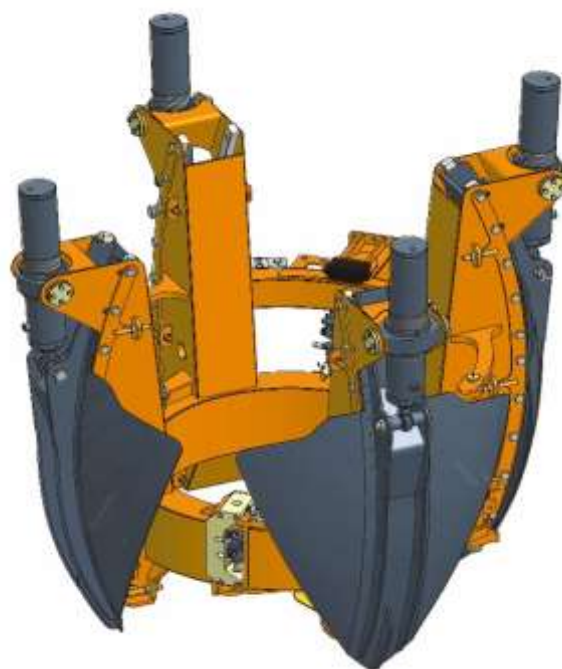




M A N U A L
ON
TREE SPADE OPTIMAL 1800



Manufacturer:

Optimal-Vertrieb Opitz GmbH
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91177 Thalmaessing
Germany

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Fieldworks Nursery Equipment
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WARNING Operator must have read and understood instructions before running the tree spade. Untrained operators can cause injury or death.

-  **Safety Alert Symbol:** This symbol is used for important safety messages. When you see this symbol, follow the message to avoid personal injury or death.
-  Never use tree spade without instructions. See machine signs (decals), and Operation & Maintenance Manual of tree spade. The operation instructions for power unit must be followed.
-  Before starting operations, bolts and hydraulic fittings must be checked to make sure they are free of damage and well tightened. Defective or loose hose pipes might cause serious injuries and therefore must be replaced immediately.
-  The operator is responsible for ensuring that no person is near the tree spade when in operation.
-  No one should be underneath the raised tree spade or near shearing and pinching areas, or near any hydraulic components. We are advising the user that due to their functional positions and movements the danger areas cannot be furnished with protective guards.
-  Keep bystanders well away from work area.
-  Do not perform any manual work on the tree or shrub when it is inside the tree spade. In particular, do not check the position of the tree or shrub by hand or feet when it is inside the tree spade. Do not tie the tree or shrub when it is near or inside the machine.
-  When sight is limited, an assistant should direct the operator by hand signals.
-  When driving, the tree spade should be in the lowest possible position. When moving and working on public roads, the traffic rules and regulations must be adhered to.
-  Never leave power unit with engine running or with lift arms up.
-  To park, engage parking brake and put tree spade flat on the ground.
-  When doing cleaning, maintenance or repair work, lower the tree spade to the ground and stop the engine of the power unit.
-  Never modify equipment. Use only original spare parts approved by manufacturer for this particular model tree spade.
-  When digging, it might happen that a stone gets caught between two blades and the blades get bent. This causes tremendous tension in the steel blade. Do not try to release the stone by means of a crow bar or other tools. Place the digging head again into the planting hole and retract the blades. Thereby the stone will come loose and the blades which got a high degree of bending strength will regain their former shape. After that the root ball can be dug again.
-  The operator must be sure that the ground he is going to dig is free from any underground installations such as cables, pipes or any other utilities or dangerous matter. Damaging such underground installations or matter is dangerous and might result in serious injury or death.
-  Safety stickers have been placed on the tree spade to warn the user of possible dangers. In case a safety sticker has been worn or destroyed, it must be replaced immediately. Safety stickers can be ordered with your distributor or the manufacturer. For ordering please use the part numbers listed on page 2A. Fix the stickers on the locations marked on page 2A.

