

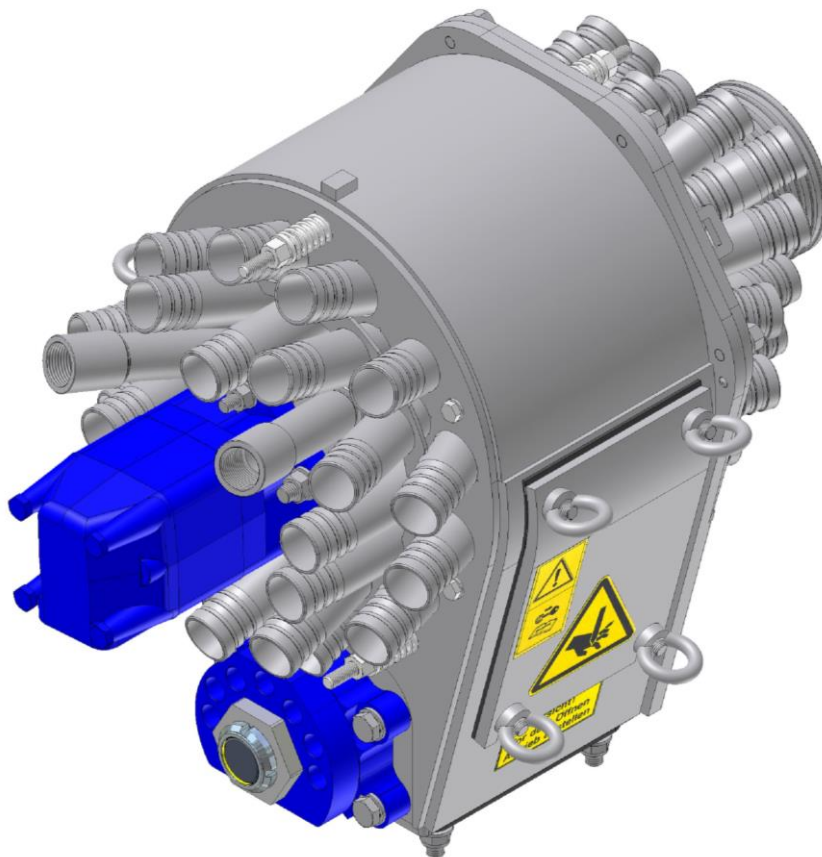


Operating instructions

ExaCut

Vario with ventilation ECV30-40/48-40

ENGINEERED TO WORK



Original operating instructions

Issuer

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Dear customer,

in every one of our products, you will see the entirety of our competence and our power of innovation at work. Each product is developed and built so that you can work more successfully.
We call it quite simply: ENGINEERED TO WORK

If you want to know more about our company or put forward requests or suggestions, a wealth of information can be found at www.vogelsang.info

1 User information

1.1 Using the operating instructions

These instructions contain all necessary information concerning the operating elements, handling, start-up and maintenance and repair work, as well as all of the relevant technical data.

The operating instructions are a component of the machine.

Please therefore keep the instructions ready to hand to ensure easy access to the necessary information at all times.

Read the operating instructions thoroughly. All of the points presented in these instructions must be understood and observed by those persons responsible for the installation, operation, maintenance and repair of the machine.

Vogelsang does not accept any liability for damage resulting from failure to comply with these maintenance and operating instructions.

1.2 Warning signs, danger symbols, information

Legend of symbols



Warning advisories (technical), safety advisories



Technical or general information

2 Intended Use

The ExaCut is a volumetric metering unit for the precise distribution of natural fertiliser (for example, liquid manure, sewage sludge) to 30 or 48 drain hoses on the spreader. Any other use is considered contrary to the intended purpose. The manufacturer is not liable for damages resulting from incorrect use!

3 Safety Notes



Before start-up, carefully read and note the contents of the operating instructions and the safety information.

- **The warning and safety labels fitted provide important notes for safe operation.**
 - **Paying attention to these stickers serves your safety.**
 - **The warning and safety labels must not be removed and must immediately be replaced if damaged or lost (see chapter "Warning and safety labels").**
-



The manufacturer's instructions for the spreading vehicle which the ExaCut is installed on must also be complied with!



The maximum permissible pressure load is 3 bar!



Attention! Before starting maintenance and repair work:

- Switch off the tractor and/or engine of the spreader vehicle.
 - Depressurise the inflow and drain hoses of the hydraulic motor (switch the hydraulic valve on the tractor to floating position) to avoid injury.
 - Switch the Vario adjustment to the centre position.
-



Caution, risk of injury!
There are sharp cutting edges in the interior of the DOSIMAT!

