Translation of the original instructions for assembly, operation and maintenance

Fodder mixing system

Verti-Mix 750-S, 1250-S
Verti-Mix 1700D-S, 2400D-S

64100901a
09.10
Printed in Germany

Please read and observe these instructions before commissioning!

GB

Declaration of incorporation

according to the EC machinery directive 2006/42/EC, Annex II B

Manufacturer:

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

Description and identification of machine:

Designation:	Fodder mixing system
Function:	Chopping, homogeneous mixing and discharge of silage and fodder
Model:	Verti-Mix S, Verti-Mix D-S
Type:	Verti-Mix 750-S, 1250-S Verti-Mix 1700D-S. 2400D-S
Serial number:	W09641000_0S38001 – W09642000_0S38999
Trade name:	Verti-Mix S, Verti-Mix D-S

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

2006/42/EC:2006-05-17	EC machinery directive 2006/42/EC

Applied harmonized standards:

EN ISO 12100-1:2003/A1:2009	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
EN ISO 12100-2:2003/A1:2009	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles
EN ISO 13857:2008	Safety of machinery - Safety distances to prevent hazard areas from being reached by upper and lower limbs (ISO 13857:2008)
EN 982:1996+A1:2008	Safety of machinery - Safety requirements for fluid power systems and their components - Hydraulics
EN ISO 4254-1:2009	Agricultural machinery - Safety - Part 1: General requirements (ISO 4254-1:2008)
EN 349:1993+A1:2008	Safety of machinery - Minimum distances to prevent limbs from being crushed
EN 703:2004+A1:2009	Agricultural machinery - Machines for loading, mixing and/or chopping and distributing silage - Safety

The special technical documentation has been compiled according to Annex VII part B and will be transmitted digitally upon reasoned request.

Commissioning of the partly completed machine is not allowed, until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the directive 2006/42/EC.

Bad Laer, 15.01.2010

Dipl.-Ing. E. Uhlemann
Chief Designer
Feeding Technology

Dr. J. Marquering
Head of Development

Dr. K.-P. Strautmann
Managing Director

Identification data

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

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

Machine ID number:
(17-digit)

Type:

Year of manufacture:

Manufacturer's address

B. Strautmann & Söhne GmbH u. Co. KG

Landmaschinenfabrik

Bielefelder Straße 53

D-49196 Bad Laer

Phone: + 49 (0) 5424 802-0

Fax.: + 49 (0) 5424 802-64

E-mail: kontakt@strautmann.com

Spare parts order service

B. Strautmann & Söhne GmbH u. Co. KG

Landmaschinenfabrik

Bielefelder Straße 53

D-49196 Bad Laer

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 machine ID number (17-digit) of your machine when ordering spare parts.

Formal information about the instructions

Document number: 64100900

Date of compilation: 09.10

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 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 instructions before starting the machine.

In case of any inquiries or problems, please refer to these 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.

User evaluation

Dear reader,

Our instructions are regularly updated. Your suggestions for improvements will be a great help for drawing up more and more user-friendly instructions. Please send your suggestions by fax or e-mail to:

B. Strautmann & Söhne GmbH u. Co. KG

Bielefelder Straße 53

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E-mail: kontakt@strautmann.com

1 User information

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

1.1 Purpose of document

The present instructions

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

1.2 Applied modes of specification

Instructions and responses

Activities to be carried out by the operator are specified as numbered instructions. Please keep to the order of the specified instructions. The response to the respective instruction is marked by an arrow if applicable. Example:

1. Instruction 1

→ Response of machine to instruction 1

2. Instruction 2

1.3 Applied terms

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	… the fodder mixing systems Verti-Mix 750-S, 1250-S, Verti-Mix 1700D-S, 2400D-S
operating element	... the component which is directly actuated by the operator, e.g. by pressing. An operating element may be an adjusting lever, a toggle switch, key button, rotary switch 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 instructions apply to your machine. Optional extras are marked in these instructions and are available at extra cost.

2.1 Overview – Assemblies

Illustration of product and identification of essential elements.

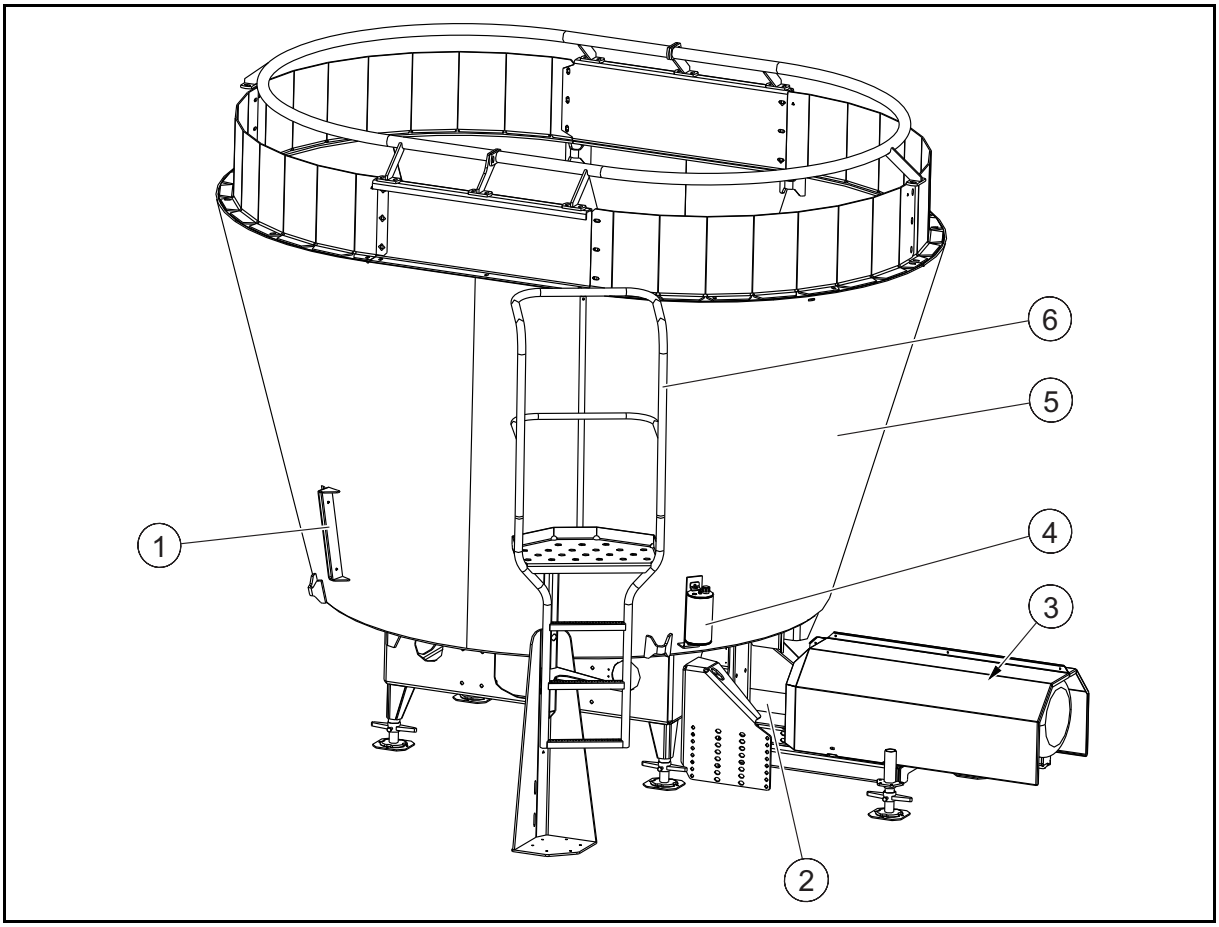


Fig. 1

(1) Counter-cutter

(2) Propeller shaft with shear bolt locking mechanism

(3) Gear motor

(4) Compensating reservoir for gear lubricant oil of angular gears

(5) Mixing container

(6) Platform

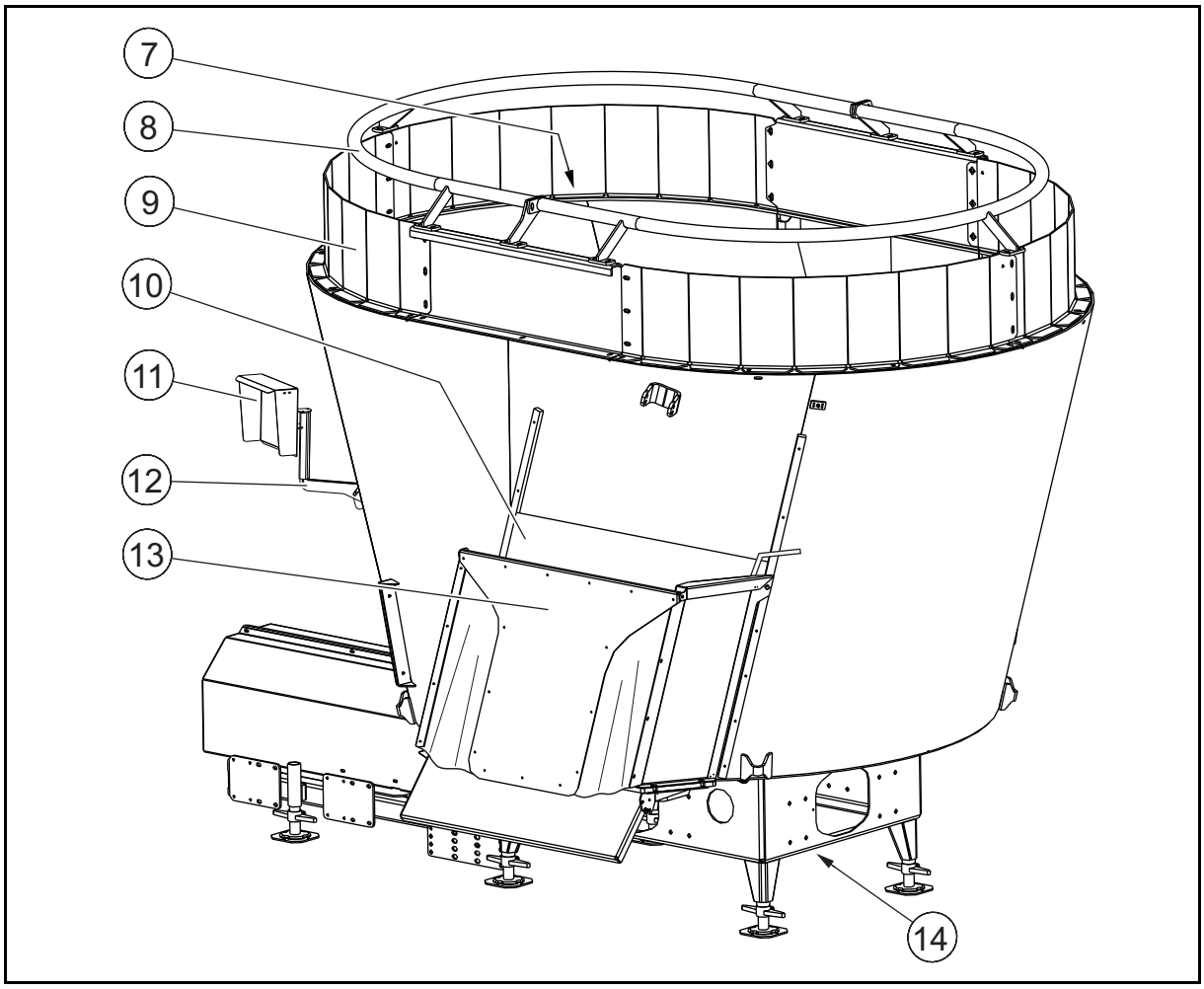


Fig. 2

(7) Mixing auger

(8) Overflow ring

(9) Attachment

(10) Discharge door

(11) Operating terminal of weighing device (only available with optional extra equipment)

(12) Swivelling holder for operating terminal of weighing device

(13) Rear left-hand discharge

(14) Angular gear for mixing auger drive

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.

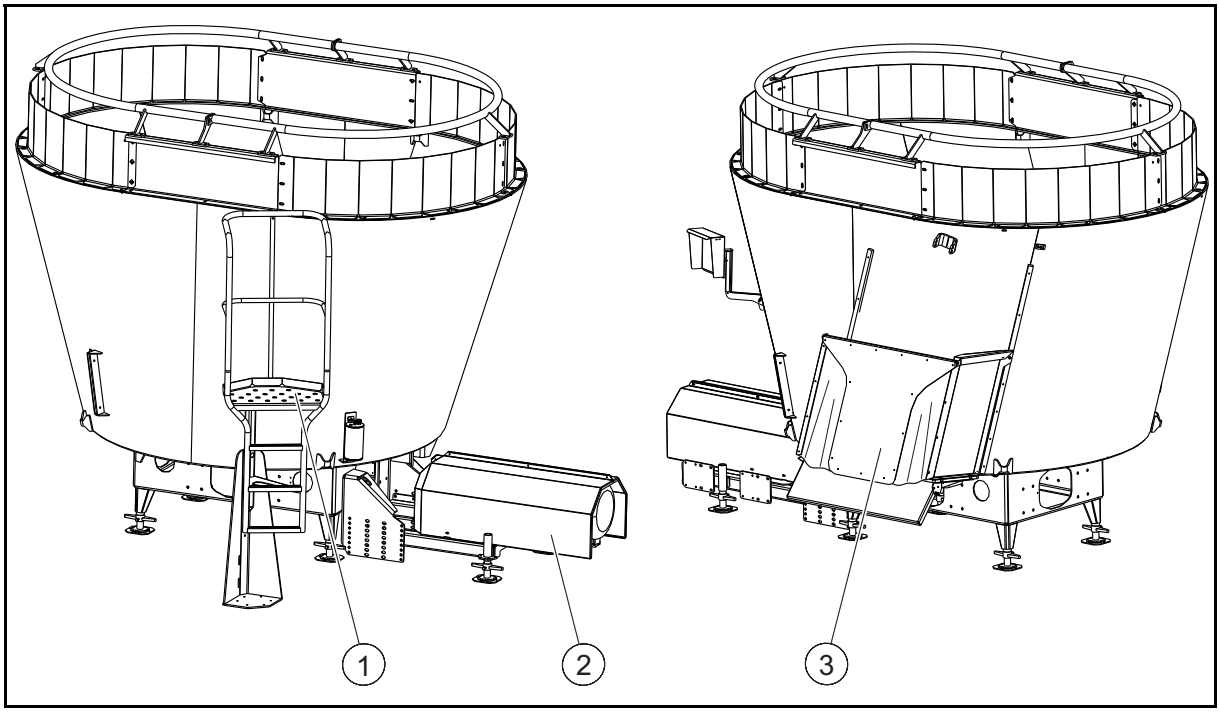


Fig. 3

(1) Platform
(2) Protective hood of gear motor
(3) Cover of discharge opening
(4) Protective device of propeller shaft
(5) Protective sleeve for drive shaft

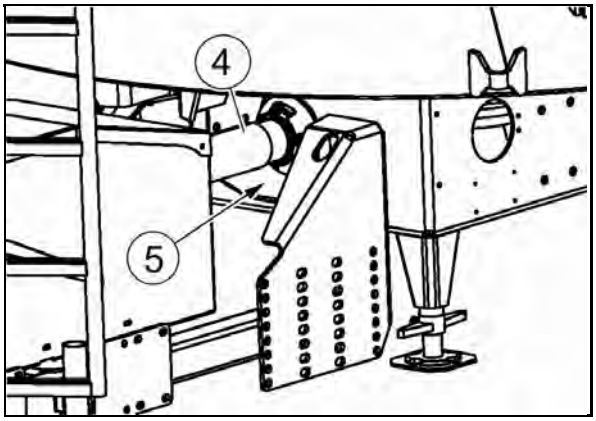


Fig. 4

2.3 Overview – Supply lines between machine and system

(1) Motor terminal board

(2) PTC resistor

Only qualified staff are allowed to connect the gear motor.

Observe:

- the chapter "Installation and connection", page 54,
- the chapter "Gear motor information", page 100,
- the included operating instructions for the gear motor.

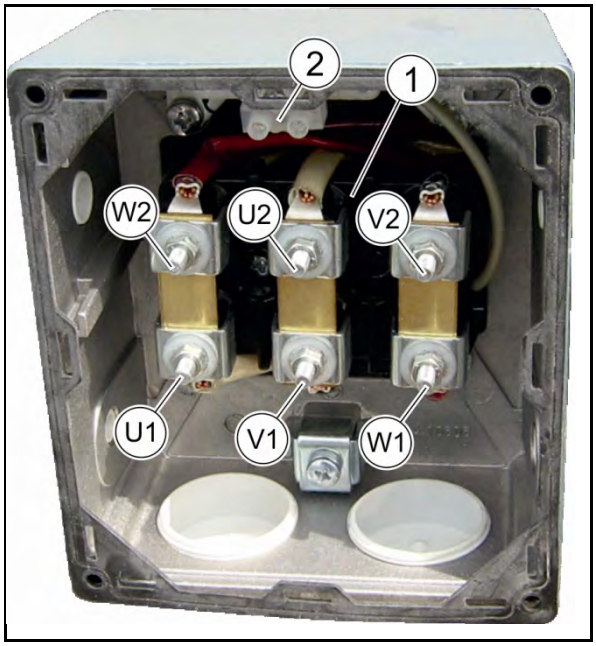


Fig. 5

(3) Analogue output of weighing device

(4) Power supply for weighing device, 2-pole

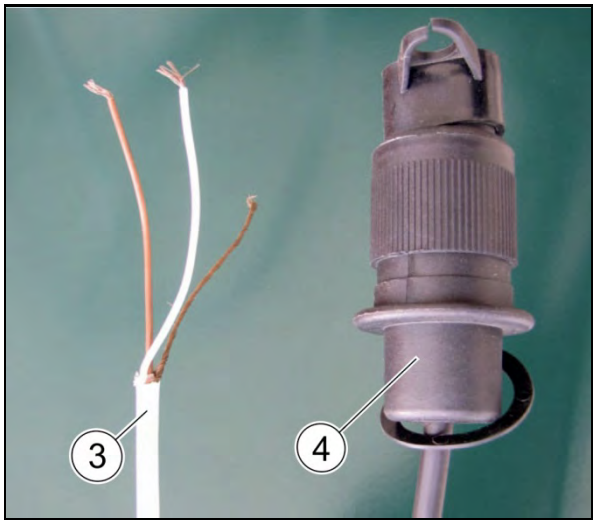


Fig. 6

(5) 4x hydraulic connector "Flow line"

(6) 4x hydraulic connector "Return line"

(7) Power supply for hydraulic unit

(8) Power supply for control system

2.4 Correct use

The fodder mixing systems of the Verti-Mix S series:

- are designed for chopping, homogeneous mixing and dosing of organic solids. The dry substance content of the mixed materials should be more than 25%.
- must not be charged otherwise than by means of:
  - a tractor equipped with a front loader,
  - a yard or wheeled loader,
  - a telescopic loader,
  - directly from a conveying device.
- are a component of a feeding system and must be incorporated in the complete feeding system.

