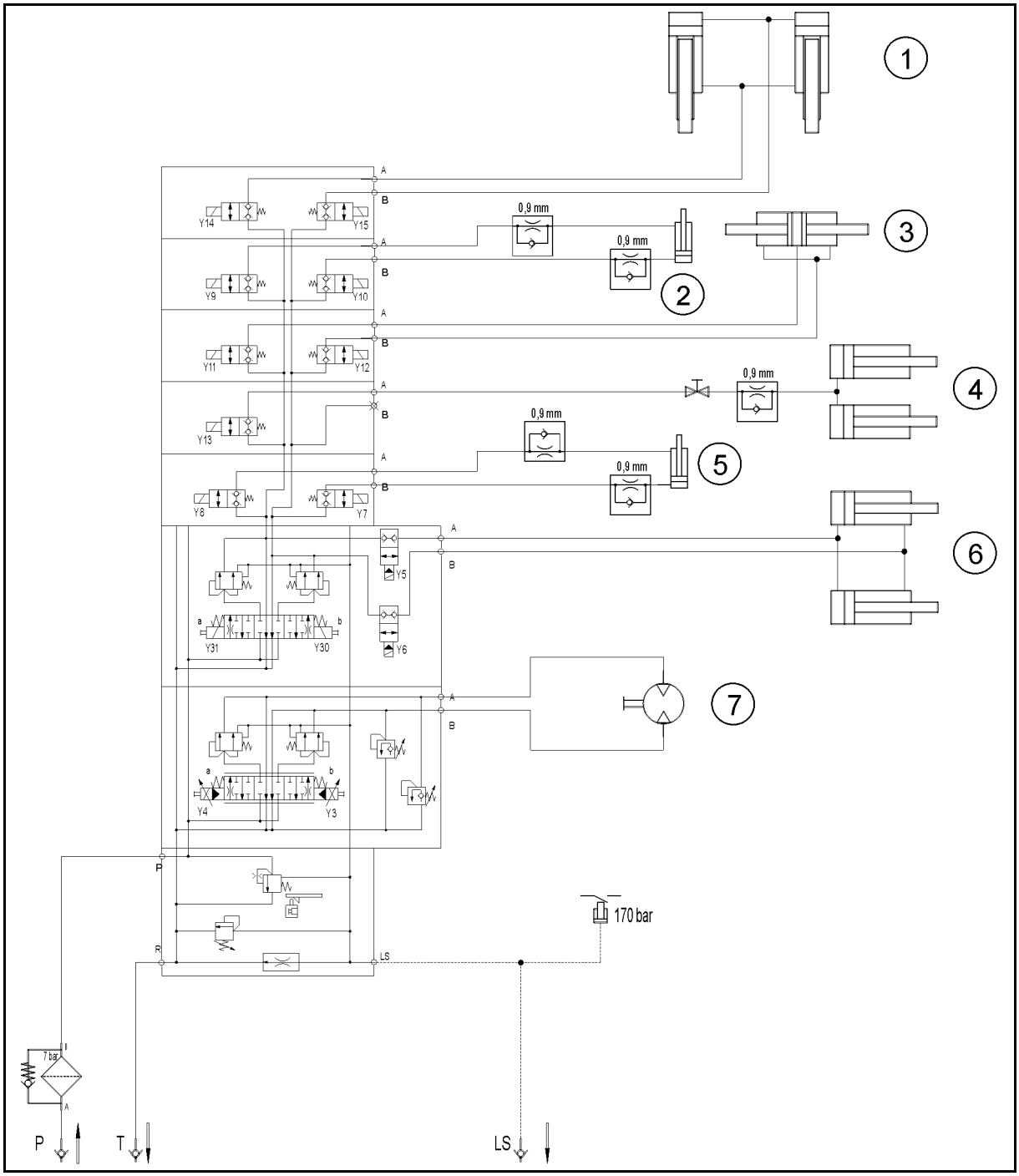
14 Circuit diagrams

14.1 Hydraulics – Direct control



(1) Additional valve for speed monitor
(2) Transport floor
(3) Spreading unit bonnet
(4) Hydraulic slurry door
(5) Supporting leg
(6) Limiting spreading device, left-hand/right-hand
(7) Steering axle (double-acting)
(8) Steering axle (single-acting)
(9) Lift axle