3.1 Warning and safety labels

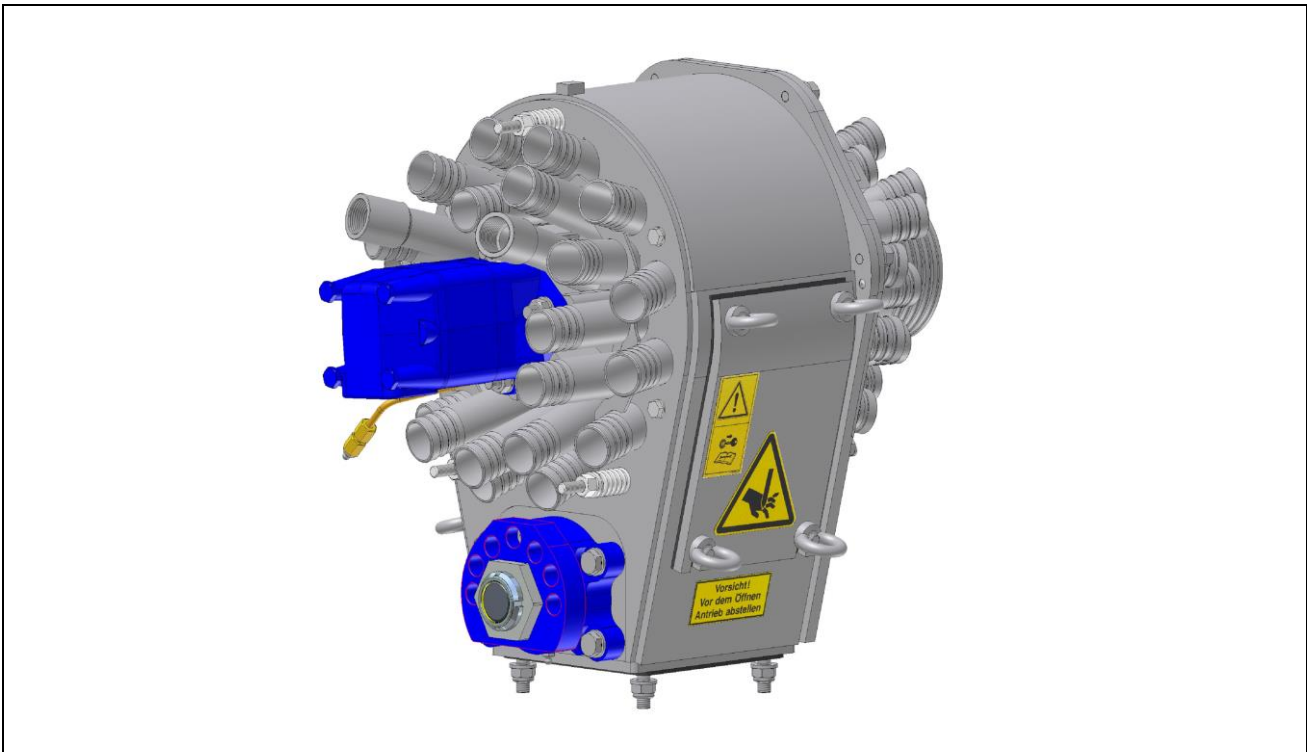


Fig. 1: Meaning of the warning and safety stickers

Sticker	Art. no.	Meaning
	VAU.011	Before putting the machine into operation, read the maintenance and operating instructions.
	VAU.014	Beware of injuries to your hands!
	VAU.013.EN	Switch the drive off before opening!

4 Assembly

When installing in a spreader, provide safe access to the vehicle for carrying out repair work and create a place to climb up safely as required.

4.1 Cleaning port

The cleaning port (see fig. "Exploded view - wear part replacement" - pos. 64) on the base (6"- hole pattern) has to be sealed so that

- Access to the edges is not possible even when open (e.g. flexible hose, DN 100, 1 m long, which is disconnected), **or**
- The hydraulic motor was safely switched off before opening (e.g. using a mechanically operated valve).

4.2 Hydraulics

See fig. "Hydraulic ports"

- Connect the hydraulic hoses (at least DN 16) to ports **[A]** and **[B]** on the hydraulic motor of the ExaCut.
- When two ExaCuts are connected in series:
 - Connect the overflow oil ports **[C]** of both hydraulic motors with a hose (at least DN 6).
 - The pressure in the return line should be as low as possible, max. 15 bar.



If you cannot ensure a depressurized return, connect the overflow oil line of the two distributors connected in series to a separate, reliably depressurized return line.



An additional pressure relief valve between the two distributors with an outlet to the depressurized return helps to reduce pressure peaks in case of blockage.

- Make sure that both devices have the same direction of rotation so that they have approximately equal spreading capacity. This can be easily done by connecting the flow of oil from port A on the first hydraulic motor to port B on the second hydraulic motor. If they have been installed in reverse, connect the flow of oil from port B on the first hydraulic motor to port A on the second hydraulic motor.

Technical data, hydraulic motors: See chapter on "Technical data - hydraulic motors".

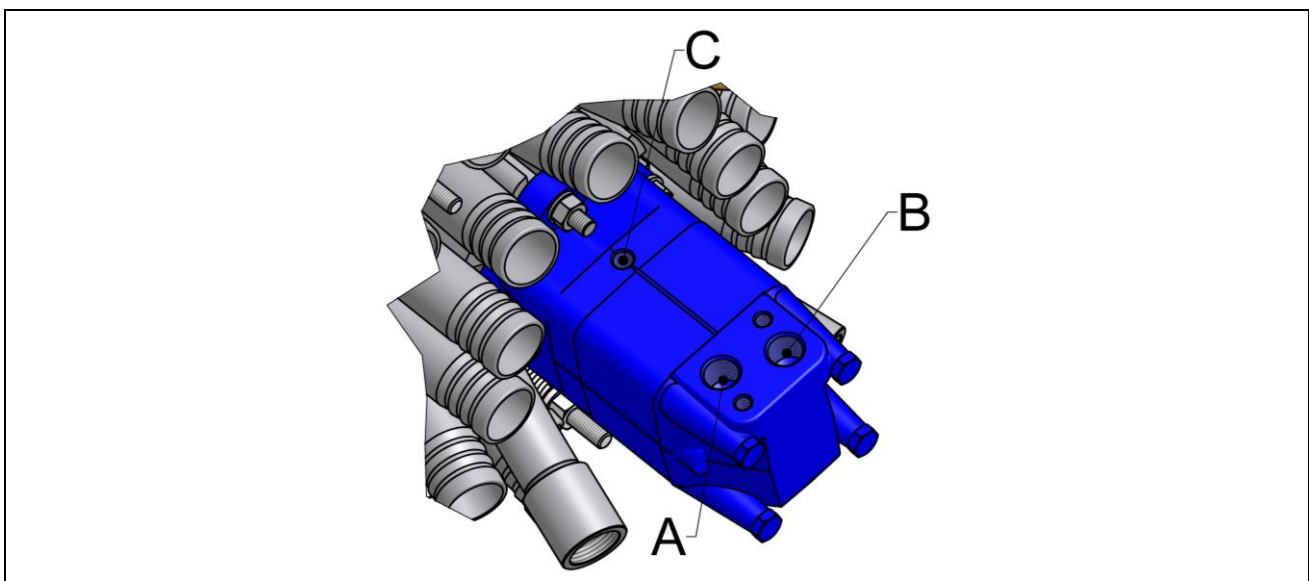


Fig. 2: Hydraulic ports

4.3 Changing the direction of rotation (reversing)

To ensure failure-free operation, it is necessary to reverse the direction of rotation regularly. To do this, the ExaCut must be connected to a double action control unit. Reversing removes almost all failures caused by foreign objects, etc. without external intervention.



Attention!

Never set the control unit abruptly to "Lock position" at high rotor speeds. Always switch from "operation" to "floating position" if possible.

The greatest operational reliability is achieved by reversing the direction of rotation at least on every end stop or through delayed action relay that switches approx. once a minute. This makes the blades self-sharpening.