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.

2.5 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 gear motor is running with the propeller shaft coupled / the electronic system connected,
- if the machine is not secured against accidental starting.

The operator is only allowed to power working tools if no people are within the hazardous area of the machine.

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

Risks may arise:

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

Dangerous spots exist:

- within the area of the powered propeller shaft,
- within the area of the discharge opening,
- within the area of the powered discharge conveyor,
- in the mixing container with the machine powered or not powered.

2.6 Type plate and marking

The following figures show the position of the type plate and the vehicle identification number (machine ID number)

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

(1) Type plate
(2) Vehicle identification number (machine ID number) (embossed into the mixing container)

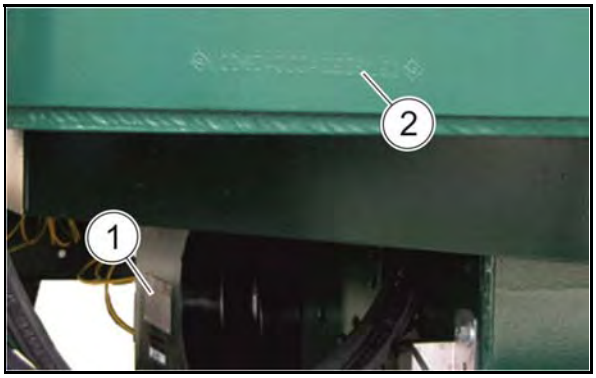


Fig. 7

The type plate includes:

- Manufacturer
- Fahrzeug-/Maschinen-Ident-Nr. = Vehicle / Machine ID number
- Typ = Model
- Leergewicht [kg] = Empty weight [kg]: no entry
- Zul. Gesamtgew. [kg] = Gross vehicle weight rating [kg]
- Zulässige Stützlast / Achslast vorn [kg] = Admissible tongue load / front axle load [kg]: no entry
- Zul. Achslast hinten [kg] = Admissible rear axle load [kg]: no entry
- Baujahr = Year of manufacture
- Nenndrehzahl [min^{-1}] = Rated speed [min^{-1}]
- Zul. Hydr. Druck [bar] = Admissible hydraulic pressure [bar]: no entry
- Zul. Höchstgeschw. [km/h] = Speed limit [km/h]: not entry

Fig. 8

2.7 Technical data

2.7.1 Verti-Mix S

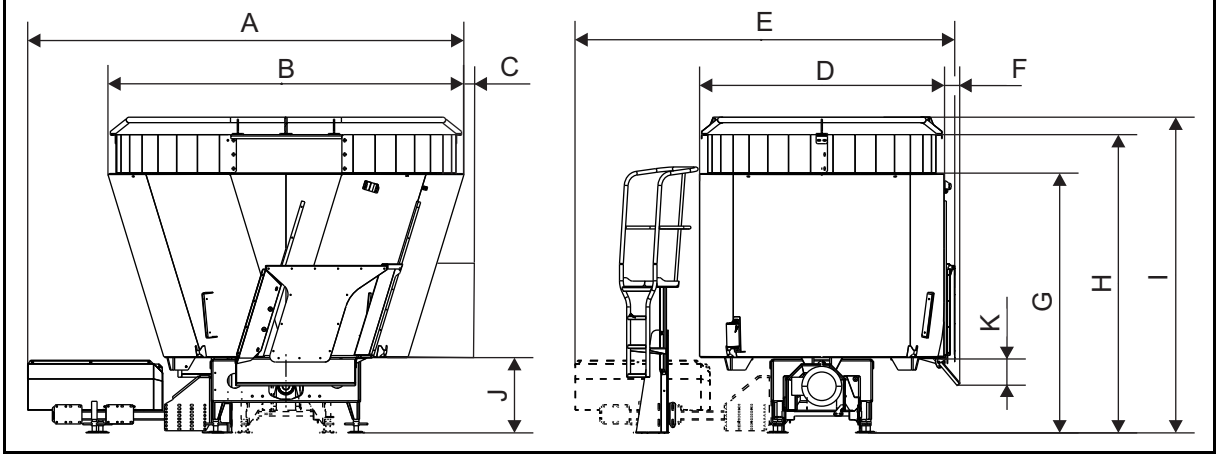
Model		Verti-Mix S	
	Unit	750	1250
Gross vehicle weight rating	kg	7500	9515
Empty weight			
• Mixer with standard equipment approx.	kg	2570	3330
• Stainless steel lining of mixing container approx.	kg	165	245
• Attachment approx.	kg	165	--
• Overflow ring approx.	kg	40	45
Usable mixing capacity	m^3	7.5	12.5
Admissible loading capacity	kg	4275	5375
Rated power	kW	22	
Maximum operating pressure	bar	180	
Power supply, weighing device / electro-hydraulic control set	V	10 – 30 VDC	
Gear motor 400 V / 50 Hz		see motor rating plate	
Sound pressure level	dB(A)	≤ 70	

* Weight may vary due to equipment

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

Tab. 1

2.7.1.1 Dimensions



Model		Verti-Mix	
	Unit	750	1250
Length:			
• A = with front / rear gear motor	m	3.74	4.11
• B = with lateral gear motor	m	3.14	3.67
• C = with discharge at the rear centre approx.	m	plus 0.08	minus 0.04
Width:			
• D = with front / rear gear motor	m	2.16	2.42
• E = with lateral gear motor	m	3.26	3.49
• F = with rear discharge, left-hand, approx.	m	plus 0.14	plus 0.14
Height:			
• G = Height of mixing container	m	2.29	2.73
• H = Height with attachment	m	2.64	3.08
• I = Height with attachment and			
inner overflow ring	m	2.68	3.12
elevated overflow ring	m	2.79	3.23
• J = Height of discharge	m	0.67	0.67
• K = Distance between bottom edge of mixing container and bottom edge of deflector plate approx.	m	0.24	0.24

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

Tab. 2

Additionally observe the technical data of the discharge conveyors in the chapter 2.7.3, page 22, if necessary.

2.7.2 Verti-Mix D-S

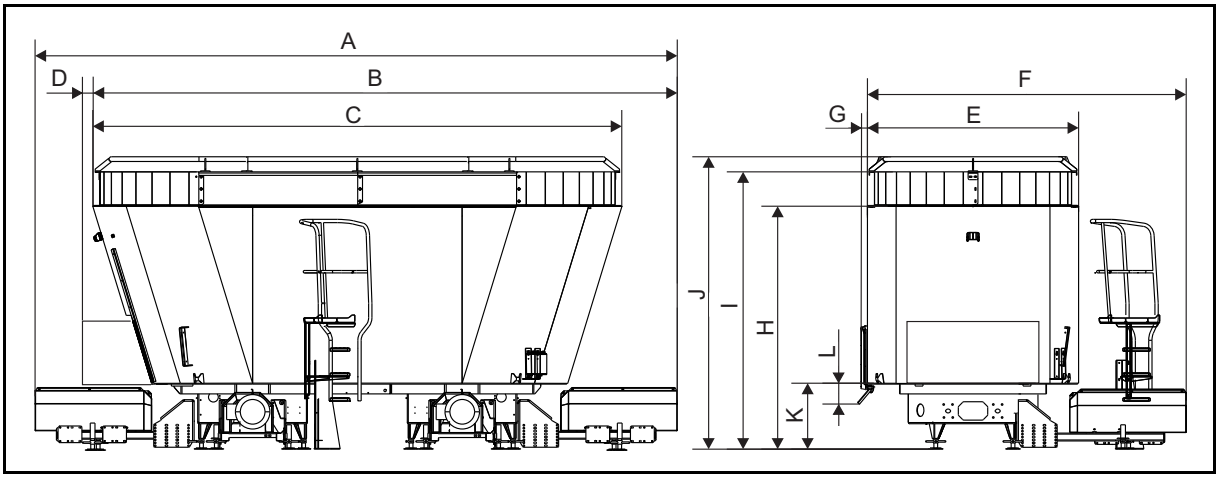
Model		Verti-Mix D-S	
	Unit	1700	2400
Gross vehicle weight rating	kg	15430	20520
Empty weight			
• Mixing container, standard equipment, approx.	kg	5170	6440
• Stainless steel lining of mixing container approx.	kg	295	440
• Attachment approx.	kg	270	310
• Overflow ring approx.	kg	65	70
Usable mixing capacity	m^3	17.0	24.0
Admissible loading capacity	kg	9000	12825
Rated power	kW	22	30
Maximum operating pressure	bar	180	
Power supply, weighing device / electro-hydraulic control set	V	10 – 30 VDC	
Gear motor 400 V / 50 Hz		see motor rating plate	
Sound pressure level	dB(A)	≤ 70	

* Weight may vary due to equipment

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

Tab. 3

2.7.2.1 Dimensions



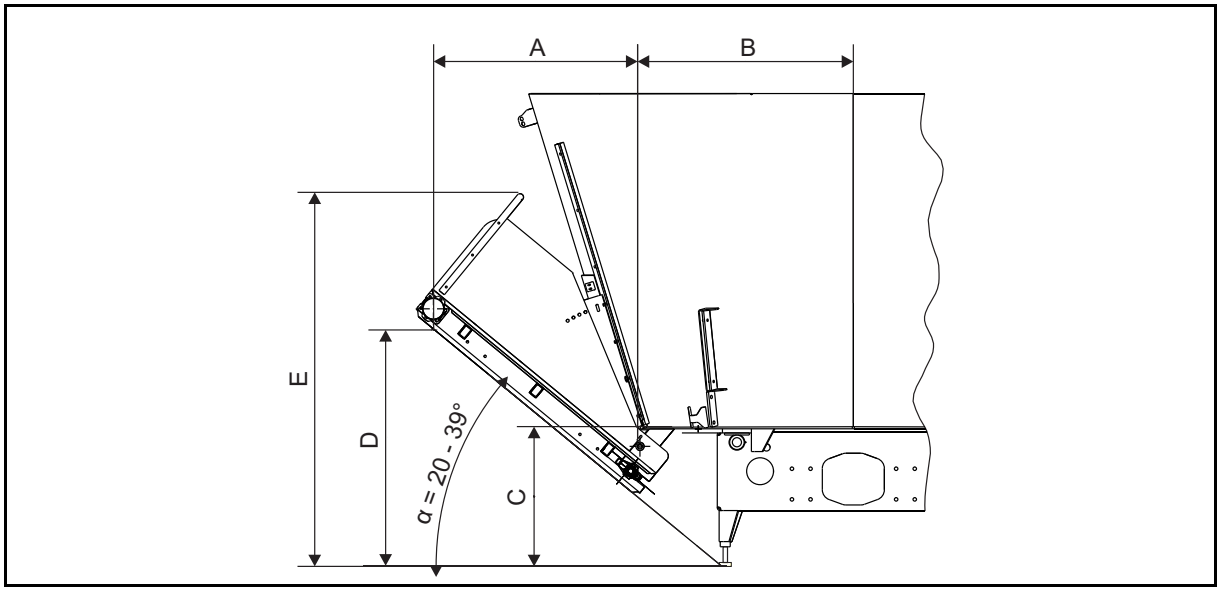
Model		Verti-Mix D-S	
	Unit	1700	2400
Length:			
• A = with front and rear gear motors, rear left-hand discharge	m	6.72	7.19
• B = with front side gear motors, rear left-hand discharge	m	6.06	6.63
• C = with lateral gear motors, rear left-hand discharge	m	5.4	6.07
• D = with discharge at the rear centre approx.	m	plus 0.08	minus 0.04
Width:			
• E = with front and rear gear motors, rear left-hand discharge	m	2.16	2.42
• F = with front side / lateral gear motors, discharge at the rear centre / rear left-hand discharge	m	3.26	3.6
• G = with rear left-hand discharge approx.	m	plus 0.14	plus 0.14
Height:			
• H = Height of mixing container	m	2.49	2.98
• I = Height with attachment	m	2.84	3.33
• J = Height with attachment and			
inner overflow ring	m	2.88	3.37
elevated overflow ring	m	2.99	3.48
• K = Discharge height	m	0.67	0.67
• L = Distance between bottom edge of mixing container and bottom edge of deflector plate approx.	m	0.24	0.24

Figures, technical data and weights may change due to technical development and are not binding for delivery.
Tab. 4

Additionally observe the technical data of the discharge conveyors in the chapter 2.7.3, page 22, if necessary.

2.7.3 Discharge conveyor

2.7.3.1 Dimensions



Model		Discharge conveyor			
	Unit	Length = 1.40 m		Length = 2.53 m	
		α=20°	α=39°	α=20°	α=39°
Width:					
A = Width between delivery point and discharge point	m	1.17	0.99	2.19	1.86
B = Width between mixing auger centre and delivery point					
Verti-Mix 750 S, Verti-Mix 1700 D-S	m	1.03		1.03	
Verti-Mix 1250 S, Verti-Mix 2400 D-S	m	1.16		1.16	
Height:					
C = Height up to delivery point	m	0.67		0.67	
D = Height up to discharge point approx.	m	0.78	1.14	1.14	1.83
E = Height up to top edge of discharge conveyor	m	1.53	1.82	1.85	2.45

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

Tab. 5

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 instructions!

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

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

3.1 Safety-conscious working

The machine has been designed according to state of the art and the accepted safety-related rules. When using the machine, risks and impairments might yet arise:

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

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

- these instructions, in particular:
  - the basic safety instructions, the activity-related safety instructions and the instructions what to do,
  - the instructions regarding correct use.
- the warning signs on the machine,
- the general national occupational safety, accident prevention and environmental protection rules.

Only operate the machine in perfect safety-related condition.

WARNING

Risk to people of being crushed, cut, becoming entangled, being drawn in and risk of impact to people if the machine is not in adequate reliable condition!

Check the machine for its operational safety every day.

3.2 Organisational measures

The 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.
- 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

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 work,
- to acquaint themselves with the following regulations before starting work and to observe them during work:
  - the general national occupational safety, accident prevention and environmental protection rules,
  - the chapter "Basic safety instructions", page 27,
  - the chapter "Warning and instruction signs", page 34, and to observe the warning signs when operating the machine,
  - to read the chapters of these 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 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 instructions,
- which is marked with the annex "Shop work" in these instructions.

Activity \ Staff	Member of staff especially trained for the activity [1)]	Instructed person [2)]	Staff with professional training (Authorized workshop) [3)]
Loading / Transport	X	X	X
Commissioning	--	X	X
Setup	--	--	X
Operation	--	X	X
Service and maintenance	--	X	X
Trouble-shooting	--	X	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, provided that no people are within the machine's hazardous area. Observe the information in the chapter "Hazardous area and dangerous spots", page 16.

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

- 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 incorporation will become invalid.
- Exclusively use original spare parts or modification and accessory parts approved by the manufacturer such that:
  - the declaration of incorporation 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 spare parts of the manufacturer or parts approved by the manufacturer. 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.

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 information included in the 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!
- Wear your personal protective equipment when carrying out work on the machine!
- 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!
- Make sure that people leave the hazardous area of the machine before starting the machine! Particularly be aware of children!
- Wait for the machine to stop completely before entering the hazardous area of the machine.

- The following measures are imperative before carrying out any work on the machine such as maintenance work or trouble-

shooting:

- Secure the machine against accidental starting,
- secure lifted machine parts / the lifted machine against accidental lowering.

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 or moving parts!
- Start the machine only if all protective devices have been installed and are in protective position!
- 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!
- Powered (e. g. hydraulically) movable machine parts have crushing and shearing zones!
- You are only allowed to operate powered machine parts if there are no people within the machine's hazardous area!

3.4.2 Hydraulic system

The hydraulic system is under high pressure!

- Ensure to properly connect the hydraulic hose pipes!
- Make sure that the hydraulic system has been depressurized when connecting the hydraulic hose pipes!
- Do not block any operating elements, 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 respective operating element is released.

  This shall not apply to:
  - continuous movements of devices,
  - automatically controlled movements of devices,
  - movements of devices which, for functional reasons, require an open-centre or pressing position.
- Before carrying out any work on the hydraulic system:
  - secure lifted movable machine parts against accidental lowering,
  - depressurize the hydraulic system,
  - switch the gear motor off,
  - secure machine against accidental starting!
- Have hydraulic hose pipes checked for their operational safety

by an expert at least once a year!

- Replace hydraulic hose pipes in case of visible defects, damage and ageing! Only use original hydraulic hose pipes!
- The period of use of the hydraulic hose pipes should not exceed six years, including a maximum possible shelf life of two years!

  Even when properly stored and exposed to admissible stress, hoses and hose connections are subject to natural ageing, which involves a limited shelf life and period of use. Notwithstanding these facts, the period of use may be specified according to experience, in particular taking into account the risk potential. For thermoplastic hoses and hose pipes, other reference values may be relevant.
- Never try to block leaking hydraulic hose pipes with your hand or fingers!

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

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

3.4.3 Electrical system

The machine can be equipped with electronic components and parts, the functioning of which may be affected by electromagnetic emissions of other devices. Such interferences may be a risk to people if the following safety instructions are not observed:

- In case of a retrofitting of electrical devices or components into the machine and their connection to the mains, the user must check on his own responsibility whether the retrofitted parts interfere with the electronics or other components.
- Ensure that the retrofitted electrical and electronic components comply with the EMC directive 2004/10EC as amended from time to time and bear the CE symbol!

3.4.4 Propeller shaft operation

- Only use the propeller shafts specified by the manufacturer and equipped with the proper protective devices!
- Observe the information included in the operating instructions for the supplied propeller shaft!
- Check the propeller shaft:
  - protective tube and protective cone of the propeller shaft must be undamaged,
  - protective sleeve at the angular gear and the gear motor cover must be undamaged.
- Mounting and dismounting of the propeller shaft is only allowed with the gear motor switched off.
- Always ensure proper mounting and securing of the propeller shaft!
- Secure the propeller shaft guard against rotation by installing the chain(s)!
- Observe the operating position of the specified tubular covers of the propeller shafts!
- Before switching the gear motor on, check whether the sense of rotation of the gear motor complies with the sense of rotation of the machine!
- People are not allowed within the range of the rotating propeller shaft when work on the propeller shaft is being carried out!
- Risk of injury due to the flywheel mass of machine parts continuing to rotate for a short time after the gear motor 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.

