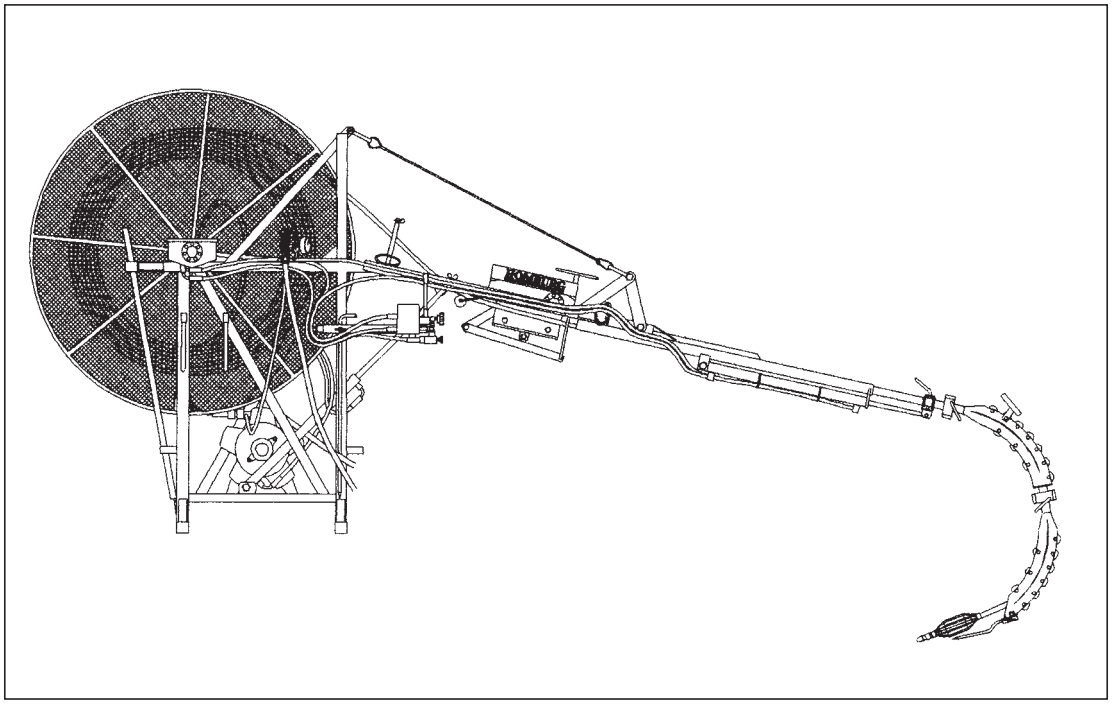
USER MANUAL

DRAIN CLEANER

Make : Homburg
Type : Delta DE-M135



Serial Number : _____
Date : 01 October 2011
Issue No. : DE-2 (English)
Version : C

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1 PREFACE

(How to use this user manual)

We thank you for purchasing the Homburg Drain Cleaner type Delta with which you bought a high-quality machine. To make the most out of that high quality throughout the service life of this machine, it is necessary to accurately follow all instructions in this user manual.

In this user manual you will find all information you need for optimum and safe use and maintenance of the machine as well as guidelines to prevent accidents with the machine. This user manual is exclusively intended for users and maintenance technicians of the Homburg Drain Cleaner type Delta.

Therefore, we expressly recommend to completely read and understand this user manual before taking the machine into use. Do you have questions about the machine? In that case contact your superior, the importer or the manufacturer as soon as possible.

You will find the icons below throughout this user manual. They refer to increasing danger levels, as explained below.

HINT!
The instruction shown here describes an efficient method that may lead to gaining time or to an improved final result.

NOTE!
The instruction shown here provides the user with additional information. This instruction draws the user's attention to possible problems.

CAREFUL
If this instruction is not followed accurately, that may result in damage to the machine or the surroundings or to pollution of the environment.

WARNING!
If this instruction is not followed accurately, that may result in bodily injury or permanent disability.

DANGER!
If this instruction is not followed accurately, that will result in bodily injury, permanent disability or death.

For easy use of this user manual, it has been provided with:
- -table of contents
- -subject index
- -list of illustrations
- -conversion table ANSI units - SI units

All units listed in this user manual are SI units.
All non-SI units are placed in brackets.

The numbered operating instructions must be carried out in that numerical sequence.

Use and maintenance instructions as supplied by manufacturers of components such as water pump and cardan shaft have been supplied with this user manual. Ask for them if you have not received them.

HOMBURG HOLLAND does not accept any liability for damage resulting from information in the use and maintenance instructions written by the manufacturers of these components.

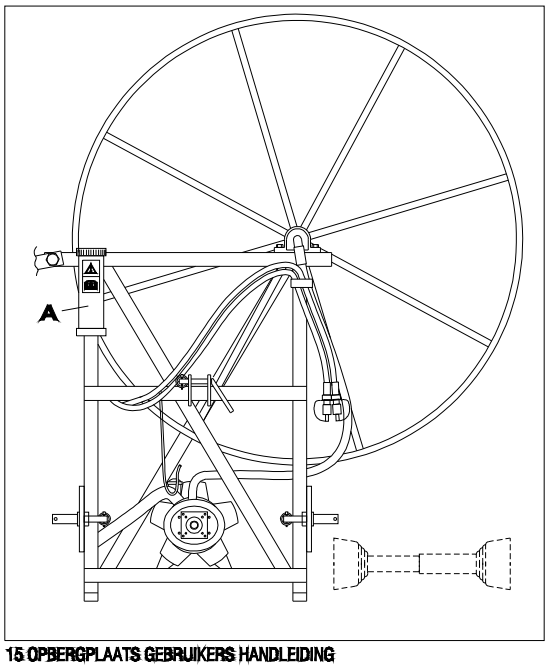
The Homburg Drainage Cleaner type Delta is referred to as *"Machine"* throughout this user manual.

"Feeding in" means: Feeding the flushing hose into the drainpipe.
"Feeding out" means: Feeding out the flushing house from the drainpipe.

Contact HOMBURG HOLLAND if you want to know anything about the machine that is not described in this user manual. If you contact us, please make sure you have the following information at hand:

-machine type
-serial number
-year of manufacture
-water pump type

Always keep this user manual on the machine in its special storage compartment (see fig. 15A). If the user manual is missing or damaged or if pages are missing, a new copy must be ordered from the manufacturer at once.



15 OPBERGPLAATS GEBRUIKERS HANDLEIDING

The following documents are available for the Homburg Drain Cleaner type Delta:

	Order number:
- User Manual with parts book	13440 (NL)
	13441 (GB)
	13442 (D)
	13443 (F)

- User manual Walterscheid cardan shafts (supplied)
- User manual Imovilli Pompe water pumps (supplied)
- Parts Book Imovilli Pompe water pumps (supplied)

On the last page you will find a form that you can use to list your suggestions, questions and remarks regarding this user manual. If you think that this user manual needs modifications, please let us now.

2 INTRODUCTION

The Homburg Drain Cleaner type Delta is exclusively intended for cleaning drainpipes in agricultural land using water. No other use of the machine is permitted. The manufacturer is not liable for damage caused by use that is not described in this user manual. If the machine does have to be used for a different purpose, this requires the prior written permission from the manufacturer.

- The guide arm must never be used as a hoist.
- The machine must not be operated by people younger than 18.

The Homburg Drain Cleaner type Delta or some construction design used in it are patented under the following patent number: **7811818**

3 CERTIFICATE OF CONFORMITY

CE Certificate of Conformity

Manufacturer

Address
Homburg Machinehandel b.v.
It Noarderfjild 21
9051 BM Stiens
The Netherlands

Postal address
Homburg Machinehandel b.v.
Postbus 5
9050 AA Stiens
the Netherlands

Importer:

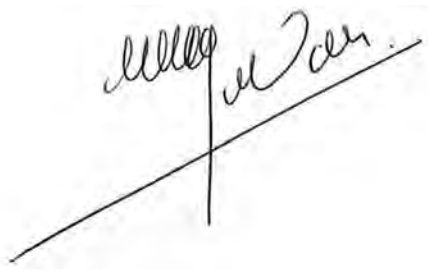
This is to certify that the Homburg Draincleaner, Delta model:

- Complies with all the applicable norms and standards of the Machinery Directive 2006/42/EC and

- all the applicable norms and standards of the EMC Directive 2004/108/EC.

Stiens, 1 October 2011

Johannes de Boer
Managing Director
HOMBURG MACHINEHANDEL B.V.

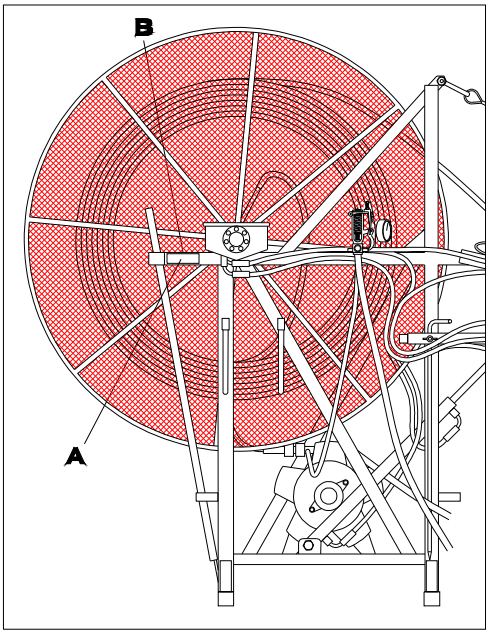


4 IDENTIFICATION

The location of the identification plate (see fig. 13) on the machine is shown in fig. 25A.
The following information can be found on the identification plate:

- Name of the manufacturer
- Visiting address of the manufacturer
- Telephone number of the manufacturer
- Fax number of the manufacturer
- e-mail address of the manufacturer
- Company logo
- Machine type reference
- Serial number of the machine
- Year of construction of the machine
- CE mark (indicating that the machine satisfies the Machine Directive)
- Patent number

The machine serial number is also stamped on top of the machine frame close to the identification plate. For the location of this stamped serial number see fig. 25B.



25.LOCATIE TYPEPLAATJE EN SERIENUMMER FRAME

On receipt of the machine fig. 13 and the information below must completely be entered:

Pump Make : Immovilli
Type : D135
Serial number :_____
Cardan shaft Make : Walterscheid
Type : W2100-SD05-660-10100-10100
Serial no. :_____

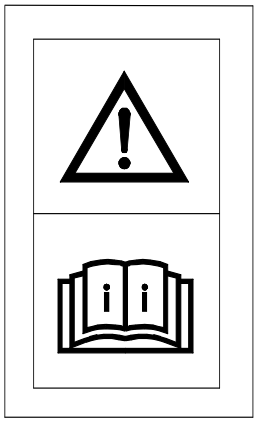
Delivery date Machine :_____
Factory stamp :

5 SAFETY

5.1 General

HOMBURG HOLLAND does not accept any liability for damage caused by acts in violation of this user manual. If the machine is used in violation of this user manual, that will automatically void the warranty of the machine and the manufacturer's product liability.

The machine may only be used by operating staff or maintenance staff older than 18 who have fully read and understood this user manual and who are familiar with the use of the machine.



07.STICKER"LEES EERST DE GEBRUIKERS HANDLEIDING"

In addition, we recommend to follow a short course in operating and maintaining the machine, which can be arranged by the manufacturer or a different company or importer recognised for that purpose by the manufacturer of the machine.

You, as machine operator or engineer, are the one who determines whether the machine is used in accordance with this user manual.

Always observe the operating manual of the tractor to be used, the cardan shaft and the water pump when using the machine.

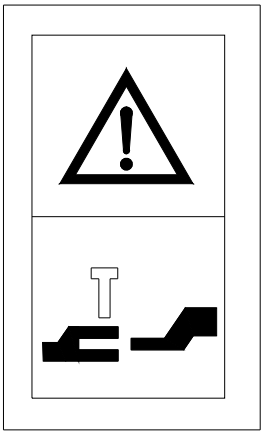
DANGER!
Failure to observe the following safety instructions may result in bodily injury, disability or death.

5.2 Before starting work

- Warning or safety provisions or guards on the machine must regularly be checked for presence and performance
- The machine must not be used unless it is in perfect technical condition. Do not operate a machine when parts are worn.
- The machine must only be used with a suitable tractor that is in perfect technical condition.
- Do not activate the water pump when it can reasonably be expected that the water in the pump is frozen.
- Make sure there are no children and/or animals near the machine when it is being operated. All people must keep out of the machine's operating range.
- Always inspect the area where the machine is going to be used (height, width, bearing capacity embankments, shoulders, floors, bridges, risk of explosion etc.).
- Wear adequate eye protection (goggles). The flushing water leaving the drainpipe under pressure may carry off small hard objects at high speed.
- Always check the machine for loose bolts and nuts, damage, leakage or defects and correct operation (also the tools and accessories).
- Check all guards, warnings and safety devices for presence and proper performance.
- Do not operate the machine when your are tired or have used alcohol, medicines or drugs.
- Beware of dangerous clothing, long hair or jewellery that may get caught somewhere.
- Keep the controls free of food, oil, dirt, dust, snow and ice.
- When the machine is operated at ambient temperatures below zero degrees Celsius, the water pump may get damaged when it is switched on.
- Use a tractor with safety cab or roll bar as prescribed by the law.

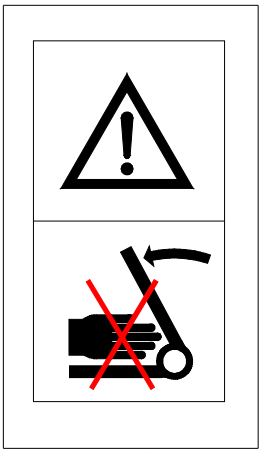
5.3 Hitching and unhitching

- The machine must only be hitched to the tractor using the three-point suspension intended for that purpose in accordance with the safety requirements.
- Utmost care must be taken when hitching or unhitching the machine.
- When hitching or unhitching the machine, the tractor operating lever must be placed in such a position that it cannot inadvertently be moved.
- Make sure the machine link pin diameters match the hole diameters of the tractor three-point.



16.STICKER"OPHANGPUNT 3-PUNTS OPHANGING"

*WARNING: In the area of the tractor three-point the risk of getting caught and sustaining injury exists.

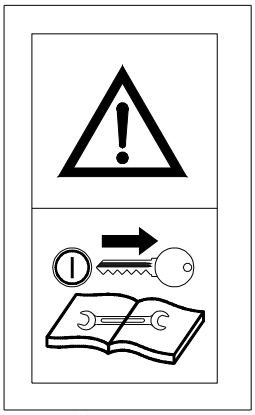


10.STICKER"AFKNELGEVAAR"

*Lock the stabiliser rods before entering a public road. This will prevent inadvertent lateral movement of the machine.

5.4 Drive (pto and cardan shafts)

- Only use the universal cardan shaft that came with the machine or the one prescribed by the manufacturer.
- The pto or cardan shaft protection must always be mounted and in good condition.
- Make sure the protective sleeve of the universal cardan shaft provides complete protection in working position as well as in transport position.
- Stop the tractor engine and take out the ignition key before mounting or dismounting the cardan shaft.

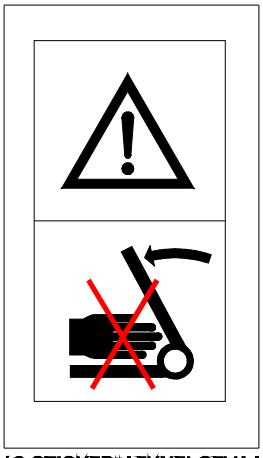


14.STICKER"VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

- If the cardan shaft is equipped with a slipping clutch or a freewheel clutch, then mount it on the machine side.
- Always make sure the universal cardan shaft is mounted and locked correctly.
- Always make sure that the protective sleeve of the universal cardan shaft is locked firmly in the rotating direction with the aid of lock chains.
- Select the correct rpm for the cardan shaft before switching it on.
- Check that there are no people or animals near the machine before switching on the cardan shaft.
- Switch off the cardan shaft when the angle with the machine or the tractor exceeds the value prescribed by the manufacturer.
- WARNING: When the cardan shaft has been switched of, the driven pump may coast down a while. Never touch it while it is coasting down.
- Place the cardan shaft in the special cardan shaft support when it is not in use. Never let it hang on the lock chain.
- After uncoupling the universal cardan shaft from the pto, the protective cover must be placed back on the tractor pto.
- Damaged and/or defective pto and cardan shaft covers must be replaced at once. Only use original replacement parts.
- Never stand on the cardan shaft or on the protective sleeve of the cardan shaft.
- Always observe the cardan shaft instruction manual when working with the machine.

5.5 Working with the machine

- The guide arm must never be used as a hoist.
- The machine must not be operated by people younger than 18.
- Always apply the tractor handbrake before working with the machine or leaving the tractor seat.
- Always ensure you have sufficient room when using the machine guide arm.
- Take care of electric cables and lines when working with the guide arm. Touching them can be fatal!
- Never play games with the machine.
- Wear adequate eye protection (goggles). The flushing water leaving the drainpipe under pressure may carry off small hard objects at high speed.
- Only operate the machine from the position intended for it.
- Only operate the tractor from the position intended for it.
- Always ensure a good view of the work.
- Always switch off the machine when you leave it and take the tractor ignition key with you.
- WARNING: In the area of the machine guide arm the risk of getting caught and sustaining injury exists.



10.STICKER"AFKNELGEVAAR"

- When working from public roads, always keep other road users in mind. Switch on the flashing light or rotating light.
- The maximum permissible values such as: engine rpm, hydraulic oil pressure and water pressure etc. of the machine must not be exceeded.
- When the machine is operating, the noise production of the machine is lower than 70 dB(A). Use hearing protection dependent on the noise produced by the tractor.
- When the machine is operating, the mechanical vibration energy value of the machine is lower than a_{vhw} 2.5 m/s^2.
- If a thunderstorm approaches when working on the field, directly sit in the tractor if it has a cab.
- Never leave the machine when the tractor ignition key is still in the ignition lock.

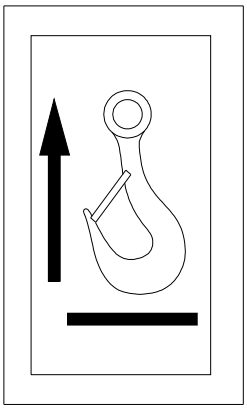
- Always observe the operating manual of the tractor used when working with the machine.
- Emergency: In the event of a runaway tractor diesel engine due to insufficient maintenance of the air filter or the crankcase ventilation system, the machine and the tractor engine may get severely damaged due to a very high rpm. If this happens, the air intake of the tractor engine must be shut off as quickly as possible to stop the engine.
- Emergency: If the tractor with the machine has toppled, the tractor engine must be shut off directly to prevent damage to the tractor engine and the machine water pump.

5.6 Transport (behind the tractor)

- If the tractor with the machine has to use public roads, the assembly must satisfy the current traffic regulations and legislation. When the machine is hitched to the tractor, in many cases the original rear lighting of the tractor is obscured. This means that a correctly functioning light beam must be mounted to the rear of the machine fitted with:
    - Rear lights
    - Brake lights
    - Flasher lights
    - Licence plate lighting (i.a.)
    - Licence plate holder (i.a.)
    - Holder for triangle "Slow traffic"
    - Red rear fog light (i.a.)
    - Reflectors
- Also make sure that the flashing light or rotating light mounted on the tractor is clearly visible for traffic approaching the tractor with machine from the rear. That applies for transport position as well as operating position.
- Make sure the maximum permissible axle loads and maximum permissible dimensions of tractor and machine are in accordance with the traffic regulations when using public roads.
- Make sure the machine has been brought into transport position as prescribed by the manufacturer when using public roads with the tractor and machine.
- It is not permitted to carry people, animals or goods with the machine.
- Be aware that the tractor handles differently with a hitched machine.
- Check that the tractor front axle pressure is sufficient before driving off. If not, place ballast weights as prescribed by the tractor manufacturer.
- Make sure that the maximum permissible axle loads or the axle loads division of the tractor are never exceeded.
- Allow for the protruding rear length when taking corners and reversing when the machine is hitched to the tractor. Insufficient room when taking corners can cause irreparable damage to the complete machine and the three-point lift.
- When the machine is transported behind the tractor in its highest position, then lock the operating lever of the three-point lift.
- Keep in mind that the machine may hit the ground with force when driving over rough terrain with the tractor. That may cause severe damage to both the three-point and the machine itself.
- Switch off all working lights when driving over public roads.

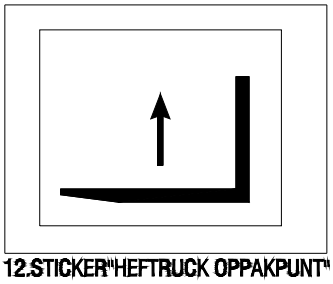
5.7 Transport (not behind the tractor)

- Be aware of the total transport height (flyovers etc.).
- Be aware of the total transport weight.
- Never stand under a lifted machine.
- Only use the special hoisting eyes when the machine has to be hoisted.



08.STICKER"HIJSPUNT"

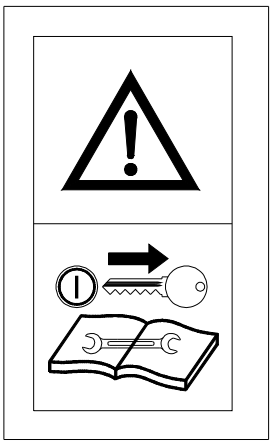
- Only lift the machine at those places indicated with the sticker below.



12.STICKER"HEFTRUCK OPPAKPUNT"

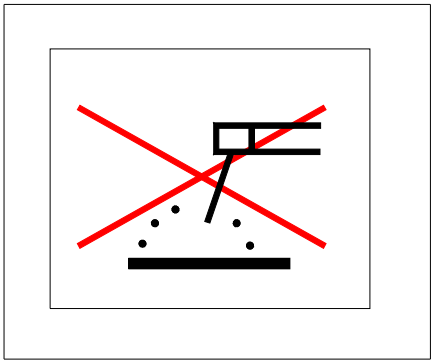
5.8 Service, Maintenance and Repair

- Maintenance and repair must only be carried out by trained, appointed and authorised personnel that does not use alcohol, medicines or drugs.
- Operators are only allowed to carry out the maintenance and repair described in this user manual.
- The settings and accesses sealed by the manufacturer must not be broken.
- If a seal is broken, that automatically voids the manufacturer's product liability.
- Always use the tools, spare parts, materials, lubricants and operating procedures prescribed by the manufacturer.
- Never use defective tools.
- Use tools only for their intended purpose.
- Don't leave any tools in the machine after maintenance.
- Make sure during maintenance and repairs on the machine that the ignition key has been removed from the lock and that the cardan shaft is uncoupled.



14.STICKER"VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

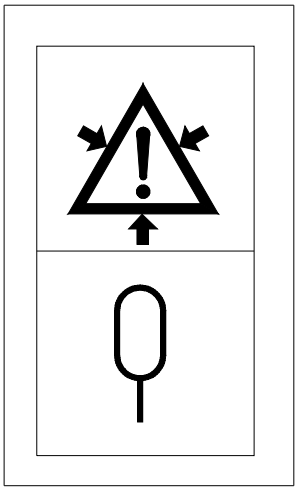
- Beware of exhaust gases in confined spaces, risk of carbon monoxide poisoning!
- Never weld on the machine without the manufacturer's written permission.



11.STICKER"NIET LASSEN AAN DE MACHINE"

- Unhitch the machine from the tractor before welding on the machine.
- Place suitable supports under the machine when carrying out maintenance with the machine in lifted position.
- Never unfold the guide arm when the machine is not hitched to the tractor. The machine may topple if you do.
- Always observe the safety precautions from suppliers of battery acid, fuels, lubricants, cooling fluid and hydraulic oil.
- Deposit used oil, used grease and oil filters at the intended places in accordance with environmental regulations.
- None of the substances on or in the machine are suitable for internal use.
- Uncouple the battery or the electric connection to the tractor when working on the electric system of the machine.
- Never remove lines, hoses or valves of hot and/or pressurised fluids.
- Never remove a protective casing of an operating machine.
- Never modify the machine without the manufacturer's written permission. Modifying also includes: removing parts, breaking seals for instance on the pump, the hydraulic valves control block and water pressure controller, or adding parts or equipment on or to the machine that are not described in the user manual.

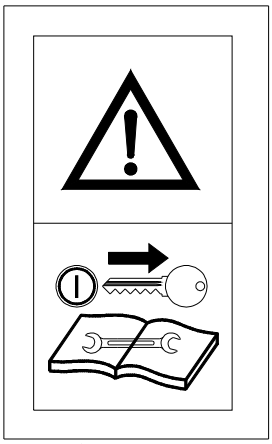
- The machine has a water pump equipped with a pressurised air-filled accumulator. Be very careful when working on this accumulator. Work must only be carried out by specialised personnel with special tools.