We recommend installing a pressure gauge in the hydraulic pressure lines of the ExaCut. This detects problems that can be corrected by reversing at an early stage.

4.4 Requirements of the vehicle hydraulics

Rotor speeds between 200 rpm and 300 rpm are required to operate the ExaCut Vario safely.

This means: For a standard configuration with hydraulic motor OMS 250, oil quantities of 50 l/min to 75 l/min are required. For other hydraulic motor configurations, adjust the oil quantities accordingly.

The following applies: Rotor speeds of below 200 rpm reduce the distribution accuracy; rotor speeds above 300 rpm increase wear.

Min. oil flow	50 l/min
Max. oil flow	75 l/min
Max. continuous oil pressure	175 bar, peak 200 bar



PTOs reach their specified oil capacity only at nominal motor speed! The greater the oil flow, the greater the resistance to foreign objects and fibrous matter. With small quantities of very low viscosity fluid, 50 l/min is optimal.

4.5 Connecting the drainage and filling hoses

See fig. " "Hose connection plans 30-40 / 48-40" as well as fig. "Hose layout sketch"



Attention! When laying the hoses, avoid kinks and chafing as well as sacking.

- When laying hoses, observe the sequence outlined in figures above.
- When laying the hoses, keep differences in hose length to a minimum. The hoses that go to the ground near the distributor should be laid in a large arch. Do not let the hoses sack!
- The following always applies: Opposing and adjacent hoses on the ExaCut should have the same length when possible. The longest and shortest hose should be arranged at a 90° angle.
- The hose supports facing the centre of the distributor (two each on the filling and hydraulic motor sides) are for ventilation (see fig. "Hose connection plans 30-40 / 48-40" - pos. 1"). Short sections of hose should be connected here to avoid contaminating the device.
- Attention! If several drain hoses are blocked to implement different part-width sections, this reduces spreading accuracy. To minimise this effect as much as possible, observe the hose connection diagrams with partial width switching.
 - If all hoses are blocked on one side of the ExaCut, the ventilation on this side must also be blocked to prevent medium from escaping.

Filling lines for vacuum tank truck

For two ExaCuts, use at least DN 150 hose up to the T-piece.

Then use two DN 125 hoses. Two separate connectors with DN 150 hoses directly at the drum, which are reduced shortly before the ExaCut by a cone, would be optimal. This prevents excessive pressure loss and blockages in the T-piece and enables a high spreading capacity, even with viscous media.

Hose connection plans for ECV30-40

Attention! See also fig. "Hose layout sketch"

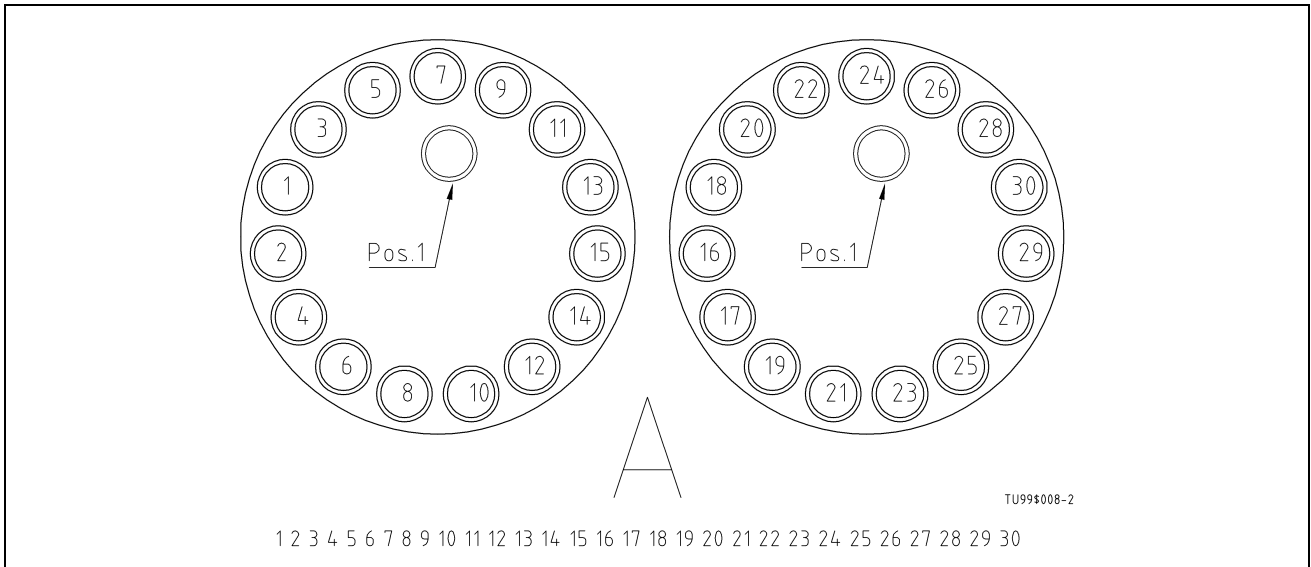


Fig. 3: ExaCut ECV30-40 for double symmetrical hose connection without partial width switching