3.4.5 Fodder mixing system

- Charge the solid material dosing system by means of a tractor equipped with a front loader, by means of a yard or wheeled loader, a telescopic loader or a conveying device.
- People are not allowed:
  - above the solid material dosing system, e.g. to fill the mixing container manually from a silo or a hayloft! People who are standing above the mixing container risk to fall into the mixing container,
  - to climb onto the top edge of the mixing container,
  - to enter or reach into the mixing container!
- Risk of crushing when opening and closing the discharge door. Before opening or closing the discharge door, make sure that people and animals leave the hazardous area!
- Risk of injuries caused by the sharp-edged cutting knives of the mixing auger.
- When using electrical tools, the connecting cables must not be moved over sharp-edged cutting knives!

3.4.6 Service and maintenance of machine

- Carry out the required service and maintenance work on the machine in due time!
- Existing mechanical, electrical or electronic residual energies may cause accidental machine movements!

  Beware of existing residual energies in the machine when carrying out maintenance work.
- Secure all operating media against accidental startup!
- Fix larger assemblies carefully to lifting equipment and secure them before replacing larger assemblies!
- Regularly check screws and nuts for tightness! Retighten loosened screws and nuts!
- Use appropriate equipment and gloves when replacing working tools with blades!
- Check unscrewed joints for tightness. After finishing maintenance work, check the safety and protective devices for proper functioning!
- Properly handle and dispose of substances and materials used for cleaning the machine, especially:
  - when working on lubrication systems and devices,
  - when carrying out cleaning work with solvents!
- Spare parts must at least comply with the specified technical standards of the manufacturer! This is guaranteed when using original spare parts!
- Observe the maintenance intervals for wearing parts!

3.5 Activity-related safety instructions and important information

Activity-related safety instructions and important information are included in the 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.

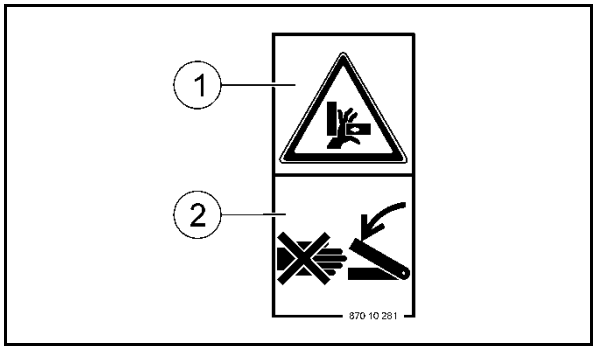


Fig. 9

Explanations of warning signs

The following list includes:

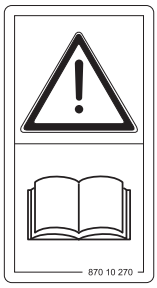
- in the right-hand column all warning signs attached to the machine,
- in the left-hand column the following details referring to the warning sign on the right-hand side:

1. The order number.
2. The description of risk, e. g. "Risk of crushing fingers or hand due to accessible movable machine parts!"
3. 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."
4. The instruction(s) how to avoid the risk, e. g. "Never reach into the dangerous spot as long as the gear motor is running with the propeller shaft coupled / the electronic system connected. Make sure that people leave the hazardous area of the machine before moving machine parts."

Order number and explanation	Warning signs

870 10 270

Please read and observe the operating and safety instructions before commissioning!

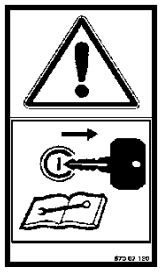


870 07 120

Risks when carrying out work on the machine such as mounting, adjusting, trouble-shooting and maintenance, due to accidental starting of the machine!

This risk may cause most serious injuries or even death.

- Secure the machine against accidental starting 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.



870 07 117

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 engine is running with the propeller shaft coupled / the hydraulic / electronic system connected.

870 10 276

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.

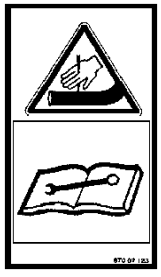
- Keep sufficient safe distance to powered working tools.
- Ensure that people keep sufficient safe distance to powered working tools.

870 07 123

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



870 10 280

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 engine is running with the propeller shaft coupled / the electronic system connected.

870 10 278

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

This risk may cause most serious injuries or even death.

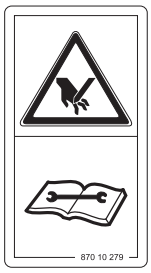
- Keep sufficient safe distance to the propeller shaft as long as the gear motor is running with the propeller shaft coupled.
- Ensure that people keep sufficient safe distance to the powered propeller shaft.

870 10 279

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

This risk may cause most serious injuries including loss of fingers and hands.

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



870 10 283

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.

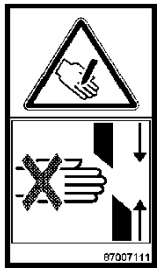
- Keep sufficient safe distance to the hazardous area of the machine.
- Ensure that people keep sufficient safe distance to the hazardous area of the machine as long as the engine is running.

870 07 111

Risk of cuts for fingers and hands, of shearing and crushing due to moving components!

This risk may cause most serious injuries including loss of fingers and hands.

- Keep sufficient safe distance to the moving components until the movement has completely stopped.
- Never reach into the hazardous area as long as the engine is running with the propeller shaft coupled / the hydraulic / electronic system connected.



870 12 568

Risk of becoming entangled, wound up, being drawn in and risk of slipping, stumbling or falling if people fall from the top edge of the mixing container!

This risk may cause most serious injuries or even death.

- People are not allowed above the top edge of the mixing container.
- Never bend over the mixing container.

870 10 287

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 is not allowed:

- mechanical processing of the sub-frame,
- drilling at the sub-frame,
- boring up of existing holes at the sub-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.

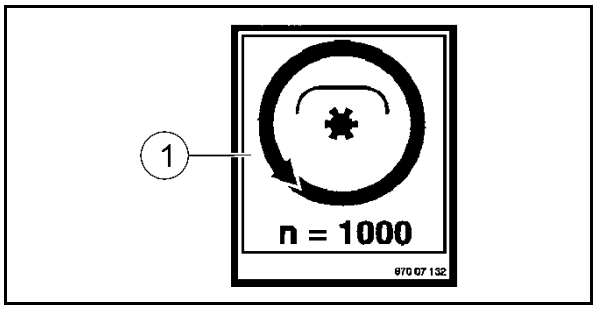
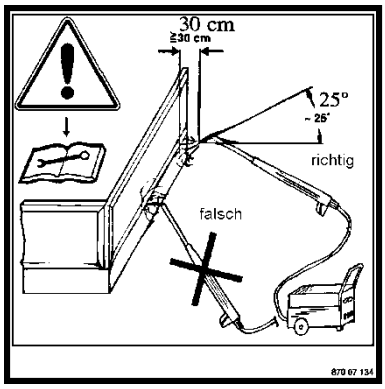


Fig. 10

Order number and explanation	Instruction signs
870 07 134 **Risk due to improper cleaning of the machine.** Absolutely observe the information in the chapter "Cleaning by means of pressure washer / steam blaster" on page 74 when using a pressure washer / steam blaster for cleaning the machine.	
870 12 547 The pictograph marks lifting points for fixing lifting equipment when loading the machine.	
877 06 091 The pictograph marks anchorage points for fixing securing equipment for transport of the machine.	

3.6.3 Placing of warning and instruction signs

The following figure illustrates the position of the warning and instruction signs on the machine.

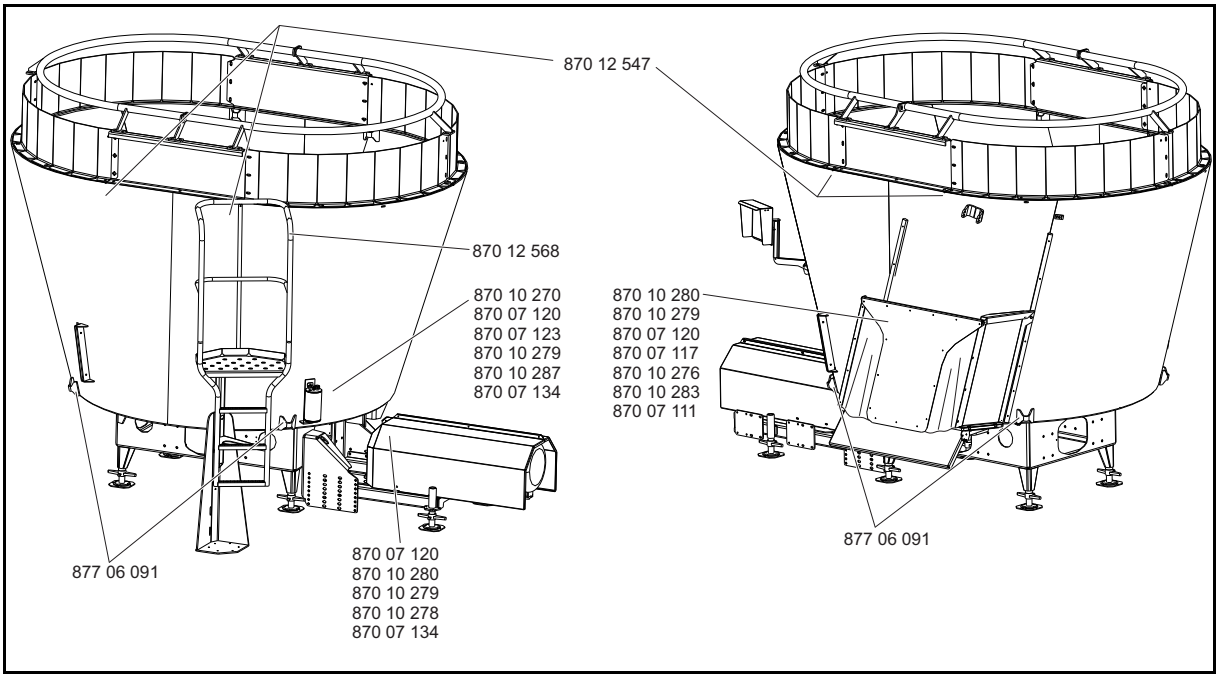


Fig. 11

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

Loading and unloading by means of lifting equipment

WARNING

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

- It is imperative to use the marked lifting points / anchorage points when fixing lifting / securing equipment for loading and unloading the machine.
- Use appropriate slings which are able to safely carry the machine's weight.
- Never stand within the lifting zone beneath the lifted machine.

Lifting points for fixing lifting equipment are identified on the machine by pictograph 870 12 547 (Fig. 12).

Fig. 12

Anchorage points for fixing securing equipment are identified on the machine by pictograph 877 06 091 (Fig. 13).

Fig. 13

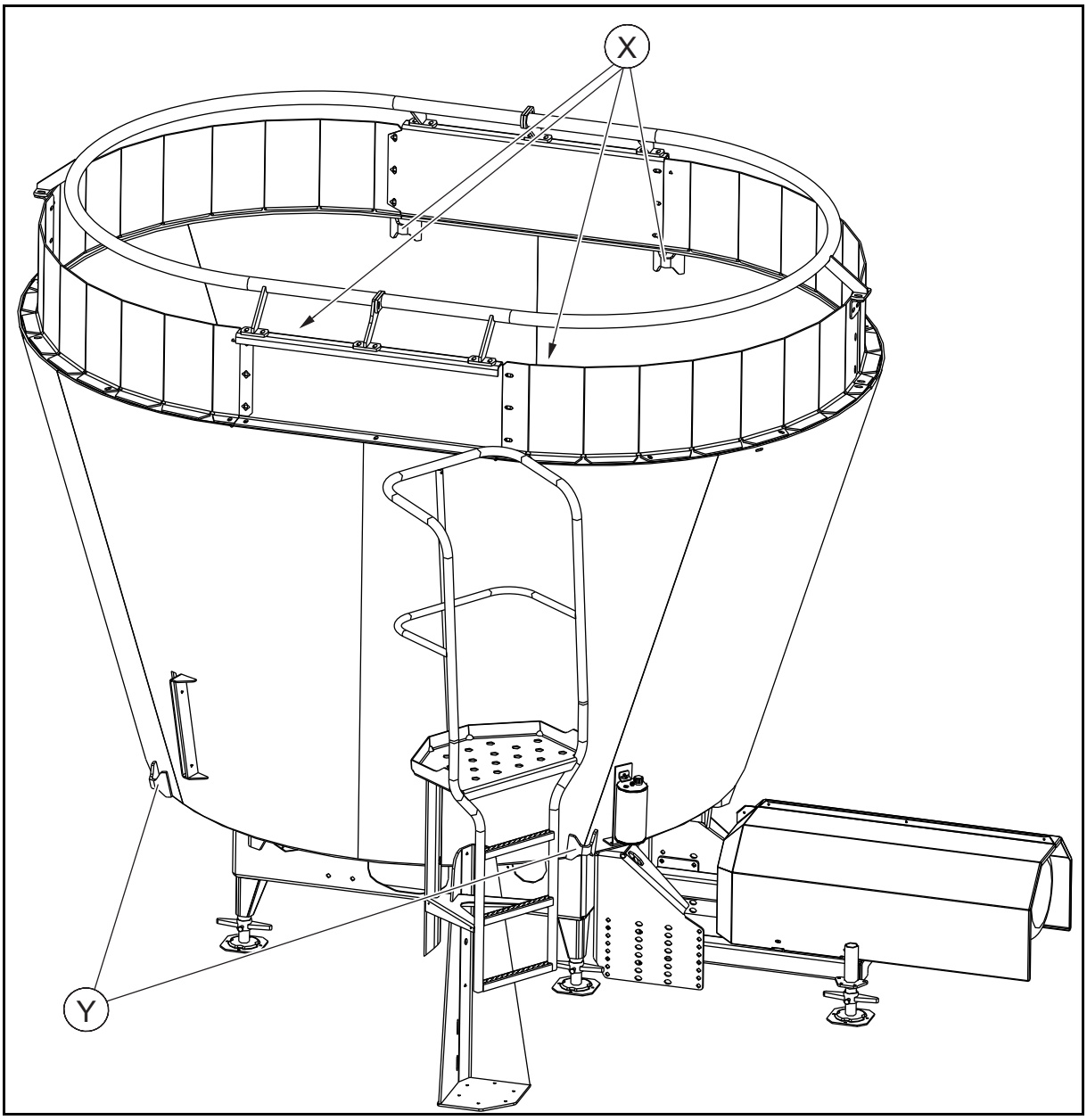


Fig. 14

(X) 4x lifting points

(Y) 4x anchorage points

5 Design and function

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 instructions and are available at extra cost.

5.1 Mixing container and mixing auger

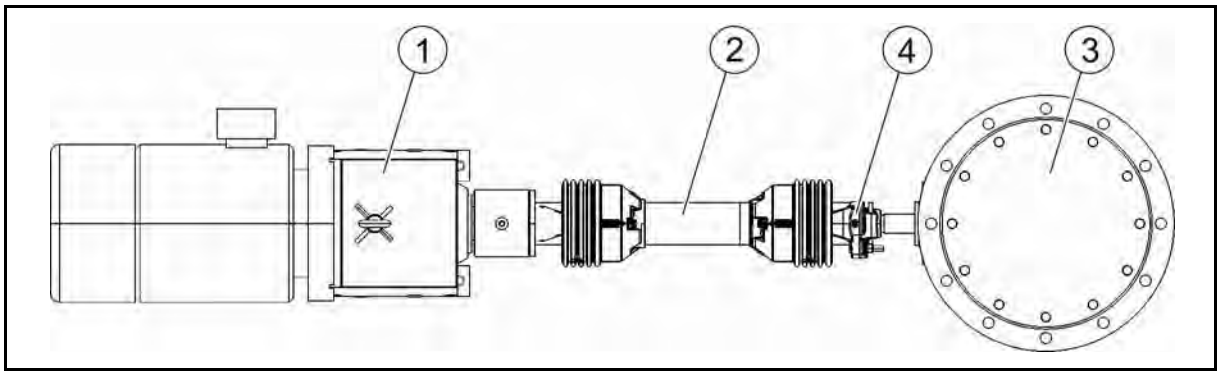


Fig. 15

Each mixing auger is mechanically powered by a gear motor (1) via a propeller shaft (2) and an angular gear (3).

The propeller shaft (2) is equipped with a shear bolt coupling (4). In case of overload, the shear bolt of the shear bolt coupling shears off thus interrupting the power flux between the gear motor and the mixing auger. This protects the power train of the mixing auger from being damaged.

The output speed of the gear motor and the individual angular gear design determine the drive speed(s) of the mixing auger(s).

During the mixing process, the mixing auger(s) first transport the solid materials filled in upwards in the centre of the mixing auger. The solid materials then fall down the container wall so that a mixing cycle is generated.

5.1.1 Cutting knives of mixing augers

In the mixing container, the cutting knives (1) of the mixing auger(s) (2) chop and mix the solid materials filled in. The number of cutting knives mounted on a mixing auger depends on the diameter and the height of the mixing auger.

Additional scrapers mounted opposite the front auger end of the respective mixing augers ensure a uniform discharge of the mixed materials.

The cutting knives (1) may be screwed onto the mixing auger in a retracted position (3) (standard) and in an extended position (4). Adjustment of the cutting knives permits to individually adapt the mixing system to the operating conditions and the structure of the solid materials to be mixed.

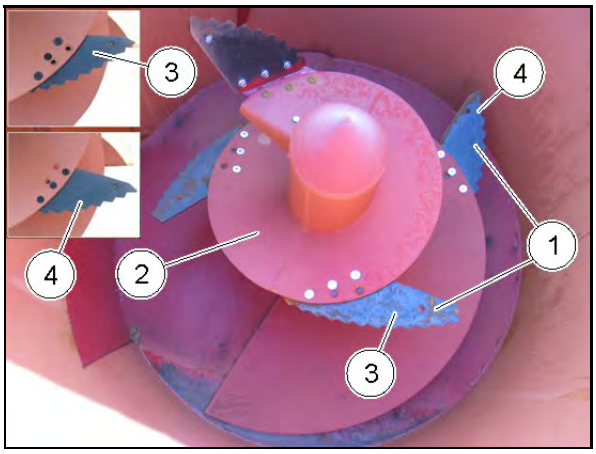


Fig. 16

- **Retracted position of cutting knives:**
  - o easier cutting,
  - o better undoing of bales,
  - o less driving power required.
- **Extended position of cutting knives:**
  - o cutting with more effort,
  - o support of discharge of highly-structured mixtures at the discharge opening,
  - o all cutting knives extended leads to worse undoing of bales,
  - o better picking-up and new inclusion in the intensive mixing process of bale components by one extended cutting knife at the top of the mixing auger,
  - o requires high driving power.

5.1.2 Attachment

DANGER	**Risk of damage to the machine due to overload caused by filling too much mass into the mixing container due to a non-approved attachment!**
	Exclusively use approved attachments.

Optional extra:

The attachment (1) increases the capacity and prevents the solid materials from being thrown over the container edge during mixing.

The attachment is screwed to the top edge of the container.