09.STICKER"ACCUMULATOR AANWEZIG"

5.9 Hydraulic system

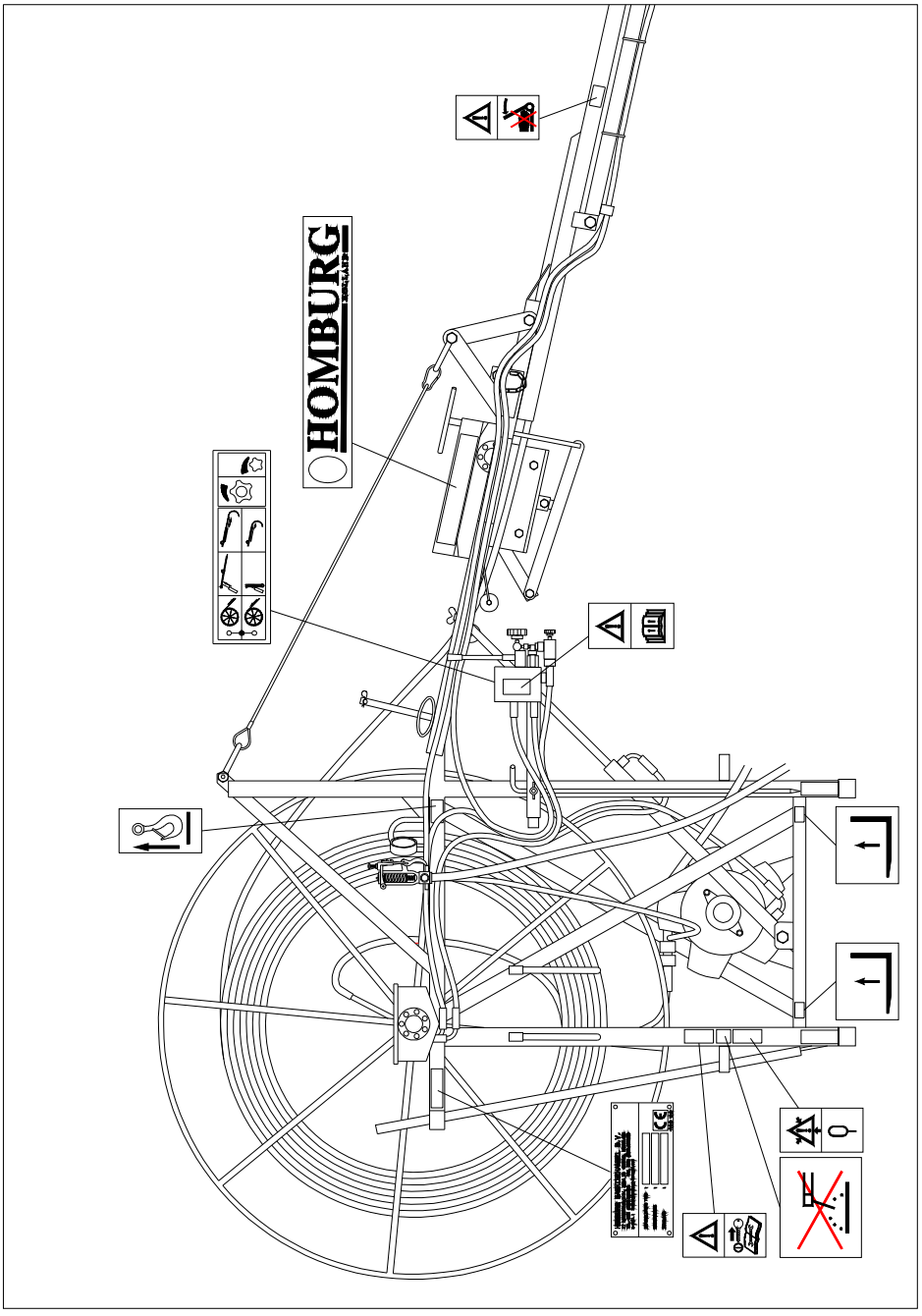
- Warning: The hydraulic system is pressurised. Hydraulic oil under pressure may cause serious injury when it touches the skin. Directly consult a physician if that happens, because there is a risk of infection.
- First switch off the hydraulic control valve of the tractor, then move the three control levers of the machine back and forth a number of times before connecting the hydraulic quick-connect couplings of the machine to the tractor.
- Mark the quick-connect couplings of the tractor as well as those of the machine to prevent incorrect connection of the quick-connect couplings. If the quick-connect couplings have been connected incorrectly, all hydraulic operating functions are reversed. (e.g. up becomes down).
- Work on the hydraulic system must only be carried out by personnel with special training.
- Regularly check the hoses. Damaged and/or defective hoses must be replaced at once. When mounting new hoses, these must satisfy the specifications prescribed by the manufacturer.
- If the hydraulic system has a leak, all necessary precautions must be taken to prevent accidents and/or damage to the environment.
- Lower the machine to the ground, switch off the tractor engine, take the ignition key from the lock and move all hydraulic operating levers back and forth a number of times to take the pressure from the hydraulic system before carrying out work on the hydraulic system.



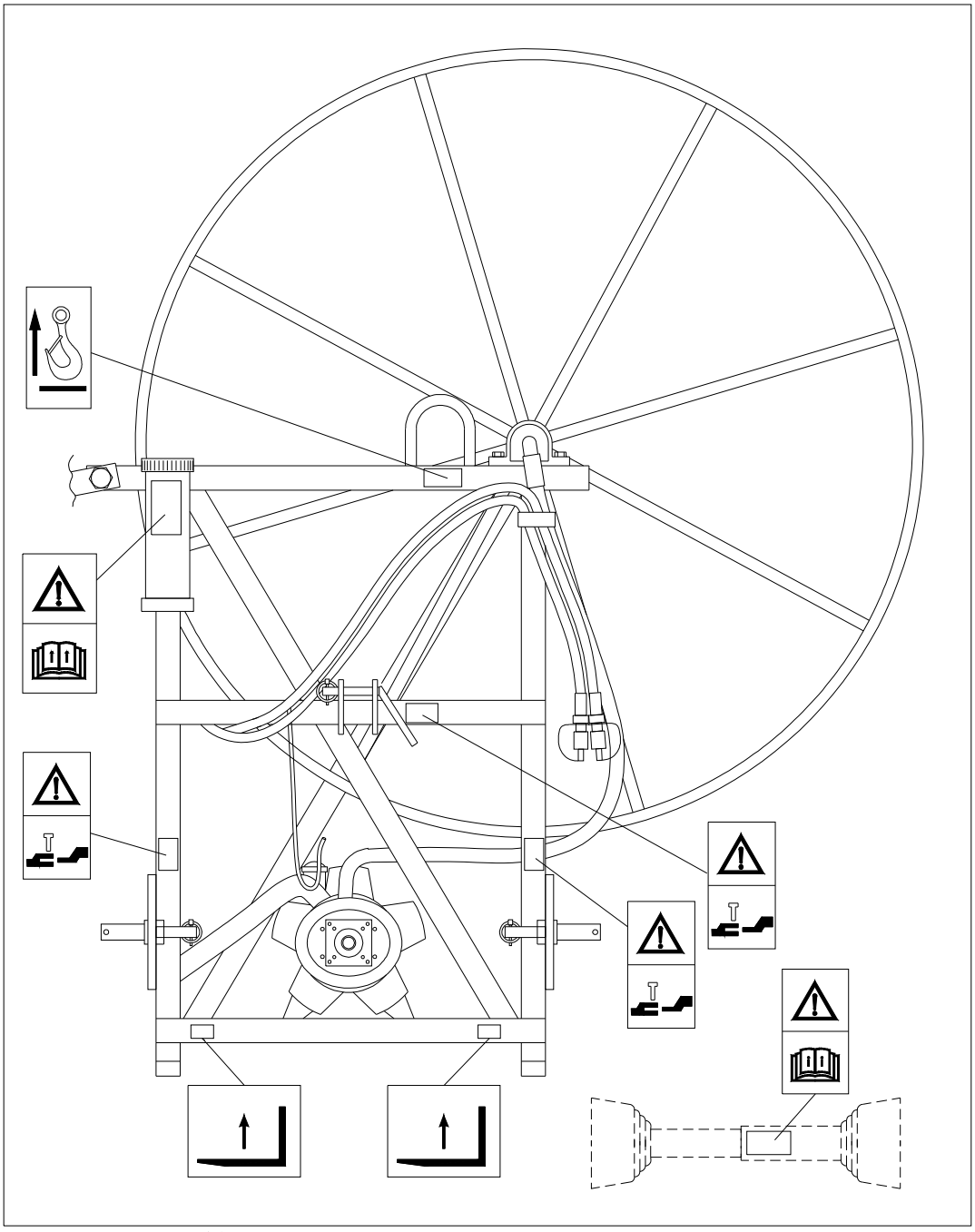
14.STICKER"VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

5.10 Safety warnings (stickers) fig. 26 + 27:

- Warnings on the machine must be durable, indelible, and permanently present on the machine throughout the machine's service life. If the warnings have been removed or have become illegible, they must be replaced at once. The meaning of all stickers has been described in the above text. Below it is shown were all warnings should be on the machine.



26.LOCATIE STICKERS ACHTERZIJDE

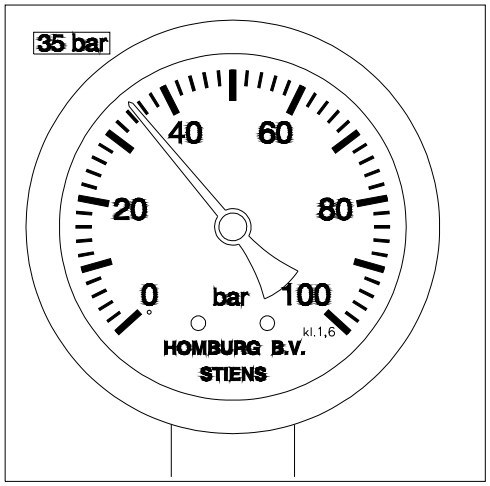


27.LOCATIE STICKERS VOORZIJDE

Warning:	**Order number:**
"Read the operating manual first"	(art. no.978443)
“Hydraulic operating symbols"	(art. no.13461)
"Hoisting point"	(art. no.978439)
"Three-point suspension point"	(art. no.978446)
"Forklift pick-up point"	(art. no.13410)
"Air accumulator present in machine"	(art. no.13411)
"Danger of getting caught"	(art. no.978434)
"No welding on the machine"	(art. no.13412)
"Remove tractor ignition key before carrying out maintenance”	(art. no.978436)
Homburg manufacturer's sticker"	(art. no.13413)

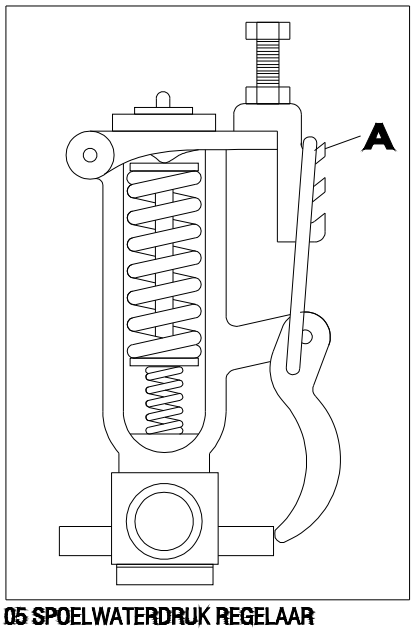
5.11 Safety provisions:

A. Stickers (see fig. 26 and 27).
B. Pressure gauge. Indicates the flushing water pump pressure in bar (see fig. 18 and fig. 19 pt. 15).



18 SPOELWATERDRUKMETER

C. Safety mesh in reel. Prevents limbs from getting caught in the rotating reel (see fig. 19 pt. 09).
D. Flushing water pressure controller Prevents the pressure from exceeding 3.5 MPa (35 bar) (see fig.05 and fig. 19 pt. 14).



05 SPOELWATERDRUK REGELAAR

E. Protective cover reel drive. Prevents limbs from getting caught in the drive (see fig. 19 pt. 13).
F. Protective cover drive rubber wheels. Prevents limbs from getting caught in the drive (see fig. 19 pt. 20).
G. Protective sleeve cardan shaft. Prevents limbs from getting caught in the rotating cardan shaft (see fig. 20 pt. 10).
H. Support cardan shaft. Prevents damage to the cardan shaft or its protective sleeve (see fig. 20 pt. 05).
K. User Manual (see "Preface" and fig. 19 pt. 48).
L. Lighting beam for use on public roads. Prevents traffic accidents (see fig. 19 pt. 47).
M. Triangle "slow traffic". Prevents traffic accidents (see fig. 19 pt. 10).

WARNING!
Never remove or deactivate safety provisions. Any defective safety provision must directly be repaired in a correct manner. Never use the machine with one of the safety provisions removed, defective or deactivated.

6 GENERAL DESCRIPTION OF THE MACHINE

6.1 Main components

The Homburg Drain Cleaner type Delta is a machine for cleaning drainage systems as found in agricultural land using water when they have got clogged up, for instance with clay silt.

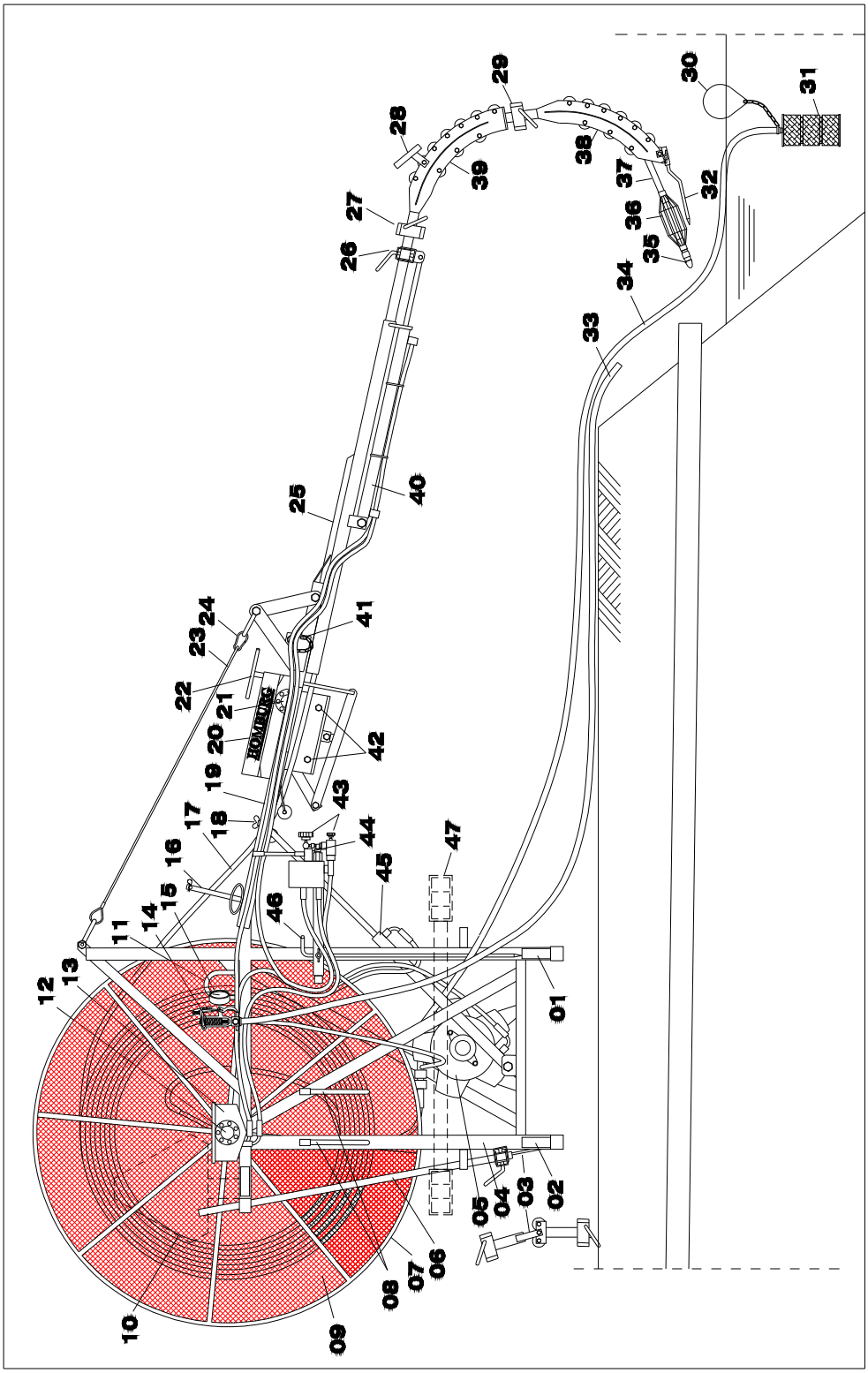
The machine can only operate when it is directly connected to a suitable agricultural tractor using:

- Three-point suspension
- Cardan shaft
- Hydraulic hoses (2) with quick-connect couplings
- Electric connection for rear lighting and/or working lights.

The main components of this machine are (see fig. 19) rear:

01. Transport support roller bend
02. Transport support roller bend
03. Knee 30° wells set (option)
04. Steel frame
05. Flushing water pump
06. Guide tube 2 m wells set (option)
07. Reel
08. Support suction hose and overflow hose
09. Safety mesh
10. Triangle "Slow traffic" (option)
11. Hoisting eye rear
12. Hydraulic motor reel drive
13. Protective cover reel drive
14. Flushing water pressure controller
15. Pressure gauge (flushing water)
16. Hose guide/Transport locking support guide arm
17. Flushing hose
18. Metres counter
19. Guide arm (split)
20. Protective cover hose drive
21. Hydraulic motor hose drive
22. Adjusting lever pressure rolls
23. Steel cable
24. Carabine hook
25. Guide arm (split)
26. Locking clamp with lever
27. Locking clamp with lever
28. Cleaning tube
29. Locking clamp with lever
30. Float
31. Suction basket

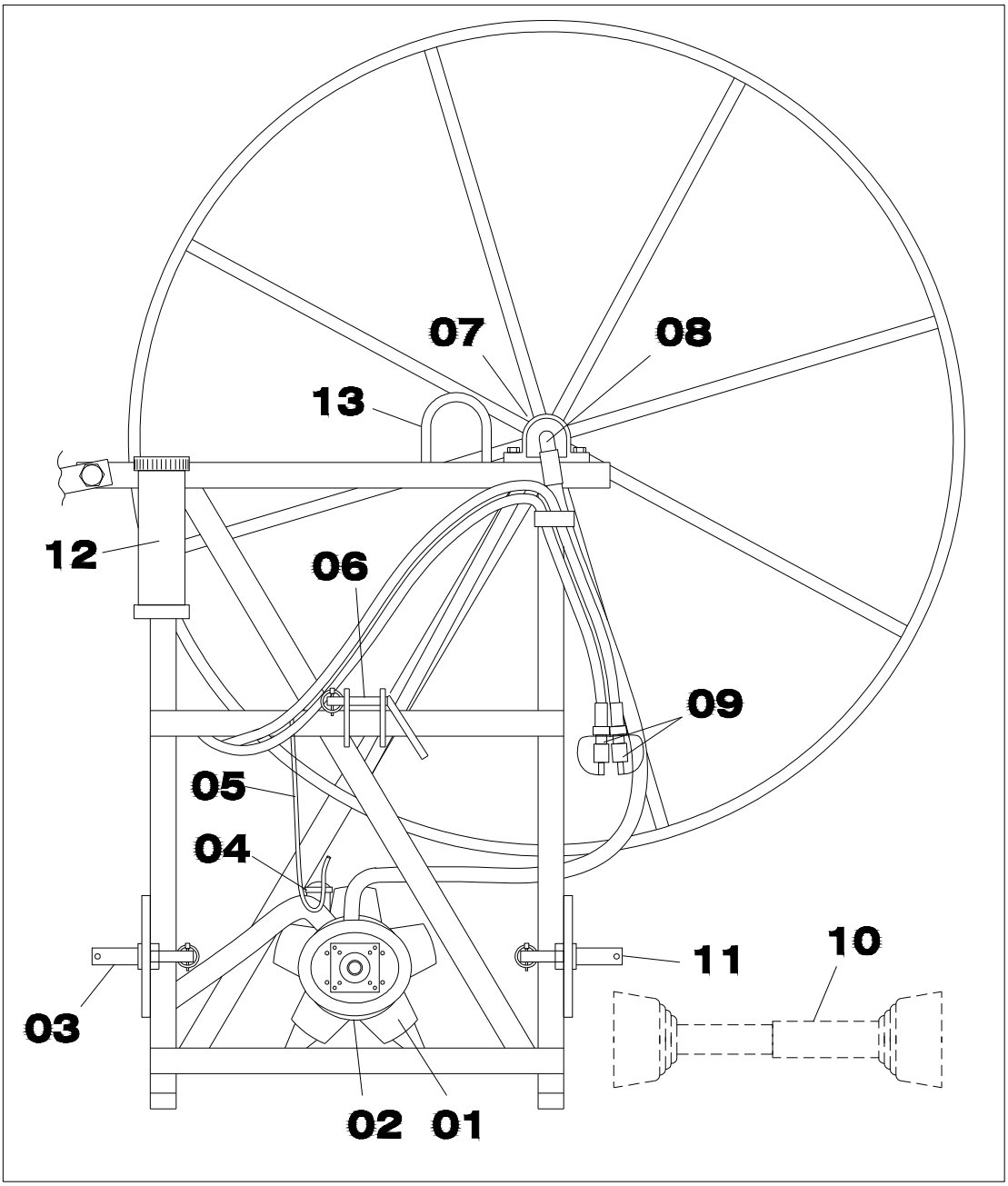
32. Fixing pin (small)
33. Overflow hose
34. Suction hose
35. End piece with nozzle
36. Guide basket (option)
37. Flushing hose
38. Roller bend - bottom
39. Roller bend - top
40. Hydraulic extension/retraction cylinder
41. Hinge lock pin on chain
42. Pressure rolls
43. Speed control valves
44. Hydraulic operating valves block
45. Hydraulic lift cylinder
46. Fixing pin
47. Rear lighting beam (option)



19 HOOFDCOMPONENTEN ACHTERZIJDE DELTA

Main components continued (see fig. 20) front:

01. Flushing water pump
02. Protective cover flushing water pump shaft
03. Suspension point three-point suspension
04. Oil gauge glass/filler cap flushing water pump
05. Cardan shaft support
06. Suspension point three-point suspension
07. Reel bearing
08. Water coupling
09. Hydraulic quick-connect couplings
10. Cardan shaft
11. Suspension point three-point suspension
12. Storage compartment User Manual
13. Hoisting eye front



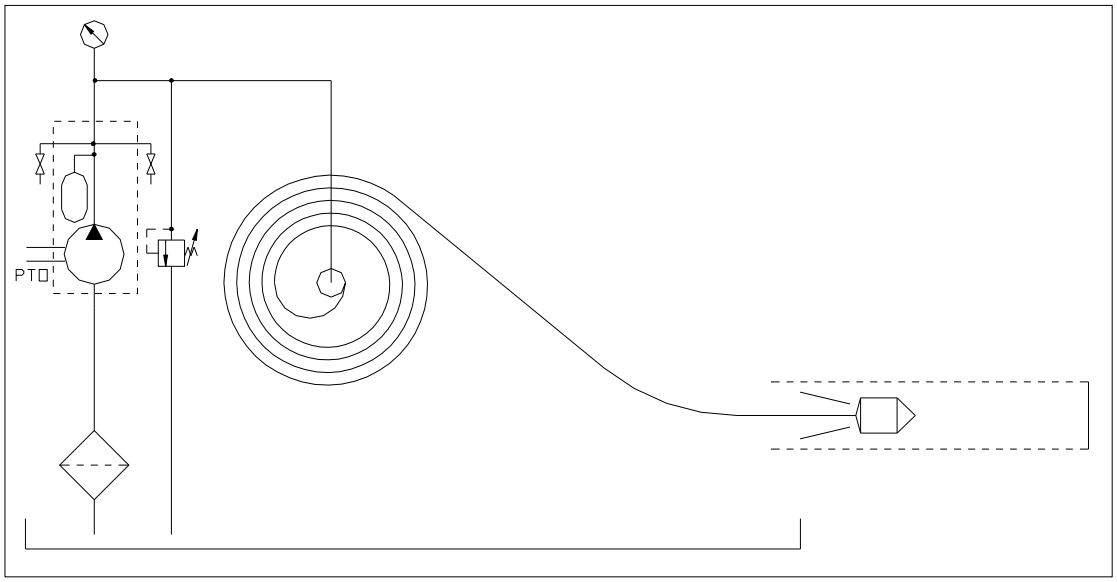
20 HOOFDCOMPONENTEN VOORZIJDE DELTA

6.2 Operation

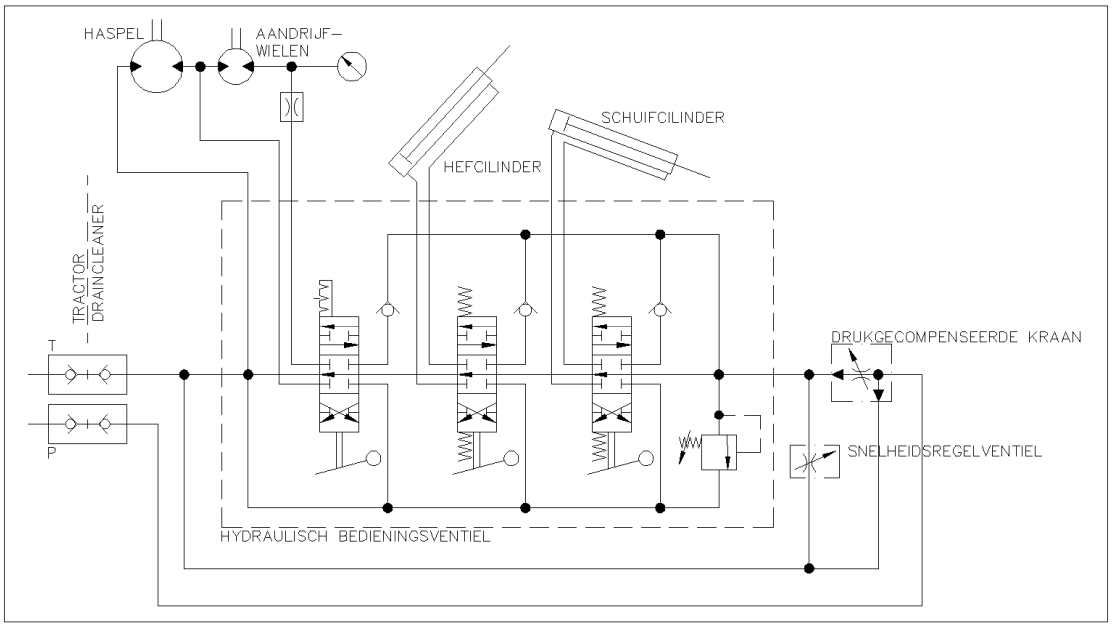
The tractor pto drives the diaphragm water pump. Through the suction basket and the suction hose water is sucked in from a ditch or a water tanker. Then the water is sent through a pressure controller (the excess pressure is sent back through an overflow hose to the ditch or the water tanker) and then through the rotating centre of the flushing hose reel, after which it sprays out of the nozzle and performs its cleaning action in the drainpipe. The flushing hose runs from the reel with the drive mechanism through the guide arm and roller bend into the drainpipe. See diagram fig. 03.