14.2 Hydraulics – Easy-to-use control, ISOBUS control



(1) Lift axle

(2) Limiting spreading device 2

(3) Steering axle, here double-acting

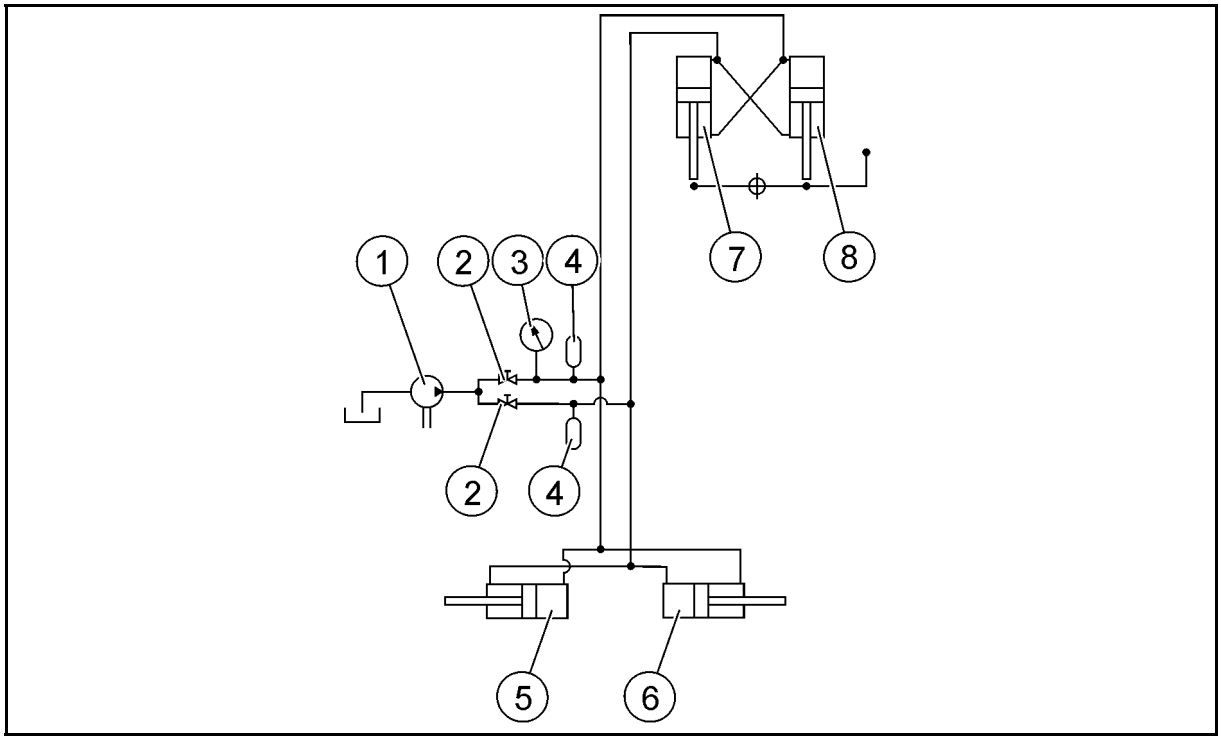
(4) Spreading unit bonnet

(5) Limiting spreading device 1

(6) Hydraulic slurry door

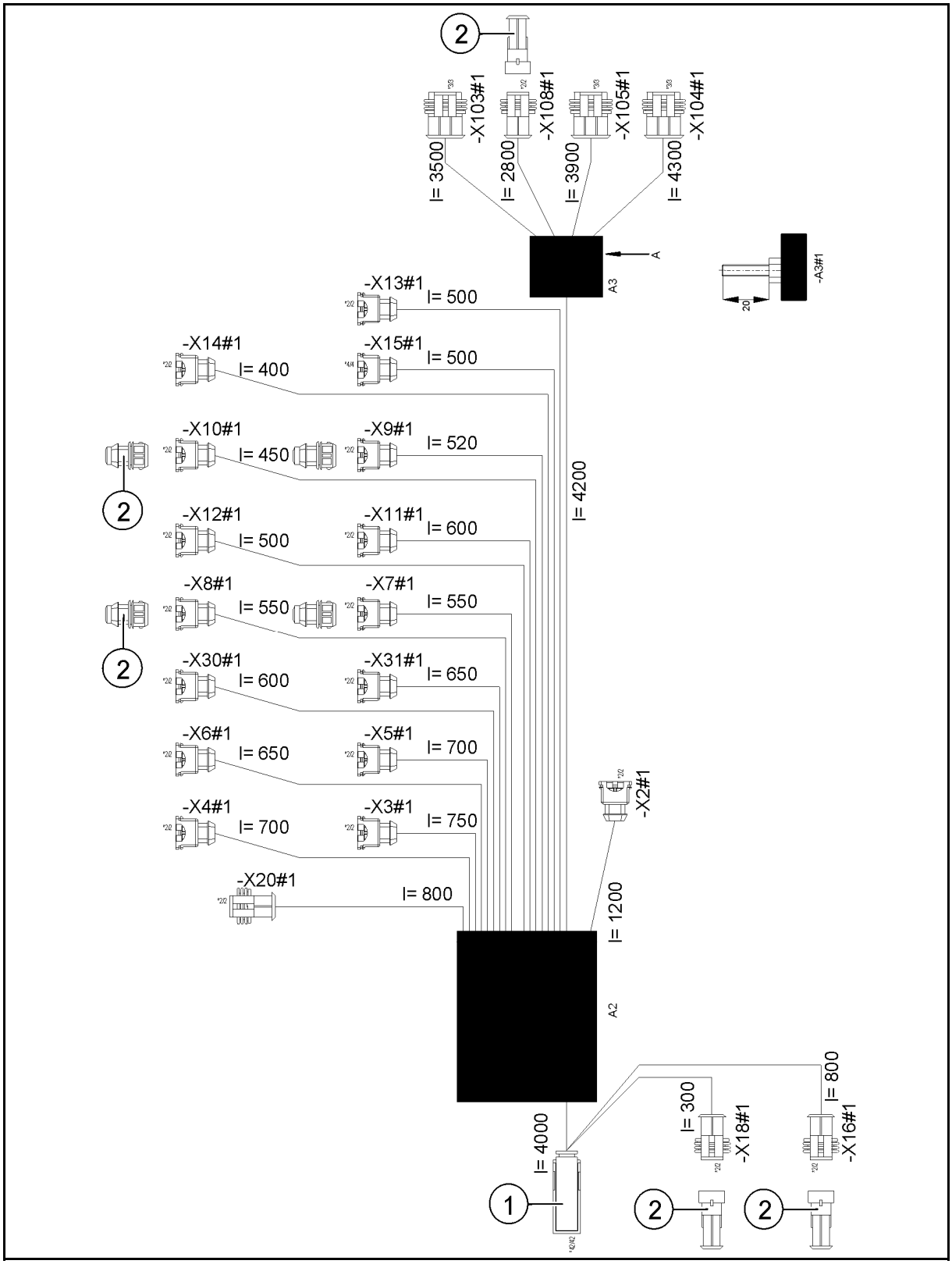
(7) Transport floor

14.3 Hydraulics – Forced steering axle system



(1) Hand pump
(2) Stop-cock
(3) Pressure gauge
(4) Membrane accumulator 60 bar
(5) Steering cylinder, left-hand
(6) Steering cylinder, right-hand
(7) Master cylinder, left-hand
(8) Master cylinder, right-hand