- Pos. 1** Ventilation
- A** Side arm

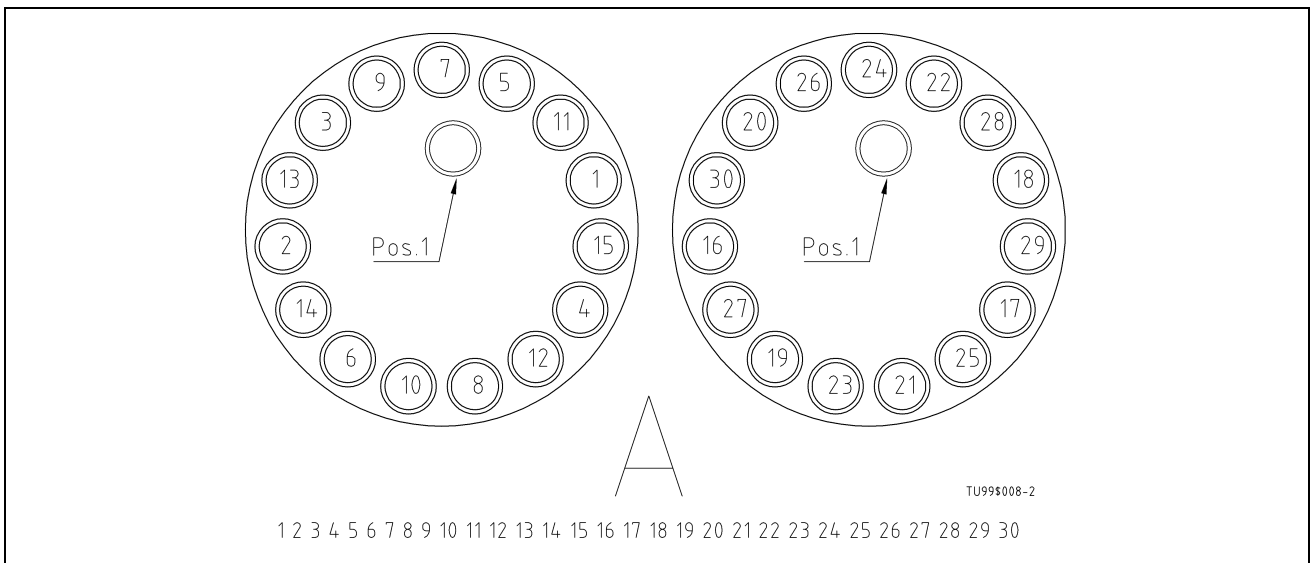


Fig. 4: ExaCut ECV30-40 for double symmetrical hose connection with partial width switching

Hose connection plans for ECV48-40

Attention! See also fig. "Hose layout sketch"

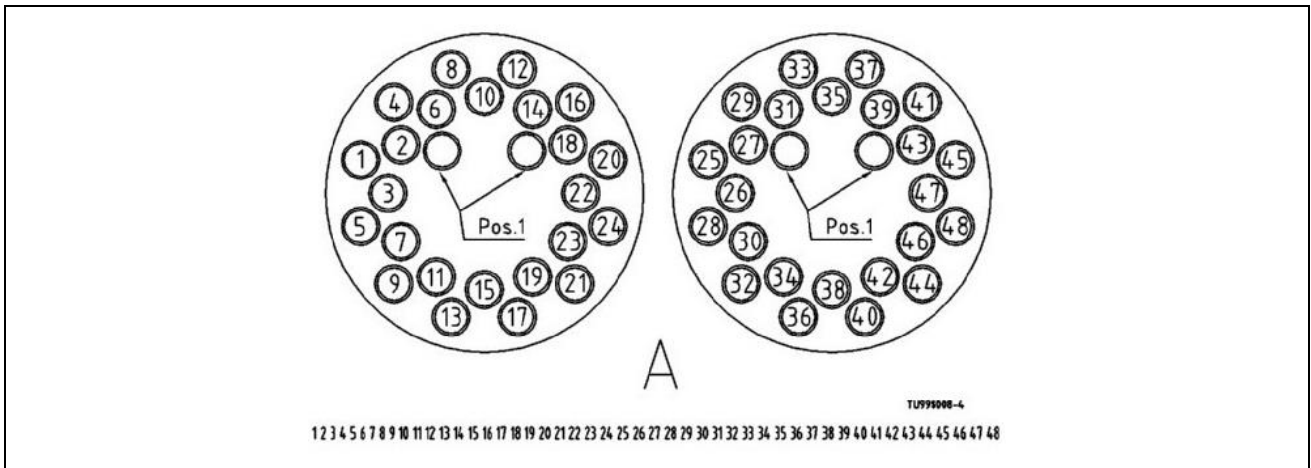


Fig. 5: ExaCut ECV48-40 for double symmetrical hose connection without partial width switching

- Pos. 1 Ventilation
- A Side arm

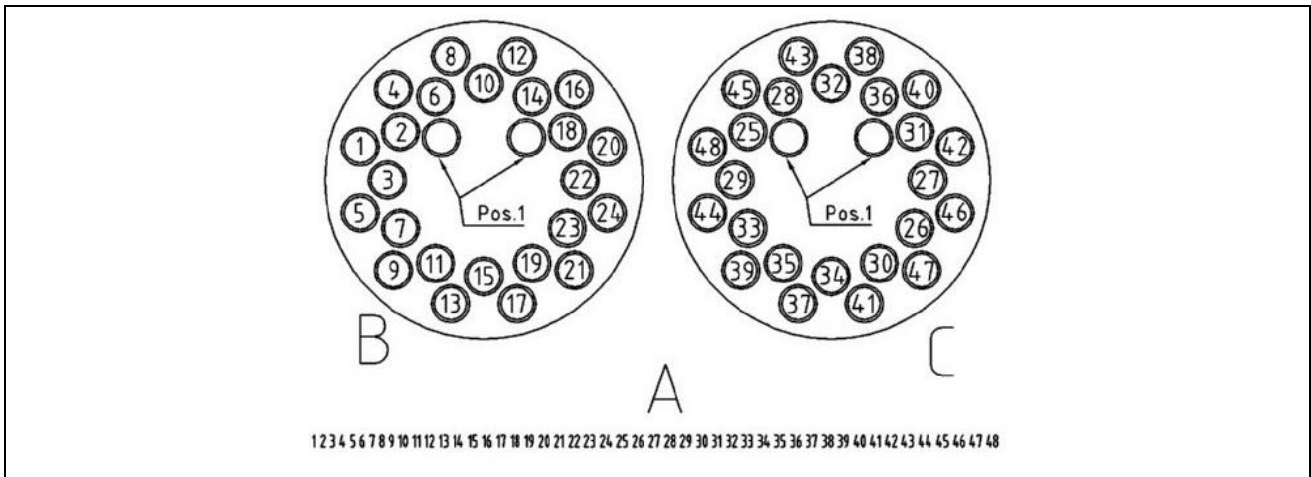


Fig. 6: ExaCut ECV48-40 for double symmetrical hose connection with partial width switching

- A Side arm
- B Interior (without stop valves)
- C Exterior (with stop valves)