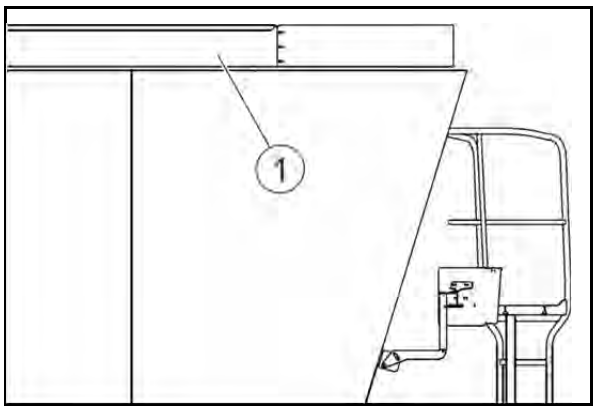


Fig. 17

5.1.3 Overflow ring

Optional extra:

The overflow ring (1) prevents the fodder from being thrown over the container edge during mixing.

The overflow ring is screwed to the top edge of the container (2) and available in two designs:

Depending on the machine's equipment, it is fitted with:

- an elevated overflow ring (Fig. 18), screwed on the top edge of the container,

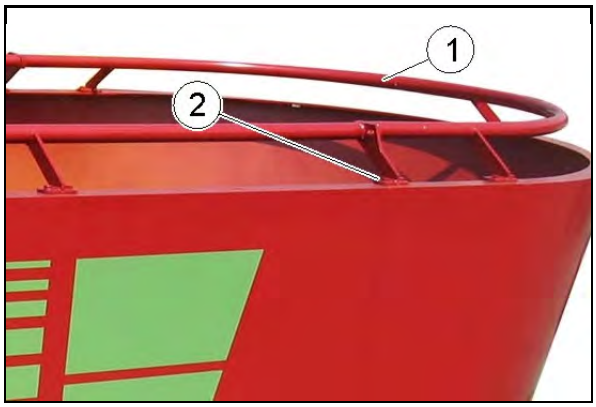


Fig. 18

- an inner overflow ring (Fig. 19).

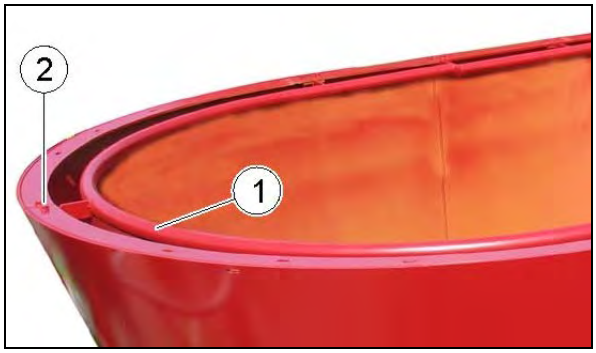


Fig. 19

5.1.4 Counter-cutters

The use of the counter-cutters (1) allows finer chopping and faster mixing of highly-structured solid materials.

The counter-cutters:

- are e.g. used for chopping and mixing round or cuboid bales,
- can be extended into the mixing container by placing the bolt (2) in 4 possible positions.
- are working the more effectively, the further the counter-cutters are extended into the mixing container,
- are, as a standard feature, manually extended into the mixing container or retracted.

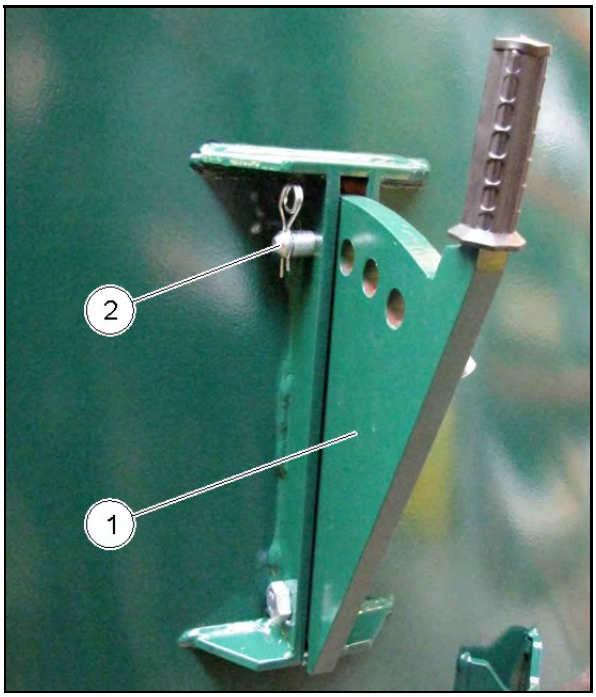


Fig. 20

Optional extra:

The counter-cutters (1) may be equipped with a hydraulic cylinder (2).

The hydraulic cylinders:

- permit the remotely controlled extension and retraction of the counter-cutters,
- can be extended into the mixing container by placing the bolt (3) in 4 possible positions.

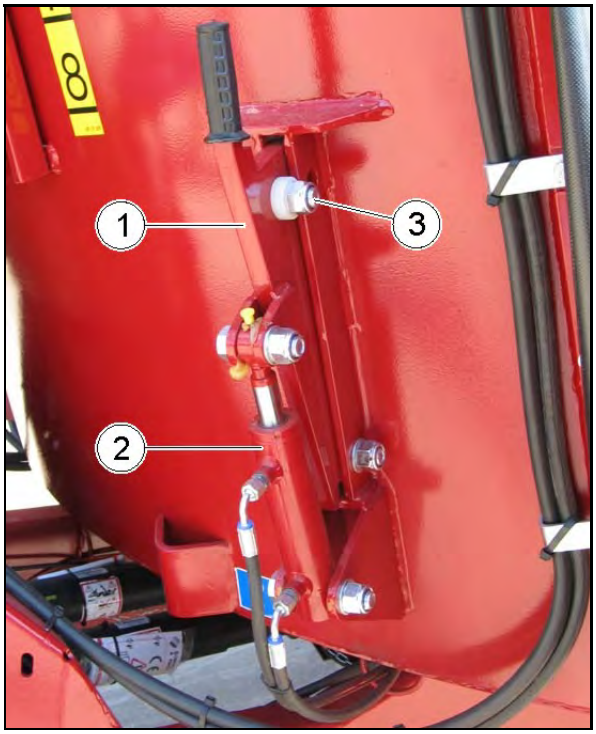


Fig. 21

5.2 Platform

Use the platform for supervision of the mixing process.

From the platform the mixing process can easily be monitored / supervised.

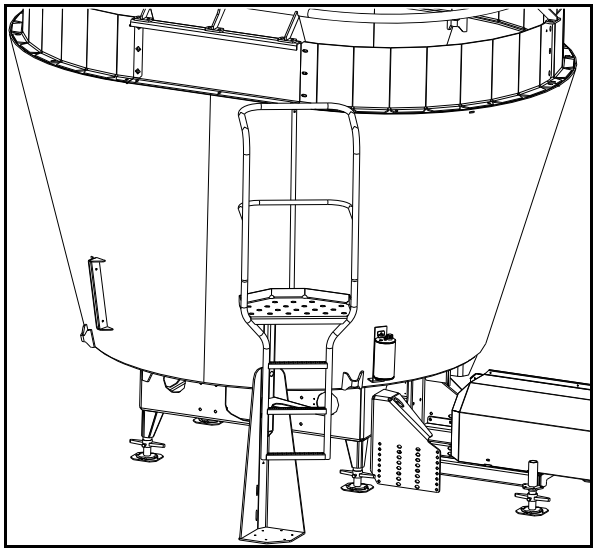


Fig. 22

5.3 Discharge options

Through the discharge device, the mixed materials are directly transported from the mixing container into a conveying device.

Depending on the machine's equipment, it is fitted with:

- a rear left-hand discharge device with protective device,
- a discharge device at the rear centre with protective device,
- a discharge device at the rear centre with protective device for discharge conveyor.

5.3.1 Rear left-hand discharge device with protective device

The rear left-hand discharge device ensures that the mixed fodder components are directly thrown from the mixing container onto the conveyor.

5.3.2 Discharge device at the rear centre with protective device

The discharge device at the rear centre ensures that the mixed fodder components are directly thrown from the mixing container onto the conveyor.

5.3.3 Discharge conveyor for discharge device at the rear centre

The discharge conveyor at the rear centre helps to discharge fodder onto a higher conveyor.

The discharge conveyor:

- is directly mounted in front of the discharge device at the rear centre,
- is powered by a hydraulic motor. The conveyor speed cannot be adjusted.
- is swivelled from its transport position to its working position and vice versa by means of the double-acting hydraulic cylinder.

Switching the driving mechanism on and off and switching from transport position to working position and vice versa is effected via remote control by means of the electro-hydraulic control (control set).

Beware of the local circumstances when swivelling the discharge conveyor.

5.3.4 Open and close discharge door for discharge opening

The discharge door (1) of the discharge opening (2) is opened and closed via the hydraulic cylinder (3).

The hydraulic cylinder is actuated via remote control by means of the electro-hydraulic control (control set).

The opening width of the discharge door (1) and the structure of the mixed fodder components determine the discharged fodder quantity.

The set opening width of the discharge door is indicated by the pointer (4) on the scale (5).

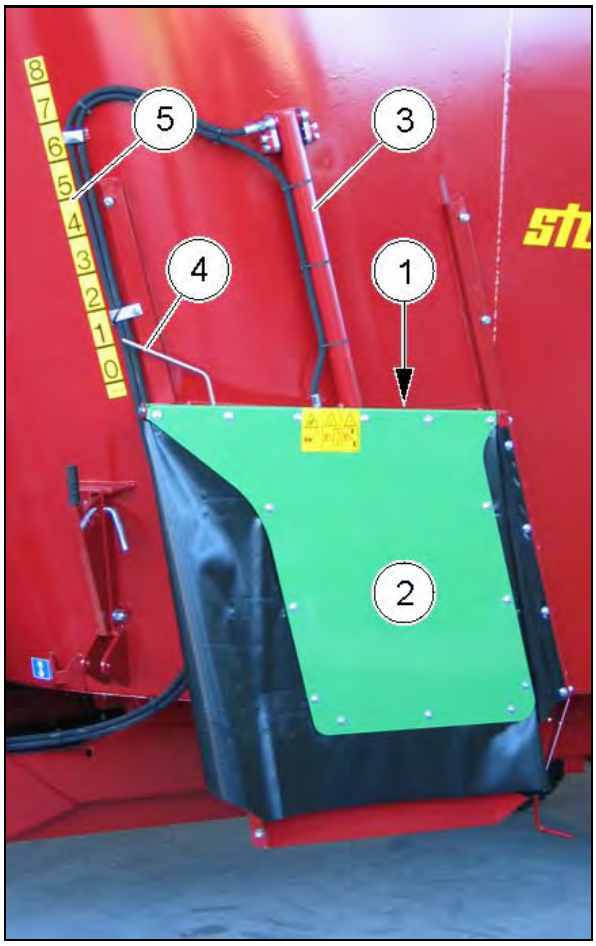


Fig. 23

5.4 Weighing device

Optional extra:

Depending on the machine's equipment, it is fitted with:

- an adding weighing device to determine the quantities of solid material filled in,
- a programmable weighing device offering the possibility to save several recipes and to transfer data to the PC.

During charging and distributing, the weight display of the weighing device can be swivelled into the desired direction for better visibility via the swivelling holder.

Observe the included operating instructions of the weighing device.

Fig. 24

The actual weight of the solid materials filled into the mixing container is calculated by means of the weighing rods (1). The weighing rods are mounted between the container and the sub-frame.

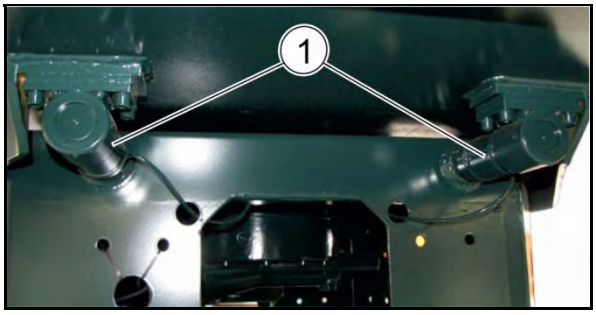


Fig. 25

5.5 Operating elements

Actuation of the machine's hydraulic and electrical function(s) is effected via remote control by means of the electro-hydraulic control (control set).

5.5.1 Electro-hydraulic control (control set)

The individual hydraulic components of the machine are connected to a control block. To ensure the oil supply, the control block is connected to the hydraulic system via a double-acting control device or a single-acting control device and a free return line.

The electro-hydraulic control (control set) serves to actuate the hydraulic functions of the machine via remote control if the oil circulation between the hydraulic system and the machine has been switched on.

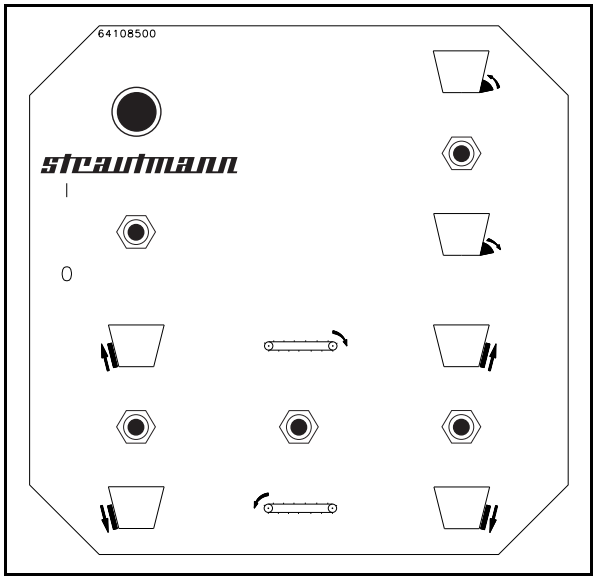


Fig. 26

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

The control set:

- is mounted on a stand within view and easy reach such that the operating elements are easily accessible,
- is equipped with several operating elements such as key buttons and toggle switches.

The control system must be connected via the 3-wire connecting cable. For details refer to the circuit diagram, page 99.

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

- In touch-control design for folding, swivelling or sliding movable machine parts, e. g. discharge door, hydraulic counter-cutters etc. The function is only carried out when the operating element is actuated and kept hold of. As soon as the operating element is released, it returns to its neutral position and the action is stopped.
- In latch-in design for movements requiring continuous action 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

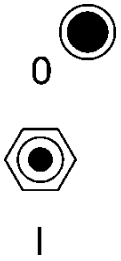
Designation in case of 2 switch positions:

- Switch position: 1 - Function I
- Switch position: 0 - Neutral position.

5.5.1.1 Possible symbols and their meaning

The following paragraphs show the possible symbols on the control set and their meaning.

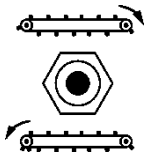
Switch control set on / off

Symbol	Position of toggle switch	Control set
	0 (OFF) top (latch-in)	off (green control lamp does not light up)
	I (ON) bottom (latch-in)	on (green control lamp lights up)

Open / Close discharge door

Symbol	Position of key button	Front discharge door
	top (touch-control)	open
	neutral position	action stops
	bottom (touch-control)	close
	not assigned	not assigned
	not assigned	not assigned
	not assigned	not assigned

Switch discharge conveyor

Symbol	Position of toggle switch	Discharge conveyor
	top (latch-in design)	discharge conveyor On
	neutral position	discharge conveyor Off
	not assigned	not assigned

Extend and retract counter-cutters

Symbol	Position of key button	Counter-cutters
	top (touch-control)	extending (in)
	neutral position	action stops
	bottom (touch-control)	retracting (out)

5.5.1.2 Electro-hydraulic control block

(1) Electro-hydraulic control block

(2) Entry plate

(3) Connection pressure pipe P

(4) Control unit with directional control valve for hydraulic cylinder of discharge door, hydraulic cylinder of discharge conveyor, hydraulic cylinder of counter-cutters

(5) End plate

(6) Connection return pipe T

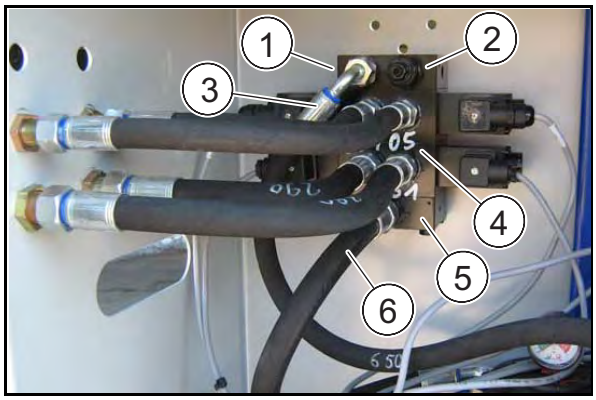


Fig. 27

5.5.1.3 Emergency manual operation in case of failure of electrical system

In case of failure of the electrical system, the solenoids for switching the directional control valves and directional seat valves can be actuated directly at the electro-hydraulic control block via the emergency manual operation function.

Use a blunt object (1) to push in the armature of the solenoid at the respective control valve to actuate the required hydraulic function.

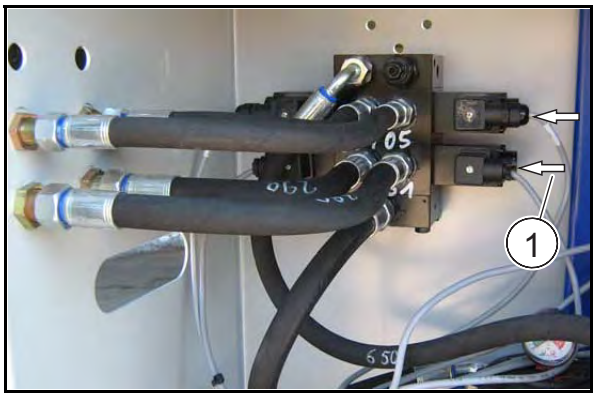


Fig. 28

5.6 Propeller shaft

The power transmission between the gear motor and the 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.
- Regularly check all protective devices of the propeller shaft for proper mounting and functioning.
- Immediately have damaged or missing parts of the propeller shaft replaced by original spare 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 gear motor and the powered machine!

Ensure that the power train between the gear motor and the powered machine is completely protected:

- The unprotected parts of the propeller shaft must always be protected by means of a protective hood mounted on the gear motor and a protective sleeve mounted on the angular gear.

5.7 Installation and connection

- Observe the safe distance to movable and immovable components required by law.
- Only qualified staff are allowed to connect the gear motor. Observe the information in the chapter "Overview – Supply lines between machine and system“, page 14 and the included operating instructions for the gear motor.