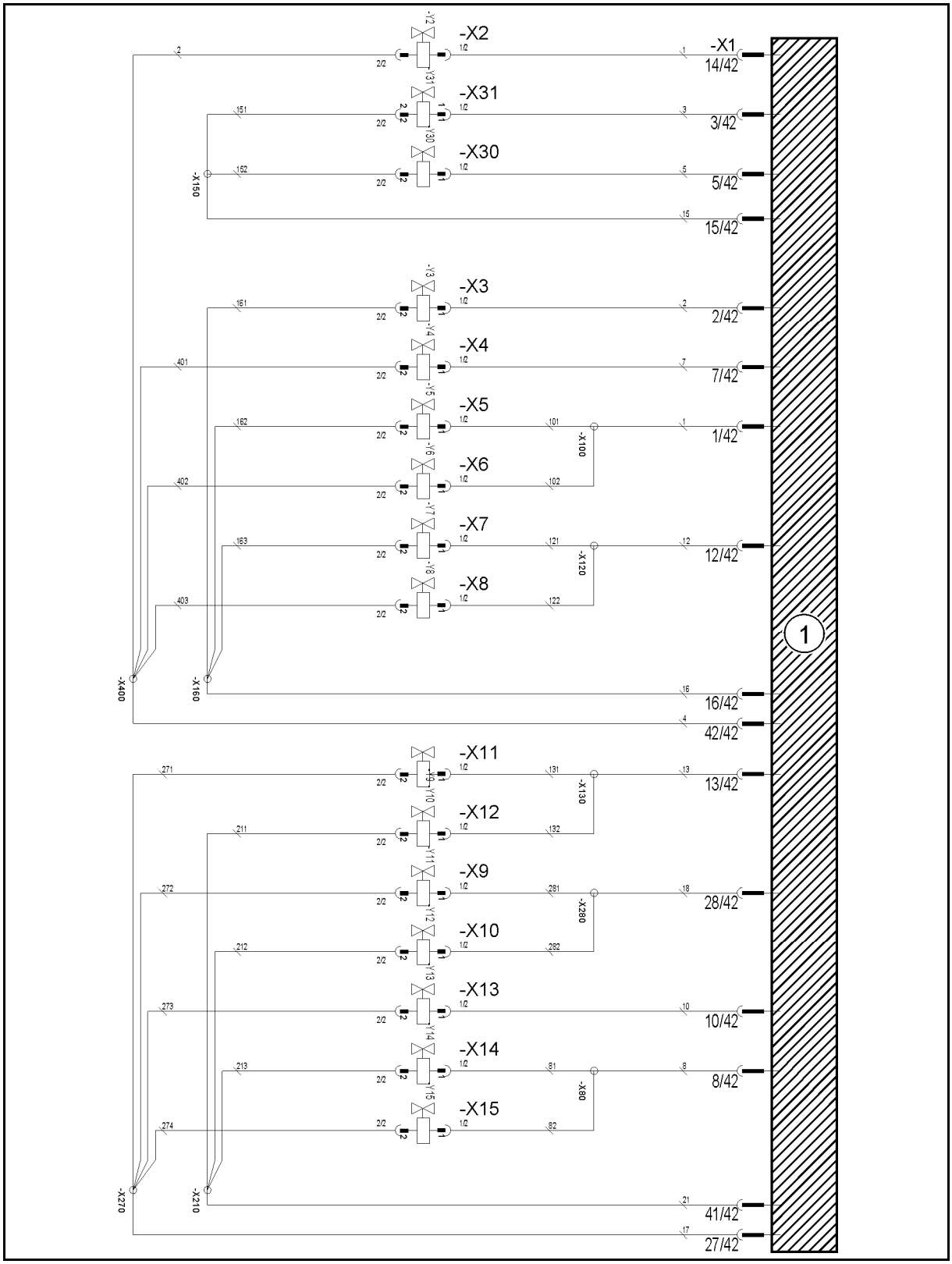
14.4 Electronics – Easy-to-use control – Cable harness overview



(1) Control unit
(2) Dummy plug

X2#1 Stop valve, lift axle
X3#1 Transport floor forward
X4#1 Reverse transport floor
X5#1 Hydraulic slurry door
X6#1 Hydraulic slurry door
X7#1 Limiting spreading device, right-hand
X8#1 Limiting spreading device, right-hand
X9#1 Limiting spreading device, left-hand
X10#1 Limiting spreading device, left-hand
X11#1 Steering axle
X12#1 Steering axle
X13#1 Spreading unit bonnet
X14#1 Lift axle
X15#1 Lift axle
X16#1 Central lubrication
X18#1 Work lights
X20#1 Pressure switch
X30#1 Pre-selection valve Y30
X31#1 Pre-selection valve Y31
X103#1 Spreading beaters
X104#1 Spreading disc, left-hand
X105#1 Spreading disc, right-hand
X108#1 Warning beacon