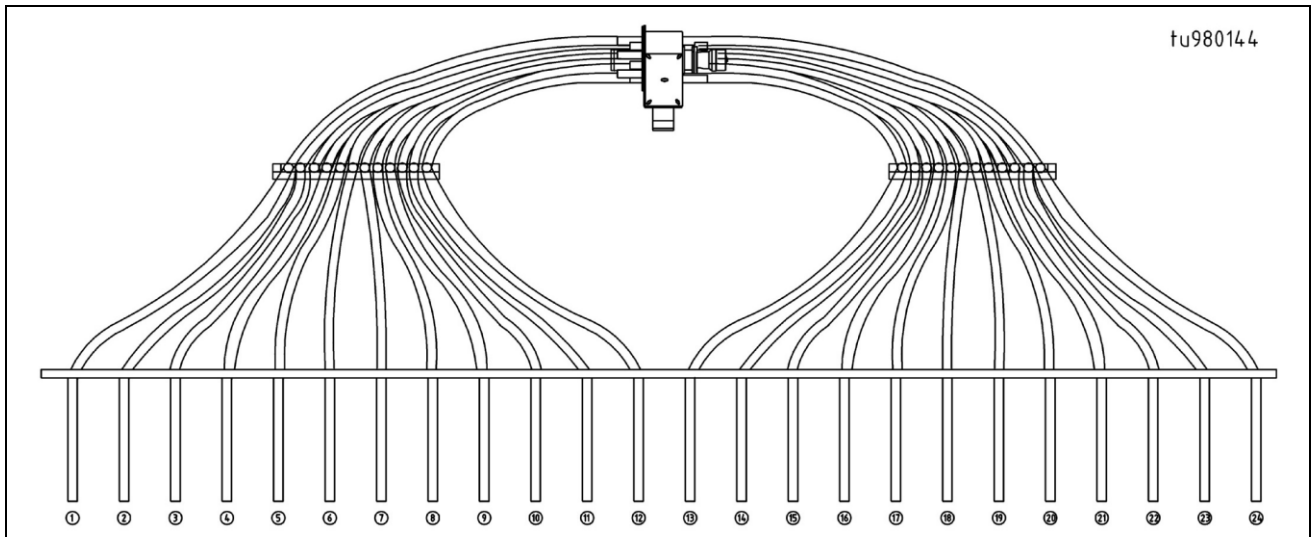


Fig. 7: Hose layout sketch



If the hose layout differs from the diagram, contact us!

5 Start-up

The ExaCut can be used on pump tankers and vacuum tankers.

Pump tankers have a pressure limit of 3 bar! This is possible using a pressure relief valve (optional). For control purposes, we recommend a pressure gauge on the liquid manure pipe.

Achievable flow rate:

The maximum flow rate depends on the proportion of dry matter, the type of liquid manure, the pressure of the spreader, the setting of the quantity preset and the rotor geometry. For the ECV30-40 it can be between 500 and 5000 l/min and for the ECV48-40 from 500 to 8000 l/min per distributor.

Required pressure:

To achieve a good lateral distribution, the pressure in the spreader needs to be at least 0.5 bar. That means that when using low viscosity media, you achieve better lateral distribution with a higher throughput.

Observe the following operating instructions:



- The ExaCut must be switched on shortly before the media flows through it.
 - To prevent increased wear, avoid running the ExaCut dry for more than 30 seconds.
 - The direction of rotation should be changed at regular intervals. Depending on the connector, this can be achieved by redirecting the control unit or by a timed electromagnetic spool valve. This guarantees optimal self-sharpening of the cutting knives.
 - Since a small amount of liquid manure can leak from the ventilation tube, connect short hoses that can be guided with the drain hoses. They also make cleaning the ventilation with a water hose easier.
-

6 Operation

(see also fig. "Flow area adjuster")

During operation, the device can be adjusted to take the varying fluidity of the medium into account. Do this using the **adjusting plate (1)** of the quantity preset.

Using the adjusting plate makes it possible to reduce the surface content of the outlet opening by up to 60%. The reduction in the outlet surface increases the pressure in the ExaCut, which ensures highly accurate distribution. The actual quantity reduction due to the reduced outlet surface is dependant on the medium as well as the spreading technology used (vacuum or pump tanker).



When operating two ExaCut Varios in parallel, slight deviations in quantity may exist even though both devices have the same quantity preset. This is in a range of max. $\pm 5\%$.

6.1 Flow area adjuster

(see fig. "Flow area adjuster")

By turning the **adjusting plate (1)** clockwise, the **cutting ring (2)** is turned counterclockwise. And vice versa, turning the **adjusting plate (1)** counterclockwise, turns the **cutting ring (2)** clockwise.

To achieve the required surface reduction in the throughput openings, screw a **hex socket head screw M12 x 16 (3)** through one of the holes in the **adjusting plate (1)** into the corresponding bore of the **fixed plate (4)**. Fig. "Flow area adjuster" shows how the hex socket head screw is moved clockwise to the centre position. The hex socket head screw can also be moved counterclockwise to the centre position.

Changing the setting direction regularly ensures even wear.