The guide arm can be folded in and out with the aid of a hydraulic cylinder from vertical to horizontal position and back. The guide arm can be extended and retracted with the aid of a second cylinder. The flushing hose can be fed through the guide arm and the roller bends with the aid of 2 rubber wheels driven by a hydraulic motor that are clamped around the flushing hose. The hydraulic system is designed in such a manner that both during feeding in and feeding out the reel wants to roll up under slight pressure, so the flushing hose always winds tightly around the reel. The second section of the roller bend can be turned to enable cleaning drainpipes in the own bank as well as in the opposite bank. See diagram fig. 04.

The hydraulic system of the machine features a pressure compensation valve that sends the excess oil from the tractor directly back to the hydraulic reservoir of the tractor. That reduces the heat generation of the hydraulic oil. See diagram fig. 04.



03 WATERSCHEMA SPOELSYTEEM DELTA



04 HYDRAULISCH SCHEMA DELTA

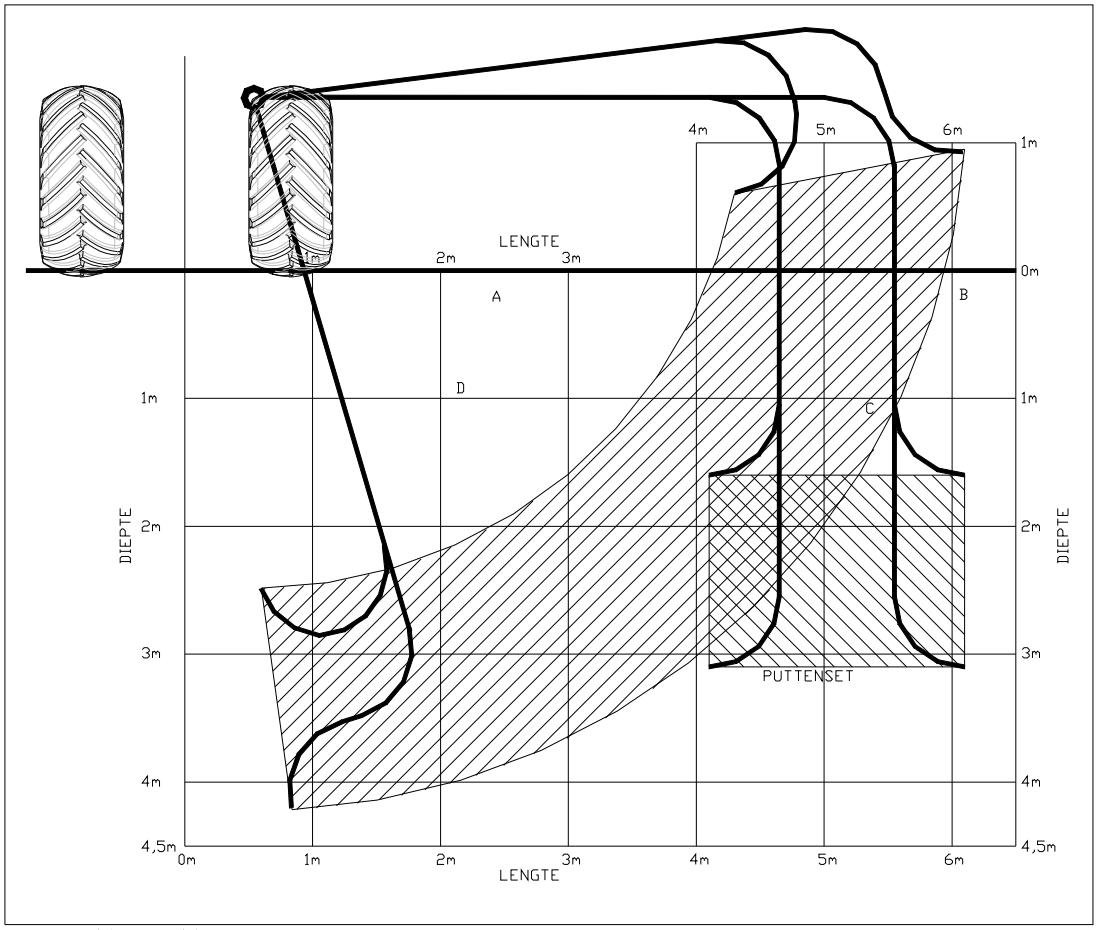
The front of the machine is the side facing the tractor. The guide arm can only be unfolded to the right of the machine. That means the drainpipes to be cleaned must always be kept to the right of the machine.

In areas without ditches in which the drainpipes end, they end in concrete wells. Then the machine must be equipped with an optional wells set. This wells set is composed of a 2 metres long pipe and a 30° knee that are mounted between the top and bottom roller bends.

7 TECHNICAL SPECIFICATIONS

7.1 Machine:

Make	:	Homburg
Type	:	Delta DE-M135
Length	:	1.10 m
Width	:	1.85 m (arm folded up)
	:	6.20 m (arm folded out and fully extended)
Height	:	2.25 m (arm folded in and standing on the ground and guide arm fully retracted and the roller bends placed on the storing supports)
	:	2.95 m (arm folded in and standing on the ground and guide arm fully attracted and roller bends on the arm hanging over the machine)
Mass empty	:	450 kg
Mass with water	:	564 kg
Material flushing hose	:	HPE (Hard PolyEthylene)
Length flushing hose	:	300 m
Diameter flushing hose	:	27 mm
Wall thickness flushing hose	:	3.5 mm
Drive flushing hose	:	hydraulic
Operating speed	:	20m/min. (max.)
Water pressure controller	:	2.5-3.5 MPa (25-35 bar)
Water pressure at the nozzle	:	1.0-1.5 MPa (10-15 bar)
Nozzle	:	12 + 1 hole Ø 2 mm
Length suction hose	:	10 m with suction basket and float
Diameter suction hose	:	38 mm
Mesh size suction basket	:	2 mm
Length overflow hose	:	10 m
Paint	:	RAL2004
Hydraulic system	:	2 hydraulic gear motors
	:	2 double-acting cylinders
	:	3-part operating valves block
	:	1 Speed control valve
	:	1 Pressure compensation valve
Noise level	:	< 70 dB(A)
Mechanic vibrations	:	a_{vhw} 2.5 m/s^2
Knee 30° well set (option)	:	Knew 30°, Extension tube length 2 m.
Arc angle roller bends	:	60°
Operating range machine	:	(see fig. 02.)



02 WERKBEREIK DELTA

7.2 Cardan shaft

Make	:	Walterscheid
Type	:	W2100-SD05-660-10100-10100 (14kW 19hp)
Maximum permissible cardan shaft angle measured from the centre line of the pto	:	25°

7.3 Flushing water pump

Make	:	Imovilli Pompe
Type	:	135 m
Drive	:	pto, universal cardan shaft
Capacity	:	115 l/min 5MPa (50 bar) (max.)
Capacity	:	70-80 l/min 3MPa (30 bar) (nominal)
Pressure accumulator	:	0.7 MPa (7 bar)
Speed	:	350-550 rpm
Input power	:	13.3 kW (18 hp)
Mass	:	27.5 kg
Lubricating oil	:	1.85 litres (SAE20/30)
Maximum head	:	3 m

7.4 Technical requirements tractor

Tractor must be fitted with:

- three-point suspension Category 2 in accordance with DIN9674 and ISO730;
- sufficient counterweight;
- pto connection 350-550 rpm. $1^3/_8$" 6 splines according to DIN9611 and ISO500;
- hydraulic supply 15 l/min15 MPa (150 bar);
- hydraulic quick-connect couplings $^1/_2$" -bi SAE according to ISO7241-1 Series A or ISO-5675 or SAE1036;
- electric connection rear/working lighting according to DIN72577;
- loose rear lighting beam according to traffic regulations.

7.5 Permissible operating conditions of the machine

Ambient temperature 0 ºC to 50 ºC
Humidity from 10% to 90%
Indoors as well as outdoors environment without dust and/or gas explosion risk.

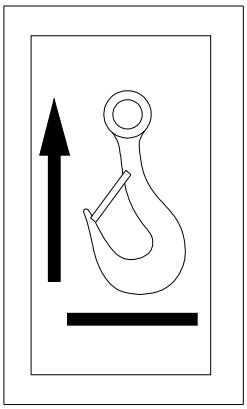
7.6 Conversion table

SI units	ANSI units	ANSI units	SI units
1 kg	2.2046 lbs	1 lb	0.453592 kg
1 m	3.28 ft	1 ft	0.3048 m
1 mm	0.03937 in	1 in	25.4 mm
1 km	0.62 mile	1 mile	1.609 km
1 litre	0.264 gallon (US)	1 gallon (US)	3,785 litres
1 MPa (10 bar)	145 psi (=145 lbs)	1 psi (=1 lbs)	0.068966 MPa (0.0689 bar)
1 kW	1.36 hp	1 hp	0.736 kW
ºC	0.555 x (ºF - 32)	ºF	(1.8 x ºC) + 32

8 TRANSPORT (NOT BEHIND THE TRACTOR)

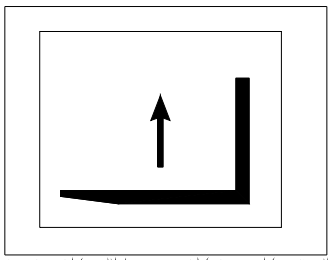
The machine always comes completely assembled. That means the machine does not have to be put together after receipt. The machine is fitted with 2 hoisting eyes (see fig. 19 pt. 11 and fig. 20 pt. 13). Make sure the reel is not pressed in by slings or hoisting cables when hoisting it! That can be achieved by using an equator.

WARNING!
Only hoist the machine on the hoisting eyes.



08.STICKER"HIJSPUNT"

A forklift may only pick up the machine under the lower horizontal beams of the basic frame. Prevent toppling when transporting by forklift

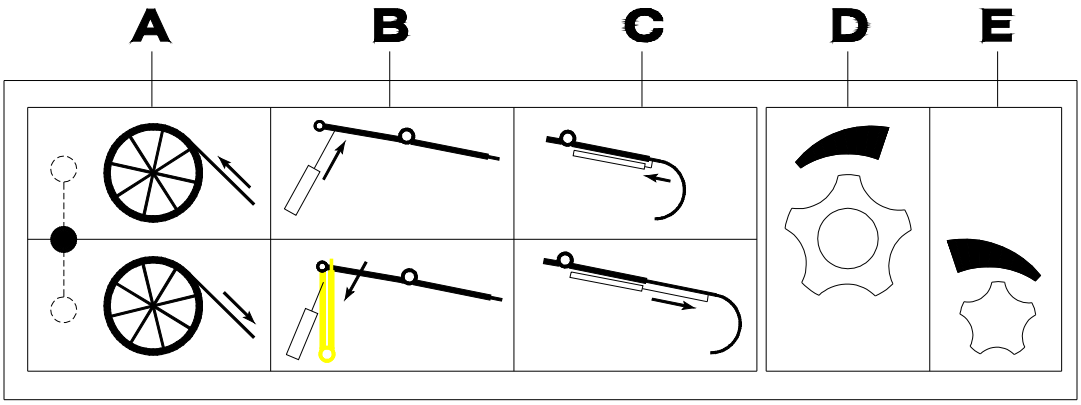


12.STICKER"HEFTRUCK OPPAKPUNT"

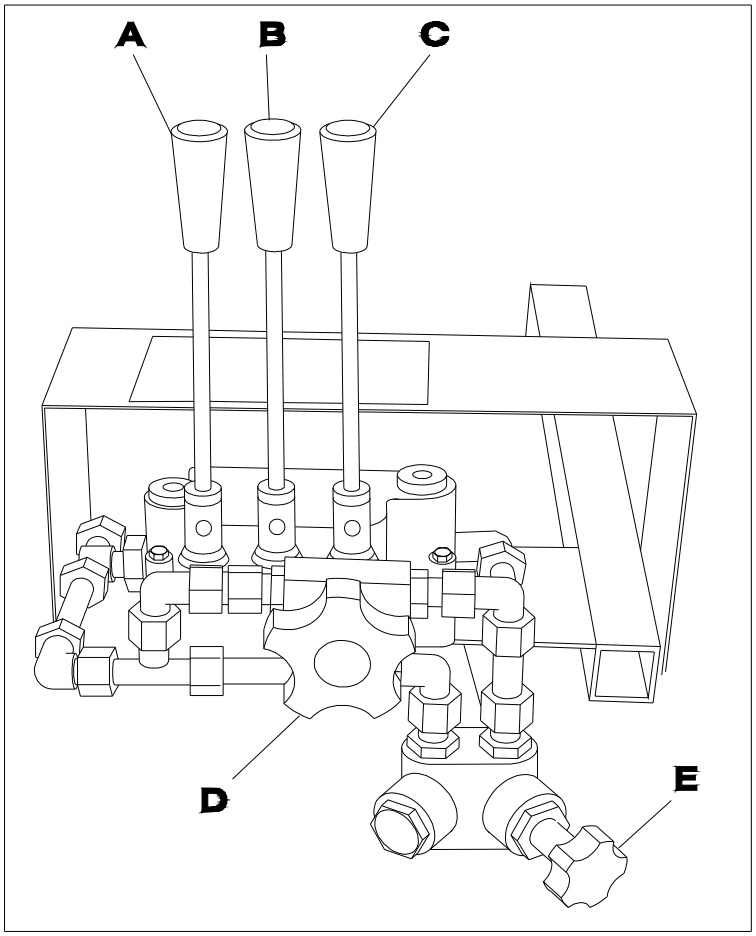
The machine may only be fastened on the beams of the basic frame using lashings and tensioners (for instance in a container and on a lorry deck) to prevent toppling during transport.

Otherwise machine parts may get damaged.

9 CONTROLS



06 STICKER BEDIENINGS-SYMBOLEN HYDRAULISCHE FUNCTIES



21 HYDRAULISCHE BEDIENINGSORGANEN

A. Hydraulic operating lever feeding in/out flushing hose
(3 catch positions)
- Press the lever back to feed in the flushing hose.
- Put the lever in central position to stop feeding in or out.
- Pull the lever forward to feed out the flushing hose.

B. Hydraulic operating lever folding in/out guide arm.
(goes to central position under spring pressure)

(if steel cable "O" is coupled)
- Press the lever back to fold out the arm.
- Pull the lever forward to fold in the arm.

(if steel cable "O" is uncoupled)
- Press the lever back to fold out the arm.
- Pull the lever forward move the arm down.

C. Hydraulic operating lever extending/retracting guide arm.
(goes to central position under spring pressure)
- Pull the lever forward to extend the arm.
- Press the lever back to retract the arm.

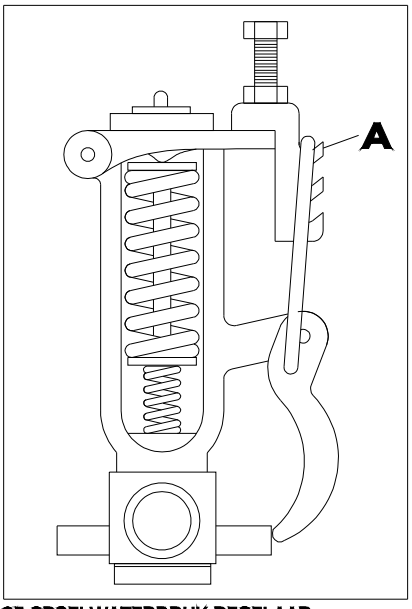
D. Speed control valve feeding in/out flushing hose
- Rotate the control anticlockwise to the decrease the speed (open).
- Rotate the control clockwise to increase the speed (close).

E. Pressure compensation valve
- Rotate the control anticlockwise to feed more oil to the system (open).
- Rotate the control anticlockwise to feed less oil to the system (close).

Setting pressure compensation valve E:
1. Feed the flushing hose some 50 m into the drainpipe.
2. Close speed control valve D.
3. Feed the flushing hose out of the drainpipe at 30 m/min using the pressure compensation valve E. Read from the metres counter how many metres a minute are being fed out.
4. Now the pressure compensation valve has been adjusted for the tractor that is now driving the machine. This must be done after once for every tractor so you don't have to touch it anymore. When a different tractor is used, this adjustment must be made again.

F. Flushing water pressure controller (see fig. 05)
(Screw setting is factory-sealed at 3.5 MPa (35 bar)

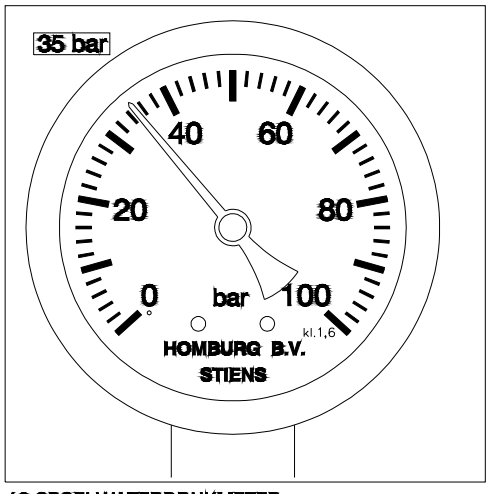
- Always use the top hook A



05 SPOELWATERDRUK REGELAAR

G. Pressure gauge (flushing water)

- Used to read out the water pump pressure.



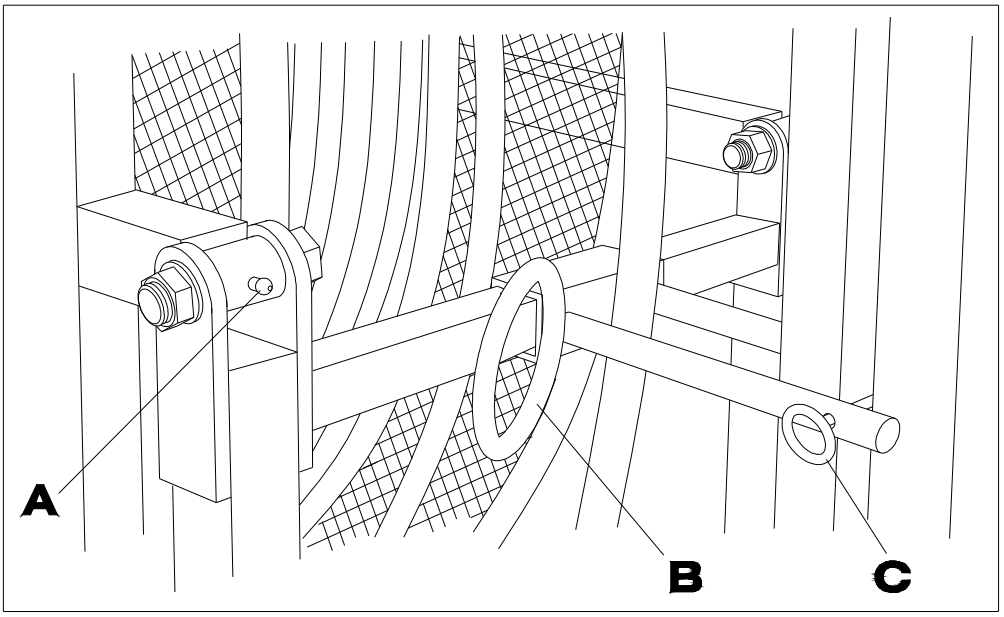
18 SPOELWATERDRUKMETER

Adjusting lever pressure roll flushing hose (see fig. 19 pt.22)

- Rotate lever anticlockwise to decrease the pressure on the feeding in/out rolls of the flushing hose.
- Rotate lever clockwise to increase the pressure on the feeding in/out rolls of the flushing hose.

Combined Arm lock support/Flushing hose guide (see fig. 22)

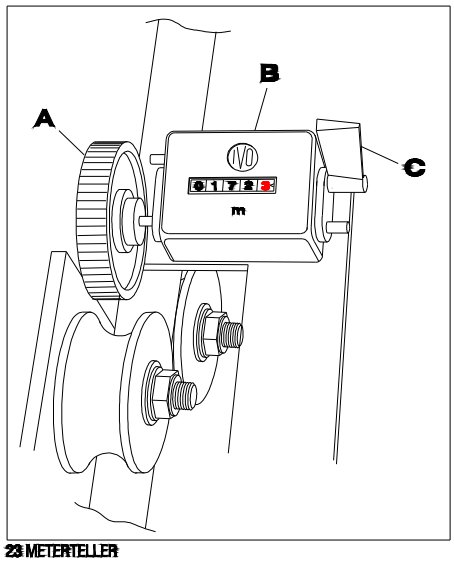
- Used to lock the guide arm in transport position **C.**
- Also used to guide to the flushing hose during reeling in **B** (can be moved manually in the horizontal direction).



22 ARMBORGSTEUN/SPOELSLANGGELEIDER

Metres counter (see fig. 23**A**)

- Displays the length of the flushing hose that has been fed out (can be reset with lever **C**).



23 METERTELLER

Cleaning tube (see fig. 19 pt. 28)

- This can be used to clean the flushing hose when reeling it in, when the overflow hose is connected to it. Increase the tractor rpm to get a higher bypass flow rate.

Fixing pin (see fig. 19 pt. 32 and pt. 46)

- This can be used to fix the roller bend before the drainpipe outflow when feeding in/out the flushing hose.

Carabine hook steel cable (see fig. 19 pt. 24)

- Coupled: 2nd lever = folding in/out guide arm.
  Never place hinge block pin when steel cable is coupled because of risk of failure.
- Uncoupled: 2nd lever = guide arm up/down.

Locking clamp.(see fig. 19 pt. 03, 06, 26, 27 and 29)

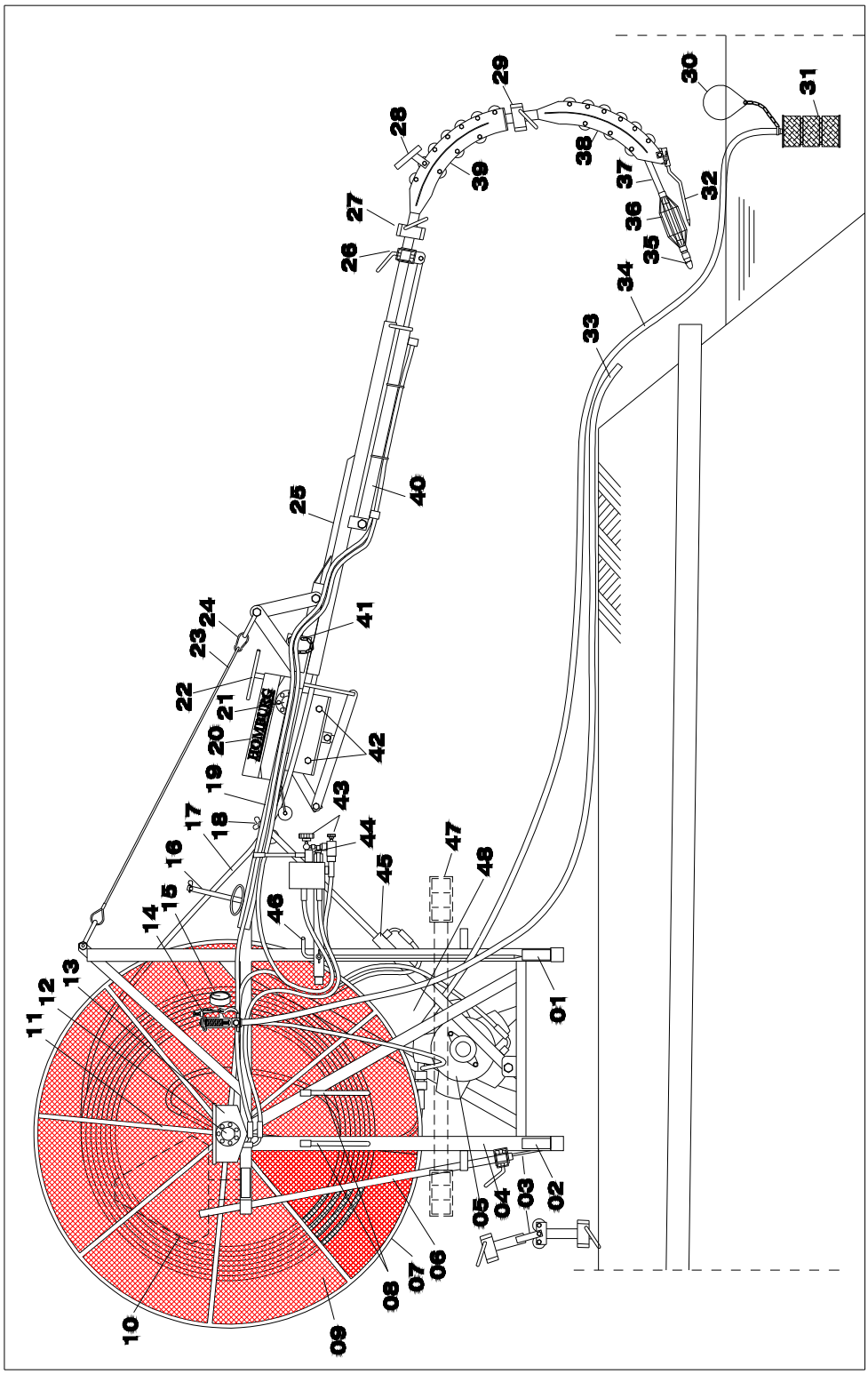
- A locking clamp has been welded on every roller bend and wells set and on the rod head of the guide arm extension cylinder.