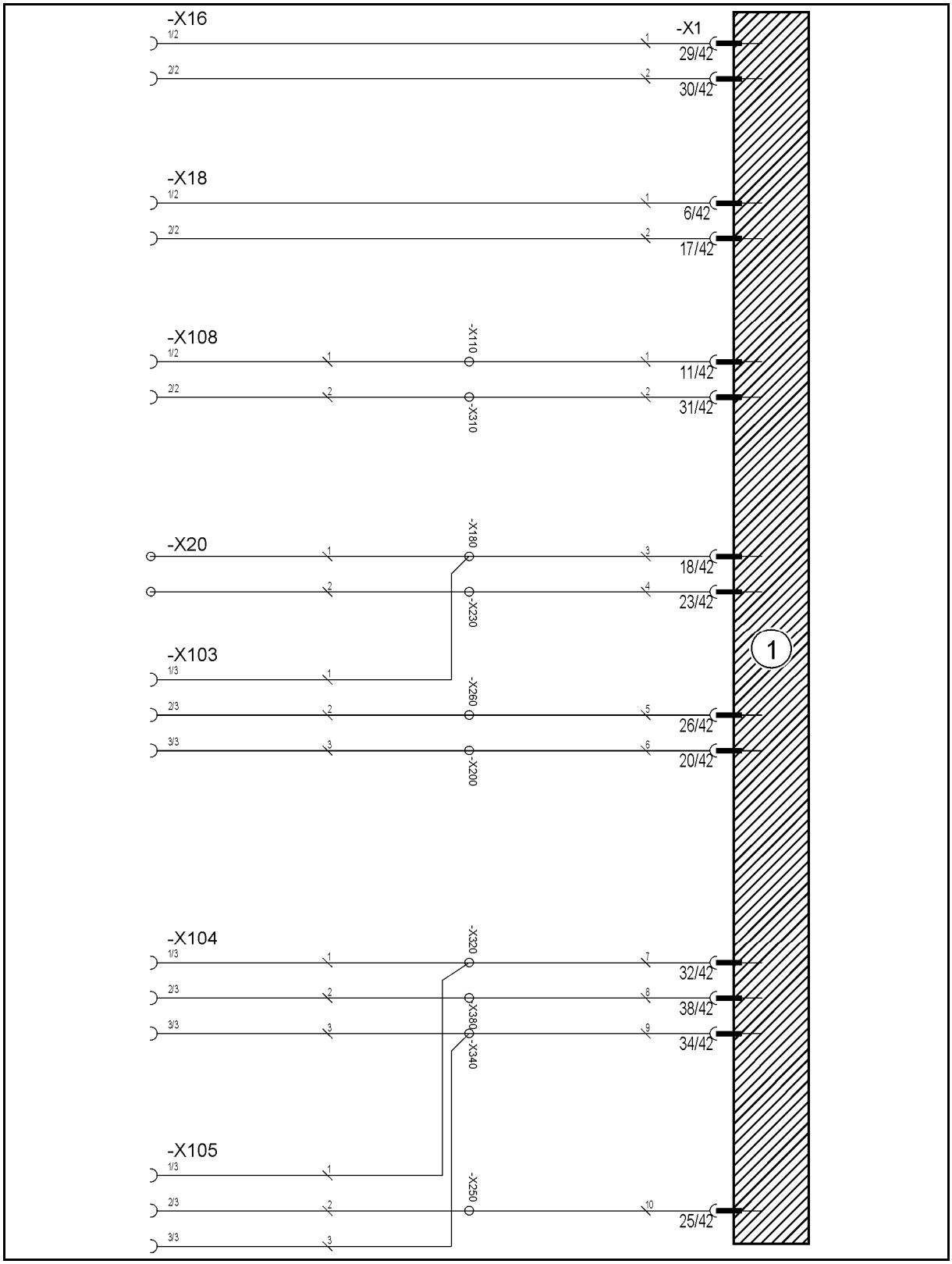
14.5 Electronics – Easy-to-use control – Valves



(1)	Control unit
X2	Stop valve, lift axle
X3	Transport floor forward
X4	Reverse transport floor
X5	Hydraulic slurry door
X6	Hydraulic slurry door
X7	Limiting spreading device, right-hand
X8	Limiting spreading device, right-hand
X9	Limiting spreading device, left-hand
X10	Limiting spreading device, left-hand
X11	Steering axle
X12	Steering axle
X13	Spreading unit bonnet
X14	Lift axle
X15	Lift axle
X30	Pre-selection Y30
X31	Pre-selection Y31

1/42	Hydraulic slurry door
2/42	Transport floor forward
3/42	Pre-selection valve Y31
5/42	Pre-selection valve Y30
7/42	Reverse transport floor
8/42	Lift axle
10/42	Spreading unit bonnet
12/42	Limiting spreading device, right-hand
13/42	Steering axle
14/42	Stop valve, lift axle
15/42	Ground, valves 1
16/42	Ground, transport floor, 2nd level
27/42	Ground, valves 4
28/42	Limiting spreading device, left-hand
41/42	Ground, valves 3
42/42	Ground, valves 2

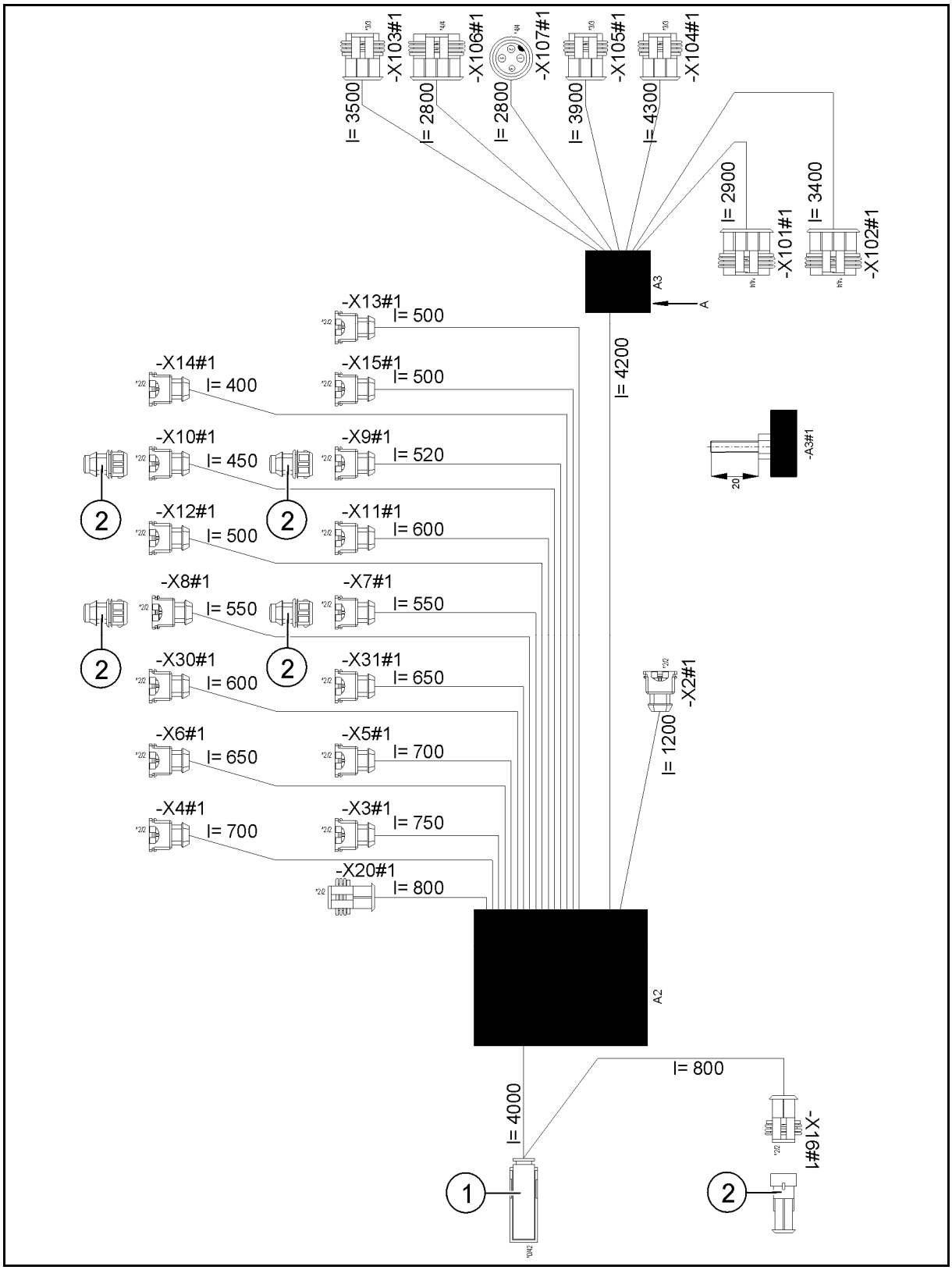
14.6 Electronics – Easy-to-use control – Sensors