1. Tower:



Part N° 711800001



KEEP AWAY
FROM SWING AREA
WHEN IN OPERATION

Part N° 711800008



NO SE ACERQUE A LA
ZONA DE MOVIMIENTO
CUANDO ESTÁ
EN FUNCIONAMIENTO

Part N° 711800015

5. Gate Cylinder:



Part N° 711800007

2. Tower:



Part N° 711800001



AVOID INJURY
Stay Clear!
This structure
swings outward

Part N° 711800012



EVÍTESE LA HERIDA
¡No se acerque!
Esta estructura
mueve hacia afuera

Part N° 711800020



Part N° 711800018

7. Frame:



Part N° 711800004



Part N° 711800005



Part N° 711800006

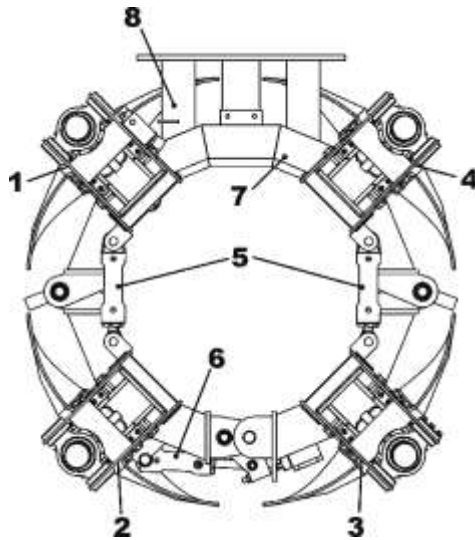


Part N° 711800068

8. Oil - Manifold

WARNING
SHUT OFF
POWER
BEFORE
SERVICING

Part N° 711800010



6. Lock Cylinder:



Part N° 711800019

4. Tower:



Part N° 711800001



AVOID INJURY
Stay Clear
Of
Elevated Unit
And Tree Spade

Part N° 711800009



EVÍTESE LA HERIDA
No se acerque
ni la unidad elevada
ni la transplantadora

Part N° 711800016

5. Gate Cylinder:



Part N° 711800007

3. Tower:



Part N° 711800001



MOVING MACHINERY
KEEP HANDS AND
FEET CLEAR

Part N° 711800014



MAQUINARIA EN MOVIMIENTO
MANTENGA MANOS Y PIES
ALEJADOS

Part N° 711800017



WATCH YOUR
HANDS AND
FINGERS

Part N° 711800013

1. Operating Specifications

Description	Tree Spade OPTIMAL 1800		
serial number	180 038		
capacity	upper root ball diameter	180 cm	(71")
	root ball depth	106 cm	(42")
dimensions of basic machine	height	240 cm	(94")
	width, frame closed	215 cm	(85")
	width, frame open	330 cm	(130")
	clearance between open gate	160 cm	(63")
weight	basic machine, empty	2700 kg	(5940 lbs.)
rated type of attachment	attachment by means of back plate to loader or excavator		
	minimum lift capacity	6500 kg	(14300 lbs.)
	the power unit must be equipped with an auxiliary double-acting hydraulic circuit for implements:		
	working pressure	160 - 200 bar	(2300-2900 lbs/in ²)
	oil flow	60 l/min.	(16 GPM)
controls	electro-hydraulic valves, double-acting, for four functions actuated by control box		
field of application	tree nurseries; gardens; civic greens		

2. Assembly



IMPORTANT:

When doing assembly work, heed relevant instructions of manufacturers of power unit!

2.1 Back Plate

The tree spade is attached to the power unit by means of a back plate. The back plate is procured from the manufacturer of the power unit, or it might be fabricated according to the drawings and instructions of the manufacturer of the power unit.

The back plate is to be furnished with borings as per drawing page 13. At these attachment points the tree spade is bolted tightly to the back plate.

2.2 Installation of Electro-Hydraulic Control (*wiring diagram page 14/15*)

- 2.2.1 Install control box at suitable place in the cabin, e.g. at dashboard
- 2.2.2 Install 13-pole socket next to the push-on connector for the implement hydraulics. A mounting bracket has been provided.
- 2.2.3 Run 12-pole cable from control box to 13-pole socket.
- 2.2.4 The control box must be connected to the power supply (12V) of the power unit.

***Important: Electric power should be flowing only when the ignition of the power unit is activated, otherwise the battery may run down.
Maximum power input 12 Ampere !***

Now the tree spade is ready for operation.

3. Putting into Service

The tree spade with the back plate is attached and secured to the power unit.

Both the hydraulic connecting hoses of the tree spade are to be connected to the hydraulic disconnect of the auxiliary hydraulic circuit of the power unit.

The plug of the electric control cable is to be plugged into the socket on the power unit (see section 2.2.2).

Make sure that hydraulic working pressure and oil flow of power unit meets the requirements as laid down in the operating specifications on page 4.



IMPORTANT:

The hydraulic disconnect of the tree spade and the power unit must match and must be connected properly. Faulty connections are extremely dangerous.

If the back-flow of the hydraulic oil is impeded, a pressure relief will divert the excess oil into an overflow tank. Possible reasons could be ill-matching disconnects or an excessive oil flow. In that case the oil flow must be reduced as per instruction of the manufacturer of the power unit.

After the first working day, the screws of the tension blocks must be checked and re-tightened, if necessary.



IMPORTANT:

When operating the power unit, follow the instructions of the operating manual of the power unit !

4. Operating Instructions



IMPORTANT:

The Operator must be a reliable person. Before commencing production work, he or she must study these operating instructions thoroughly.

The following safety instructions must be observed:

It is the operator's prime duty to ensure that any persons must stay clear off the danger area. Special care must be taken that no one is ever under the raised tree spade, or near the potential shearing and pinching areas, or near the opened gate, near the spades or near any hydraulic components.

Do not perform any manual work at the tree or shrub when it is inside the tree spade. In particular, do not check the position of the tree or shrub by hand or feet when it is inside the tree spade. Do not bind the tree or shrub when it is near or inside the machine.

When sight is limited, an assistant should direct the operator by hand signals.

Before starting to work with the tree spade, make sure the hydraulic fittings and the bolts are properly tightened and are free from any defects.