  Danger to life in case of improper connection!
- Exclusively connect the included gear motor(s) with an appropriate gear shaft.
- Observe the regulations for connections of the power supply companies.
- In order to ensure trouble-free weighing, the machine must not come into contact with feeding or discharging conveyor systems.

5.7.1 Installation

Build an amply dimensioned, solid, even and horizontal foundation which meets the machine requirements and complies with state-of-the-art technology.

Make sure that a lockable emergency stop switch is connected at an appropriate position, in order to establish the machine's readiness for operation.

1. Set down the machine on appropriate ground.
2. Align the machine to the feeding system.
3. Align the machine in horizontal position by adjusting the adjustable legs.
4. Mount the platform.

Check the distance X between the top edge of the mixing container and the standing surface of the platform. The distance X shall

- be not less than 1.20 m
- be not more than 1.60 m

Correct this distance if necessary.

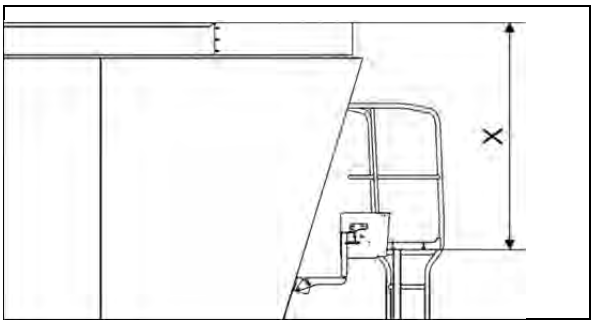


Fig. 29

5. Have the gear motor installed and connected by qualified staff.
   - o Cable cross sections and gear motor fuse must be selected according to the motor rating and the operating conditions.

6. Check the gear motor connection by comparing the sense of rotation of the mixing auger(s) with that illustrated in Fig. 30.

   6.1 If the sense of rotation of the mixing auger(s) is not identical to that illustrated in Fig. 30, the sense of rotation must be corrected by interchanging two phases.

7. Mount a lockable emergency stop switch (not included in the scope of delivery) on the machine within easy reach.

8. Connect the weighing device. Observe the included operating instructions for the weighing device.

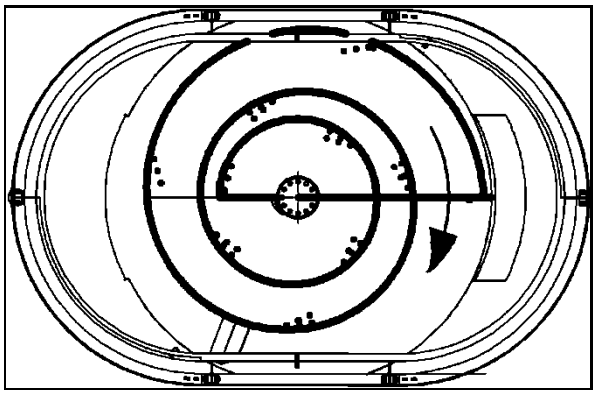


Fig. 30

5.7.2 Establish potential equalization

Check the correct potential equalization establishment by measuring the resistance by means of appropriate testing equipment!

1. Establish a potential equalization (connection to ground) between:

   - the container, the sub-frame and the gear motor support and the ground conductor of the complete system.
   - between the control system of the weighing device and the ground conductor of the system.

   1.1 Screw the connecting cable (1) to an M8 screw (2) on the machine. For details refer to Fig. 31 for Verti-Mix S and to Fig. 32 for Verti-Mix D-S.

   1.2 For establishing a potential equalization between the control system of the weighing device and the ground conductor of the system, observe the included operating instructions for the weighing device.

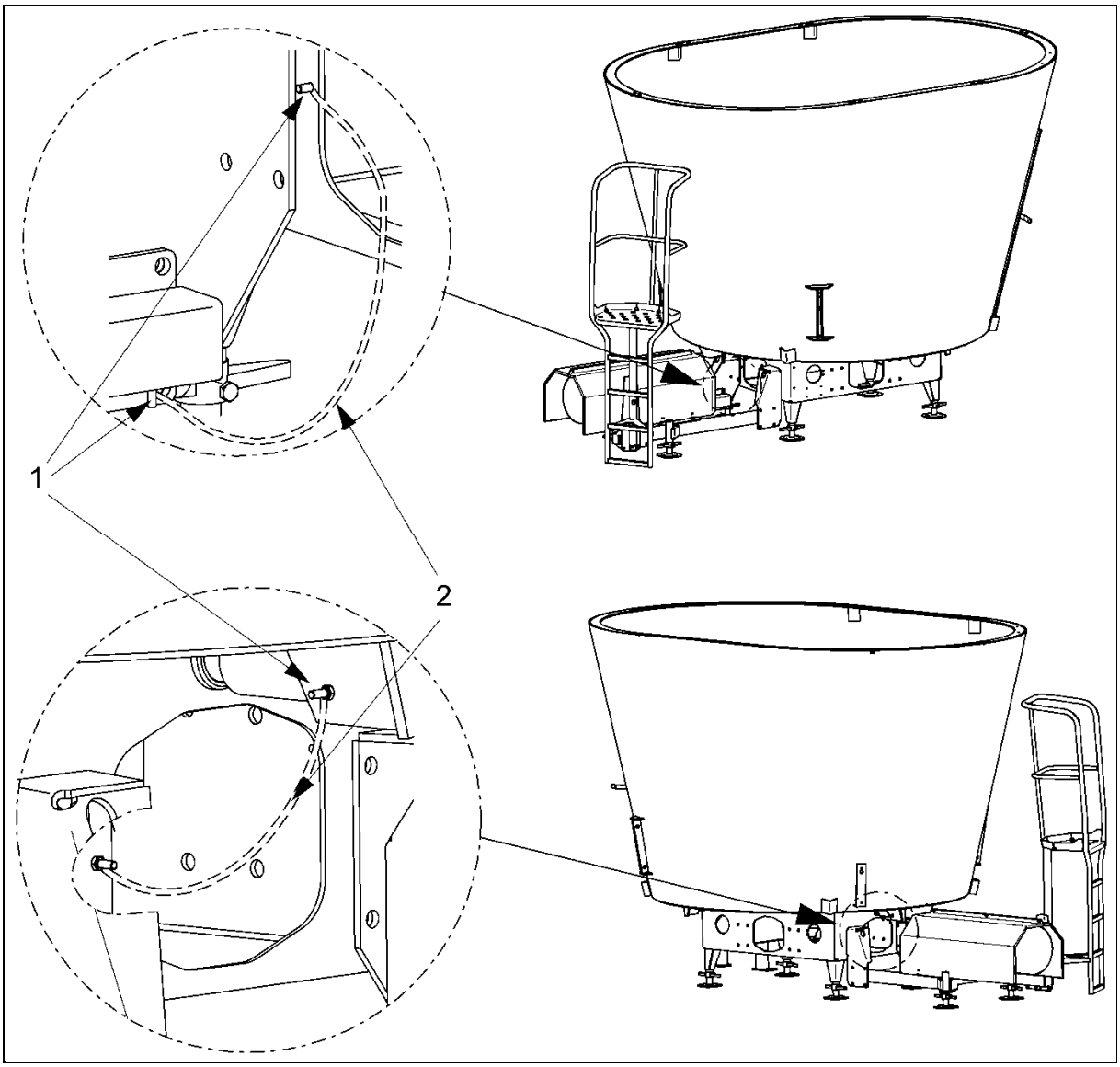


Fig. 31 Verti-Mix S

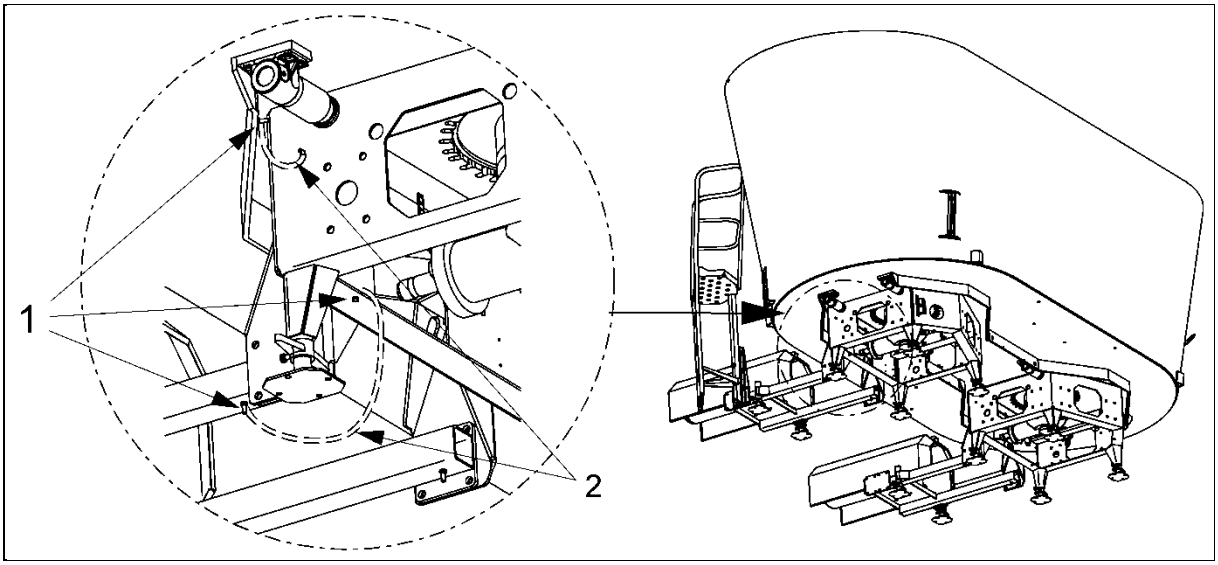


Fig. 32 Verti-Mix D-S

5.8 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 has been depressurized when connecting and disconnecting the hydraulic hose pipes. Always swivel the operating element at the control device to open-centre position.

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

5.8.1 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 details refer to the chapter "Overview – Supply lines between machine and system", page 14.
- 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.
- Do not mix mineral oils with bio oils!
- Observe the maximum admissible operating pressure of the hydraulic oil of 180 bar.
- Only connect clean hydraulic plugs and hydraulic sleeves.
- Make sure that oil cannot escape into the environment when connecting and disconnecting hydraulic hose pipes.
- 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 not chafe against external components.

1. Swivel the respective operating element at the control device to open-centre position (neutral position).
2. Clean the hydraulic plugs and the hydraulic sleeves before connecting them.
3. Connect the hydraulic hose pipes to the control devices of the hydraulic system:
   3.1 Pressure pipe (red dust cap) to a single-acting or double-acting control device.
   3.2 Return pipe (blue dust cap) to a pressure-less return port if possible.

5.8.2 Disconnect hydraulic hose pipes

CAUTION	**Risk of burns due to contact with hot hydraulic hose pipe components!**
	Do not touch considerably warmed-up components of the hydraulic hose pipes (particularly do not touch any hydraulic plugs and hydraulic sleeves).

1. Swivel the respective operating element at the control device 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.

6 Commissioning

This chapter will provide information:

- on how to proceed when commissioning your machine.

- Before commissioning, the operator must have read and understood the instructions.
- When commissioning the machine, additionally observe the information included in the chapters:
  - "Operator's obligation", page 24,
  - "Qualification of staff", page 25,
  - "Basic safety instructions", page 27,
  - "Warning and instruction signs", page 34,
  - "Service and maintenance of machine", page 72.

  Observance of these chapters serves your safety.
- Before each startup, the machine must be checked for its operational safety.

WARNING

Risk of crushing, shearing, cuts, becoming entangled and being drawn in to people if operating elements used to actuate hydraulic or electrical components are blocked!

Do not block any operating elements, 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 respective 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.

6.1 Check machine for proper functioning

Check the machine for proper functioning before the first startup:

1. Completely lubricate the fodder mixing system and the propeller shaft. Observe the information in the chapter "Lubrication of machine", page 74.
2. Check the oil level of the angular gear in the compensating reservoir for the gear lubricant oil. Observe the information in the chapter "Check oil level", page 78.
3. Check all functions of the machine before filling the mixing container for the first time:
   - 3.1 Open and close discharge door.
   - 3.2 Extend and retract hydraulic counter-cutters (if available) into and from the mixing container
   - 3.3 Let discharge conveyor (if available) run in driving direction

(in working position).

3.4 Check the weighing device (if available) for proper functioning.

6.2 Secure machine against accidental starting

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 powered working tools are not switched off,**
- **if working tools or machine parts are unintentionally powered with the machine connected to the gear motor and the gear motor running,**
- **if the gear motor is accidentally started,**
- **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:

- de-energize the gear motor and the machine,
- actuate the lockable emergency stop switch,
- secure lifted machine parts against accidental lowering.

Secure machine against accidental starting

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

→ This will prevent accidental lowering.

2. De-energize the gear motor and the machine.
3. Actuate the lockable emergency stop switch.

6.3 Enter the mixing container

You will have to enter the mixing container, e.g. to carry out maintenance work on the cutting knives of the mixing auger.

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 , e.g. an open discharge door,**
- **gear motor and machine accidentally start,**
- **the mixing auger is accidentally powered!**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure the gear motor and the machine against accidental starting before entering the mixing container.

  Observe the information in the chapter "Secure machine against accidental starting", page 60.

WARNING

Risk of falling off the machine if people enter the mixing container by climbing over the top edge of the mixing container!

As a basic principle, enter the mixing container through the discharge opening.

WARNING

Risk of cuts when entering the mixing container if the cutting knives of the mixing auger are directed towards the discharge opening!

Rotate the mixing auger such that the cutting knives are directed away from the discharge opening before entering the mixing container.

WARNING

Risk of slipping, stumbling or falling when moving in the mixing container if people slip due to insufficient stability!

- Wear appropriate protective clothing when entering the mixing container.
- Always ensure a firm standing position. Beware that the standing surface on the mixing auger is inclined.
- Cover the sharp-edged cutting knives before moving inside the mixing container.
- Remove any fodder residues and dampness before moving inside the mixing container

1. Completely open the discharge door of the discharge opening.
2. Secure the gear motor and the machine against accidental starting, see information on page 60.
3. Uncouple the propeller shaft from the engine allowing you to manually rotate the mixing auger via the propeller shaft if necessary.
4. Rotate the mixing auger such that the cutting knives are directed away from the discharge opening.
5. Unscrew the screwed connections (1) between protective cover (2) and mixing container (3).
6. Remove the screwed connection (4) of the swivel pin and take off the protective cover (2).
7. Carefully enter and leave the mixing container through the discharge opening.
8. Carefully clean the mixing container from installation material or grinding residues before leaving the mixing container.
9. Ensure that all components, tools etc. are removed from the mixing container.
10. Properly fix the protective cover (2) again at the mixing container after finishing all necessary work in the mixing container.

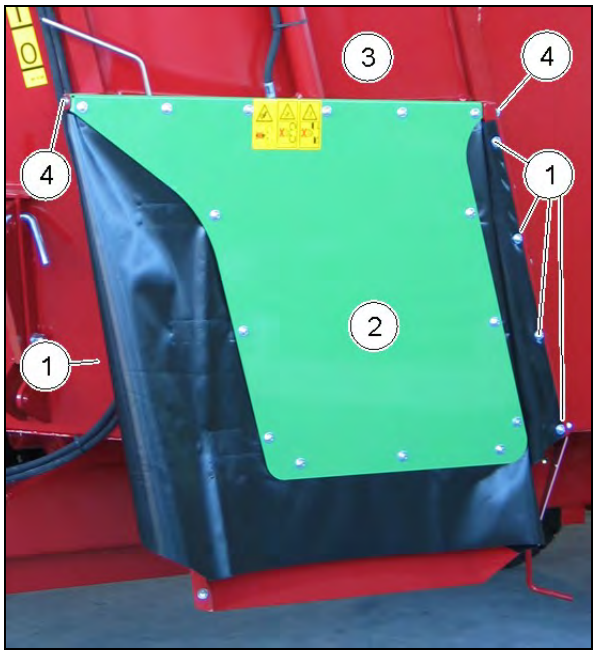


Fig. 33

7 Settings

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

- "Basic safety instructions", page 27,
- "Warning and instruction signs", page 34.
- "Secure machine against accidental starting", page 60.

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 adjusting work on the machine:

- **if powered working tools are not switched off,**
- **if working tools or machine parts are unintentionally powered with the machine connected to the gear motor and the gear motor running,**
- **if the gear motor is accidentally started,**
- **if lifted machine parts accidentally come down!**

- Secure the machine against accidental starting before carrying out adjusting work on the machine.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

7.1 Adjust cutting knives

For details refer to the chapter "Swivel / Replace cutting knives“, page 86.

7.2 Adjust counter-cutters

For details refer to the chapter "Counter-cutters“, page 45.

8 Use of machine

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

- "Operator's obligation", page 24,
- "Qualification of staff", page 25,
- "Basic safety instructions", page 27,
- "Warning and instruction signs", page 34.
- "Secure machine against accidental starting", page 60.

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!

- Regularly check the safety and protective devices of the propeller shaft for proper functioning and completeness.

  Have damaged safety and protective devices of the propeller shaft immediately replaced by an authorized workshop.
- Ensure that the propeller shaft guard is secured against twisting by means of the clip chain.
- Keep sufficient safe distance to the powered propeller shaft.
- Make sure that people leave the hazardous area of the powered propeller shaft.
- Immediately switch the gear motor 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 gear motor is running with the propeller shaft coupled / the hydraulic system connected,
  - if the gear motor can be accidentally started with the propeller shaft coupled.

  Close open protective devices before switching the machine on.

CAUTION

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

Immediately switch the gear motor off if the overload clutch engages.

This will prevent damage of the overload clutch.

WARNING

Risk of crushing, cuts, becoming entangled and being drawn in if people get into accidental touch with the powered mixing auger!

- Never reach into the mixing container through the open discharge opening with the mixing auger powered.
- Never bend over the top edge of the mixing container with the mixing auger powered.
- Never enter the mixing container.

8.1 Fill mixing container

CAUTION

Risk of breakdown of components due to overloading of the machine!

Observe the maximum load of the machine and the filling order of the individual fodder components.

The solid materials should freely move in the mixing container when the mixing auger is powered. Overloading may occur if solid materials become entangled by the counter-cutters and blockages pile up.

Overloading affects the machine's performance and service life. Damages due to overloading are excluded from warranty.

WARNING

Risk of crushing, cuts, becoming entangled or being drawn in if people get into accidental contact with the powered mixing auger due to improper filling of the mixing container!

- Only use appropriate equipment to fill the mixing container.

Appropriate equipment is:

  - o tractor equipped with front loader,
  - o telescopic loader,
  - o yard / wheeled loader,
  - o conveying device.

- People are only allowed to fill the mixing container manually if they cannot accidentally fall into the mixing container.