(1)	Control unit
X16	Central lubrication
X18	Work lights
X20	Pressure switch
X103	Spreading beaters
X104	Spreading disc, left-hand
X105	Spreading disc, right-hand
X108	Warning beacon

6/42	Work lights +
11/42	Warning beacon +
17/42	Work lights -
18/42	12 V sensors 1
20/42	Ground, sensors 1
23/42	Pressure switch
25/42	Signal, spreading disc, right-hand
26/42	Signal, spreading beaters
29/42	Central lubrication
30/42	Ground, central lubrication
31/42	Warning beacon -
32/42	12 V sensors 2
34/42	Ground, sensors 2
38/42	Signal, spreading disc, left-hand

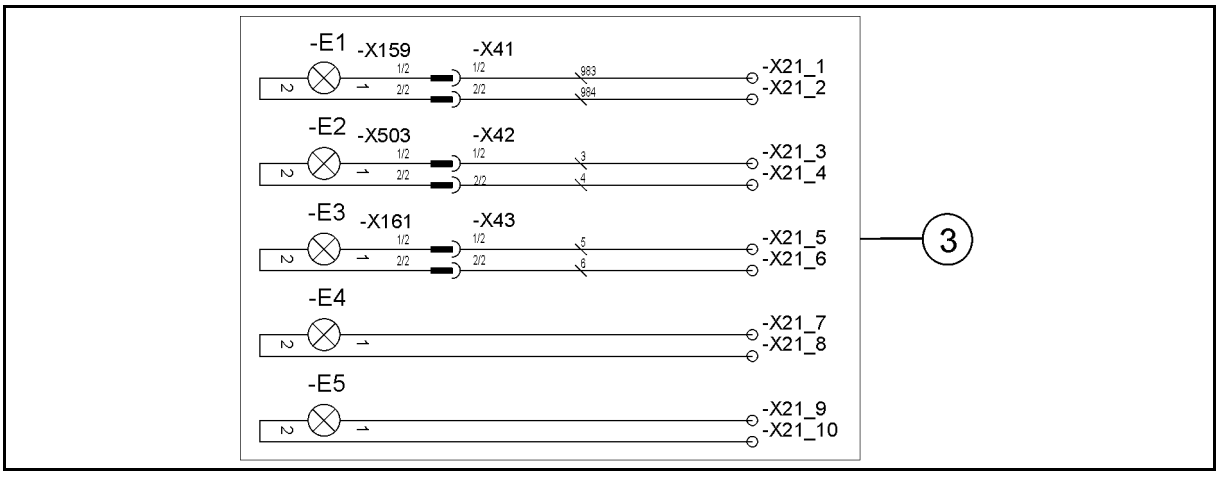
14.7 Electronics – ISOBUS control Field-Operator 120 – Cable harness overview



(1) Control unit

(2) Dummy plug

X2#1	Stop valve, lift axle	X15#1	Lift axle
X3#1	Transport floor forward	X16#1	Central lubrication
X4#1	Reverse transport floor	X20#1	Pressure switch
X5#1	Hydraulic slurry door	X30#1	Pre-selection valve Y30
X6#1	Hydraulic slurry door	X31#1	Pre-selection valve Y31
X7#1	Limiting spreading device, right-hand	X101#1	ABS sensor 1
X8#1	Limiting spreading device, right-hand	X102#1	ABS sensor 2
X9#1	Limiting spreading device, left-hand	X103#1	Spreading beaters
X10#1	Limiting spreading device, left-hand	X104#1	Spreading disc, left-hand
X11#1	Steering axle	X105#1	Spreading disc, right-hand
X12#1	Steering axle	X106#1	Hydraulic slurry door
X13#1	Spreading unit bonnet	X107#1	Transport floor speed
X14#1	Lift axle		