Rpm counter pto (on tractor)

- Displays the water pump rpm of the machine.

Manual throttle (on tractor)

- Used to set the water pump rpm of the machine.



19 HOOFDCOMPONENTEN ACHTERZIJDE DELTA

10 OPERATING INSTRUCTIONS

10.1 Daily inspection list

Every day the checklist below must be completed before starting work with the machine. The list is used to check correct and safe operation of the machine. Copy this list so it can be entered every day. The fully completed lists can be stored in a folder that can be used as technical record for the machine.

Check carried out by :_____

Date check :_____

Time start check :_____

Check:	OK	Not OK
General damage and leakage machine	□	□
Presence and operations safety provisions:		
Stickers	□	□
Pressure gauge	□	□
Safety mesh in reel	□	□
Water pressure controller	□	□
Protective cover reel drive	□	□
Protective cover drive rubber wheels	□	□
Protective sleeve cardan shaft	□	□
Support cardan shaft	□	□
User manual	□	□
Lighting beam for use on public roads	□	□

WARNING!
Never remove or deactivate safety provisions. Any defective safety provision must directly be repaired in a correct manner. Never use the machine with one of the safety provisions removed, defective or deactivated.

Check:	OK	Not OK
Water pump:		
Oil level	□	□
Accumulator pressure 7 bar (check and correct with air compressor and pressure gauge if necessary!)	□	□
Presence suction basket	□	□
Presence float	□	□
Check that the two shut-off valves are closed	□	□
Presence and operation of:		
Roller bends (2)	□	□
Wells set pipe (option)	□	□
Wells set knee 30° (option)	□	□
Suction hose	□	□
Overflow hose	□	□
End piece	□	□
Nozzle	□	□
Centring basket (option)	□	□
Cardan shaft	□	□
Fixing pin	□	□

Be sure to get information showing where exactly the drainpipes are and how long all drainpipes of the system to be cleaned are. (For instance drawings, obtained from your superior or the client.)

10.2 Cleaning drainpipes: When and how often?

When to clean the drainpipes depends on the weather conditions, soil type and soil structure, on the diameter, type and condition of the drainpipe, and on how accurate the pipe lies in the ground. The following test that should be carried out in or after a wet period with a lot of rain, preferably in autumn, provides a guideline.

01. Find a drainpipe in the edge of the ditch.
02. Collect the water in a one litre graduated beaker.
03. Measure how many seconds (T) it takes to collect 1 litre.
04. Fill out the following formula:

$$\frac{86400}{(L \times Ax\ T)} = M$$

L = Length drainpipe (metres)
A = Drainpipe space in (metres)
T = Measured time (seconds)
M = Number of millimetres discharged per day

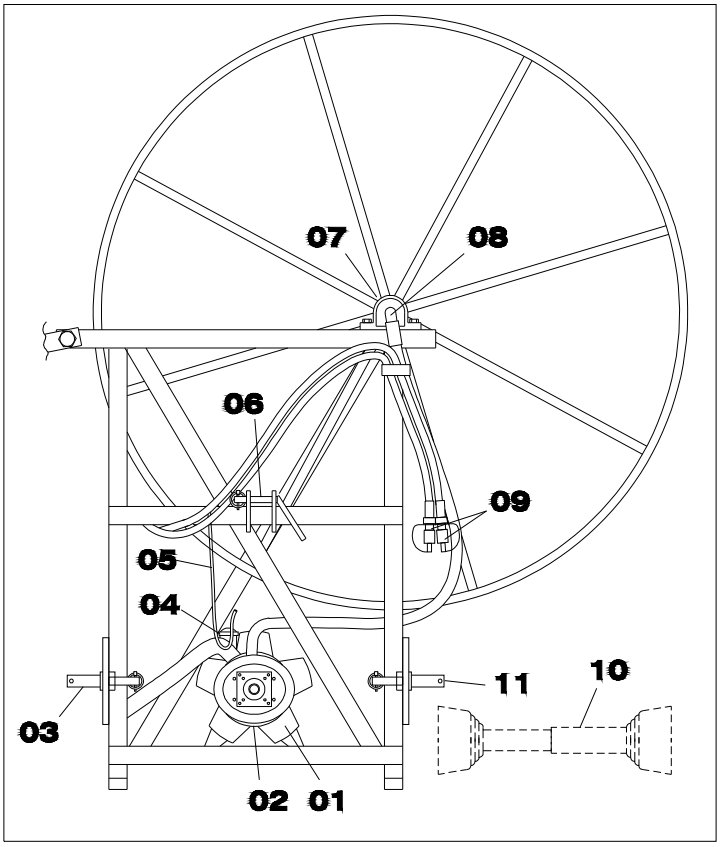
For grass land, maize land and arable land this discharge must be 7 millimetres. (Note, this applies to drainpipes with single-sided discharge). If it is less, it must first be checked whether the drainpipes are situated correctly. If so, the drainpipes must be cleaned. Do this for a number of drainpipes in the field, to determine an average.

It is recommended to clean the drainpipes during a wet period when the drainpipes are already discharging water. For more detailed agricultural knowledge and recommendations on the use and maintenance of drainpipes you should consult the relevant institutions and/or literature. Agricultural science is not within the scope of this user manual.

10.3 Taking into operation

10.3.1 Hitching the machine to the tractor

01. Observe all safety instructions as described in the safety chapter of this user manual.
02. If necessary, equip the tractor with sufficient front weights.
03. Make sure the machine is on a level surface.
04. If necessary, place guide shells on the lower link pins of the machine (see fig. 20 pt. 3 and 11).
05. Couple the lower lift arms of the three-point to the lower link pins of the machine (see fig. 20 pt. 3 and 11).



20 HOOFDCOMPONENTEN VOORZIJDE DELTA

06. Lock the lower lift arms.
07. Couple the top rod of the three-point to the top link pin of the machine and, if necessary, set the correct length (see fig. 20 pt. 06).
08. Lock the top link pin.

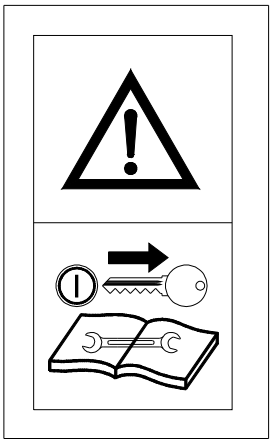
10.3.2 Matching the cardan shaft and the tractor

01. Lift the machine to minimise the distance between the tractor pto and the water pump shaft.
02. Support the machine in a sensible manner if the machine is not on the ground after carrying out the previous action.
03. Check that the cardan shaft matches the manufacturer's specifications.
04. Check whether the cardan shaft can be mounted without modifying its length. If not, shorten the cardan shaft.

10.3.3 Shortening the cardan shaft

(also refer to the instructions that came with the cardan shaft)

WARNING!
Apply the tractor parking break, switch off the tractor engine and take the tractor ignition key from the lock.



14.STICKER"VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

01 Slide the cardan shaft over the water pump shaft while holding the thinnest side of the protective sleeve down.
02. Check that the spring-tensioned catch of the cardan shaft sits in the recess of the pump shaft.
03. Slide the cardan fully in.
04. Measure the distance from the rear of the tractor pto to the front of foremost steel part of the cardan shaft (= for instance 15 cm)
05. Add 1 cm to this distance (= 16 cm).
06. Remove the cardan shaft from the water pump.
07. Take the front section of the cardan shaft (and protective sleeve) from the rear section.

08. Cut 16 cm off:
    - front cardan shaft section;
    - rear cardan shaft section;
    - front protective sleeve section;
    - rear protective sleeve section.

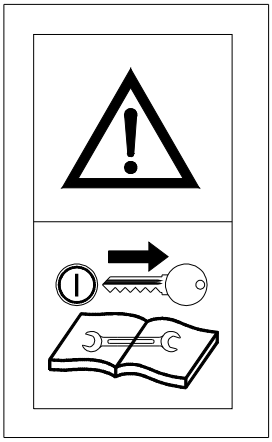
    Note! The above values are only examples.
09. Deburr the cut sections and round off sharp edges.
10. Remove the synthetic and steel sawdust and filings.
11. Coat the sliding splines with lubricating grease.
12. Slide the two cardan shaft sections (and the protective sleeve) back together. Be sure to slide the sections together in their original orientation!
13. Other modifications to the cardan shaft are not permitted.

WARNING!
Make sure that the two cardan shaft sections are at least half the total sliding length of the cardan shaft into each other when the distance between the pto and the water pump shaft is at its maximum!

10.4 Working with the machine

10.4.1 Coupling the cardan shaft between the tractor and the machine

DANGER!
Apply the tractor parking break, switch off the tractor engine and take the tractor ignition key from the lock.



14.STICKER"VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

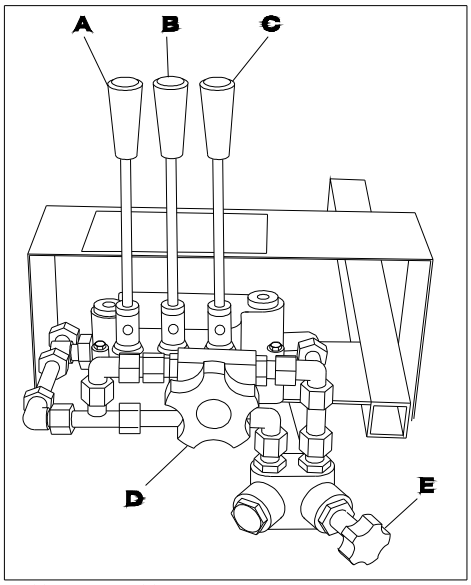
01. Slide the cardan shaft over the water pump shaft while holding the thinnest side of the protective sleeve down.
02. Check that the spring-tensioned catch of the cardan shaft sits in the recess of the pump shaft.
03. Slide the cardan shaft fully in.
04. Slide the cardan shaft over the pto while holding the thickest side of the protective sleeve upward.
05. Check that the spring-tensioned catch of the cardan shaft sits in the recess of the pto.
06. Prevent the protective sleeve of the cardan shaft from rotating with the two lock chains.

10.4.2 Coupling the hydraulic quick-connect couplings to the tractor

WARNING!
First switch off the hydraulic control valve of the tractor, then move the three control levers of the machine back and forth a number of times before connecting or disconnecting the hydraulic quick-connect couplings of the machine to/from the tractor.

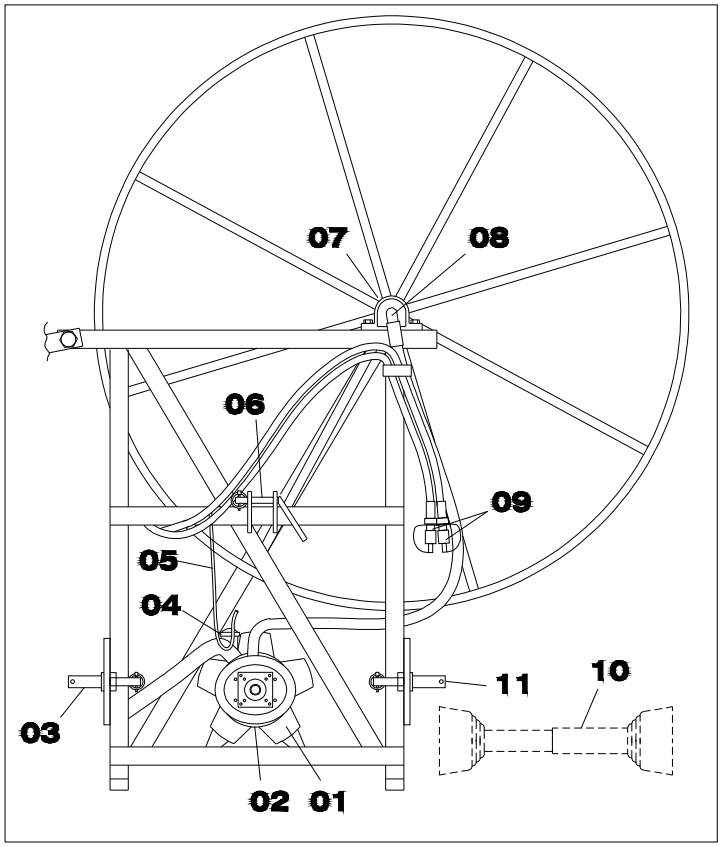
CAREFUL
Take measures to prevent environmental pollution due to spilling hydraulic oil.

01. Check that all hydraulic levers of the machine are in central position (see fig. 21 A, B, and C).



21 HYDRAULISCHE BEDIENINGSORGANEN

02. Connect the hydraulic quick-connect coupling for the return (Blue to return) (see fig. 20 pt.09).
03. Connect the hydraulic quick-connect coupling for the supply (Red to supply) (see fig. 20 pt.09).



20 HOOFDCOMPONENTEN VOORZIJDE DELTA

10.4.3 Connecting (electrically) and mounting the rear lighting beam

(Only for driving on public roads)

01. Mount the lighting beam on the machine.
02. Insert the machine plug into the tractor outlet.
03. Check the correct operation of the lighting beam.
04. Lift the machine into transport position.
05. Check that the rotating light or flashing light (if mounted) for traffic approaching from the rear is clearly visible.
06. Check the presence of the triangle "Slow traffic"

10.4.4 At the working location

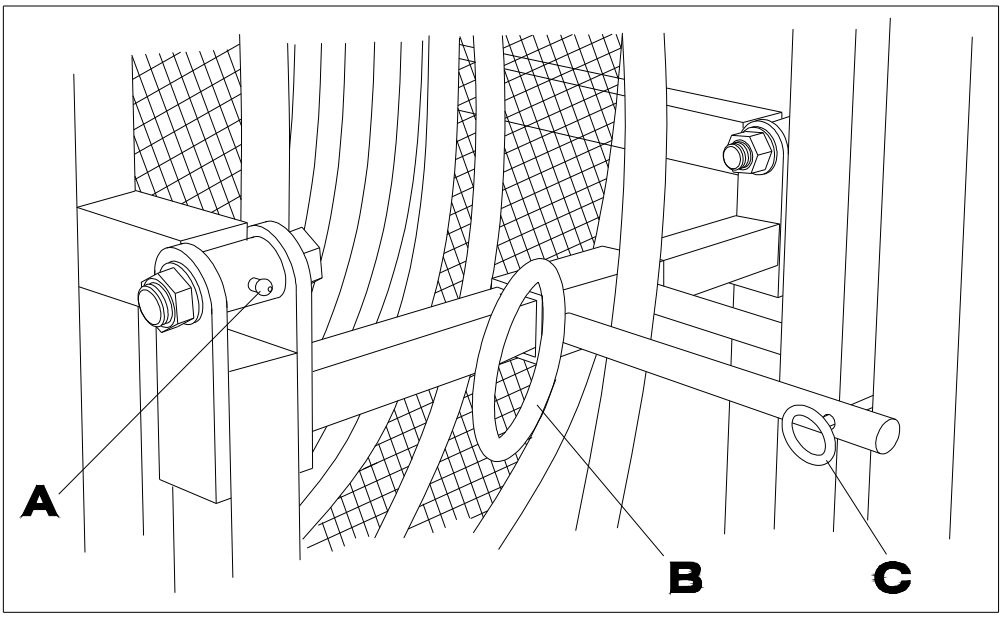
01. Observe all safety instructions as described in the safety chapter of this user manual.
02. Switch on the working lights if you have to work in the dark.
03. Take the plug of the lighting beam from the tractor outlet. (if mounted)
04 Lift the machine some 10 cm off the ground.
05. Place the machine at a suitable distance from the drainpipe to be cleaned.
06. Apply the tractor parking brake.

07. Connect the transparent suction hose to the pump suction side and fix it.

NOTE!
Know the maximum pump head. If it is too high, the pump will not suck in any water.

08. Put the suction basket on the float in a ditch (upstream so the suction basket does not suck in used flushing water) or in a water tanker. If the head is too high, or if there is no suction basket or if it is not clean, the pump must not be activated.
09. Make sure the filter is fully submerged and does not suck in any dirt or air.
10. Connect the yellow overflow hose to the water pressure controller and fix it.
11. Put the hydraulic operating valves block in operating position, take it out, turn 90° to the left, insert and lock it.
12. Put the feed in/out lever (far left - see fig. 21A) of the valve block in central position.

13. Remove the transport lock pin (fig. 22C) from the guide arm.

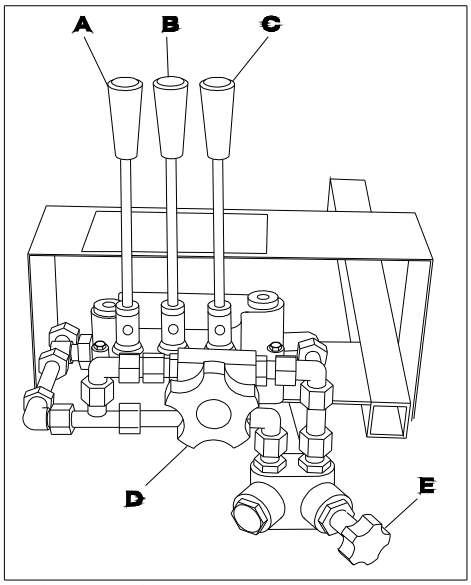


22 ARMBORGSTEUN/SPOELSLANGGELEIDER

14 Manually lower the second section of the guide arm until the steel cable is taut.

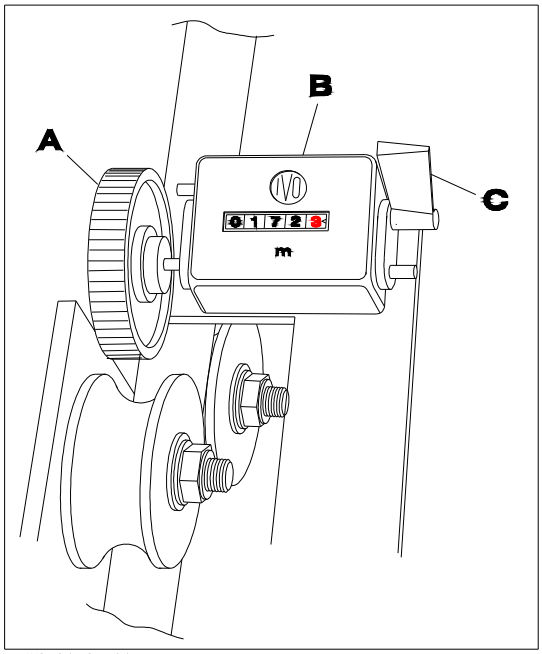
CAREFUL
The first operating lever must not be operated simultaneously with the second and third operating lever.
The second and third operating levers can be operated simultaneously.

15. Switch on the hydraulic control valve of the tractor.
16. Bring the guide arm into stretched horizontal position with the central lever (fig. 21B).
17. Place the hinge lock pin (see fig. 19 pt. 41) in the guide arm, and lock it. This is only necessary when the arm has to be pushed down, for instance at a hedge.
18. Put the top roller bend on the end of the guide arm and fasten it.
19. Attach the lower roller bend to the upper roller bend and fasten it.
20. Extend the guide arm using the lever at the far right (fig. 21C) The guide arm can additionally be extended another 35 cm using the clamp. (fig. 19 pt. 26) that can be placed on the red mark on the tube.



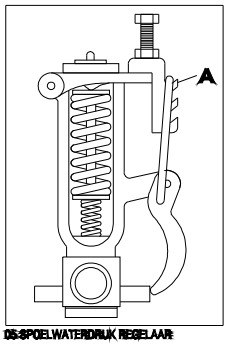
21 HYDRAULISCHE BEDIENINGSORGANEN

21. Wear adequate eye protection (goggles). The flushing water leaving the drainpipe under pressure may carry off small hard objects at high speed.
22. Put the end of the second roller bend in front of the drainpipe discharge opening. This can be done by simultaneously operating the central and right-hand lever (fig. 21B) (fig. 21C). If the steel cable is taut while the guide arm has to be moved further down, the steel cable can be uncoupled using the carabine hook. That changes the function of the central operating lever (fig. 21B). Do not forget to couple the steel cable again using the carabine hook as soon as that is possible again! If the drainpipe is under water, positioning the roller bend requires more attention.
23. Drive the tractor a little forward or backward if the roller bend cannot be placed in front of the drainpipe.
24. Apply the tractor parking brake.
25. Manually guide the flushing hose through the flushing hose guide and through the drive wheels and pressure rolls.
26. Adjust the pressure roll clamping pressure using the adjusting lever (fig. 19 pt. 22). Do not set the clamping pressure too high.
27. Mount the end piece with guide basket and nozzle if necessary. Note! Do not mount these until the hose has been fed through both roller bends.
28. Fix the roller bend using the supplied fixing pin (fig. 19 pt. 46), when the roller bend has been positioned in front of the drainpipe. That will prevent the roller bend from shifting while the flushing hose is being fed in and out. When working on the opposite bank, the pin (fig. 19 pt. 32) that is fixed on the second roller bend can be pushed into the bank to fix the end of the roller bend.
29. Put the wheel of the metres counter (fig. 23A) on top of the hose.



23 METERTELLER

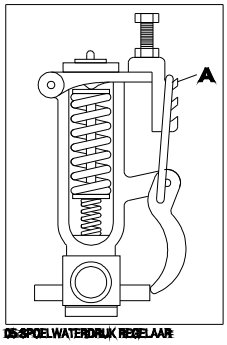
30. Check that the lever on the left (fig. 21A) is in its central position.
31. Put the top speed control valve (fig. 21D) fully open.
32. Pull the lever on the left (fig. 21A) forward.
33. Slowly turn the top speed control valve (fig. 21D) clockwise (never shut it!) Feed the flushing hose up to 2 metres into the drainpipe.
34. Put the lever on the left (fig. 21A) in its central position.
35. Set the metres counter (fig. 23C) to zero.
36. Slowly take all tension off the water pressure controller (fig. 19 pt.14) by taking loose the hook clamp (fig. 05A).



05-SPOELWATERDRUK REGELAAR

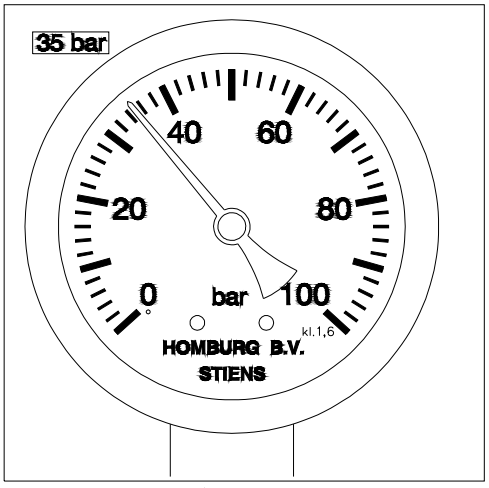
CAREFUL
Do not activate cardan shaft or the water pump when it can reasonably be expected that the water in the pump is frozen.

37. Switch on the cardan shaft (tractor).
38. Set the cardan shaft speed. About 400 rpm (tractor).
39. Wait until all air has disappeared from the transparent suction hose. If the air does not disappear, the pump does not suck properly or the suction hose leaks or the head is too high. Note! The pump must not run dry for longer than 5 min to prevent damage to the pump.
40. Set the hook clamp (fig.05A) of the water pressure controller to its highest position.



05-SPOELWATERDRUK REGELAAR

41. Check that the flushing water pressure does not exceed 3.5 MPa (35 bar) on the pressure gauge (fig. 18).



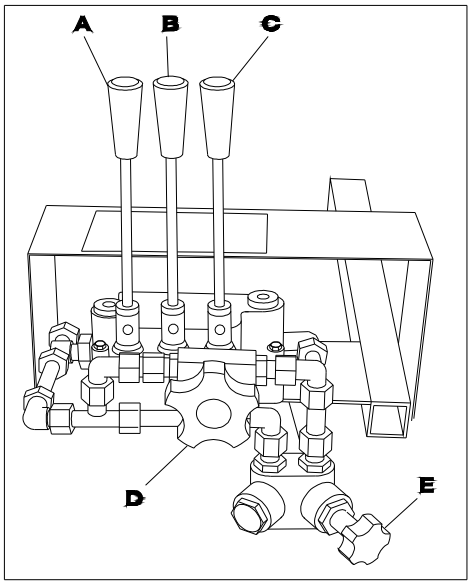
18 SPOELWATERDRUKMETER

CAREFUL
The water pressure must never exceed 5MPa (50 bar).

42. Set the cardan shaft speed to achieve the smallest possible water flow from the overflow hose. That saves energy. Make sure that the pressure indicated on the pressure gauge (see fig. 19 pt. 15) remains between 2.5 MPa and 3 MPa (25 bar and 30 bar).

10.4.5 Feeding the flushing hose into the drainpipe

01. Observe all safety instructions as described in the safety chapter of this user manual.
02. Pull the lever on the left (fig. 21A) forward.