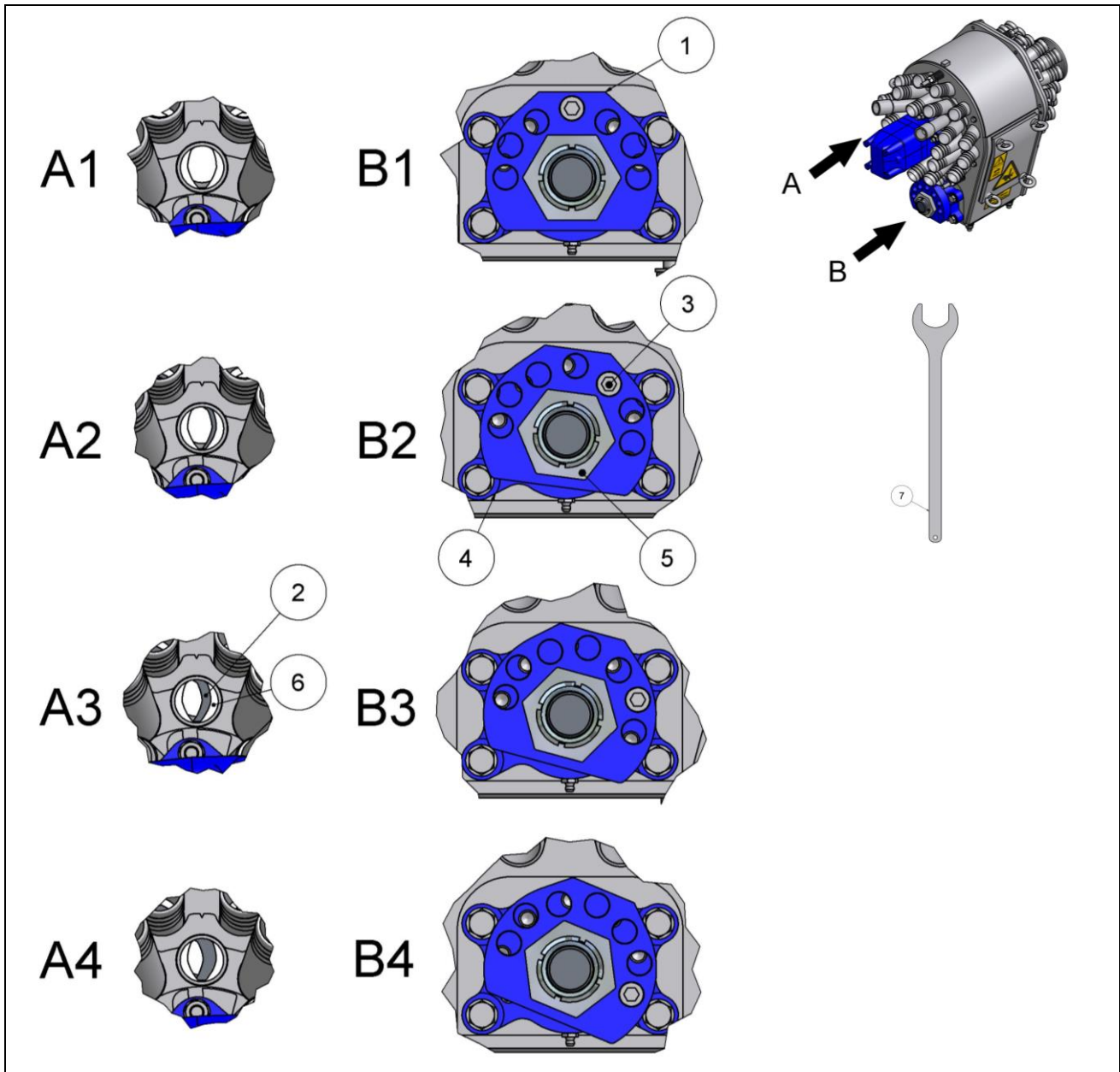


Fig. 8: Flow area adjuster

A	View, cutting ring (through tube)	B	View, Vario adjustment
A1	Flow area 100%	B1	Centre position
A2	Flow area 80%	B2	Move the hex socket head screw/turn the adjusting plate clockwise in the first (B2), second (B3) and third (B4) bores to the right of the centre position.
A3	Flow area 60%	B3	
A4	Flow area 40%	B4	
1	Adjusting plate	5	Hexagonal
2	Cutting ring	6	Cutting ring plate
3	Hex socket head screw	7	Open-end wrench (GMS.003)
4	Fixed plate		

7 Maintenance



Attention! Before starting maintenance and repair work:
Observe the "Safety notes" chapter.

7.1 Cleaning and checks

- Remove foreign bodies, such as stones, through the cleaning port at regular intervals (see fig. "Wear part replacement," pos. 64) (intervals depend on the proportion of foreign objects).
-



Attention!

To keep the air duct in the interior of the distributor free, regularly spray water into the air lines while the distributor is running slowly. Attaching short hoses to the ventilation tubes makes this job easier.

Check excentrics for movability regularly; remove and repair as required. When reinstalling the excentrics, re-tension per "Tensioning the excentric" chapter.

- Drain the ExaCut through the cleaning port before brief downtime.
 - Before longer downtime, clean the ExaCut by spreading water with it.
 - The ExaCut is cleaned with open maintenance ports and checked for wear.
 - Lubricate the hydraulic motor adapter with ample grease after cleaning to protect the running surfaces of the sealing rings.
 - All cutting surfaces should be sprayed with biodegradable oil before longer downtime.
-



Attention!

First switch off the PTO and put the hydraulic valve in floating position.

- Open the cleaning port and let the distributor run empty. Then unscrew the lateral maintenance port and grease the cutting parts.
-



Attention!

When the housing cover is removed for cleaning, the excentric adjusters slacken. Before reattaching the housing cover, tighten and secure the excentric adjuster according to the instructions (see the chapter on "Tensioning the excentric").

7.2 Lubricating the grease nipples

(see fig. "Grease nipples")

Service instruction:

Lubricating the grease nipples:

- every 50 operating hours
- before long breaks in operation

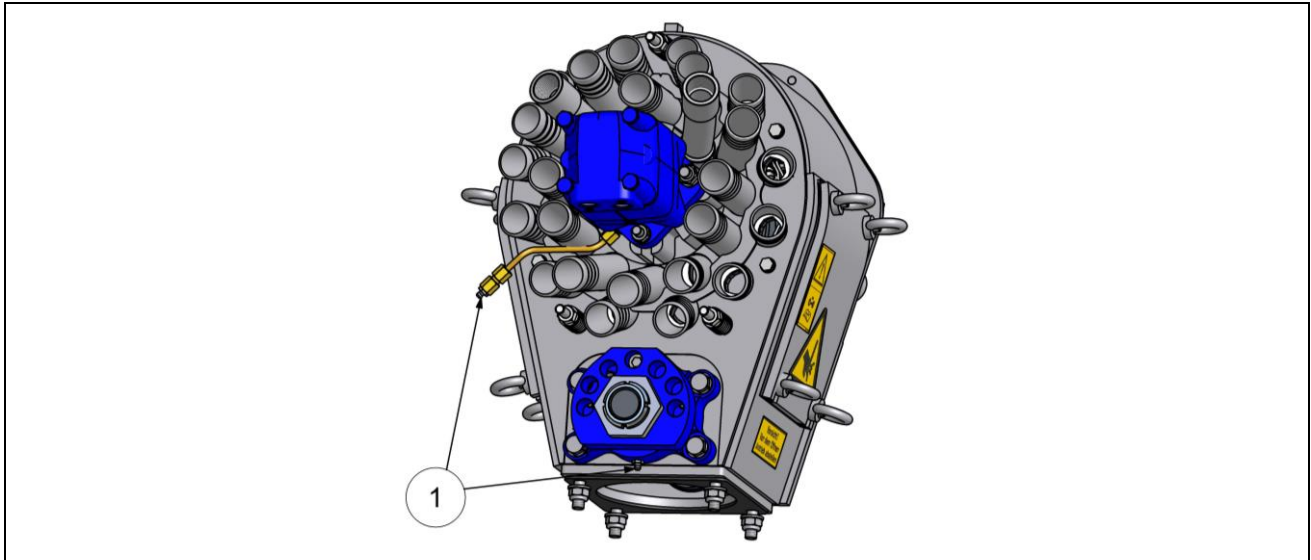


Fig. 9: Grease nipple

1 Grease nipple

7.3 Wear part replacement

(see following figure "Wear part replacement")

Replace the cutting knives when the driver plate of the rotor is protruding 8 - 10 mm from the cutting knife.