(3) LIN module

E1 Work light, front

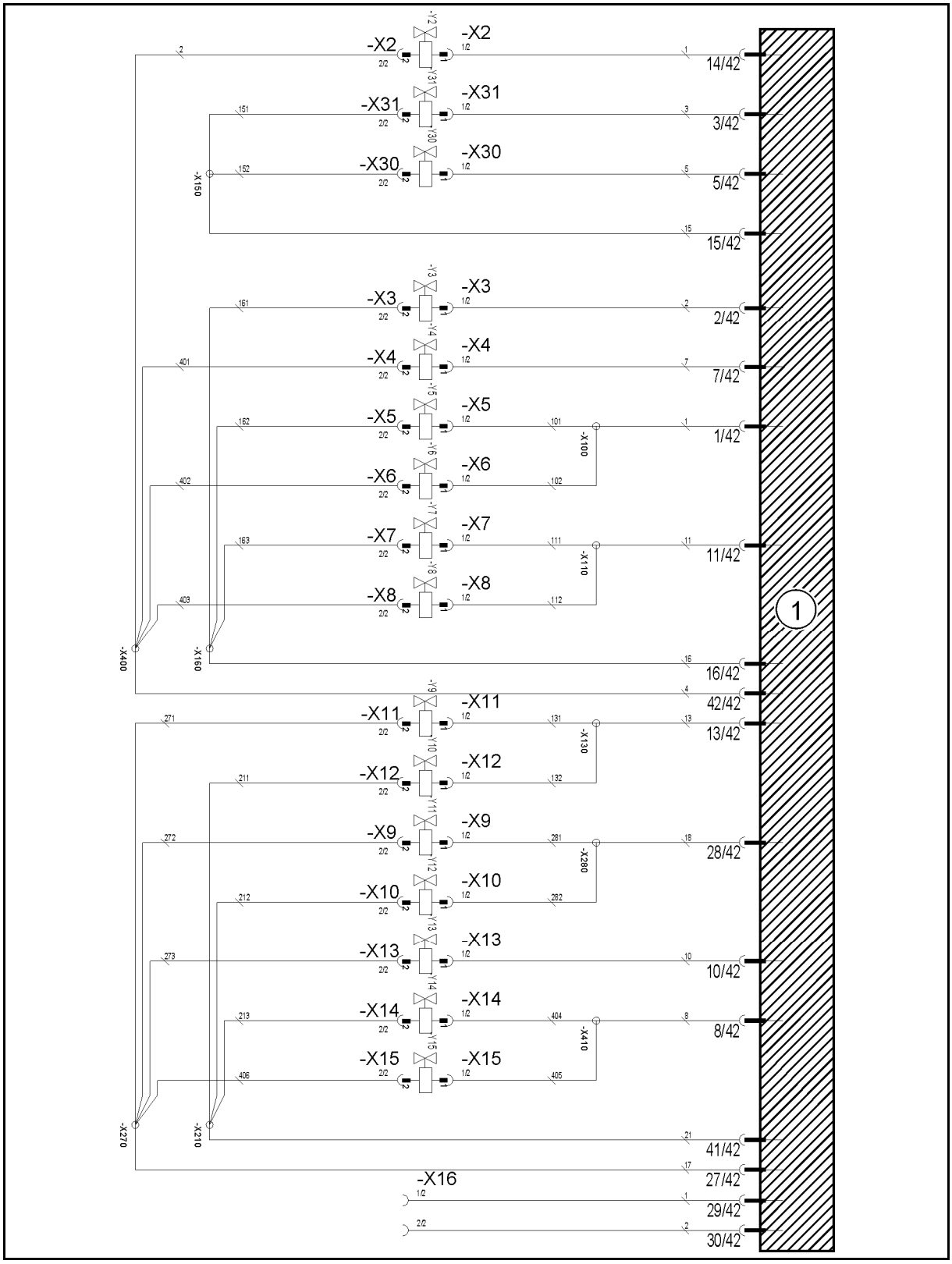
E2 Work light, rear, left-hand

E3 Work light, rear, right-hand

E4 Work lights (optional extra)

E5 Warning beacon

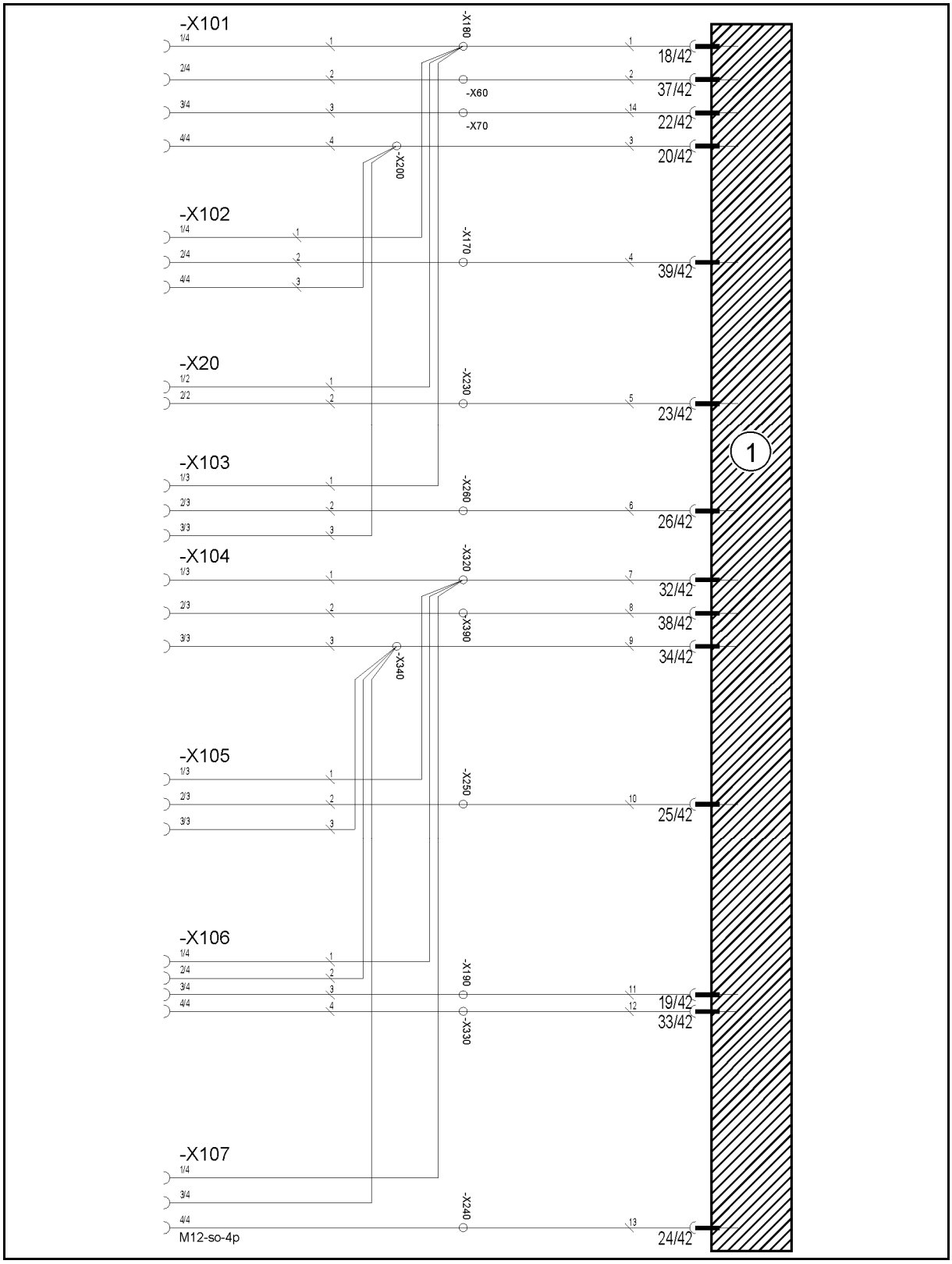
14.8 Electronics – ISOBUS control Field-Operator 120 – Valves