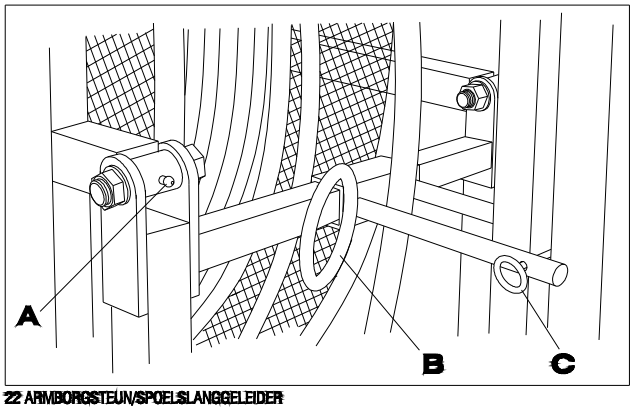
21 HYDRAULISCHE BEDIENINGSORGANEN

03. Slowly turn the top speed control valve (fig. 21D) clockwise (never shut it!). That controls the feeding-in speed of the flushing hose into the drainpipe.
04. Make sure the drive wheels do not slip on the hose. That could damage the hose. When the drive wheels are slipping, the resistance is too high.
05. Set a feeding-in speed of about 25 metres per minute.
06. Note de metres counter to know when the flushing hose has reached the end of the drainpipe (feeding in 300 m takes 12 min!).
    When the nozzle hits an obstacle during feeding in, for instance a blockage, the flushing hose must be moving back and forth at a lower speed in the drainpipe, using the lever on the left (fig. 21A) (turn the top speed control valve counterclockwise (fig. 21D) to reduce the speed.

07. Turn the speed control valve (fig. 21D) fully open (counterclockwise) when the nozzle approaches the end of the drainpipe. That stops feeding in the flushing hose.
08. Directly put the water pressure controller open at the moment in the nozzle doesn't go any further. Also do that in the event of problems such as blockages.
09. Put the lever on the left (fig. 21A) in its central position.

10.4.6 Feeding out the flushing hose from the drainpipe (reeling in)

HINT!
By manually moving the flushing hose guide (fig. 22B) back and forth during feeding out, the flushing hose can evenly be wound on the reel.

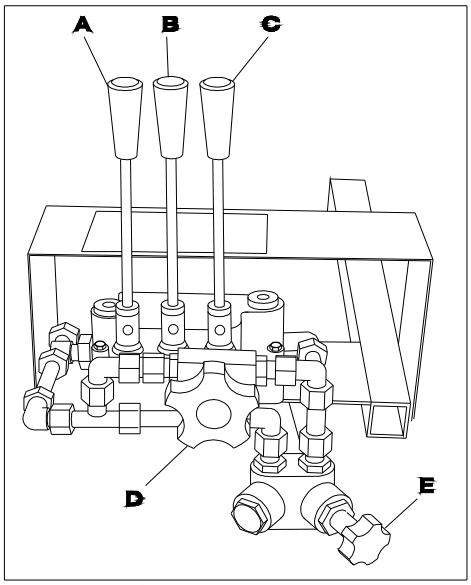


22 ARMBORGSTEUN/SPOELSLANGGELEIDER

HINT!
Be sure to reel in the flushing hose as clean as possible to prevent slip and drive problems with the flushing hose. Proceed as follows to achieve this:

WARNING!
The water pressure must never exceed 5MPa (50 bar).

01. Slide the end of the overflow hose over the upturned end of the cleaning tube (fig. 19 pt. 28).
02. Set the cardan shaft speed to keep a pressure on the pressure gauge of no more than 3.5 MPa (35 bar) while water flows out of the cleaning tube (fig. 19 pt. 28).
03. Put the top speed control valve (fig. 21D) fully open (counterclockwise).
04. Pull the lever on the left (fig. 21A) forward.



21 HYDRAULISCHE BEDIENINGSORGANEN

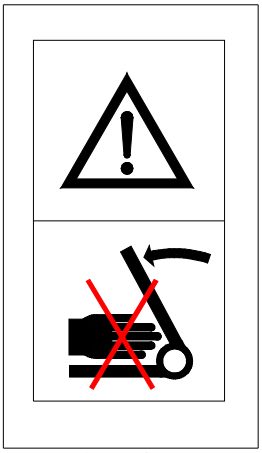
05. Slowly turn the top speed control valve (fig. 21D) clockwise (never shut it!) until the feeding-out speed of the flushing hose is about 20 metres per minute.
06. Make sure the drive wheels do not slip on the flushing hose. That could damage the flushing hose. When the drive wheels are slipping, the resistance is too high.
07. Note de metres counter to know when the flushing hose has reached the start of the drainpipe (feeding out 300 m takes 15 min!).
08. Turn the speed control valve (fig. 21D) fully open (counterclockwise) when the nozzle approaches the start of the drainpipe. That stops feeding out the flushing hose.
09. Put the lever on the left (fig. 21A) in its central position.
10. Carefully take the tension (open the hook clamp - fig. 05A) off the water pressure controller.
11. Switch off the cardan shaft (tractor).
12. Push the lever on the left (fig. 21A) backward.
13. Slowly turn the top speed control valve (fig. 21D) clockwise. That way the flushing hose can completely be removed from the drainpipe.
14. Slowly open the top speed to control valve (fig. 21D) (counterclockwise) when the flushing hose has been retracted far enough between the rubber wheels.
15. Put the lever on the left (fig. 21A) in its central position.
16. Pull the roller bend fixing pin out of the ground (fig. 19 pt. 46).
17. Push the central lever (fig. 21B) backwards to lift the guide arm a little.
18. Roll up the suction hose with suction basket and float, and hang them on the machine.
19. Roll up the overflow hose and hang it on the machine.
20. Drive with unfolded but fully retracted guide arm, to the next drainpipe. This is the only situation in which driving with unfolded guide arm is permitted.

DANGER!
In all other transport situations, particularly when transporting over public roads, the machine must be put completely into transport position.

10.4.7 Preparing the machine for transport on public roads

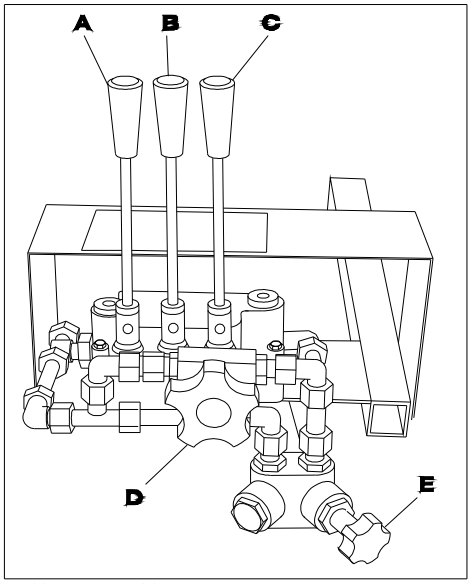
01. Observe all safety instructions as described in the safety chapter of this user manual and ensure that the flushing hose is fully retracted between the rubber wheels as described above.
02. Carefully take the tension (open) off the hook clamp (fig. 05A) of the water pressure controller.
03. Switch off the cardan shaft (lever in tractor).
04. Attach the steel cable with the carabine hook, if it is not attached.
05. Fully retract the guide arm using the lever at the right (fig. 21C).
06. Remove the lower roller bend, put it on the roller bend transport support and lock it.
07. Remove the top roller bend, put it on the roller bend transport support and lock it.
08. Remove the hinge lock pin (fig. 19 pt. 41) from the guide arm, and put it in the hinge lock pin holder.

WARNING!
When folding in the guide arm there is risk that limbs get caught.



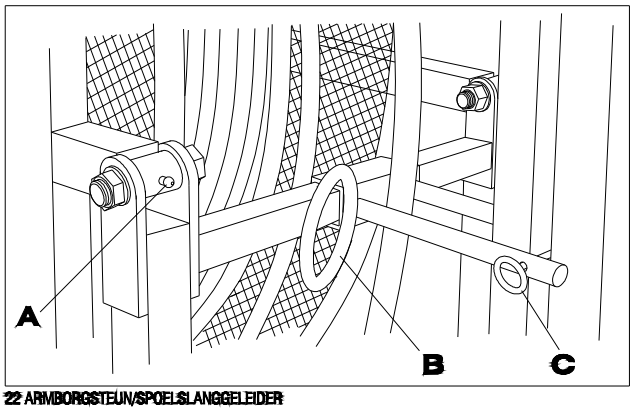
10.STICKER"AFKNELGEVAAR"

09. Fold in the guide arm by pulling the central lever (fig. 21B) forward.



21 HYDRAULISCHE BEDIENINGSORGANEN

10. Fold the second guide arm section fully in by hand.
11. Put the guide arm transport lock pin in the arm lock support (fig. 22C) and lock it with the hairpin lock pin.



22 ARMBORGSTEUN/SPOELSLANGGELEIDER

12. Switch off the hydraulic control valve of the tractor.
13. Put the hydraulic operating valves block in transport position (90° to the right and fully in) and lock it with the wing bolt.

WARNING!
First switch off the hydraulic control valve of the tractor, then move the three control levers of the machine back and forth a number of times before connecting or disconnecting the hydraulic quick-connect couplings of the machine to/from the tractor.

CAREFUL
Take measures to prevent environmental pollution due to spilling hydraulic oil.

14. Check that all hydraulic levers of the machine are in central position.
15. Disconnect the hydraulic quick-connect coupling for the supply (Red).
16. Disconnect the hydraulic quick-connect coupling for the return (Blue).
17. Roll up the suction hose with suction basket and float, and hang them on the machine.
18. Roll up the overflow hose and hang it on the machine.
19. Mount the lighting beam on the machine.
20. Insert the machine plug into the tractor outlet.
21. Check the correct operation of the lighting beam.
22. Lift the machine into transport position (lifted some 10 cm off the ground).
23. Switch off the working lights of the machine (if they are on).
24. Check that the rotating light or flashing light (if mounted) for traffic approaching from the rear is clearly visible.

25. Check the presence of the triangle "Slow traffic".
26. Release the tractor parking brake.
27. Drive to the new destination.

10.4.8 Unhitching the machine from the tractor

01. Make sure the machine is on a level surface.

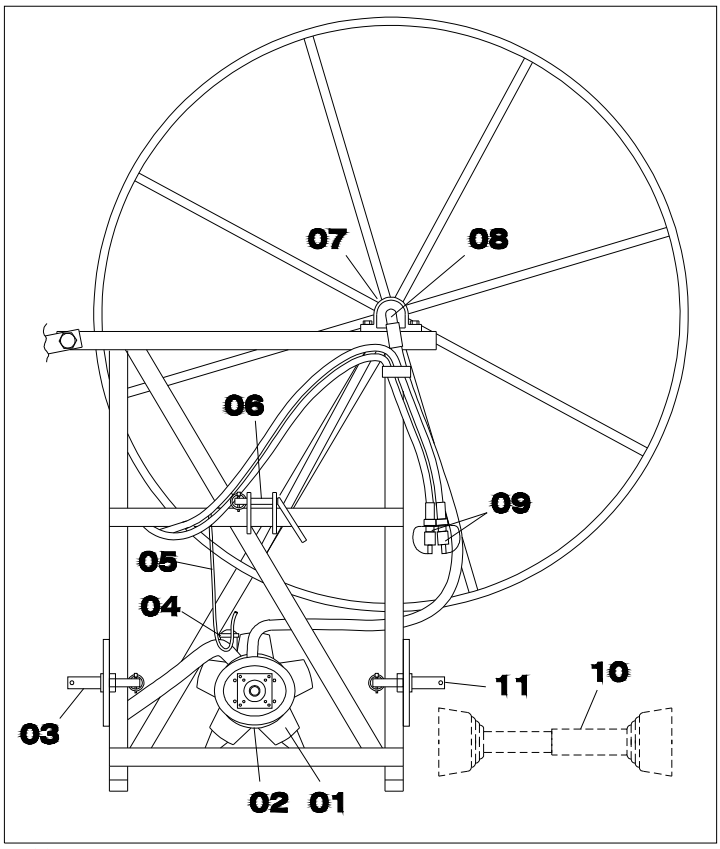
WARNING!
Apply the tractor parking break, switch off the tractor engine and take the tractor ignition key from the lock.

02. Take the plug of the lighting beam from the tractor outlet (if mounted).

WARNING!
First switch off the hydraulic control valve of the tractor, then move the three control levers of the machine back and forth a number of times before connecting or disconnecting the hydraulic quick-connect couplings of the machine to/from the tractor.

CAREFUL
Take measures to prevent environmental pollution due to spilling hydraulic oil.

03. Check that all hydraulic levers of the machine are in central position.
04. Disconnect the hydraulic quick-connect coupling for the supply (Red).
05. Disconnect the hydraulic quick-connect coupling for the return (Blue).
06. Loosen the two lock chains of the protective sleeve of the cardan shaft.
07. Push in the spring-tensioned catch of the cardan shaft and slide the cardan shaft off the tractor pto.
08. Hang the cardan shaft on its special support (fig. 20 pt. 05) on the machine.

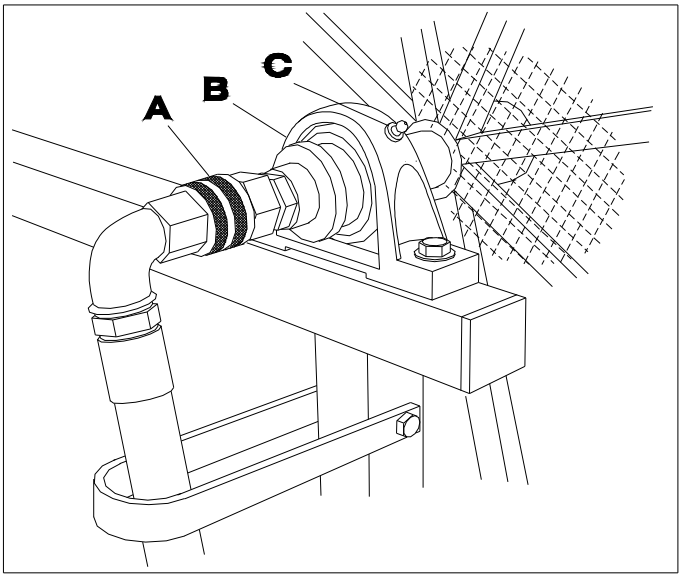


20 HOOFDCOMPONENTEN VOORZIJDE DELTA

09. Uncouple the top rod of the three-point suspension from the machine (fig. 20 pt. 06).
10. Uncouple the lower lift arms of the three-point suspension (fig. 20 pt. 03 and 11).
11. If applicable, remove the front weights from the tractor.

10.4.9 Storing the machine

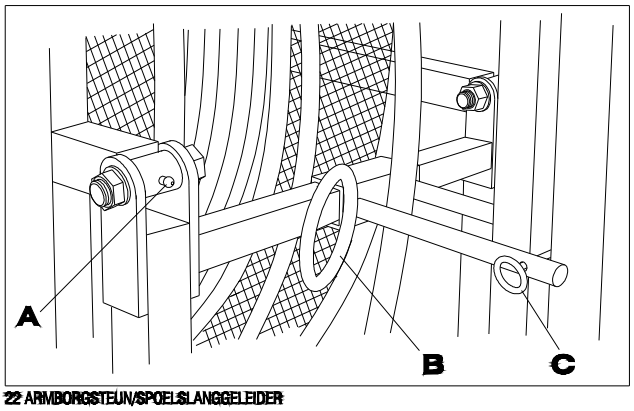
01. Uncouple the central reel coupling (fig. 24A).



24 HASPELLAGER EN WATERKOPPELING

02. Remove the nozzle and use pressurised air to purge all water from the flushing hose.
03. Open both valves of the flushing water pump and let the pump run to remove al water.
04. Fill a 10-litre bucket with a mixture of water and anti-freeze with protection up to -25°C.
05. Close both valves of the flushing water pump.
06. Put the end of the suction hose, the end of the overflow hose and the water supply hose of the reel (fig. 24A) in the bucket.
07. Switch on the cardan shaft and let the flushing water pump take up the anti-freeze mixture to prevent frost damage and internal corrosion of the pump and to prevent the diaphragms from drying out
08. Roll up the suction hose with suction basket and float, and hang them on the machine.
09. Roll up the overflow hose and hang it on the machine.
10. Unhitch the machine from the tractor
11. Always protect the black flushing hose from intense sunlight, particularly in summer or in tropical areas. That will increase the service life of the flushing hose.
12. Fill the two reel bearing grease nipples (fig. 24C) with grease and grease the central reel coupling (fig. 24A).

13. Fill the two guide arm grease nipples (fig. 22A)



22 ARMBORGSTEUN/SPOELSLANGGELEIDER

14. Coat all exposed steel parts with grease.
15. Check flushing water pump oil level. The level must be at the mark of the sticker on the oil filler pot on the flushing water pump.

11 MAINTENANCE INSTRUCTIONS

11.1 General

Observe all safety instructions as described in the safety chapter of this user manual.

To make the most out of this machine's high quality throughout its service life, it is necessary to accurately follow all maintenance instructions below.

Operators are only allowed to carry out the maintenance and repair described in this user manual. Other maintenance must be carried out by specialised personnel.

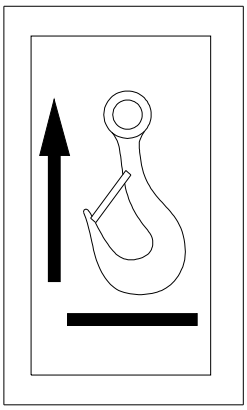
Maintenance must only be carried out by trained and appointed personnel that does not use alcohol, medicines or drugs.

None of the substances on or in the machine are suitable for internal use.

Make sure during maintenance that no oil or grease is spilled on the flushing hose or the drive wheels and the pressure rolls. That will cause slip when feeding in or out.

The settings and accesses sealed by the manufacturer must not be broken. If a seal is broken, that automatically voids the manufacturer's product liability.

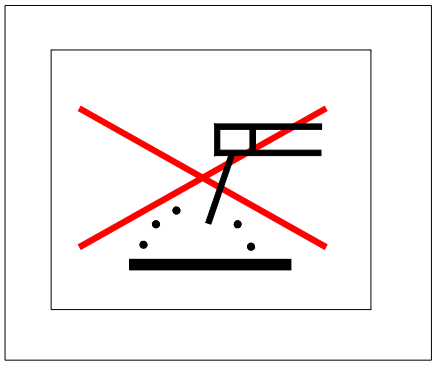
Only hoist the machine on the special hoisting points.



08.STICKER"HIJSPUNT"

Make sure that nobody can start the machine during maintenance and repairs. Therefore, you should fully unhitch the machine from the tractor.

Never weld on the machine without the manufacturer's written permission.



11.STICKER"NIET LASSEN AAN DE MACHINE"

Always observe the safety precautions from suppliers of battery acid, fuels, lubricants, cooling fluid and hydraulic oil.

When working with grease, battery acid, fuel, lubricants, cooling fluid and hydraulic oil, make sure these substances do not end up in the environment. Never remove a protective casing of an operating machine.

If the machine is used under special operating conditions (for instance: 24 hours a day, 7 days a week, with very dirty flushing water, a modified maintenance schedule must be observed. Consult your supplier in that case.

11.2 Paint damage

Paint damage, through mechanical causes or corrosion, must be repaired as follows:

01. Sand the location in question to the plain metal.
02. Remove all dust and grease.
03. Apply a zinc-bearing primer.
04. Let it dry completely.
05. Sand the surface lightly.
06. Apply a coat of paint in the original colour of the machine.
07. Let it dry completely.

11.3 Cleaning the machine

The machine can be cleaned with a high-pressure sprayer or a steam cleaner with tap water not warmer than 40°C. Do not use detergent, for that will cause the flushing hose drive wheels to slip.

11.4 Changing oil flushing water pump

This must be done annually. Be sure there is no air left in the cylinder head after changing the oil of the flushing water pump. The air can be removed by tilting the pump forward and simultaneously rotating the shaft. That way the air between the piston and the diaphragms will disappear (also refer to the manufacturer's instructions that came with the pump).

11.5 Maintenance schedule

Part	8 hours or daily	40 hours or weekly	250 hours or monthly	Qty per machine	Material / Method
Water Coupling	Fill grease	--	--	1	Grease Mollub-Alloy 777-1
Reel bearing	Fill grease	--	--	2	Grease Mollub-Alloy 777-1
Hose Guide	Grease	--	--	1	Grease Mollub-Alloy 777-1
Chain hose Drive	--	Grease	Check chain tension	1	Grease Mollub-Alloy 777-1
Chain reel Drive	--	Grease	--	1	Grease Mollub-Alloy 777-1
Swivel points pressure controller	--	Grease	--	6	Engine oil 5W30
Swivel points guide arm	--	Grease	--	4	Grease Mollub-Alloy 777-1
Cardan shaft	--	Grease / Check protective sleeve	--	3	Grease Mollub-Alloy 777-1
pto tractor	--	Grease	--	1	Grease Mollub-Alloy 777-1
Water pump shaft	--	Grease	--	1	Grease Mollub-Alloy 777-1
Water pump	--	Check/top up	--	1.85 litres	Engine oil SAE30/40 Change after 1000 hours
Suction basket	Clean	--	Check	1	Using as brush
Nylon rollers	--	Lubricate	--	20	Engine oil 5W30
Pressure controller	--	Lubricate	--	1	Engine oil 5W30
Nose wheel clamp	--	Lubricate	--	2	Engine oil 5W30

Part	8 hours or daily	40 hours or weekly	250 hours or monthly	Qty per machine	Material / Method
Dust covers quick-connect coupling	--	Check	--	2	Check presence and condition
Hydr. System	--	--	Check	1	Check for leakage
Water system	--	--	Check	1	Check for leakage
Accumulator	--	Check	--	1	0.7 MPa (7 bar)

11.6 Technical support

If you want to know what your nearest address is for minor and major maintenance and repairs, ordering parts and getting technical advice, you can ask the manufacturer for the telephone number of the current importer in your country. Then this importer can refer you to the dealer or service provider nearest to you.

You can also get information from the dealer where you bought the machine.

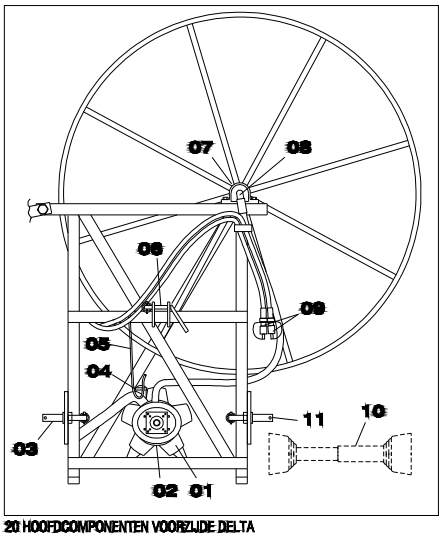
12 TROUBLESHOOTING TABLE

Operators are only allowed to carry out the maintenance and repairs described in this user manual. Other malfunctions must be solved by specialised personnel.

Maintenance and repair must only be carried out by trained and appointed personnel that does not use alcohol, medicines or drugs.

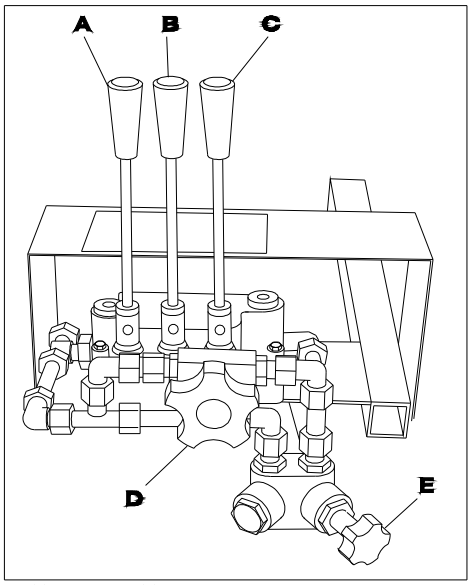
Malfunction	Cause	Solution
Pump sucks irregularly	Suction basket is not submerged Suction basket is fouled Suction basket connection defective Pump valves do not close properly Pressure in accumulator incorrect	Submerge suction basket Clean suction basket Repair connection Repair pump Change accumulator pressure
Maximum flushing pressure is not reached	Pump valves do not close properly Suction basket is fouled Leakage water pressure controller Nozzle worn	Repair pump Clean suction basket Replace pressure plate or seat Replace nozzle
Pump looses oil	Oil level too high Diaphragm failure	Lower oil level Repair pump

If you find a thick and white emulsion of water and oil in the pump oil reservoir (fig. 20 pt. 04), or if you see slicks in the ditch, a diaphragm has failed. Proceed as follows without delay:



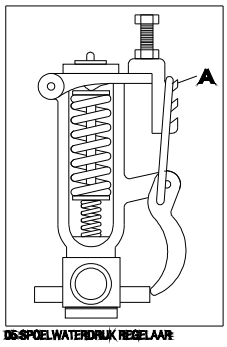
20 HOOFDCOMPONENTEN VOORZIJDE DELTA

01. Put the lever on the left (fig. 21A) in its central position.



21 HYDRAULISCHE BEDIENINGSORGANEN

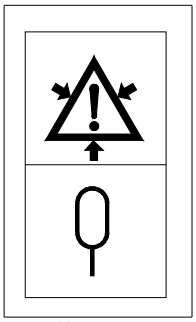
02. Carefully take the tension (open) off the hook clamp (fig. 05A) of the water pressure controller.