  People are not allowed on a level with or above the feed opening of the mixing container.

- As a basic principle, fill pourable fodder additives (e. g. mineral feed) into the mixing container by means of the loading device (loading shovel) or through the feed funnel (optional extra).
- Fill liquid or sticky fodder additives into the mixing container by means of the loading device (loading shovel).
  - o Fill the loading shovel only partly.
  - o Form a hollow in the grass or maize silage.
- o Fill the fodder additives into the hollow.

Remove baler twines and nets on the ground before filling round or cuboid bales into the mixing container by means of the loading device.

- The total fodder quantity that can be mixed and chopped in one mixing container filling cycle depends on the following factors:
  - mixing container capacity,
  - total dry mass of the solid material components to be mixed,
  - structure (stalk length and quality) of the individual solid materials,
  - way and order of filling,
  - gear motor power.
- Due to the different fodder components to be mixed, the loading quantity for one mixing container filling cycle may vary. Avoid overloading of the fodder mixing system when filling the mixing container. In case of overload:
  - the individual solid materials cannot be mixed homogeneously,
  - mechanical damage on the power train may occur,
  - cutting knives of the mixing auger may be bent.
- The mixing process will be accelerated if the mixing auger(s) is (are) powered during filling.

  If the mixing auger(s) is (are) switched on only after filling, more power will be required to set the fodder components to be mixed in motion.

1. Check the mixing container for foreign objects every day. Have the foreign object(s) removed from the mixing container if necessary.
2. Close possibly open discharge door.
3. Swivel the weighing device (if available) into filling direction.
4. Switch the weighing device on and start the programme (if available).
5. Switch the gear motor on.

→ The mixing auger(s) start(s).

6. Fill the mixing container by means of a tractor equipped with a front loader, by means of a yard / wheeled loader or from a conveying device.

8.1.1 Recommended filling order

Recommended procedure for processing round or cuboid bales:

1. Extend the counter-cutters into the mixing container.
2. Fill round or cuboid bales in.
3. Retract the counter-cutters from the mixing container after the bales have been undone.

1. Fill highly-structured fodder components (hay, straw etc.) in with the mixing auger powered.

   Have them possibly mixed for a short time before filling in the next component. A longer mixing ensures better chopping of the long stalks.
2. Fill in concentrated feed, grain feed etc.
3. Fill in mineral feed by means of the loading tool (shovel) or via the feed funnel (optional extra).
4. Fill in grass silage.
5. Fill in maize silage, grain silage.
6. Fill in fodder components with a high proportion of water, e.g. draff, potato pulp or beet chips
7. Fill liquid components such as liquid yeast, molasses into the mixing container by means of the loading tool together with the last portion of maize silage.

8.2 Mix fodder components

- The type and the structure of the used fodder components and the desired cutting length of the fodder mixture determine the duration of the last mixing cycle.

  The mixing process will be extended for highly-structured fodder components which must be cut.
- Monitor the mixing process from the ladder.
- Stop the mixing process when the fodder components have been homogeneously mixed. In case of a too long mixing process, the mixture risks to lose its structure.
- Depending on the structure of the fodder components, the counter-cutters can be extended into the mixing container at different positions.

  The counter-cutters slow down the horizontal revolving of the fodder in the mixing container, e. g. during chopping and mixing of round or cuboid bales. The further the counter-cutters project into the mixing container, the larger the slowing-down effect.

  Extend the counter-cutters into the mixing container only as far as to ensure that the fodder will not get entangled by / pile up on the counter-cutters.

  Swivel the counter-cutters only with the mixing auger stopped.
- If the mixing container happens to overflow, an overflow ring (optional extra) may help. Observe the information in the chapter "Overflow ring", page 44.
- Sharp cutting knives reduce the required mixing auger power. Regularly sharpen cutting knives. Observe the information in the chapter "Grind cutting knives", page 85.

8.3 Fodder discharge

WARNING

Risk of impact to people and animals if objects are blown out of the discharge opening or the discharge conveyor with the mixing auger powered!

Make sure that people leave the hazardous area of the discharge opening and / or the discharge conveyor before switching the engine on.

Keep animals away from the hazardous area.

The discharge of the mixed materials can be started after the mixing process has been finished.

The mixed materials quantity to be discharged is adjusted by means of the opening width of the discharge door.

- The discharge door must be completely opened when discharging very dry, long and highly-structured fodder.
- The discharge door must be opened according to the desired discharge quantity when discharging easily pourable fodder.

8.3.1 Fodder discharge through discharge openings

1. Switch the mixing auger(s) on.
2. Slowly open the discharge door via the hydraulic cylinder until the fodder is homogeneously coming out of the discharge opening. The set opening width of the discharge door is indicated by the pointer on the scale.
3. Finish fodder discharge:
   3.1 Close the discharge door.
   3.2Turn the engine off.

8.3.2 Fodder discharge via discharge conveyor for discharge at rear centre

1. Swivel the discharge conveyor to working position.
2. Tighten the screws to fix the discharge conveyor in its position.
3. Switch the discharge conveyor drive on.
4. Switch the mixing auger(s) on.
5. Open the discharge door at the desired opening width. The set opening width of the discharge door is indicated by the pointer on the scale.
6. Finish fodder discharge:
   6.1 Close the discharge door.
   6.2 Turn the engine off.
   6.3 Switch the discharge conveyor off only when the fodder discharge has been finished.

8.3.3 Eliminate blockages

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 , e.g. an open discharge door,**
- **the machine accidentally starts.**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure the machine against accidental starting, For details refer to page 60.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

WARNING

Risk of cuts if people reach into sharp-edged cutting knives of the mixing auger when eliminating blockages!

When eliminating blockages, beware that sharp-edged cutting knives of the mixing auger may be within the discharge opening area.

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact if people fall into or enter the container while eliminating blockages!

Climbing onto the top edge of the container is not allowed.

CAUTION

Risk of damage to the machine if you change the sense of rotation of the gear motor for eliminating blockages!

Never change the sense of rotation of the gear motor.

1. Open the discharge door completely.
2. Secure the machine against accidental starting,
3. Remove the protective device.
4. Eliminate the blockage such that the discharge opening gets free and the mixed materials can be easily discharged again.
5. Reset the protective device to protective position.
6. Close the discharge door.
7. Unlock the machine.
8. Switch the mixing auger(s) on.
9. Open the discharge door at the desired opening width and continue the fodder discharge.

9 Service and maintenance of machine

Regular and proper service and maintenance:

- will keep your machine ready for use for a long time and avoid early wear,
- will reduce downtimes and repairs,
- is a precondition for our warranty provisions.

- When carrying out service and maintenance work on the machine, additionally observe the information included in the following chapters:
  - "Operator's obligation", page 24,
  - "Qualification of staff", page 25,
  - "Basic safety instructions", page 27,
  - "Warning and instruction signs", page 34,
  - "Secure machine against accidental starting", page 60.

  Observance of these chapters serves your safety.
- Observe environmental measures when carrying out service and maintenance work on the machine.
- Observe legal provisions when disposing of operating materials such as oils and greases. These legal provisions also apply to parts having come into contact with those operating materials.
- As a basic principle, secure the machine against accidental starting before carrying out any service and maintenance work on the machine.
- As a basic principle, disconnect all electrical / electronic connections to the gear motor before carrying out welding work.
- It is necessary to take protective measures such as covering power supply and feed lines or removal of such lines at particularly critical spots:
  - when carrying out welding, drilling and grinding work,
  - when carrying out work by means of cutoff wheels in the vicinity of these lines.
- Check 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 instructions.
- The maintenance intervals depend on the frequency of use of your machine.

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people if:

- **lifted, unsecured machine parts accidentally come down or are unintentionally lowered,**
- **the machine accidentally starts!**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure the machine against accidental starting before carrying out any service or maintenance work on the machine.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

WARNING

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

- It is not allowed to open or remove protective devices with the gear motor running. Wait for the machine to stop completely.
- Secure the machine against accidental starting before opening protective devices.
- 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

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.

9.1 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.

9.2 Clean 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.
- Observe the legal provisions for handling and disposal of cleaning agents.
- Continuously inspect the machine for corrosion damage! Remedy corrosion damage by touching up paintwork.
- Check hydraulic hose pipes with special care for visible defects.
- Never treat hydraulic hose pipes with benzine, benzol, paraffin or mineral oils.

Cleaning by means of pressure washer / steam blaster

Absolutely observe the following when using a pressure washer / steam blaster for cleaning:

- The maximum admissible injection pressure is 80 bar.
- The maximum admissible water temperature is 60°C.
- Do not clean electrical components such as weighing rods, distributor boxes, weighing computer etc.
- Do not clean chromium-plated components.
- Never aim the cleaning nozzle jet of the pressure washer / steam blaster:
  - at lubrication points and bearings,
  - directly at hydraulic components.
- Always keep a minimum nozzle distance of 300 mm between the cleaning nozzle and the machine.
- Never aim the cleaning nozzle jet at the machine parts at right angles. The nozzle spray angle must at least be 25°.
- Do not use any chemical additives.
- Observe the safety instructions when handling pressure washers.

9.3 Lubrication of machine

- Lubricate all bearings and lubrication points according to the lubrication plan.
- Remove dirt from the lubricating nipples.
- Use environmentally friendly oils and greases where lubricants may penetrate 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.

9.3.1 Lubrication plan

Observe the included operating instructions of the propeller shaft manufacturer(s) when lubricating the propeller shaft(s).

Item	Component / Location	Number	Activity	Time / Interval
1	Guide rail, discharge door	2	grease	50 h
2	Lubricating nipple, top bearing, angular gear	1 (2)	lubricate	500 h
3	Angular gear	1 (2)	change oil	1000 h, then every 2000 h
4	Lubricating nipple, propeller shaft	5	lubricate	50 h
5	Gear motor	1 (2)	change oil	10000 h, after 2 years at the latest

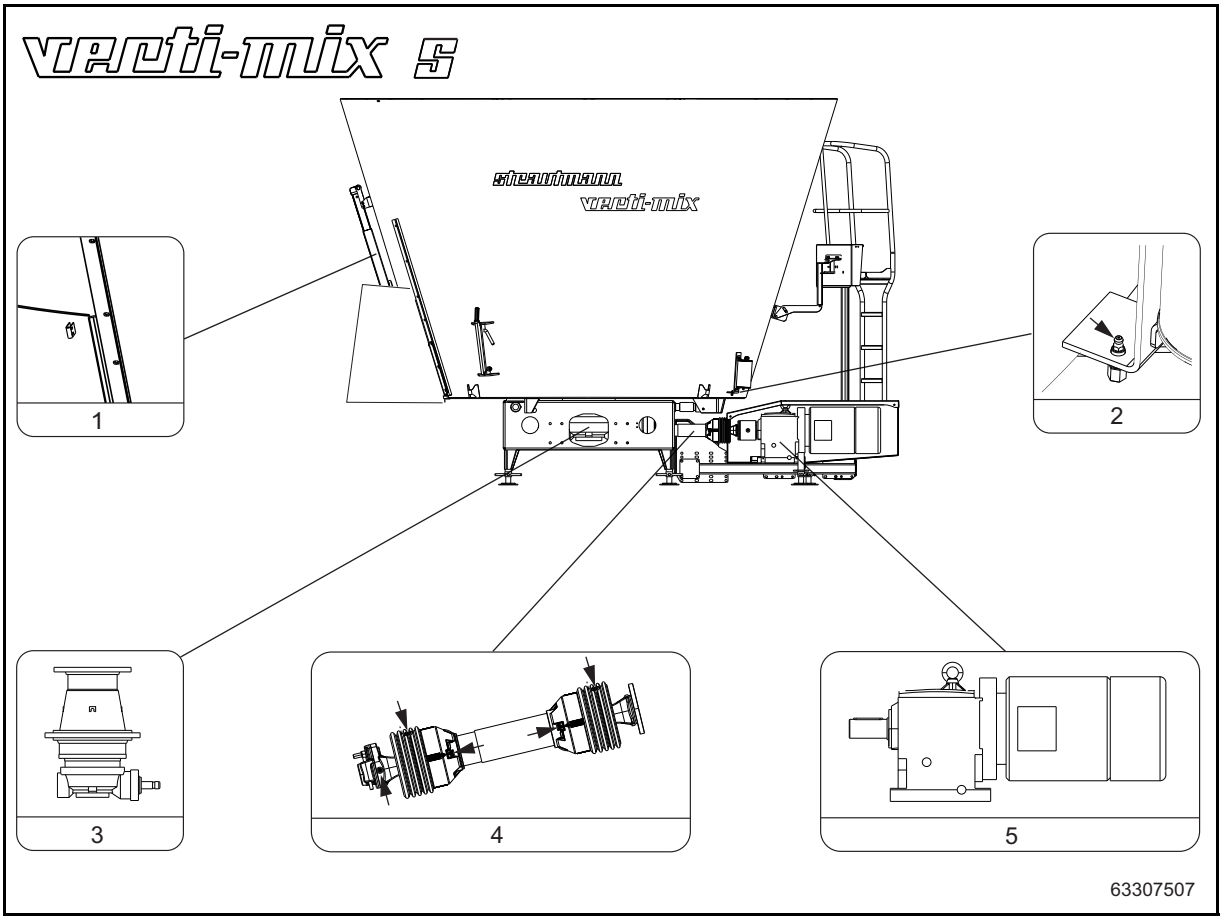


Fig. 34

9.4 Preservation / Longer downtimes

Preparing the machine for longer downtimes shall include:

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

9.5 Check / top up / change gear lubricant oil

The angular gears and the gear motor require:

- regular check / topping-up of oil level,
- change of 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.

WARNING

Risk of slipping to people due to leaking gear lubricant oil during topping-up of oil / oil change!

Immediately remove fresh oil stains by means of binding agents.

- 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.
- Optimum check of oil level is carried out at an oil temperature between 0 - 20°C.

9.5.1 Quantities when filled and change intervals

Dispose of used oil according to regulations. Contact your oil supplier in case of disposal problems!

Gearbox	Gear lubricant oil	Quantity when filled [litre]	Interval
Angular gear in Verti-Mix 750 S, Verti-Mix 1250 S, Verti-Mix 1700 D-S	EP 80W-90 / EP VG 220	18	1000 h, then 2000 h
Angular gear in Verti-Mix 2400 D-S	EP 80W-90 / EP VG 220	23	1000 h, then 2000 h
Gear motor	See included operating instructions for gear motor		10000 h, after 2 years at the latest

Tab. 6

9.5.2 Angular gear

The angular gears require:

- check of oil level and topping-up if necessary,
- change of gear lubricant oil.

9.5.2.1 Check oil level

Check the oil level before starting the mixing process, as the oil heats up during the mixing process thus rising in the compensating reservoir.

1. Check the oil level in the angular gears via the lateral compensating reservoirs (1).

   The oil level must be visible between the two markings (2, 3) of the sticker (4).

2. Top up oil through the filler neck (5) into the compensating reservoir if necessary.

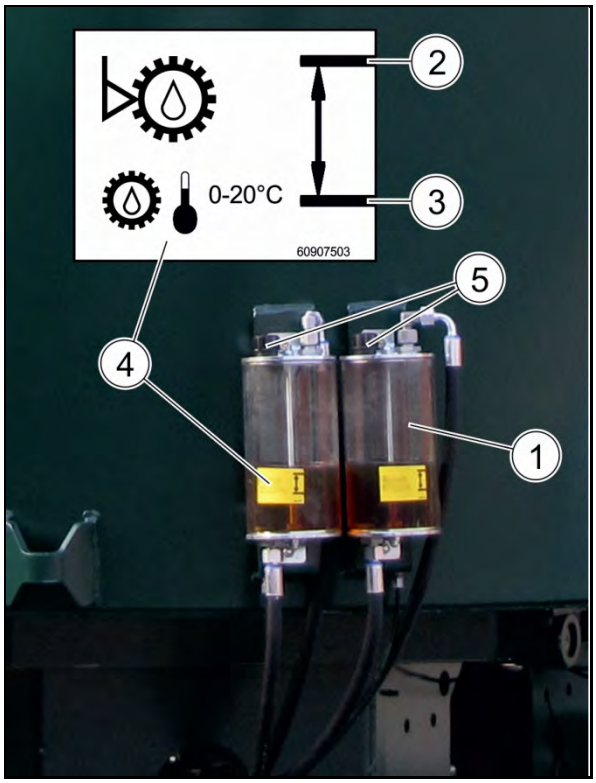


Fig. 35

9.5.2.2 Change gear lubricant oil

1. Place a drip tray beneath the drain valve of the mixer gearbox (capacity approx. 25 litres).
2. Hang one end of the oil drain hose (M 26 x 1.5) (not included in the scope of delivery) into the drip tray.
3. Remove the cap from the drain valve (1).
4. Screw the other end of the oil drain hose onto the drain valve (1).

→ The drain valve automatically opens.

→ The gear lubricant oil drains off into the drip tray.

5. Wait for the oil to stop draining off through the oil drain hose.
6. Connect a filling pump to the oil drain hose.
7. Fill gear lubricant oil through the filling pump into the mixer gearbox until the gear lubricant oil pours into the compensating reservoir through the connector and the oil level is visible between the two markings of the sticker (4) (18 / 23 litres).

Fill the gear lubricant oil slowly into the mixer gearbox, in order to avoid formation of bubbles. In case of bubbles forming, the mixer gearbox cannot be filled with the required quantity of gear lubricant oil.

8. Disconnect the filling pump from the oil drain hose.
9. Unscrew the oil drain hose from the drain valve (1).
10. Screw the cap onto the drain valve (1).
11. Carry out a test run for several minutes.
12. Check the oil level in the compensating reservoir afterwards.
13. Top up oil through the filler neck (2) into the compensating reservoir if necessary.
14. Check the oil level in the mixer gearbox several times a day during the first 10 service hours after changing the gear lubricant oil.