(1)	Control unit
X2	Stop valve, lift axle
X3	Transport floor forward
X4	Reverse transport floor
X5	Hydraulic slurry door
X6	Hydraulic slurry door
X7	Limiting spreading device, right-hand
X8	Limiting spreading device, right-hand
X9	Limiting spreading device, left-hand
X10	Limiting spreading device, left-hand
X11	Steering axle
X12	Steering axle
X13	Spreading unit bonnet
X14	Lift axle
X15	Lift axle
X16	Central lubrication
X30	Pre-selection Y30
X31	Pre-selection Y31

1/42	Hydraulic slurry door
2/42	Transport floor forward
3/42	Pre-selection valve Y31
5/42	Pre-selection valve Y30
7/42	Reverse transport floor
8/42	Lift axle
10/42	Spreading unit bonnet
11/42	Limiting spreading device, right-hand
13/42	Steering axle
14/42	Stop valve, lift axle
15/42	Ground, valves 1
16/42	Ground, valves 5
27/42	Ground, valves 4
28/42	Limiting spreading device, left-hand
29/42	Central lubrication
30/42	Ground, central lubrication
41/42	Ground, valves 3
42/42	Ground, valves 2

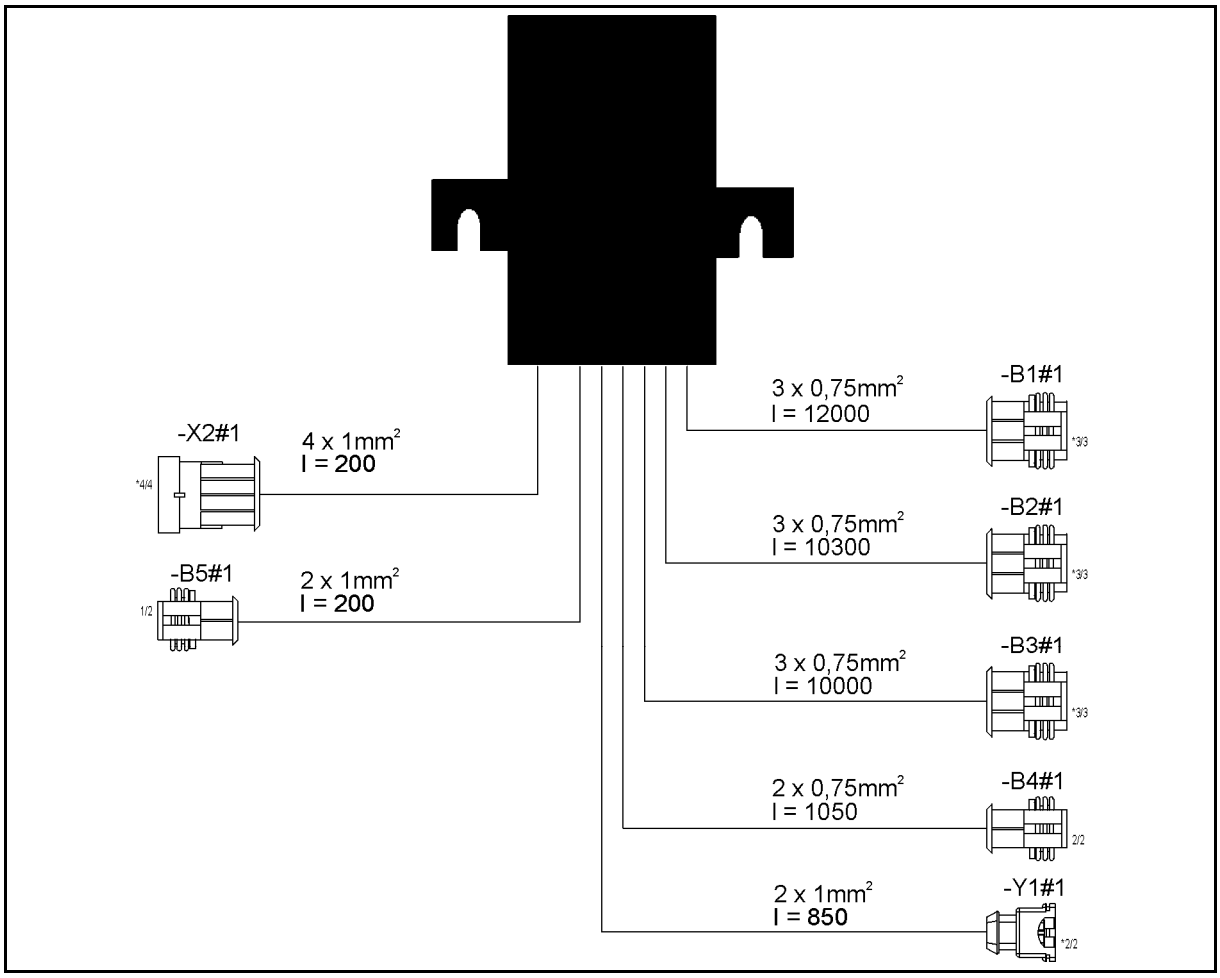
14.9 Electronics – ISOBUS control Field-Operator 120 – Sensors



(1)	Control unit
X20	Pressure switch
X101	ABS sensor 1
X102	ABS sensor 2
X103	Spreading beaters
X104	Spreading disc, left-hand
X105	Spreading disc, right-hand
X106	Hydraulic slurry door
X107	Transport floor speed