On the VOGELSANG web site, www.vogelsang-gmbh.com, how to replace the wear parts of an ECL is shown in a computer animation!



Attention!

Observe the information in the "Safety notes" chapter before replacing wear parts.

1. Switch off the engine of the PTO/spreader and set the hydraulic valve to floating position.
2. Open the cleaning port (bottom of housing) **(64)** and let the distributor drain.
3. Open the maintenance port **(68/69)**. This places the flow area adjuster in the centre position (see Fig. "Flow area adjuster - B1"). Remove the nuts from both lower tension bolts **(61)** and loosen those of the upper tension bolt. Slightly press the housing cover away from the housing and lift it upwards and out.
4. Unscrew the housing cover **(6)** of the ExaCut.
5. Unscrew the screw **(20)** in the rotor **(8)**.
6. Pull out the rotor **(8)**. Pay attention to the shims **(16)**. If the rotor does not move, try using an M30 hex head screw to pull it out (see "Removing the rotor from the hydraulic motor" chapter).
7. Unscrew the tension bolt nuts **(61)** from the back and remove the tension bolts **(57)**. Remove the cutting rings **(3)**. Check the cutting ring plate **(5 or 2)** for wear and replace as required. Before installing the new cutting rings, clean the contact surfaces thoroughly. When tightening the nuts of the tension bolts, tension the tension spring **(60)** to a length of 30 mm.
8. Check lip seals and bushing **(10)** for wear and replace as required.
9. Lubricate the ring gasket, PU foam **(9)** and replace if worn.
10. Clean the cover seal **(79)** and examine for damage.
11. Tension the excentric **(12)** using a small pair of water pump pliers and secure it using a spring cotter (see the chapter on "Tensioning the excentric").
12. Place the cutting knives **(4)** on the rotor.
13. Lubricate the bushing **(10)** on the rotor, assemble the rotor **(8)** while it is lightly turning to protect the lip seal. Pay attention to the shims **(16)** and spacer bushing **(14)** with O-ring **(15)** between the rotor and the hydraulic motor.
14. Assemble the cover **(6)**. The cover is positioned with 2 aligning pins **(62)**. Make sure that the tothing of the flow area adjuster is centred, identical on both sides and interlocks properly.
15. Check whether the rotor is centred and, if not, balance it using shims.
16. Remove the spring cotter (you should hear a clicking sound - the excentric turns), seal the cleaning port **(64)** and the maintenance port **(68+69)**.

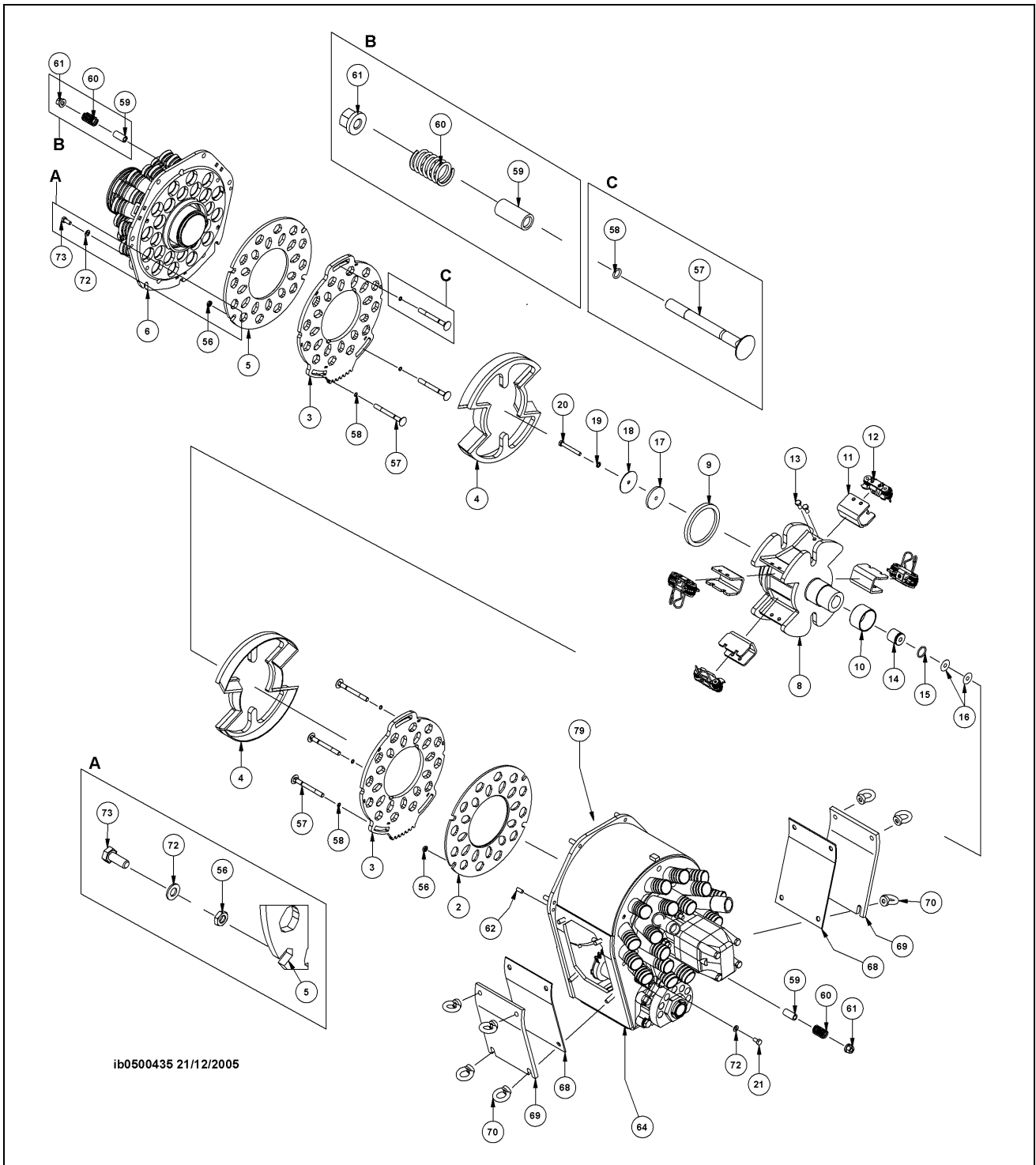


Fig. 10: Exploded view of ExaCut ECV30-40 / 48-40 wear part replacement

Pos. 2, 3, 4, 5, 9, 10 = Wear parts

7.4 Disassembling the rotor from the hydraulic motor

In addition, observe instruction leaflet BPZ.12 as required.