05-SPOELWATERDRUK REGELAAR

03. Switch off the cardan shaft (tractor).
04. Switch off the hydraulic control valve of the tractor.
05. Switch off the tractor engine.
06. Uncouple the cardan shaft from the tractor and from the pump.

07. Internally clean the pump with diesel or petrol to prevent corrosion of the pump.



09.STICKER"ACCUMULATOR AANWEZIG"

08. Check the diaphragms.
09. Replace the defective diaphragm.

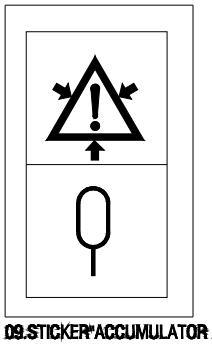
Important: Be sure there is no air left in the cylinder head after changing the diaphragms. The air can be removed by tilting the pump forward and simultaneously rotating the shaft. That way the air between the piston and the diaphragms will disappear.

13 DISPOSING OF THE MACHINE

When the machinery has reached the end of its technical service life and has to be disposed of, the following should be observed in connection with environment and safety:

Oil and grease (in the water pump):
Dispose of these in an environmentally sound manner as prescribed by the local authorities.

Accumulator (in the water pump):
The gas pressure in the accumulator is high. Only specialised personnel with specialised equipment are allowed to be depressurise the accumulator.



09.STICKER"ACCUMULATOR AANWEZIG"

Flushing hose:
The flushing hose is made of HPE-(Hard PolyEthylene) synthetic. Send the flushing hose to a recycling facility that specialises in synthetics.

The rest is mainly made of steel and can be sent off to a scrap iron processing company.

14 LIST OF ILLUSTRATIONS

15 SUBJECT INDEX

16 COMMENT FORM

If you think this manual can be improved, please fill in the form below:

Is this publication:

-complete?	yes*	no*
-set up correctly?	yes*	no
-clear?	yes*	no
-well-illustrated?	yes*	no

* Please circle where applicable.

Does this user manual satisfy your wishes?

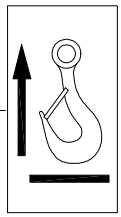
How can this user manual be improved in your opinion?
(Please describe clearly what you mean and give examples)

Fill in your particulars below:

Name	:
Position	:
Company name	:
Address	:

Please fill in this form completely and send it by mail or fax to HOMBURG HOLLAND

978439



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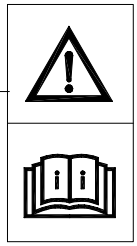

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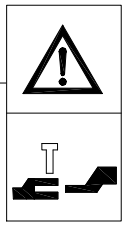

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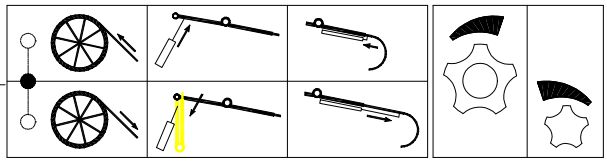

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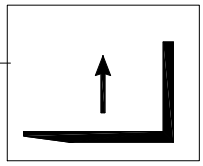

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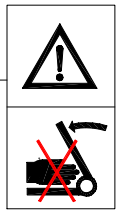

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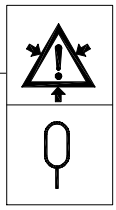

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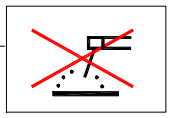

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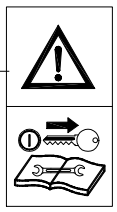

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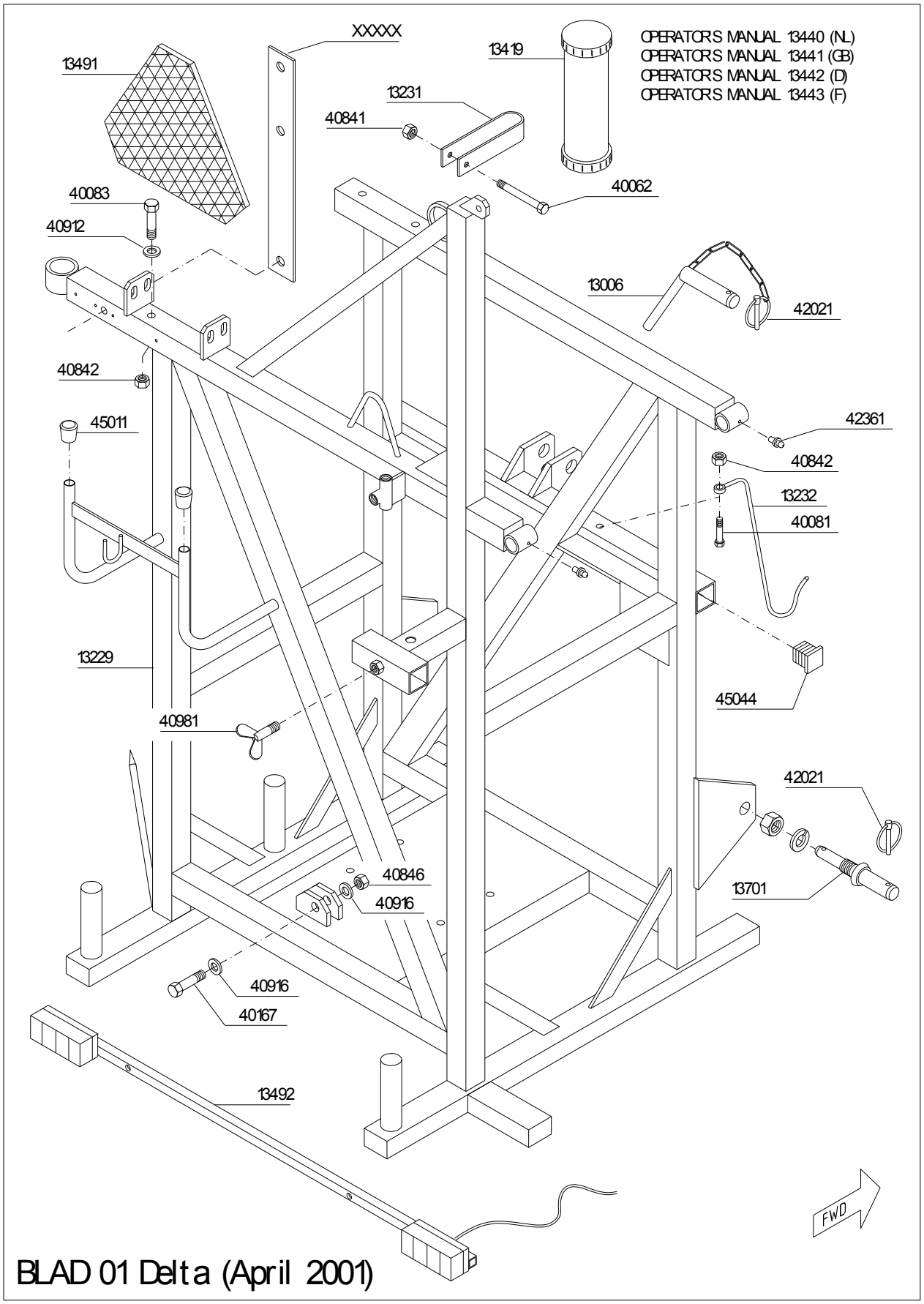

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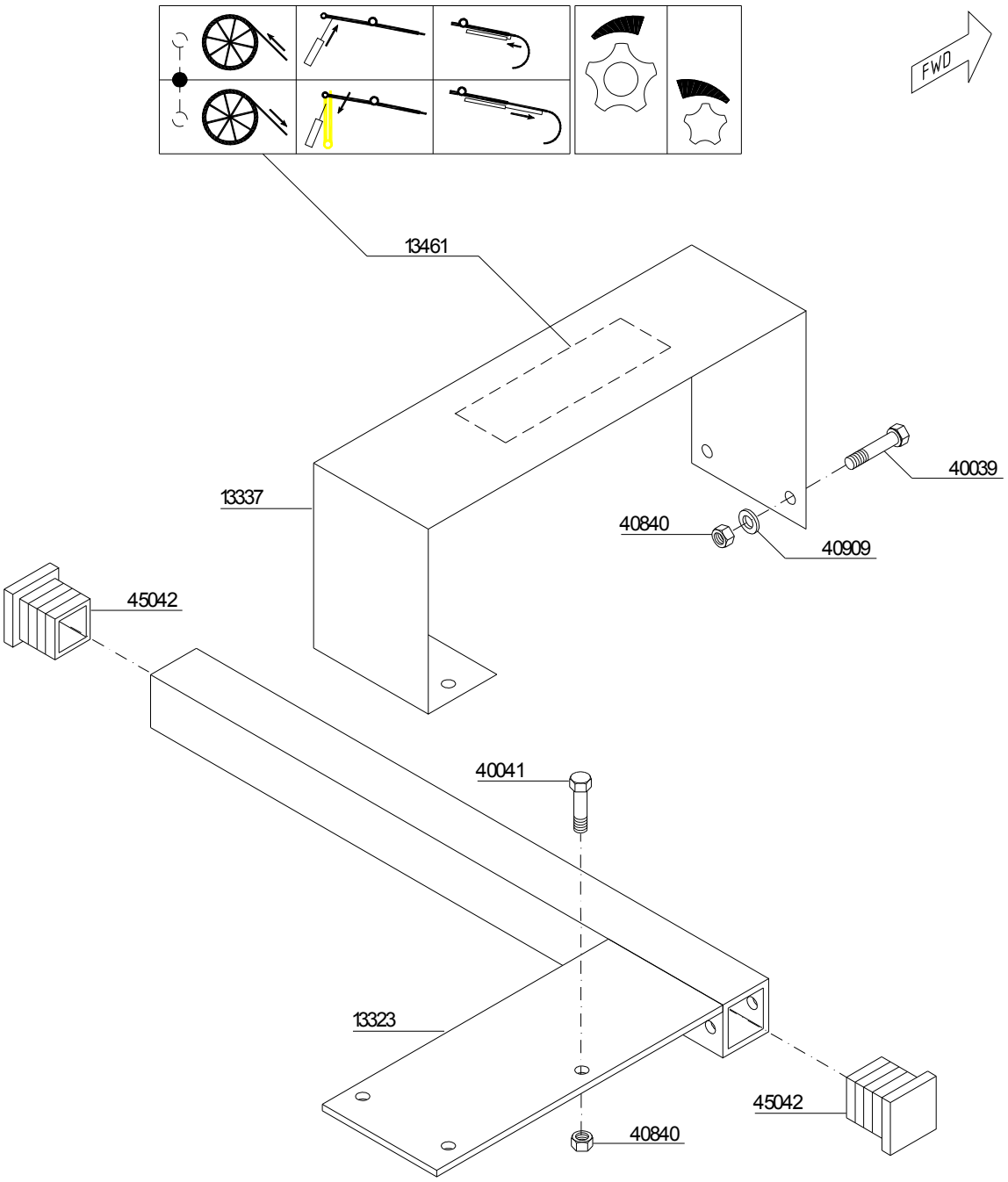

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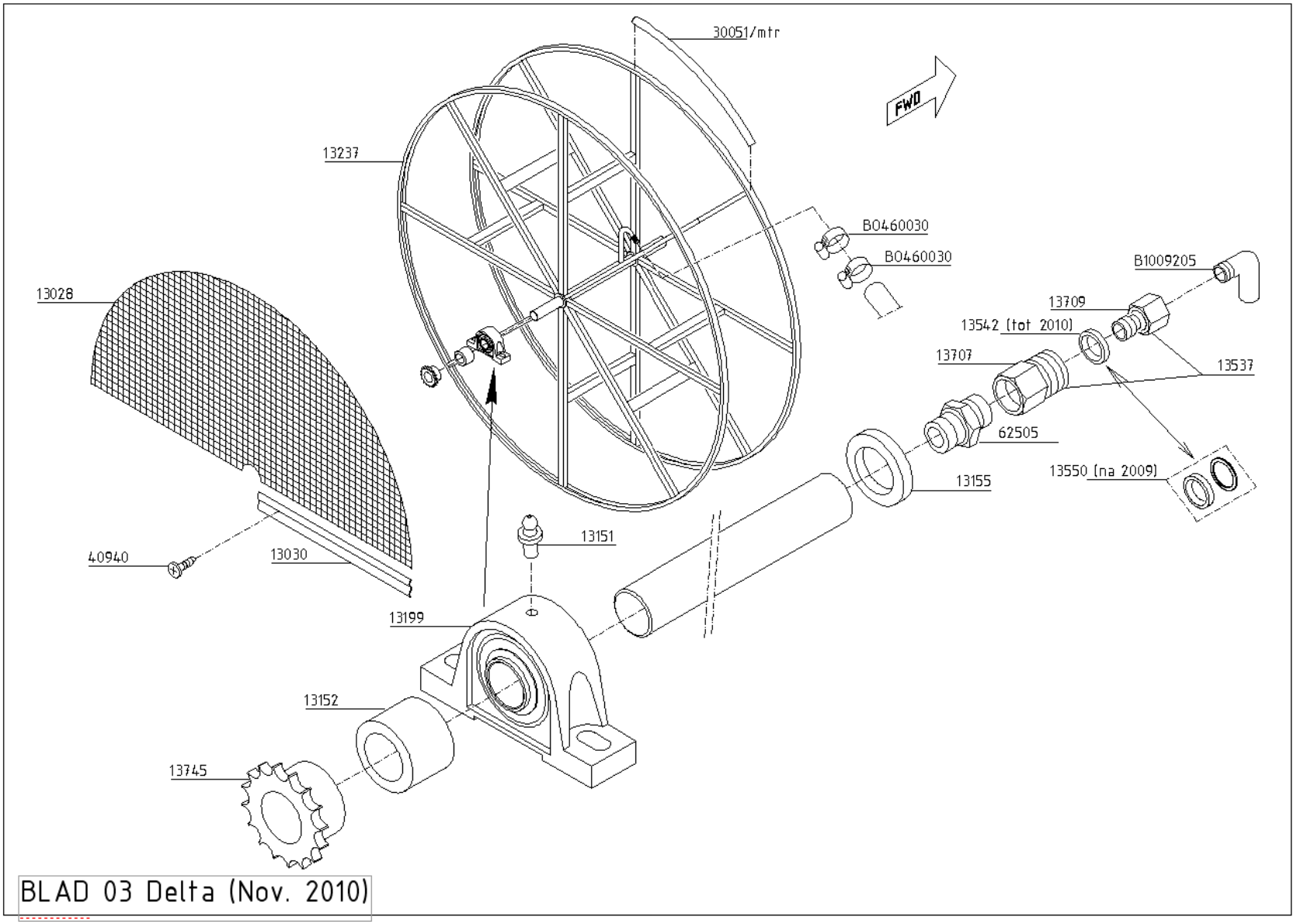

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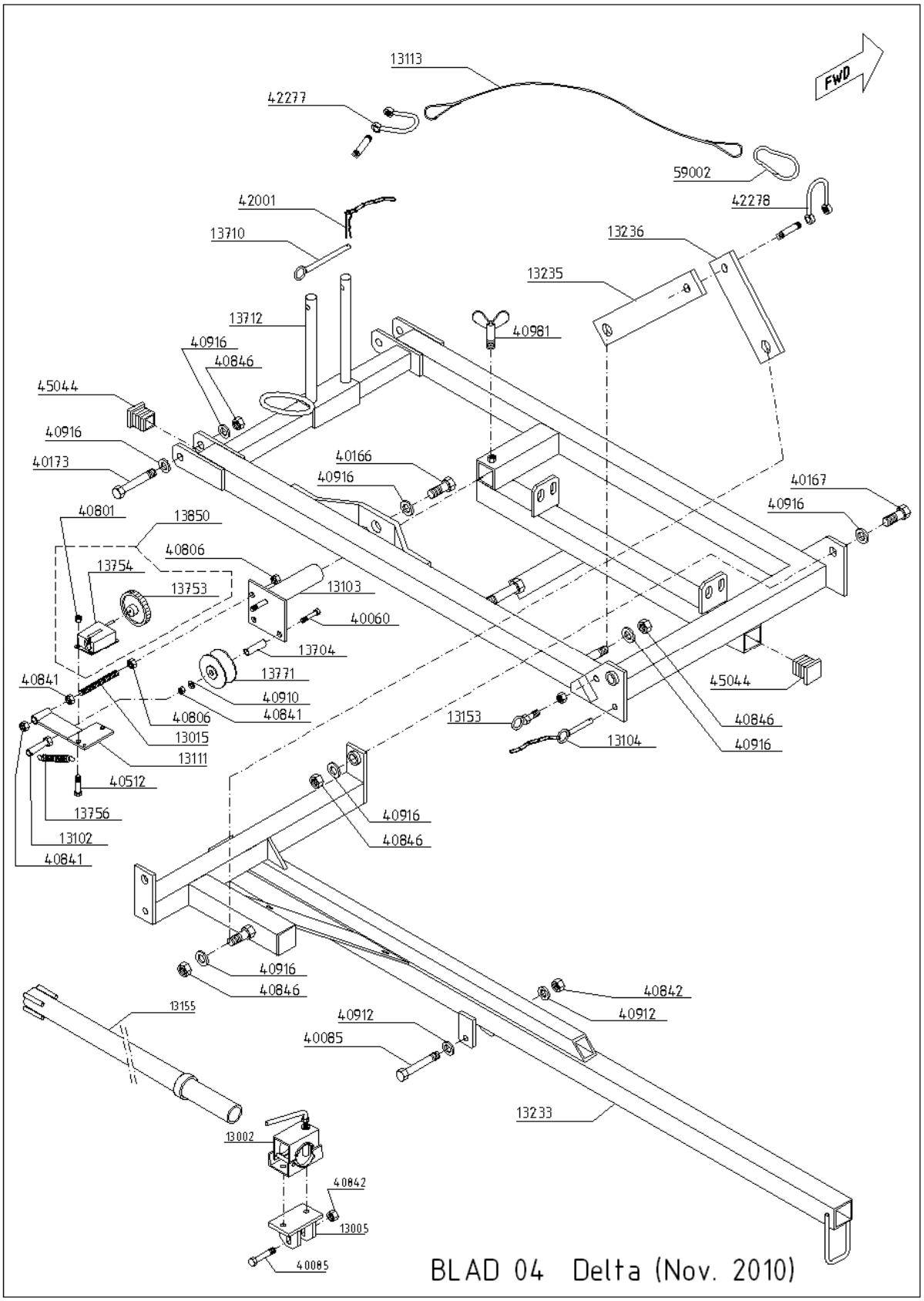

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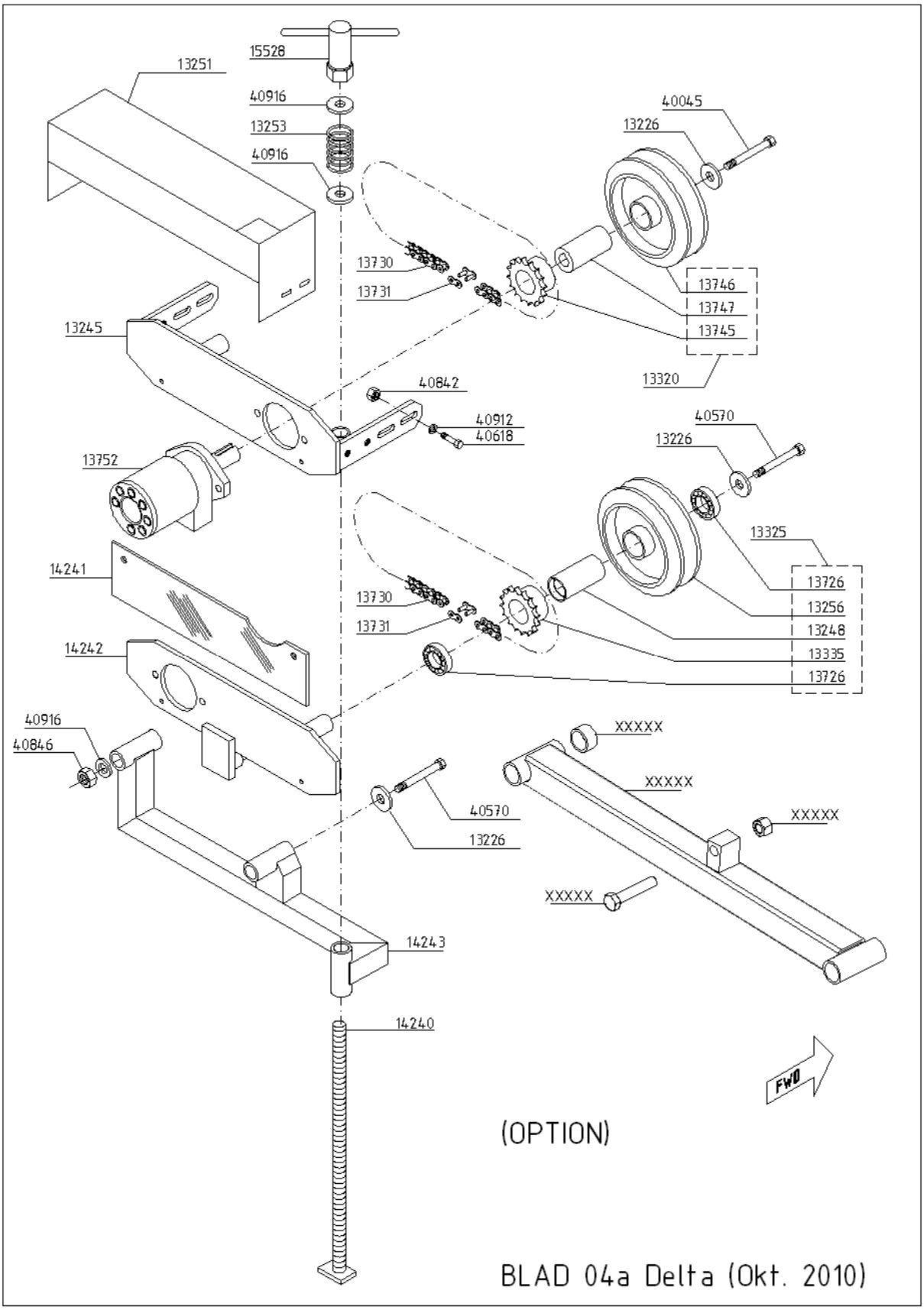
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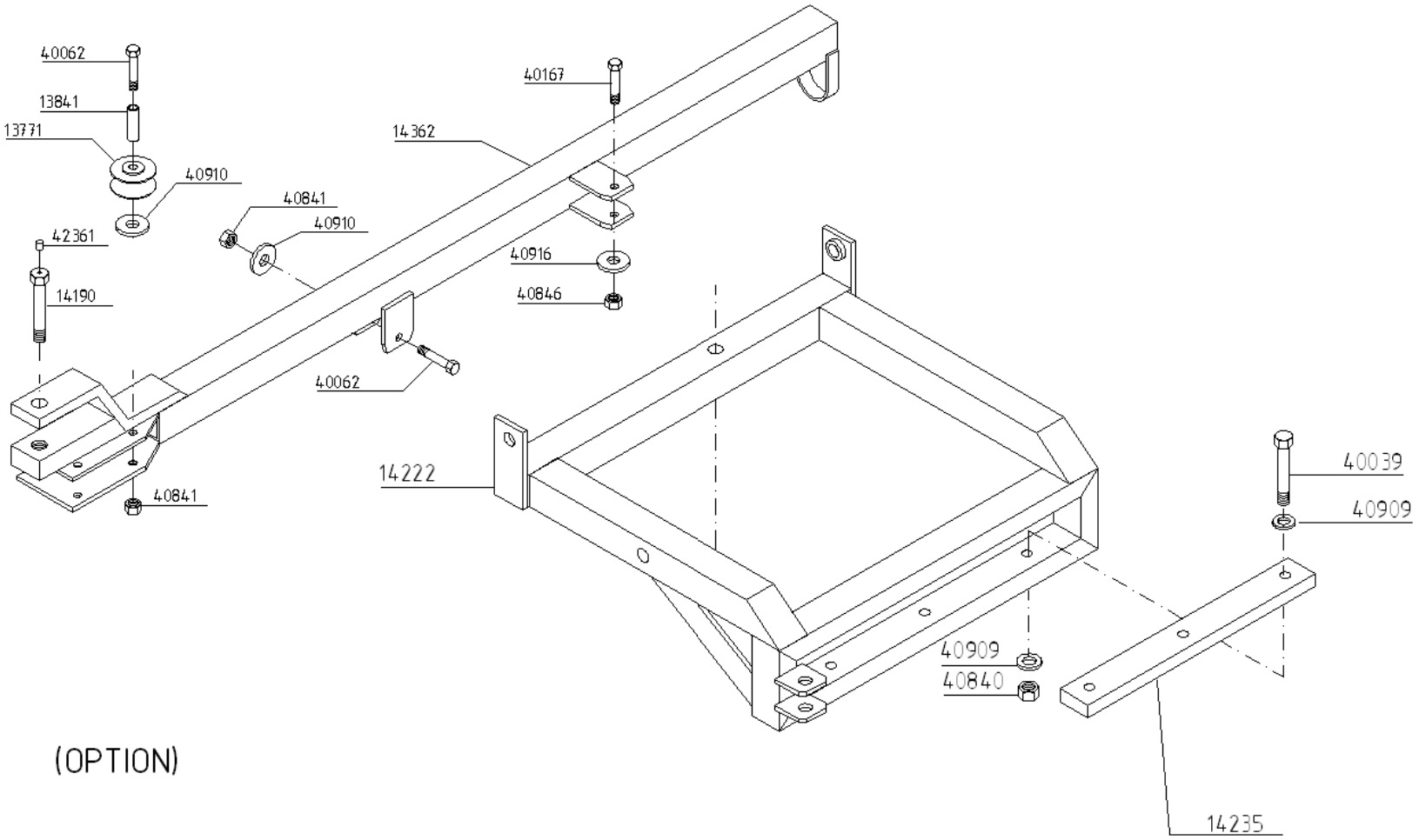