18/42	12 V sensors 1
19/42	CAN 2 High
20/42	Ground, sensors 1
22/42	Direction of motion
23/42	Pressure switch
24/42	Signal, transport floor
25/42	Signal, spreading disc, right-hand
26/42	Signal, spreading beaters
32/42	12 V sensors 2
33/42	CAN 2 Low
34/42	Ground, sensors 2
37/42	ABS sensor 1
38/42	Signal, spreading disc, left-hand
39/42	ABS sensor 2

14.10 Electronics – Speed monitoring with 2-disc wide-angle spreading unit – Cable harness overview



B1#1 rpm sensor

Superseal bushing, 3-pole

1 12 V

2 Signal

3 Ground

B2#1 rpm sensor

Superseal bushing, 3-pole

1 12 V

2 Signal

3 Ground

B3#1 rpm sensor

Superseal bushing, 3-pole

1 12 V

2 Signal

3 Ground

B4#1 Pressure switch

Superseal bushing, 2-pole

1 12 V

2 Signal

B5#1 Central lubrication

Superseal bushing, 2-pole

1 12 V

2 Ground

X2#1 Supply, control set

Superseal plug, 4-pole

1 12 V

2 *H1* LED

3 *H2* Horn

4 Ground

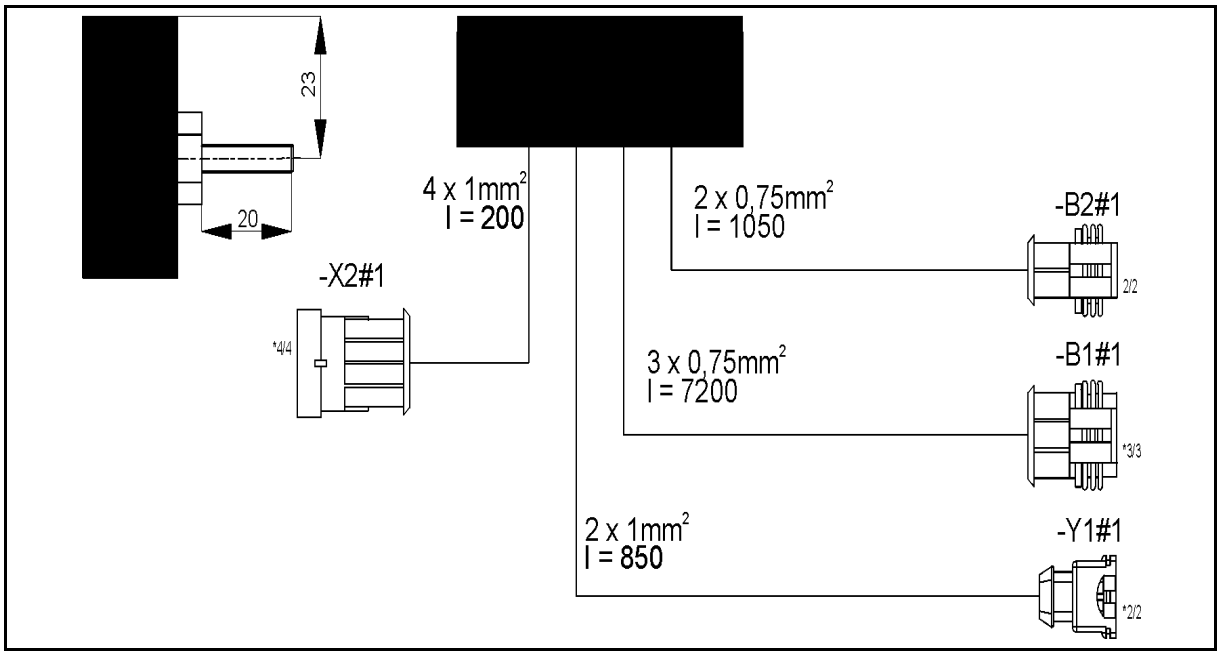
Y1#1 Solenoid valve

Bushing housing JPT, 2-pole

1 Triggering

2 Ground

14.11 Electronics – Speed monitoring with 4-beater spreading unit – Cable harness overview



B1#1 rpm sensor

Superseal bushing, 3-pole

1 12 V

2 Signal

3 Ground

B2#1 Pressure switch

Superseal bushing, 2-pole

1 12 V

2 Signal

X2#1 Supply, control set

Superseal plug, 4-pole

1 12 V

2 *H1* LED

3 *H2* Horn

4 Ground

Y1#1 Solenoid valve

Bushing housing JPT, 2-pole

1 Triggering

2 Ground

14.12 Connection of lighting system

(1) Brake light: pink
(2) Rear light, left-hand: yellow
(3) Rear light, right-hand: yellow
(4) License plate light: yellow
(5) Indicator, left-hand: blue
(6) Ground: black
(7) Indicator, right-hand: brown

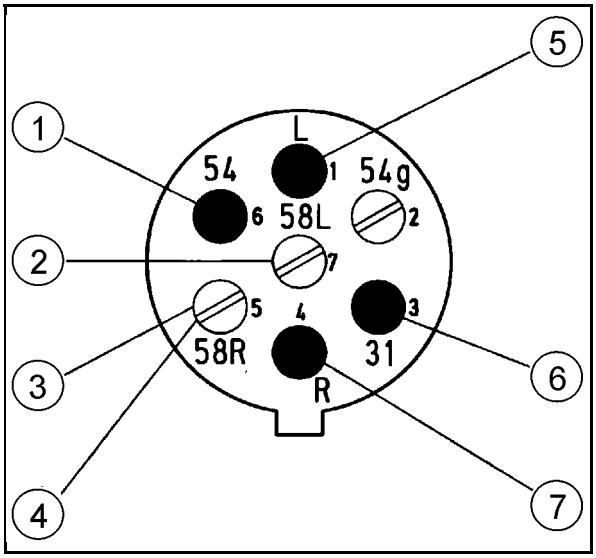


Fig. 146

14.13 Connection of additional electrical loads

Do not connect any additional electrical loads to the control set.

Additional electrical loads are e. g. a silage additive pump or additional lighting (more than 2 lamps).

We offer an additional control for additional loads which triggers these additional loads via relays.

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