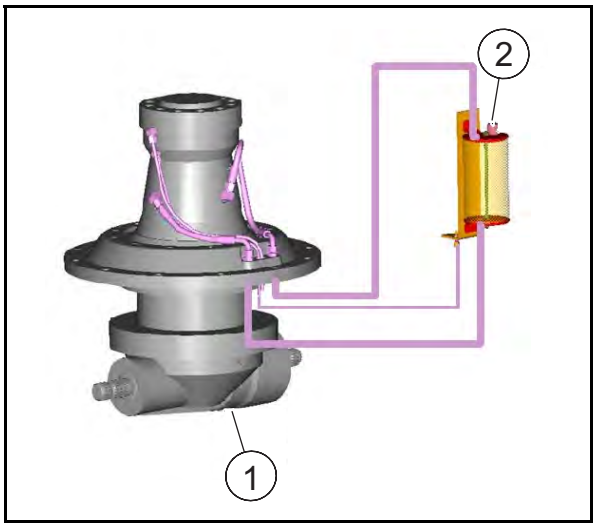


Fig. 36

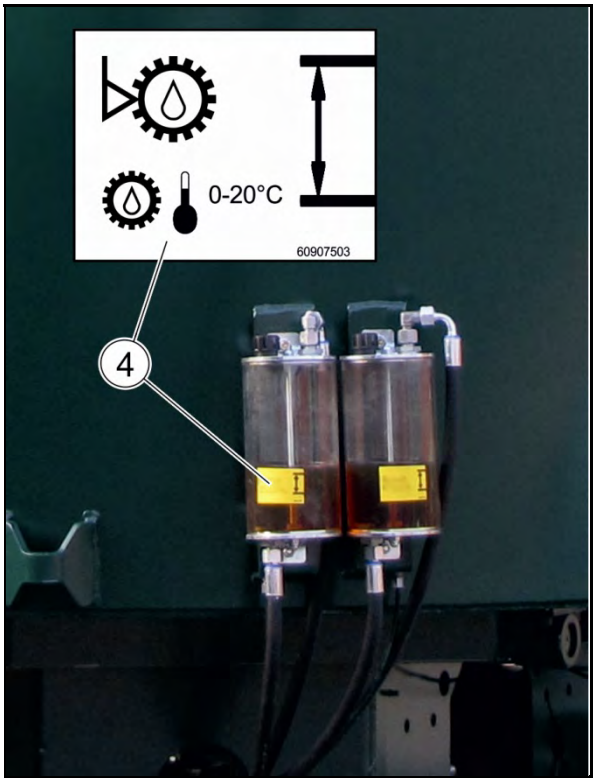


Fig. 37

9.5.3 Compact hydraulic system

The compact hydraulic system requires:

- check of oil level and topping-up of hydraulic oil if necessary,
- change of hydraulic oil / replacement of filter element.

- Change the hydraulic oil:
  - for the first time after 500 service hours,
  - then every 1000 service hours,
  - but at least every 2 years (depending on which change interval occurs first).
- Required hydraulic oil, compact hydraulic system for hydraulic functions:
  - Hydraulic oil ATX 40 (similar to ATF oil),
  - Quantity when filled approx. 7 litres for hydraulic unit with 2.2 kW; quantity when filled approx. 36.7 litres for hydraulic unit with 5.5 kW.
- Never mix different types of hydraulic oil
- Dispose of used oil according to regulations. Contact your oil supplier in case of disposal problems!
- Replace the filter element:
  - for the first time after 500 service hours,
  - then every 1000 service hours,
  - but at least every 2 years (depending on which change interval occurs first).

9.5.3.1 Check oil level

Observe the fact that the hydraulic cylinders must be in retracted position when checking the oil level!

For hydraulic unit with 5.5 kW

1. Check the oil level at the oil inspection plug (1).
2. Top up hydraulic oil through the oil filler neck (2) into the hydraulic oil tank if necessary.

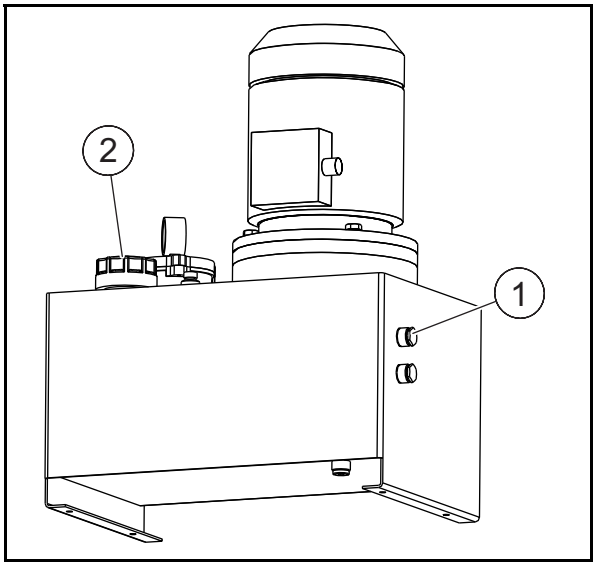


Fig. 38

For hydraulic unit with 2.2 kW

1. Check the oil level.
2. Top up hydraulic oil through the oil filler neck (1) into the hydraulic oil tank if necessary.

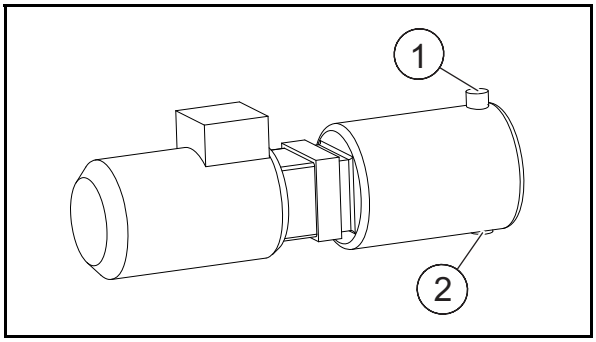


Fig. 39

9.5.3.2 Change hydraulic oil

1. Place a drip tray with a capacity of approx. 40 litres beneath the hydraulic oil tank.
2. Unscrew the oil drain plug (1) from the bottom of the hydraulic oil tank.
3. Wait for the oil to stop draining out of the oil drain opening.
4. Screw in again and tighten the oil drain plug (1) (use sealant).
5. Fill the required hydraulic oil and the required oil quantity through the filler neck (2) into the hydraulic oil tank.

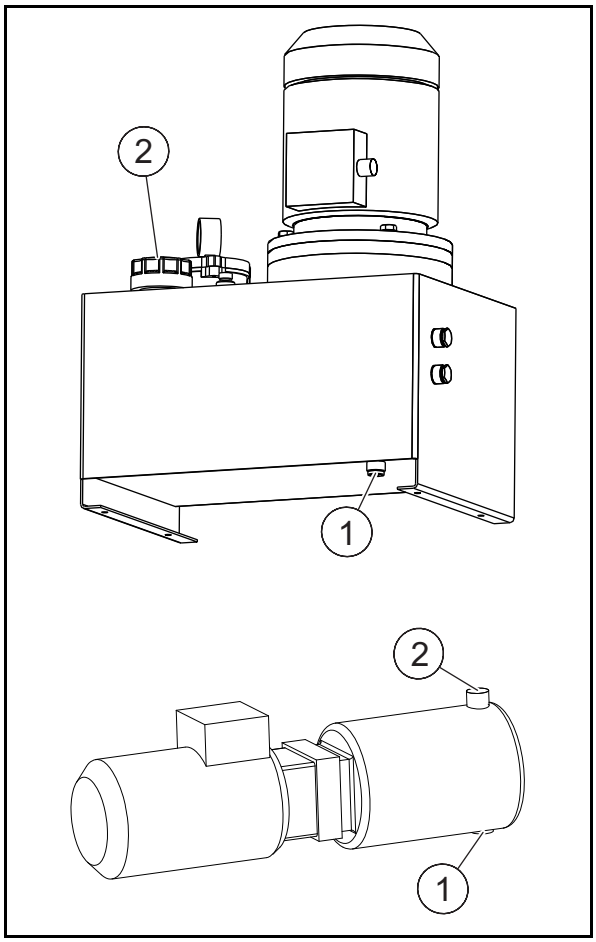


Fig. 40

9.6 Replace shear bolts of shear bolt coupling

1. Eliminate the cause for the overloading, see information on page 71.
2. Open the fitting apertures on the protective device. Observe the included operating instructions for the propeller shaft.
3. Remove the residues of the shear bolt (2).
4. Rotate the power train such that the boreholes of the coupling halves (3) and (4) face each other.
5. Replace the shear bolts (2) by a bolt of equal grade (8.8).
6. Close the fitting aperture.

Fig. 41

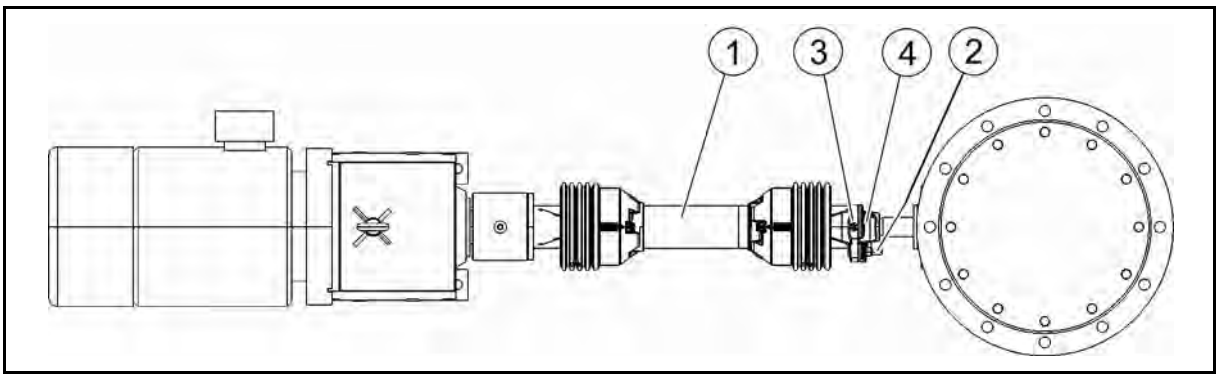


Fig. 42

9.7 Discharge door

1. Check the gap X between the discharge door and the mixing container. The gap X should be approx. 5 mm.

   The gap X can be altered by unscrewing the screws (1) and displacing the L straps (2) in the oblong holes.

2. Align the L straps (2) such that the gap X is again approx. 5 mm.
3. Retighten the screwed connections (1).

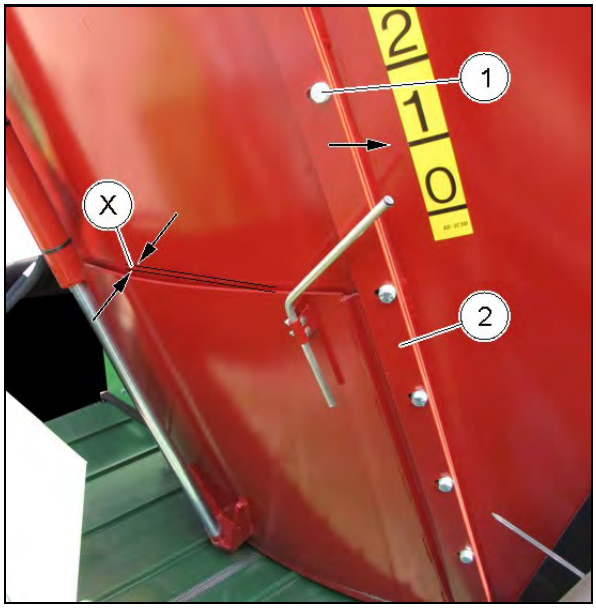


Fig. 43

9.8 Cutting knives of mixing auger

- Grind the cutting knives of the mixing auger if necessary.

  Blunt cutting knives require a higher mixing auger power.
- Daily check the cutting knives from the service platform / the ladder for visible defects. Timely replace damaged or worn cutting knives. Have broken-off cutting knife particles removed from the mixing container to avoid any damage resulting from conveyed cutting knife particles.

WARNING

Risk of cuts when carrying out assembly work on sharp cutting knives!

Wear cut-proof protective gloves when carrying out work on the cutting knives.

9.8.1 Grind cutting knives

WARNING

Risk to eyes due to blown-away abrasive particles when grinding the cutting knives!

Always wear protective goggles when grinding cutting knives.

- Use a right-angle grinder with a flap grinding wheel (Fig. 44) when grinding the cutting knives.
- Only grind the cutting knives on their smooth side, never on their corrugated side.
- Carefully regrind the cutting knives such that they do not heat up much. If the cutting knives change colour during grinding:
  - they have heated up excessively,
  - this will reduce the service life of the cutting knives.

1. For grinding the cutting knives, enter the empty mixing container through the discharge opening. Absolutely observe the information in the chapter "Enter the mixing container", from page 61.
2. Carefully grind the cutting knives on their smooth side.
3. Remove any foreign objects (tools etc.) from the mixing container. Clean the mixing container from grinding residues if necessary.
4. After completing work, leave the mixing container through the discharge opening.

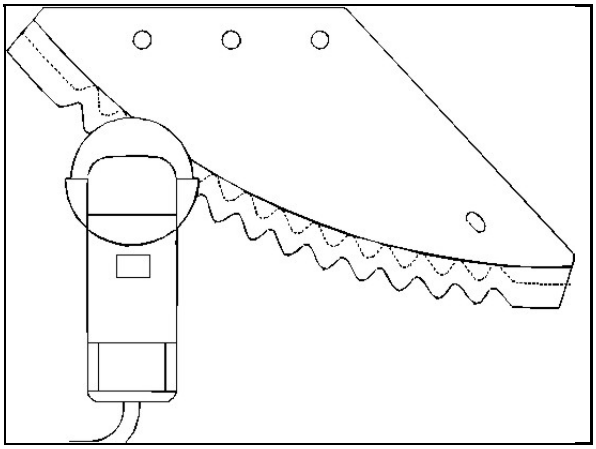


Fig. 44

9.8.2 Swivel / Replace cutting knives

For swivelling / replacing the cutting knives you require:

- various wrenches:
  - 1 x socket wrench / ring wrench, wrench size 24,
  - 1 x hexagon wrench, size 10,
  - 1 x hexagon wrench, size 6, for the top cutting knife with knife supporting plate,
- a scraper or screw driver,
- a hard brush,
- cut-proof protective gloves,
- edge protectors to cover the blades when carrying out assembly work on the cutting knives.

1. For replacing the cutting knives, enter the empty mixing container through the discharge opening. Absolutely observe the information in the chapter "Enter the mixing container", from page 61.
2. Use an edge protector to cover the blade (1) of the respective cutting knife to be mounted.
3. Unscrew and remove the screws (2) (M16 x 45 or M10 x 20 – grade 8.8).
4. Replace the cutting knives or swivel the cutting knives into the desired position (extended or retracted), see information on page 43.
5. Tighten all screws (2) of the cutting knives' screwed connections.
6. Remove any foreign objects (tools etc.) from the mixing container. Clean the mixing container if necessary.
7. After completing work, leave the mixing container through the discharge opening.

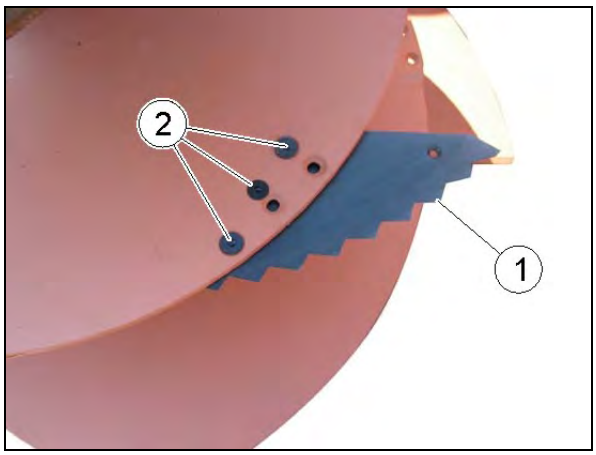


Fig. 45

9.9 Discharge conveyor

- Check the tension of the discharge conveyor before each start-up.

  A wrong tension may cause damage to the discharge conveyor.

  A properly tightened discharge conveyor sags by approx. 10 to 15 mm in its centre. Consider the ambient temperature. Low temperatures shorten the conveyor, high temperatures lengthen it.
- Straighten the conveyor by means of the clamping screws (Fig. 47/2) if the conveyor is not running straight or is rubbing along the frame.
- Clean the driving and carrying rollers and pulleys if fodder residues have piled up on the rollers.
- Lubricate the 4 flanged bearings of the discharge conveyor at least every 25 service hours.

9.9.1 Check discharge conveyor for visible defects

Check the conveyor (1) and the belt fastener (2) of the discharge conveyor weekly for visible defects. Replace the discharge conveyor in case of damage (fissures, raised corners).

Fig. 46

9.9.2 Tighten / Adjust discharge conveyor

1. Unscrew the counter nut (1) of the right and left radial insert ball bearing (2).
2. Equally turn the two clamping nuts (3):
   - such that the conveyor sags by approx. 10 to 15 mm in its centre,
   - the distance A between the square profiles (4) and the clamping housing (5) is equal on both sides of the conveyor.

     Only if the distance A is equal on both sides of the conveyor, does the conveyor run straight.
3. Carry out a test run to check whether the conveyor has an equal distance to the frame at the return rollers on both sides. If not, correct accordingly by turning the clamping nuts (3).
4. Retighten the counter nut (1) at the right- and left-hand radial insert ball bearing (2).

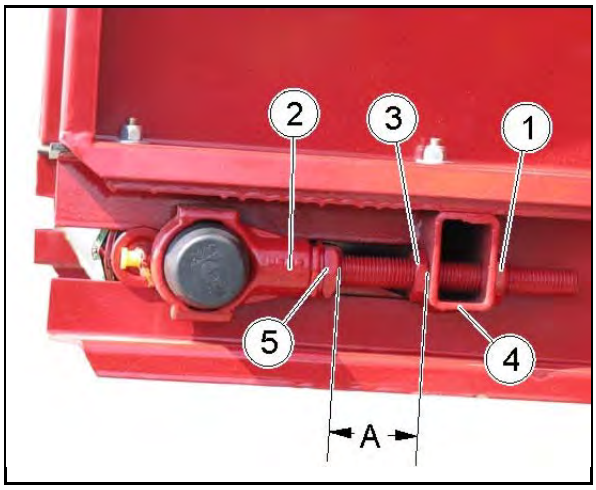


Fig. 47

9.9.3 Clean driving rollers, carrying rollers and pulleys

1. Relieve the discharge conveyor (1).
2. Rotate the relieved discharge conveyor until the side of the belt fastener (2) is positioned on the pulley.
3. Pull the connecting wire out of the belt fastener.
4. Remove the discharge conveyor.
5. Clean:
   - the driving, carrying rollers and pulleys,
   - the frame,
   - the interior of the conveyor,
   - the rubber seal strips.
6. Reinstall the discharge conveyor.

   Ensure that the rubber seal strips rest on top of the discharge conveyor.
7. Mount the connecting wire.
8. Tighten the discharge conveyor.