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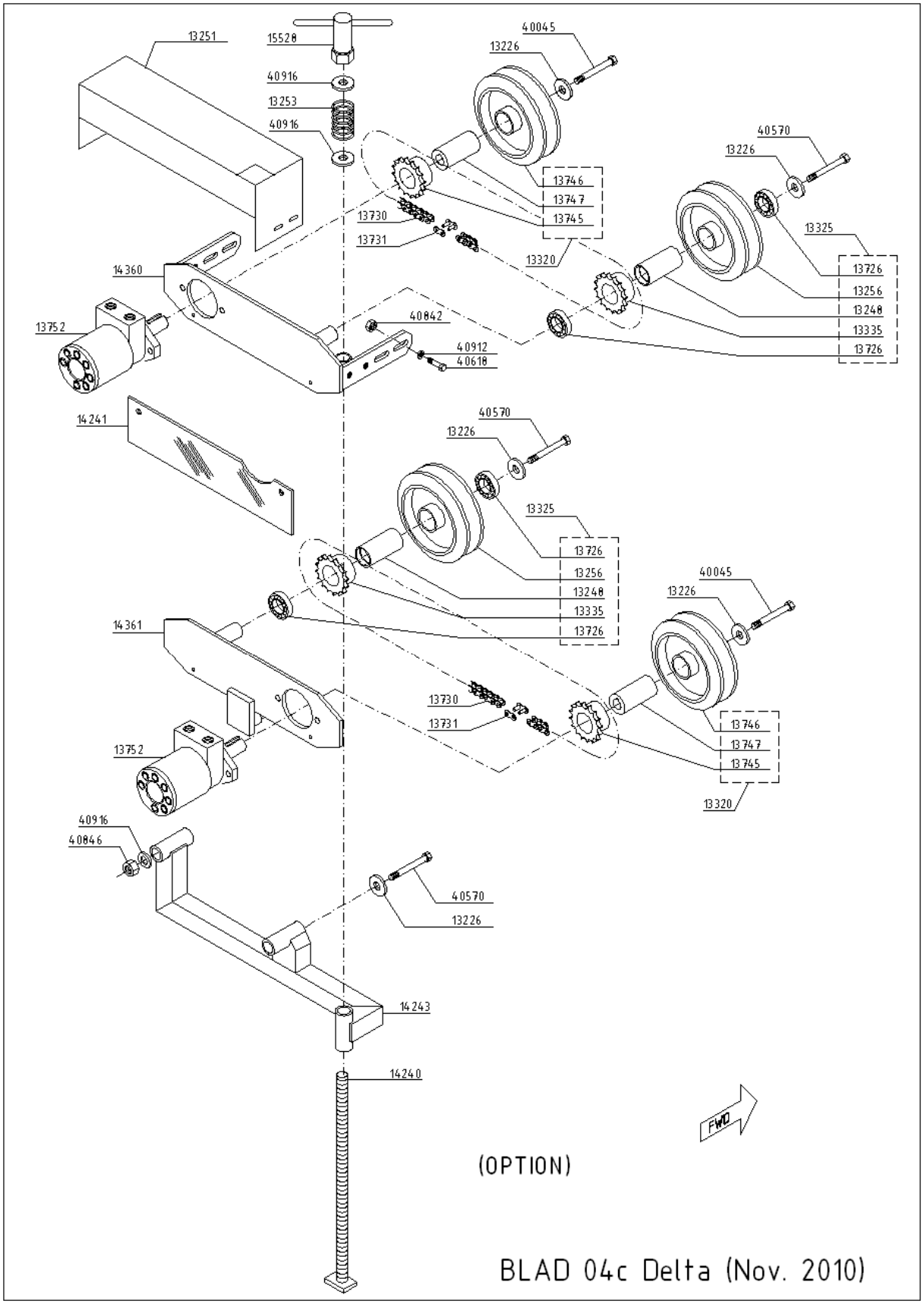

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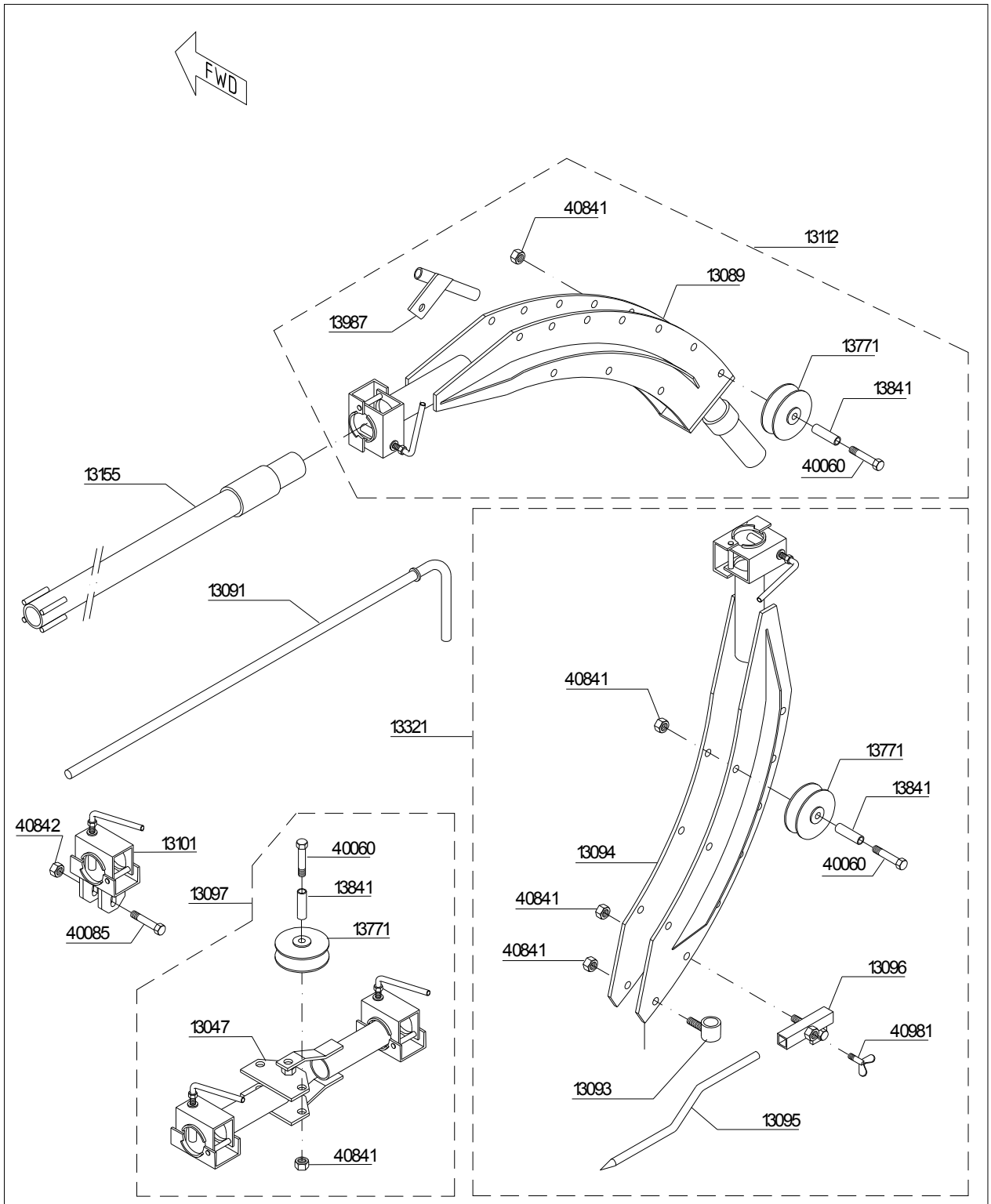

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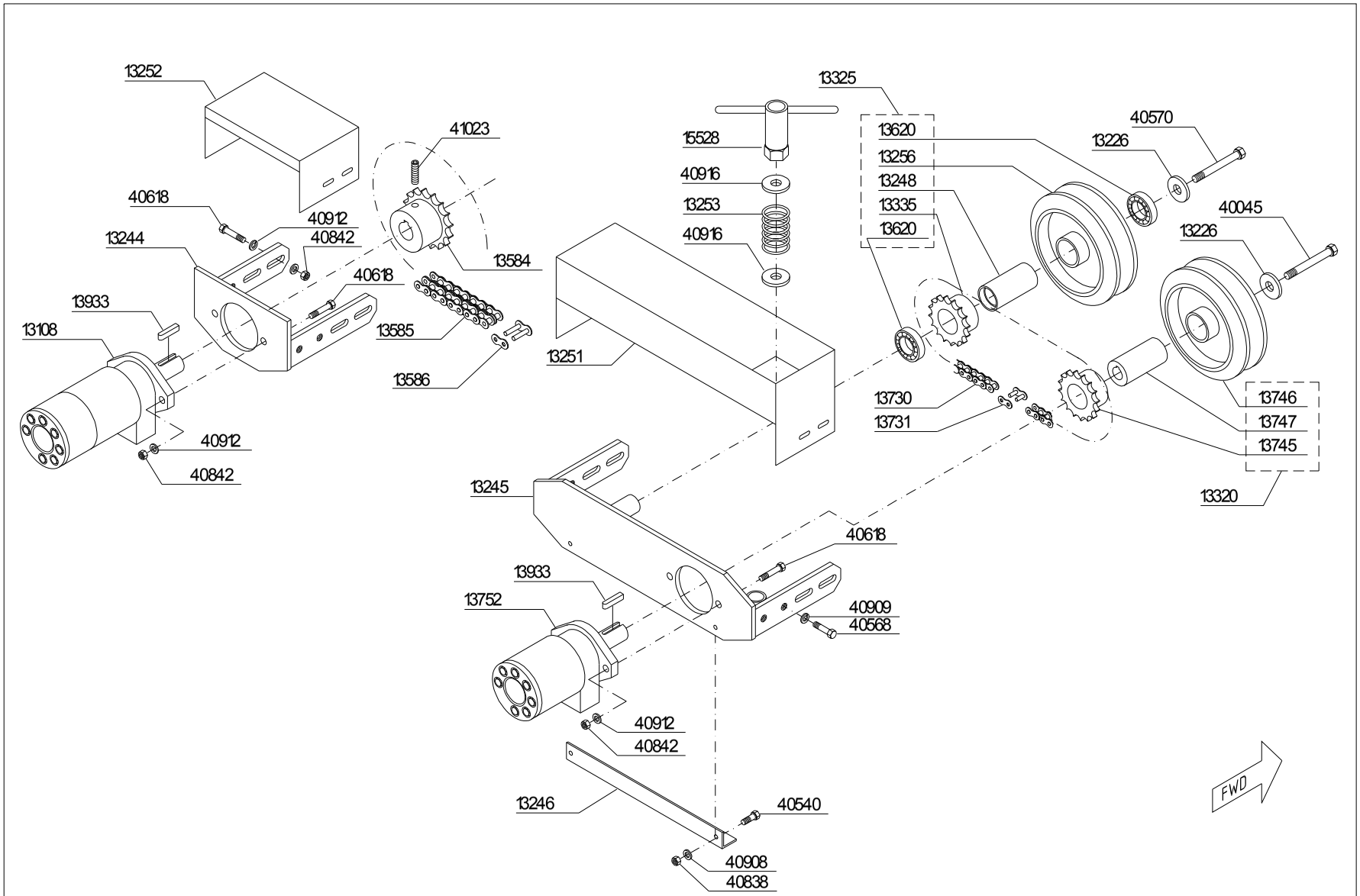

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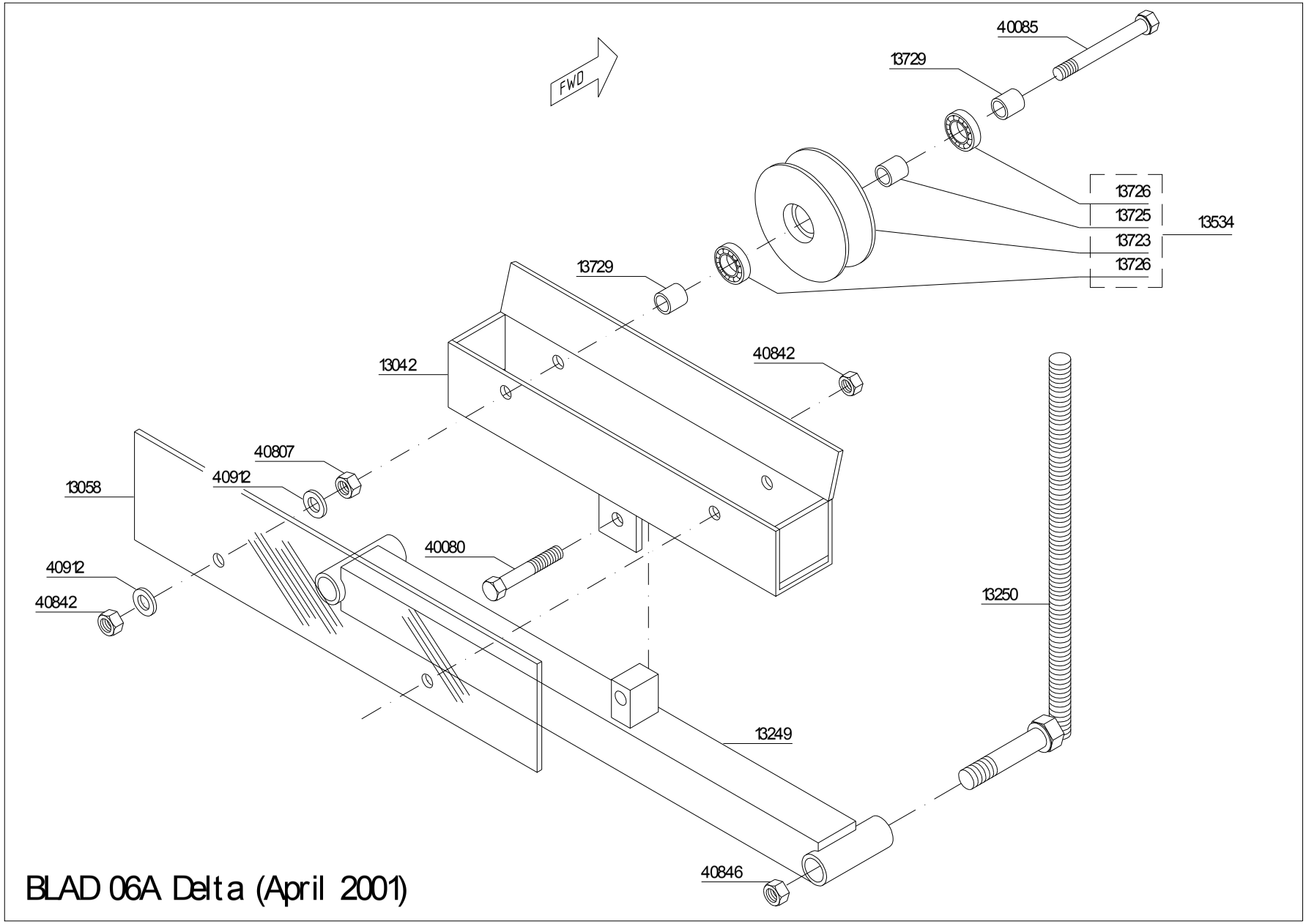

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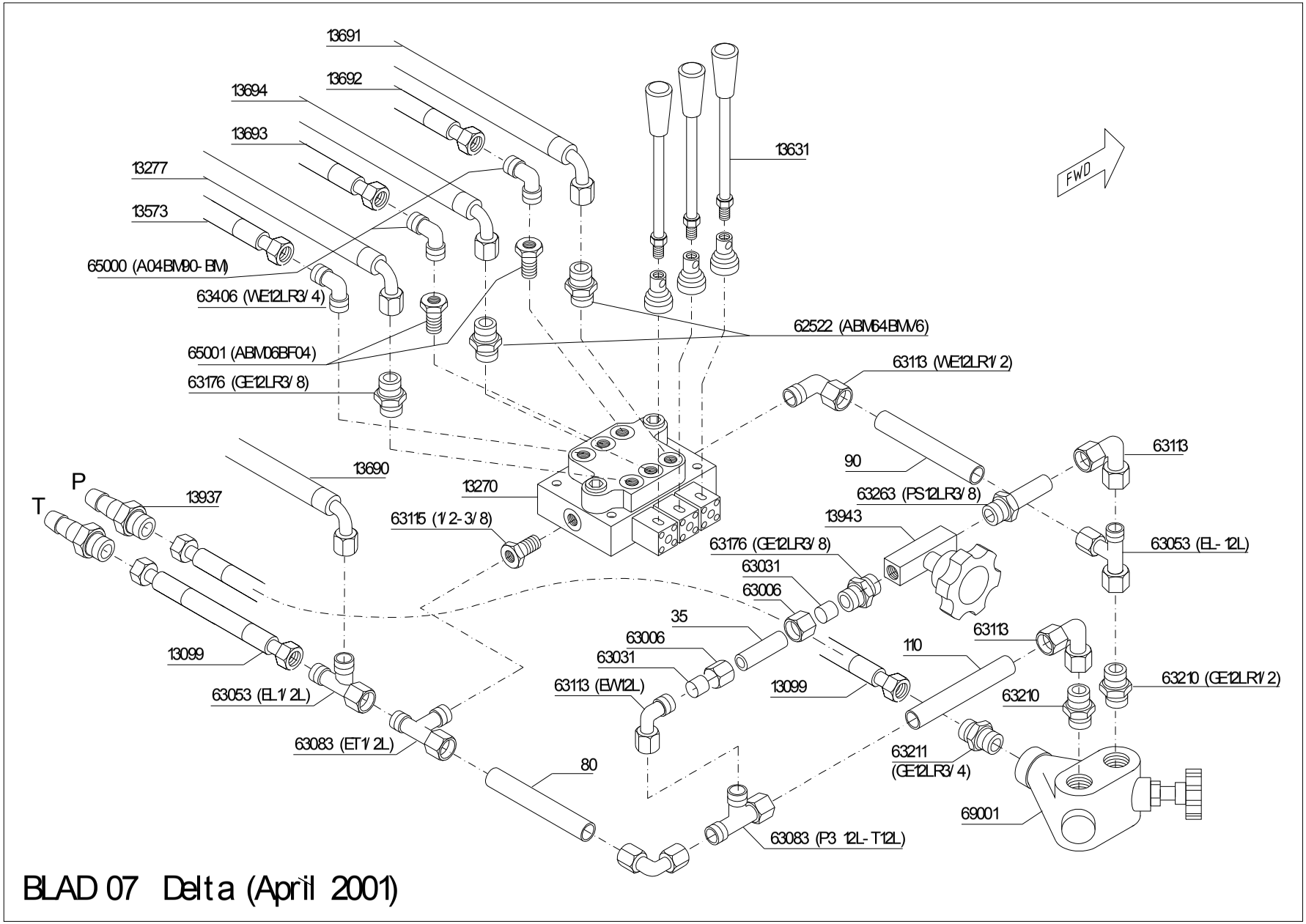

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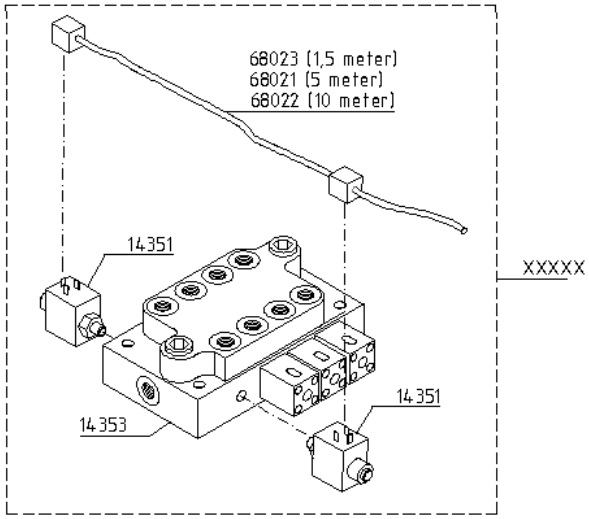
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68021 (5 meter)
68022 (10 meter)
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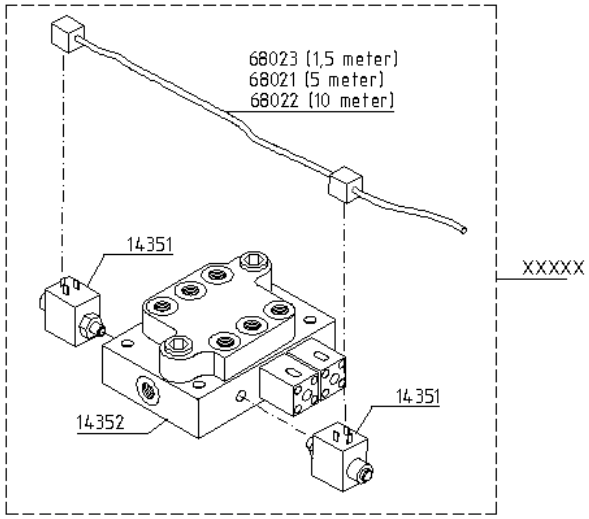
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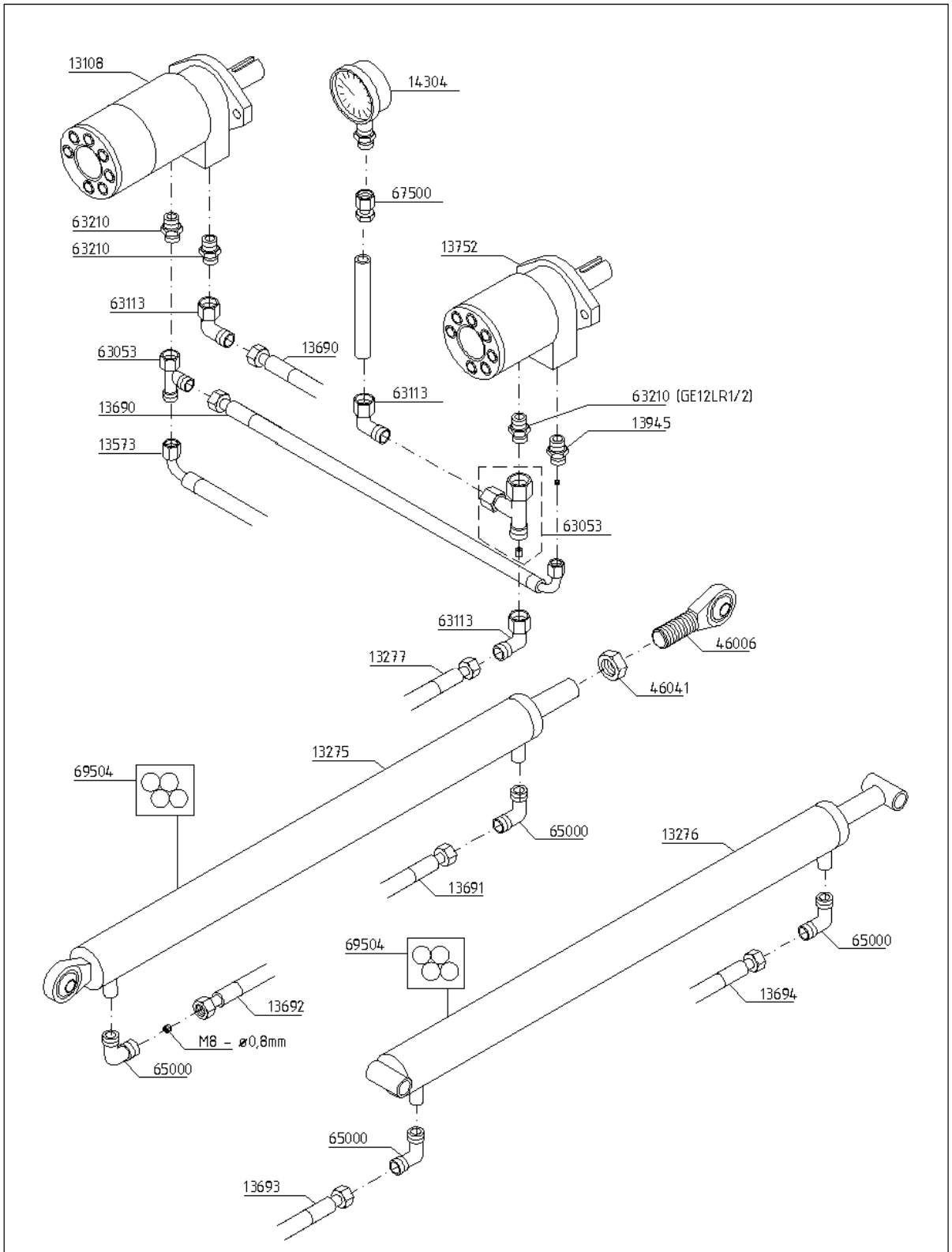