<p>Remove the screw, washer and gasket.</p>	
<p>To centre the shims, a M10x * hex head screw is inserted into the boring of the bushing.</p> <p>*max. 30 mm long</p>	
<p>To remove the rotor from the motor, screw a lubricated hex head screw M30 into the rotor. When the hex head screw is in deep enough, the rotor releases itself from the motor.</p>	

Fig. 11: Removing the rotor from the hydraulic motor

Note:

For very stiff rotors, it may be necessary to first pull it out approx. 12 mm without a centring screw and use the centring screw afterward.

7.5 Tensioning the excentric

(see fig. "Tensioning the excentric with a clip" and "Tensioning the excentric with water pump pliers")



Attention!
Wear protective gloves!

- First tighten by hand and secure behind the leg spring using the spring cotter.
- Tighten the rest using a pair of water pump pliers until the borings are aligned. Then secure using the spring cotter.



First assemble the housing cover, then remove the spring cotter through the opening of the maintenance port.



Fig. 12: Tensioning the excentric with a clip



Fig. 13: Tensioning the excentric with water pump pliers

8 Trouble-shooting

Malfunction	Possible cause	Action to be taken
ExaCut vibrates	<ul style="list-style-type: none"> • Rotor runs too slowly • Rotor is blocked • Ventilation is blocked 	<ul style="list-style-type: none"> • Check the hydraulics • Clean the ExaCut • Clean the air suction ducts from outside using a water hose
Cutting force insufficient	<ul style="list-style-type: none"> • Liquid manure flow rate too high • Cutting knives worn • Pre-tensioning part(s) defective • Cutting knives do not move • Rotor runs too slowly 	<ul style="list-style-type: none"> • Reduce the pump speed • Replace the cutting knives • Replace pre-tensioning part(s) • Make cutting knives operational • Check the hydraulics
Poor distribution	<ul style="list-style-type: none"> • Rotor speed too low/too high • Pressure in pot too low • Hose layout incorrect • Fibrous matter under the cutting knife • Ventilation is blocked 	<ul style="list-style-type: none"> • Check the oil flow rate of the PTO • Increase the throughput quantity • See hose layout plan • Remove fibrous matter • Clean ventilation
Only a few hoses are charged with medium	<ul style="list-style-type: none"> • Rotor blocked 	<ul style="list-style-type: none"> • If possible, reverse the rotor several times • Remove blockage • Check the hydraulics
Cover cannot be attached	<ul style="list-style-type: none"> • Excentrics are not pre-tensioned 	<ul style="list-style-type: none"> • Pre-tension excentrics
Rotor does not run smoothly	<ul style="list-style-type: none"> • Cover incorrectly fastened 	<ul style="list-style-type: none"> • Tighten cover
	<ul style="list-style-type: none"> • Cutting rings not parallel 	<ul style="list-style-type: none"> • Clean cutting ring plate

9 Technical data for the hydraulic motors

Motor type		OMS 160	OMS 200	OMS 250
VOGELSANG Art. no.		AOM.015	AOM.017	AOM.018
Ø Shaft		32	32	32
Max. speed [rpm]	Cont.	470	375	300
	Int. ¹⁾	560	450	360
Max. drop in pressure [bar]	Cont.	210	210	200
	Int. ¹⁾	260	250	250
	Peak ²⁾	280	270	270
Max. torque [Nm]	Cont.	490	610	720
	Int. ¹⁾	600	720	870
Max. oil flow [l/min]	Cont.	75	75	75
	Int. ¹⁾	90	90	90
Max. input pressure [bar]	Cont.	230	230	230
	Int. ¹⁾	295	295	295
	Peak ²⁾	300	300	300
Max. return pressure with overflow oil line [bar]	Cont.	140	140	140
	Int. ¹⁾	175	175	175
	Peak ²⁾	210	210	210
Max. return pressure without overflow oil line [bar]	Cont.	35	45	50
	Int. ¹⁾	75	75	75

¹⁾ Intermittent operation: the permissible values may be reached max. 10% of every minute.

²⁾ Peak load: the permissible values may be reached max. 1% of every minute.

10 Declaration of Installation



Declaration of installation for an incomplete machine according to Machinery Directive 2006/42/EC

Hugo Vogelsang,
Maschinenbau GmbH
Holthöge 10-14
49632 Essen (Oldb.), Germany

We declare, that this delivery concerns the following machine which is not complete. The machine must not be put into service until the machinery into which this incomplete machine is incorporated is in conformity with the Machinery Directive 2006/42/EC.

Name of machine: Volumetric metering unit for liquid manure spreading vehicles

Type of machine/serial number: ExaCut

The special technical documents according to annex VII B have been prepared and can if necessary be obtained from:

Ms Ilona Ballmann at Hugo Vogelsang Maschinenbau GmbH, D-49632 Essen (Oldb.), Germany

The basic health and safety requirements according to Annex I of the above-mentioned directive are applied and observed.

Applied harmonised standards:

DIN EN 349:1993+A1:2008
DIN EN 1037:1996
DIN EN ISO 12100-1:2003
DIN EN ISO 12100-2:2003
DIN EN ISO 13857:2008

Applied national standards and technical specifications:

DIN 4844-1:2002
DIN 4844-2:2001+A1:2004
DIN 4844-3:2003
DIN 11000 :1980
DIN 11001-6 :1998
DIN EN 707 :1999
DIN EN ISO 4254-1:2005
DIN EN 62079 :2001





Hugo Vogelsang Maschinenbau GmbH

49632 Essen, 04.01.2010

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