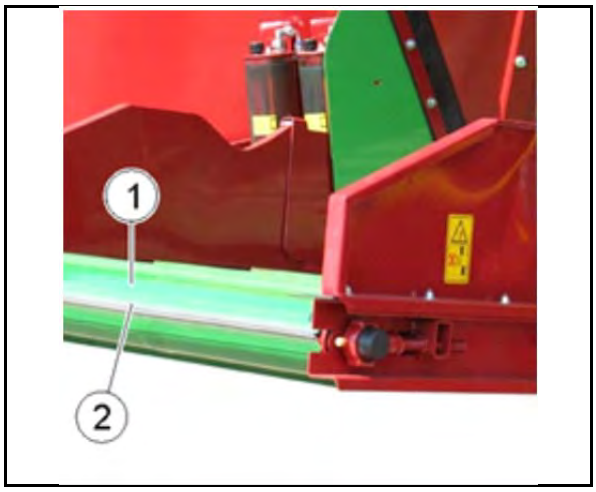


Fig. 48

9.10 Hydraulic system

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.
- 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.
- Observe the information in the chapter "Basic safety instructions", page 28, when carrying out maintenance work on the hydraulic system.

WARNING

Risk of slipping to people due to leaking hydraulic oil during work on the hydraulic system!

Immediately remove fresh oil stains by means of binding agents.

- Regularly check all hydraulic hose pipes and hydraulic plugs for damage and contamination.
- Dispose of used oil according to regulations. Contact your oil supplier in case of disposal problems.
- Do not keep hydraulic oil within reach of children.
- Beware that no hydraulic oil penetrates the soil or water.

9.10.1 Depressurize hydraulic system

WARNING

Risk of accidental contact with hydraulic oil due to hydraulic oil squirting out under high pressure and entering the body!

- Working on the hydraulic system with the system under operating pressure is not allowed.
- Depressurize the hydraulic system before carrying out work on the hydraulic system.

1. Relieve the respective hydraulic cylinder via the corresponding operating element with the hydraulic pump switched off.

9.10.2 Hydraulic hose pipes

9.10.2.1 Marking and period of use of hydraulic hose pipes

The marking on the fitting (Fig. 49) provides the following information:

(1) Identification of the hydraulic hose pipe manufacturer (A1HF)

(2) Date of manufacture of the hydraulic hose pipe (09 / 02 = year / month = February 2009)

(3) Maximum admissible operating pressure (210 bar)

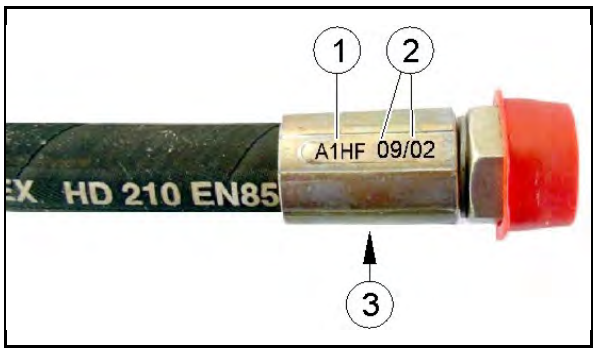


Fig. 49

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

Example:

Date of manufacture (2) = 09 / 02	February 2009
Period of use expires	February 2015

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

9.10.2.2 Maintenance intervals

After the first 10 service hours and then every 50 service hours:

1. Check all components of the hydraulic system for tightness.
2. Retighten screwed connections if necessary.

Before each startup:

Check hydraulic hose pipes for visible defects. Immediately remedy the following defects:

1. Eliminate chafing points on hydraulic hose pipes and tubes.
2. Immediately replace worn, damaged or overaged hydraulic hose pipes (shop work).

9.10.2.3 Inspection criteria for hydraulic hose pipes

For your own safety:

Immediately replace hydraulic hose pipes 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 hose 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 90.

9.10.2.4 Installation and removal of hydraulic hose pipes (shop work)

When installing and removing hydraulic hose pipes, absolutely observe the following information:

- Only use hydraulic hose pipes of the manufacturer.
- Ensure cleanliness.
- Install hydraulic hose pipes such that the following applies to all operating states:
  - there is no tensile stress, except for that due to the dead weight,
  - there is no upsetting stress in case of short lengths,
  - external mechanical influences on the hydraulic hose pipes are avoided.

    Make sure to avoid chafing of hydraulic hose pipes against components or against each other by suitable arrangement and fixing. Protect hydraulic hose pipes by means of protective coatings if necessary. Cover sharp-edged components.
  - the bending radii do not fall below the admissible limits.
- When connecting a hydraulic hose pipe to moving parts, the hose length must be such that:
  - in the complete range of motion the bending radius does not fall below the minimum admissible limit,
  - the hydraulic hose pipe is not subject to tensile stress.
- Fix the hydraulic hose pipes to the specified fixing points. Avoid additional hose supports which affect the natural motion and length variation of the hose.
- Overcoating of hydraulic hose pipes is not allowed.

9.10.3 Replace hydraulic filter (shop work)

Replace the filter element (1/50) after approx. 500 service hours, then as necessary, but at least every 1000 service hours. Regularly check the degree of soiling by means of the contamination indicator if available (green = no replacement required, yellow = replace filter element, red = immediately replace filter element).

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 hydraulic unit and the hydraulic oil has cooled down.

For hydraulic unit with 5.5 kW

1. Disconnect the hydraulic system of the machine from the hydraulic unit.

→ The hydraulic system is depressurized.

2. Unscrew the filter casing (1) from the filter head (2).
3. Remove the soiled filter element (3).
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.
7. Lubricate the O-ring (2) of the new filter cartridge.
8. Slip the new filter element on as far as it will go.

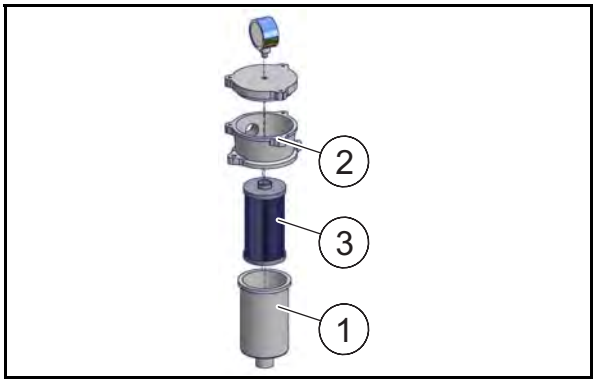


Fig. 50

9. Screw the filter casing into the filter head.
10. Tighten the screwed connection at a torque of 150 Nm.

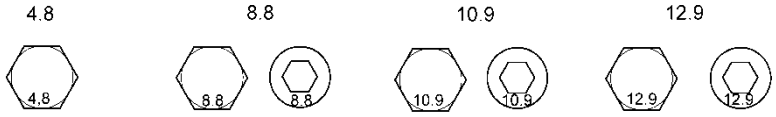
For hydraulic unit with 2.2 kW

1. Disconnect the hydraulic system of the machine from the hydraulic unit.

→ The hydraulic system is depressurized.

2. Drain the hydraulic oil via the oil drain plug.
3. Remove the casing.
4. Remove the filter.
5. Insert a new filter.
6. Reinstall the casing.
7. Fill in hydraulic oil via the filler neck (approx. 7 litres).

9.11 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
M 6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M 8	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.*

Tab. 7

The tightening torques listed in the above table are reference values. They apply provided that these 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.

10 Trouble-shooting

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 , e.g. an open discharge door,**
- **the machine accidentally starts.**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure the machine against accidental starting before eliminating any malfunctions on the machine. For details refer to page 60.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

10.1 Malfunctions and remedy – Machine

Malfunction	Cause	Remedy
The power requirement is too high, shear bolt of the shear bolt coupling in front of the angular gear shears	Cutting knives blunt	Sharpen knives.
	Long stalks have wrapped around the auger front end or the scraper	Clean mixing auger.
	Foreign objects are jamming the mixing auger	Eliminate foreign objects.
	Screwed connection of the mixing auger has loosened	Retighten screwed connection.
Mixing auger does not rotate with the p.t.o. shaft powered	Shear bolt of the shear bolt coupling in front of the angular gear sheared off.	Replace shear bolt.
Machine does not mix well	Material to be mixed is piling up in front of counter-cutter	Extend and retract counter-cutter.
Non-uniform discharge	All cutting knives retracted (out)	Extend lower cutting knives (in).
Discharge conveyor does not start	Operating error	First switch discharge conveyor on, open discharge door only then.
	Discharge conveyor too loose	Tighten discharge conveyor.

Tab. 8

10.2 Malfunctions and remedy – Weighing device

Absolutely observe the included operating instructions for the weighing device.

Malfunction	Cause	Remedy
Device cannot be switched on	No power supply	Check connecting cable.
		Switch on power supply, check power supply battery.
	Wrong polarity	Check connecting cable for correct polarity. (The devices are equipped with an automatic fuse).
Device displays bars (top or bottom)	Device	Pull the terminal box plug out of the weighing computer and watch display. If the bars disappear, the weighing computer functions properly.
	Terminal box	Pull out the plugs of all weighing rods, the terminal box being plugged into the weighing computer. Watch display. If the bars disappear, the display functions properly.
	Weighing rods	Always plug only one weighing rod at a time into the terminal box or directly into the weighing computer. If the bars disappear, the respective weighing rod functions properly.
Weighed value varies	Device	See malfunction description: "Device displays bars".
	Terminal box	See malfunction description: "Device displays bars".
	Weighing rods	See malfunction description: "Device displays bars".
Scales display wrong weighed value	Weighing rods not properly installed	Always plug only one weighing rod at a time into the terminal box or directly into the weighing computer. The displayed value must increase when load is applied. Always test all rods!
	Weighing system misadjusted	Readjust scales, see included operating instructions "Recalibration".
Device displays ERROR	Internal error	Send device in for repair.

Tab. 9

11 Circuit diagrams

11.1 Circuit diagram of weighing device

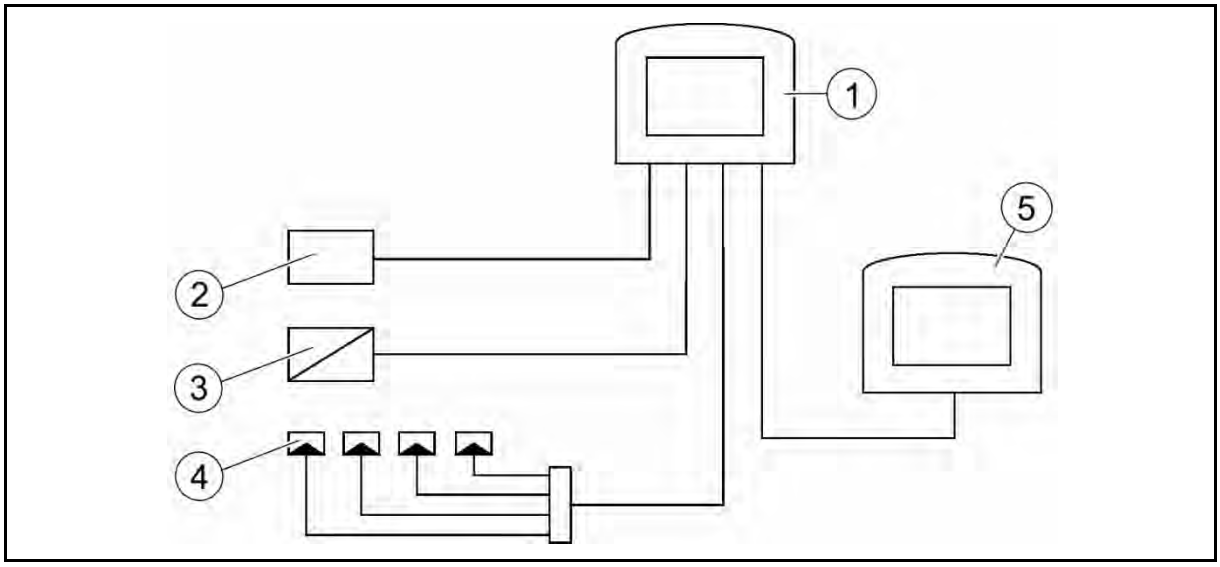


Fig. 51

Optional extra:

(1) Weighing computer

(2) Power supply 10 – 30 VDC

(3) Analogue output 4 – 20 mA

(4) Weighing rod

(5) Additional display

11.2 Circuit diagram of control set

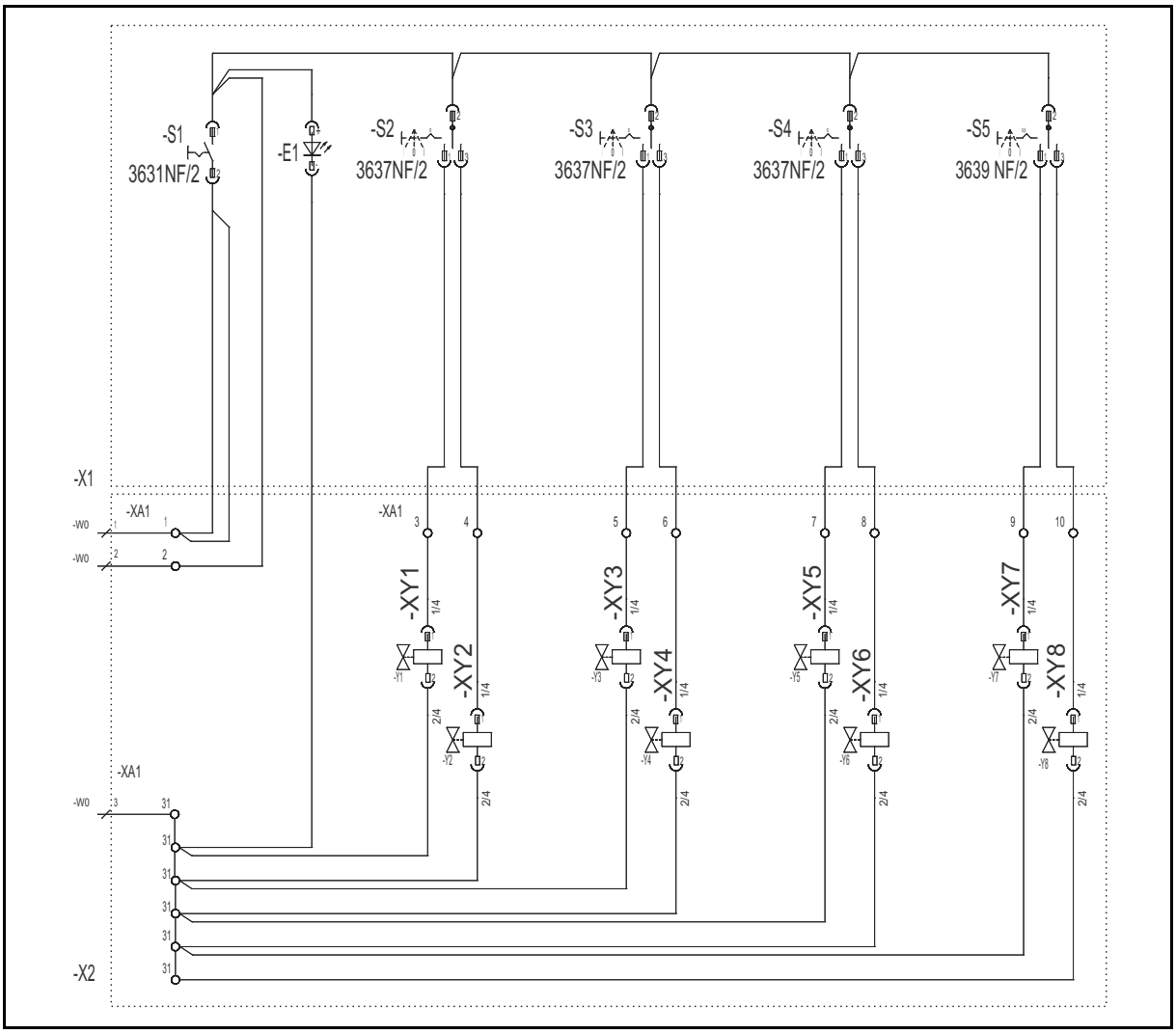


Fig. 52

S1 - Main switch

S2 - Discharge door 1

S3 - Discharge door 2

S4 - Counter-cutter

S5 - Discharge conveyor On

XY1 - Discharge door 1 opens

XY2 - Discharge door 1 closes

XY3 - Discharge door 2 opens

XY4 - Discharge door 2 closes

XY5 - Extend counter-cutter

XY6 - Retract counter-cutter

XY7 - Discharge conveyor On, ccw rotation

XY8 - Discharge conveyor On, cw rotation

12 Gear motor information

12.1 Technical data - Gear motor

Observe also the included operating instructions for the gear motor.

	Output [kW]	Speed [1/min]	Power supply [V]	Frequency [Hz]	Weight approx. [kg]
SK52-180LH/4	22	263	230 / 400 400 / 690	50	229
SK52-180LH/4	22	230			229
SK62-200LH/4	30	231			356

	P_N [kW]	n_N [1/min]	I_N 230/400V [A]	I_N 400/690V [A]	cos φ	η (1/2xP_N) [%]	η (3/4xP_N) [%]	η (4/4xP_N) [%]	EFF rating *
SK52-180LH/4	22.0	1475	69.8 / 40.3	40.3 / 23.3	0.86	92.7	92.9	92.2	IE2
SK52-180LH/4	22.0	1475	69.8 / 40.3	40.3 / 23.3	0.86	92.7	92.9	92.2	
SK62-200LH/4	30.0	1465	--	54.0 / 31.5	0.87	91.5	92.7	92.3	

	M_N [Nm]	M_A/M_N	M_K/M_N	I_A/I_N	J [kgm^2]
SK52-180LH/4	143	2.8	3.1	7.7	0.16
SK52-180LH/4	143	2.8	3.1	7.7	0.16
SK62-200LH/4	196	3.0	3.2	7.0	0.32

12.2 Technical data – Hydraulic unit

Output [kW]	Power supply [V]		Current [A]		Power factor [cos φ]	Speed [1/min]
	Y	Δ	Y	Δ		
2.2 kW	220	380	8.95	5.17	0.82	1400
2.2 kW	245	420	8.87	5.12	0.80	1420
2.2 kW	220	380	8.87	5.12	0.83	1680
2.6 kW	280	480	8.87	5.12	0.81	1700

12.3 Circuit diagram - Three-phase gear motor with short-circuit armature

(I) Terminal board

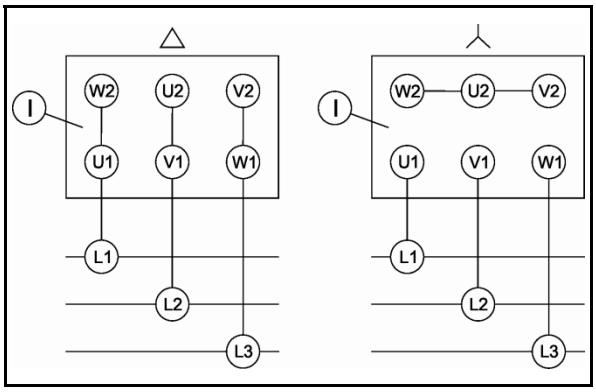


Fig. 53