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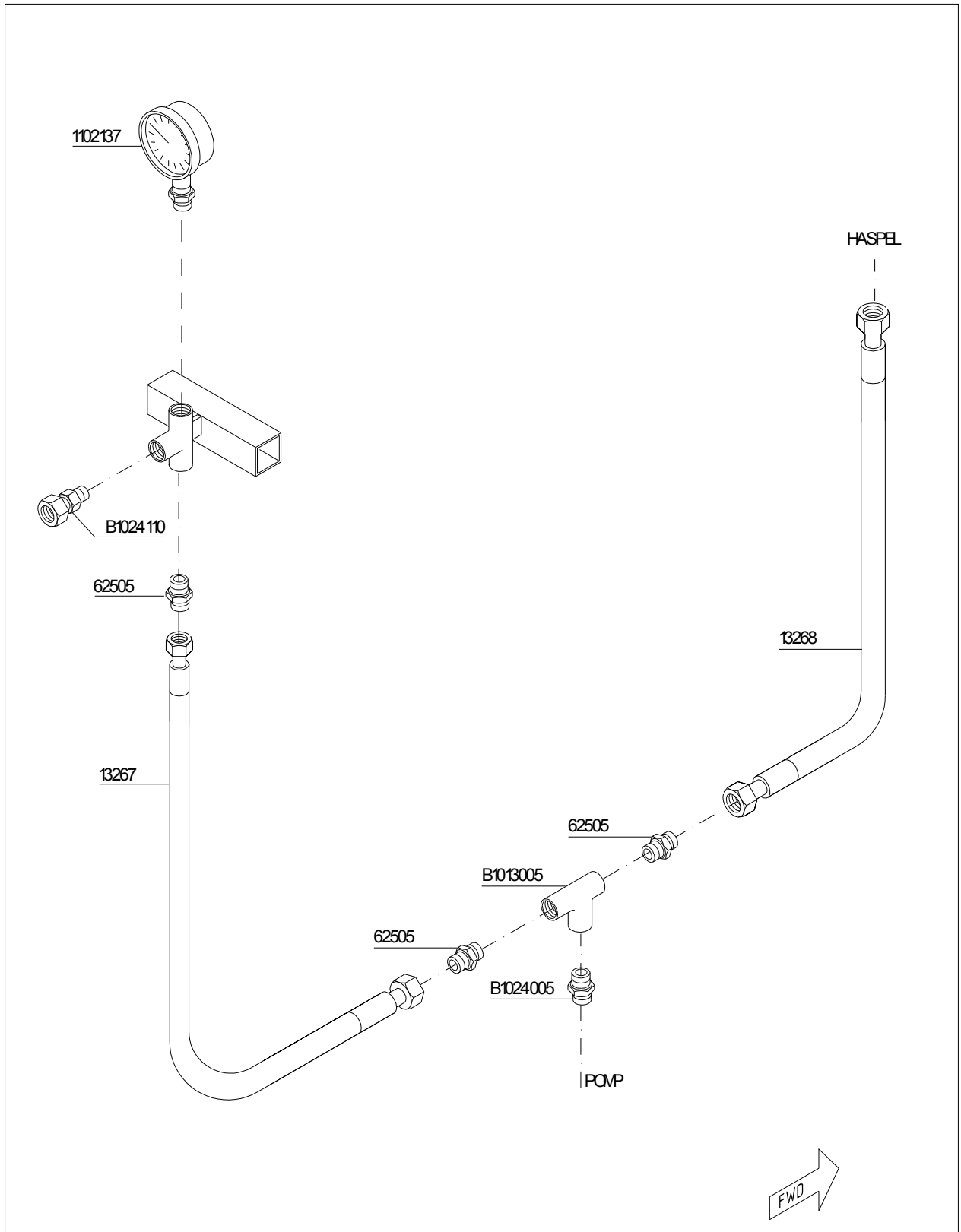

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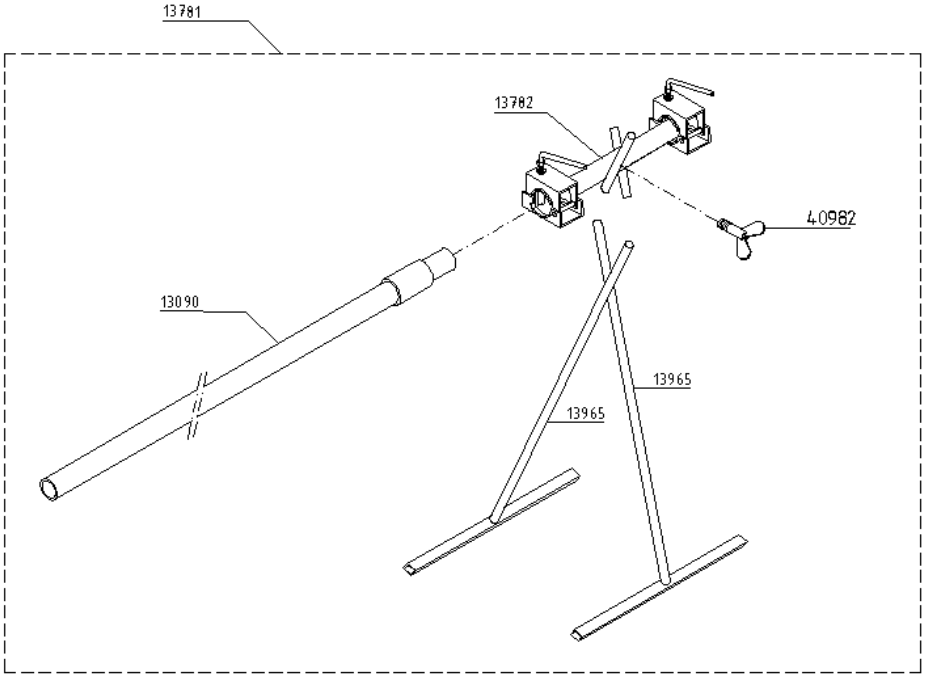

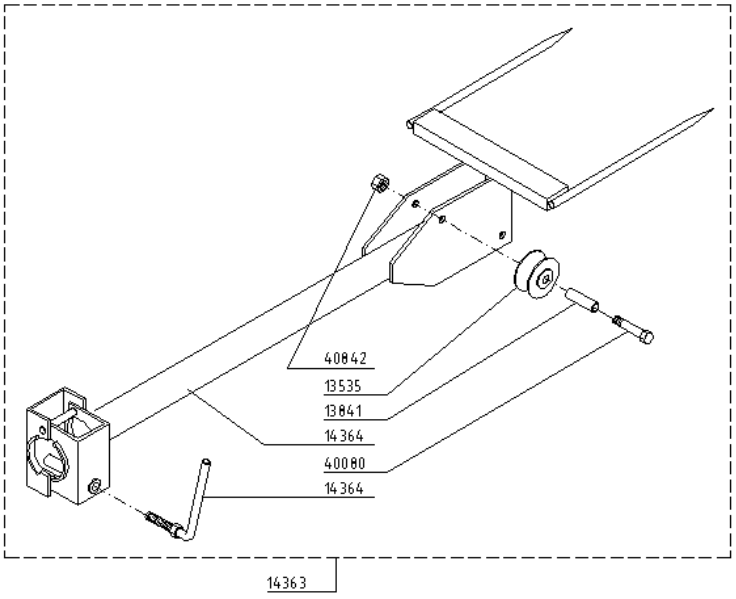

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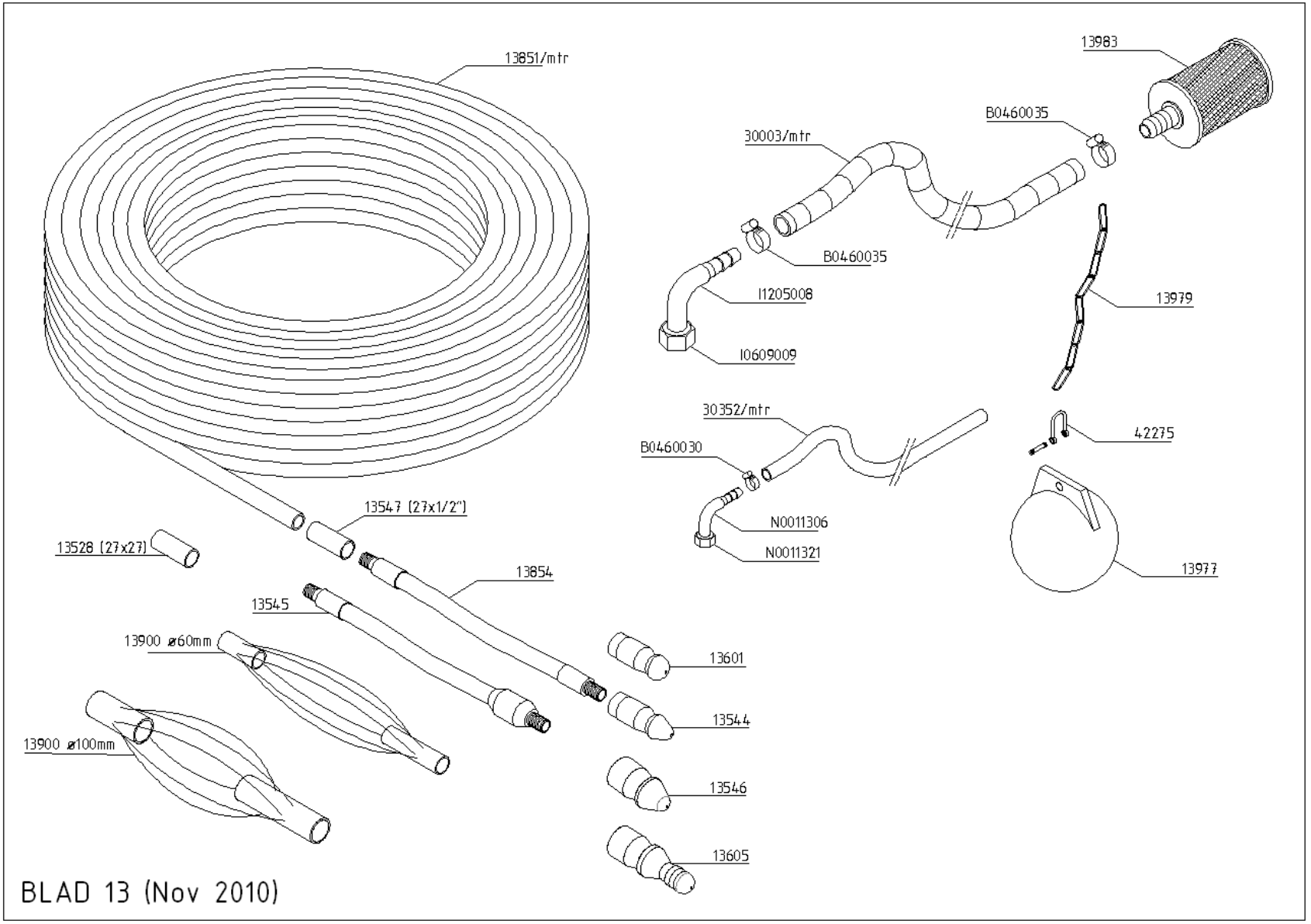

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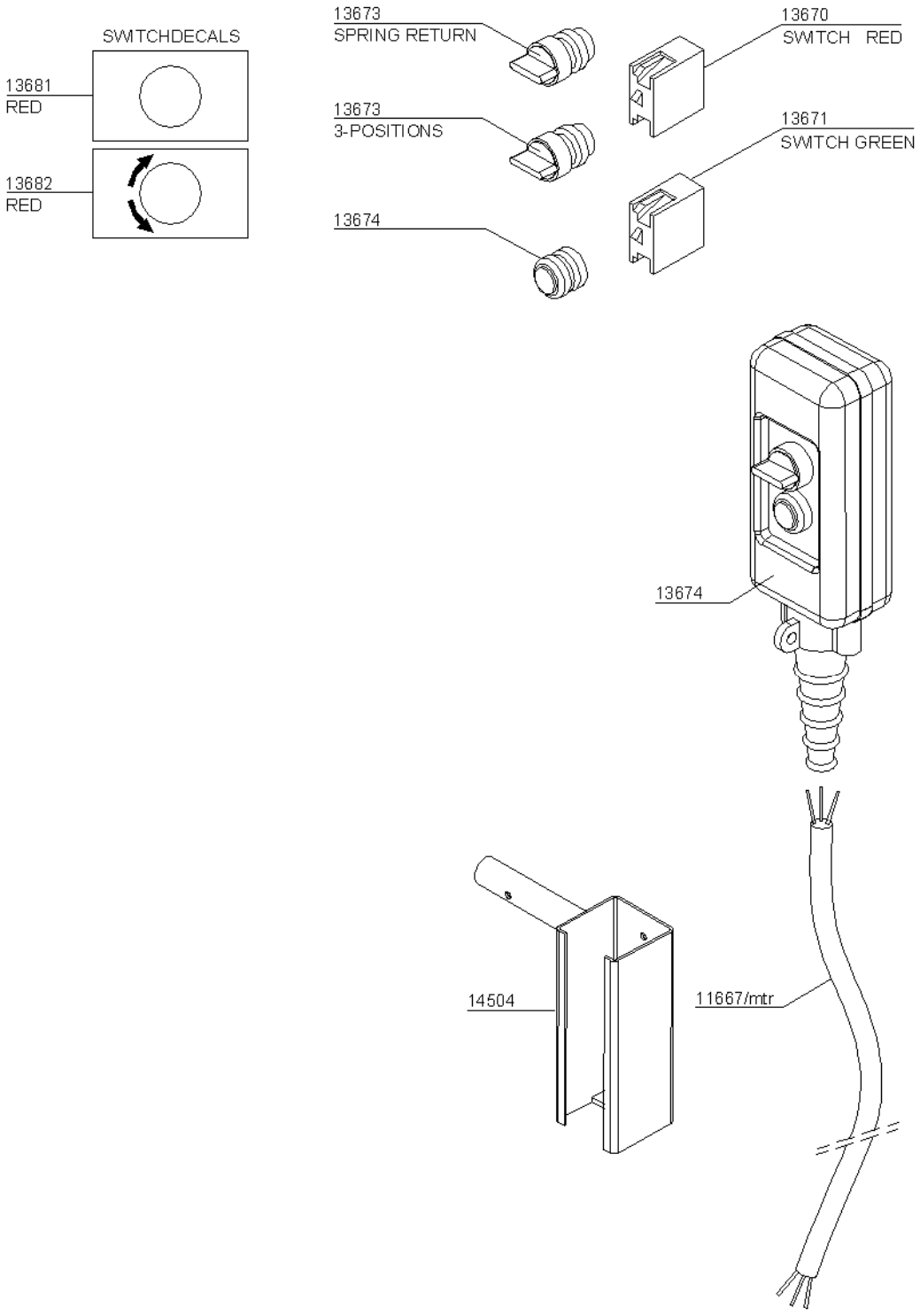

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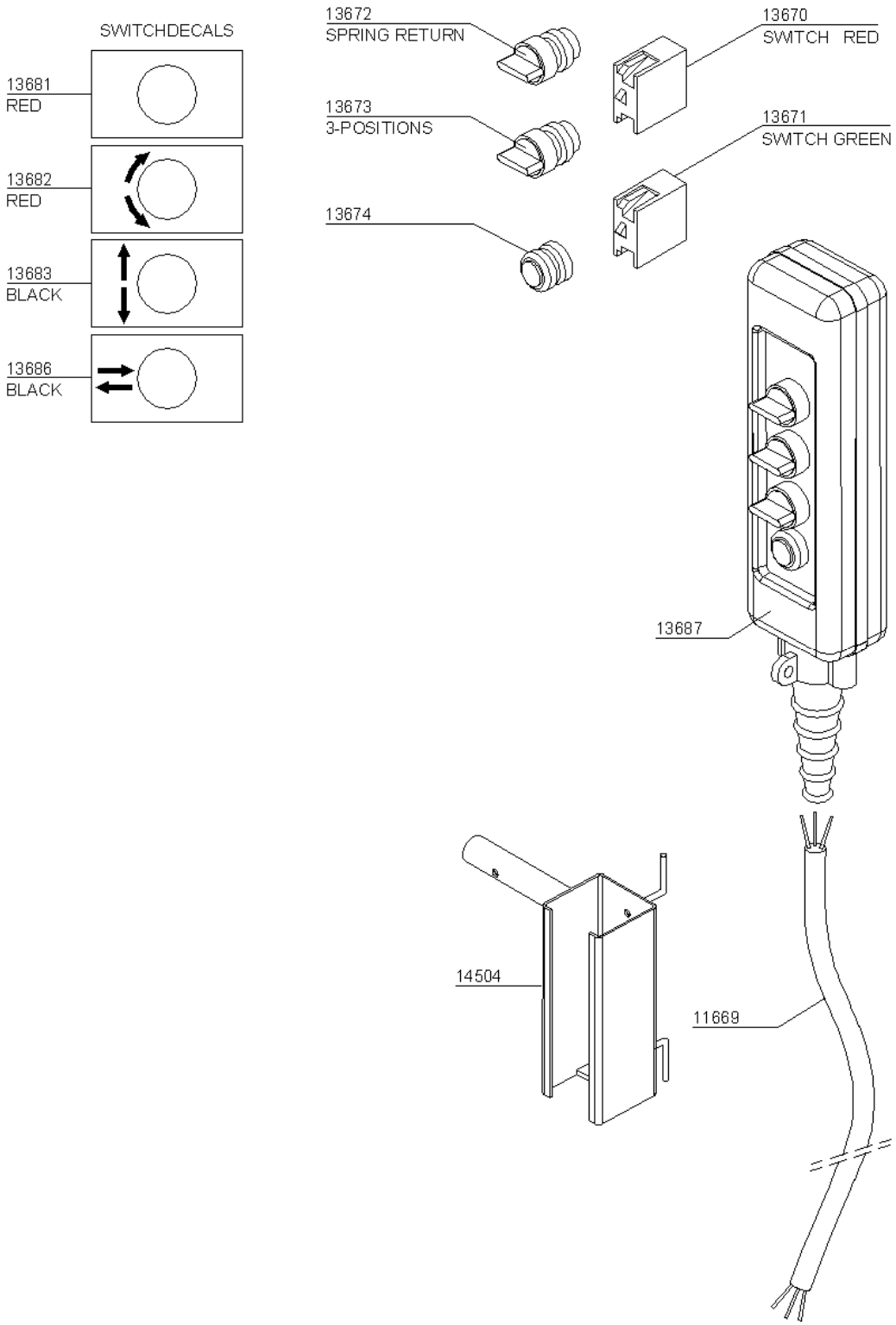

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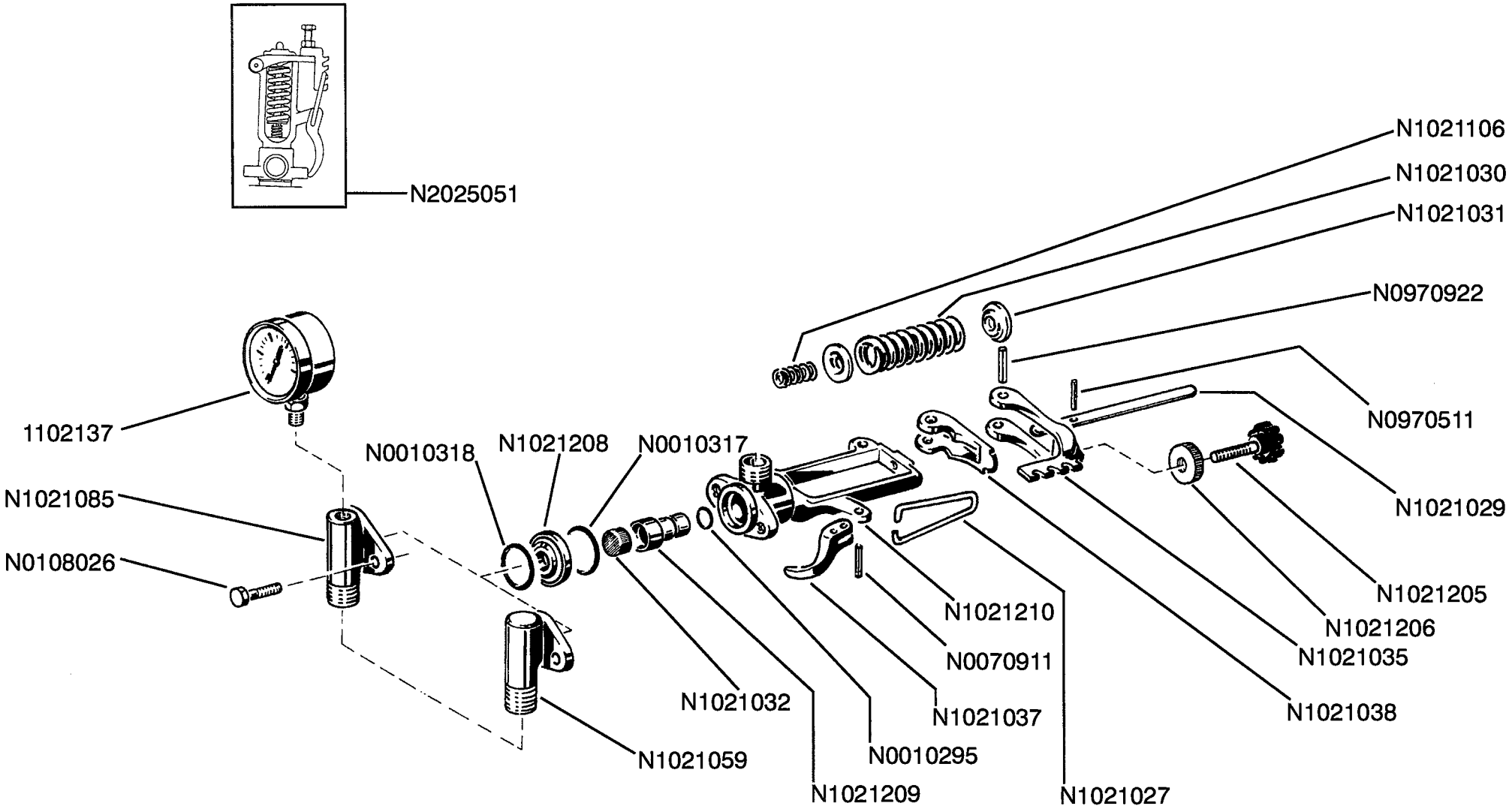
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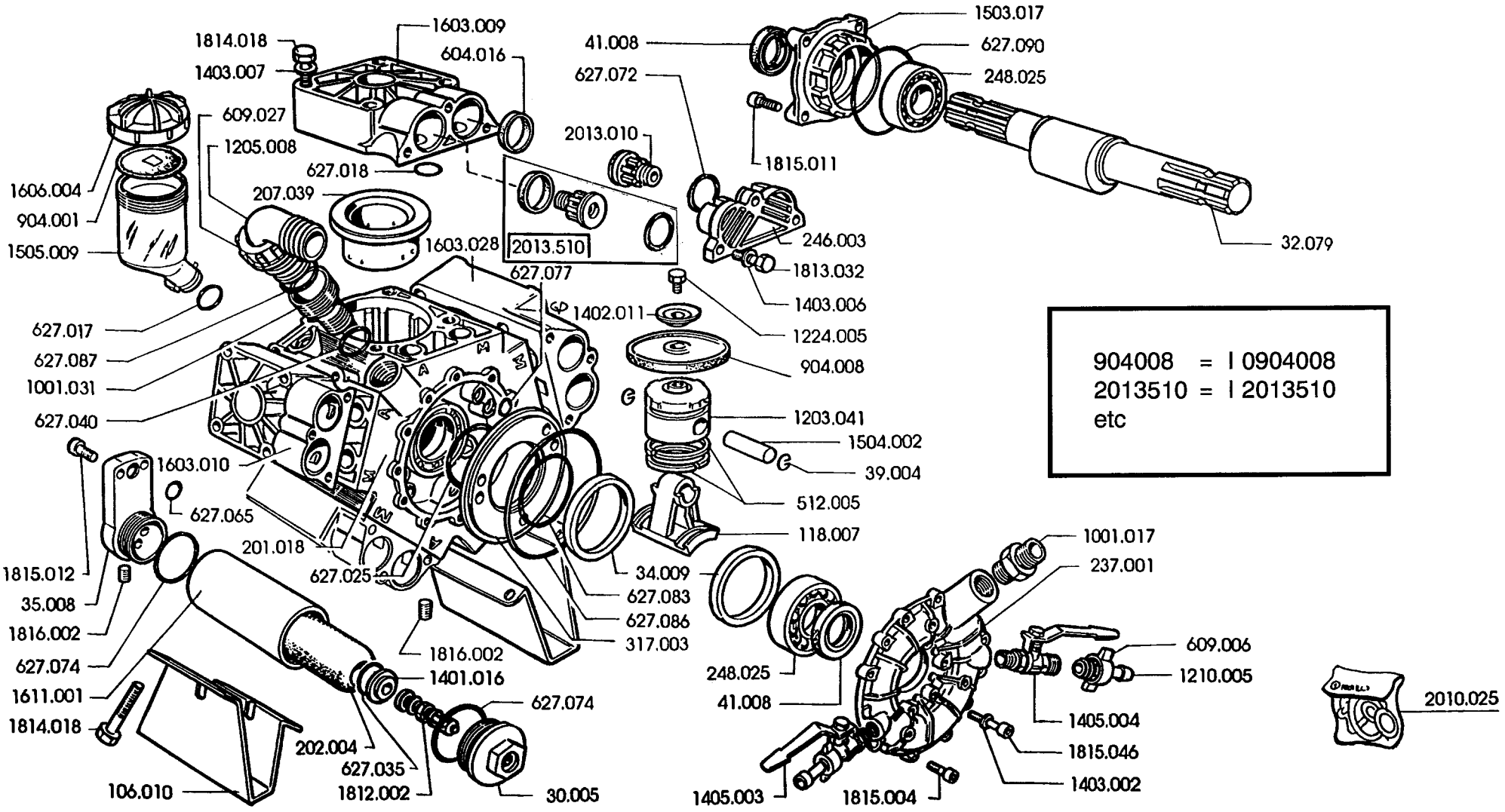

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