4.1 Control Box

The work movements are controlled as follows:

Pre-Selector

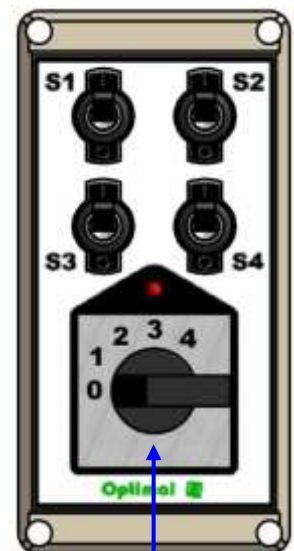
Manual Controls (hydraulic)

0 : control box switched off (LED light indicates when gate is not locked)	
function 1 : gate lock	unlock / lock
function 2 : gate	open / close
function 3 : blades	up / down
function 4 : stabilizers (optional)	up / down

The control box is installed in the driver's cabin. The function required is preset with the pre-selector of the control box, and it is then activated by means of the manual control lever or pedal respectively.

The tree spade is equipped with individual blade control as standard, i.e. each blade can be controlled individually with toggle switches S1, S2; S3 and S4.

Individual blade control is of particular advantage when soil conditions are difficult.



Pre-Selector

4.2 Operation

4.2.1 Lower the tree spade with the lift arms of the power unit until the blade points are about 20 cm (8") above the ground.

4.2.2 To open the gate, the gate lock must be unlocked first:
pre-selector: function 1, gate lock
manual control: unlock

4.2.3 Now the gate can be opened:
pre-selector: function 2, gate
manual control: open

4.2.4 With the gate wide open, the tree spade is driven towards the tree to be dug. Position the tree into the centre of the circular frame of the tree spade, then close the gate:
pre-selector: function 2, gate
manual control: close

4.2.5 Lock the gate:
pre-selector: function 1, gate lock
manual control: lock

It is of utmost importance to lock the gate before digging. It must never be forgotten because digging with an unlocked gate will bend the frame!

A safety switch ensures that the tree spade digs only when the gate is properly locked. Furthermore, a red control lamp will light up to indicate that the gate is not locked.

4.2.6 When having locked the gate, the tree spade is lowered to the ground and brought into a level position by means of the lift arms of the power unit.
Again check if the tree is positioned in the centre of the frame, and correct, if necessary.

4.2.7 In case the power unit had been furnished with rear stabilizers of its own, extend rear stabilizers with the respective control valve of the power unit.
But in case stabilizers have been installed with the tree spade and they are controlled by Optimal control box, extend rear stabilizers by setting
pre-selector: function 4 (optional), rear stabilizers
manual control: down

4.2.8 Now proceed with digging:
pre-selector: function 3, blades (S1-S4)
manual control: down

The blades are pressed into the soil by means of spade cylinders suspended at the spade towers. When all four blades are activated simultaneously, only the blades which encounter the least soil resistance are moving at a given time.

In the event the tree spade lifts from the ground, retract the blades slightly (manual control: "up") and then dig again, or press the blades down one by one, or by opposite pairs. In either case, the digging movements must be carried out step by step, until all blades are completely pressed into the soil. **When digging, do not rock the tree spade forward and backward by means of the tilting cylinder of the power unit!**

4.2.9 Once all blades have been completely pressed into the soil, the tree spade with the planting material is lifted out of the ground by means of the lift arms of the power unit.

4.2.10 The root ball is lowered by means of the lift arms of the power unit.

Then the gate is unlocked:

pre-selector: function 1, gate lock

manual control: unlock

and the gate is opened:

pre-selector: function 2, gate

manual control: open

4.2.11 The rear stabilizers are retracted with the control valve of the loader, or with the optional function 4 (up) of the pre-selector.

4.2.12 When work has been accomplished, the pre-selector is set to 0.

Before travelling, rear stabilizers must be retracted !



IMPORTANT: When moving and working on public roads, the traffic rules and regulations must be adhered to.

When driving, the tree spade should be in the lowest possible position.

When digging, it might happen that a stone gets caught between two blades and the blades get bent. This causes tremendous tension in the steel blade. Do not try to release the stone by means of a crow bar or other tools.

Place the digging head again into the planting hole and retract the blades. Thereby the stone will come loose and the blades which got a high degree of bending strength will regain their former shape. After that the root ball can be dug again.

4.3 Releasing the Tree

When transplanting, or when placing the tree in a basket, lower the tree spade by means of the lift arms, retract spades (function 3 "blades", control valve "up") then unlock gate (function 1 "gate lock", control valve "unlock") and open gate (function 2 "gate", control valve "open").

When the work has been finished, set the pre-selector in off-position (function 0). If the tree spade is controlled by means of a joy stick, the hydraulics are off when no button is being pressed.

5. Care and Maintenance

5.1 Blade Guides

Thanks to the plastic lining the spade guides do not require lubrication. Once the plastic lining has been worn to the point where the heads of the countersunk screws are even with the surface of the plastic linings, they must be replaced to prevent the screws from damaging the blades.



IMPORTANT:

After the first digging day the screws (Item A, page 11) of the tension block have to be tightened with a torque of 730 Nm (ft.lb.538).

Make sure tension bolts at bottom of guides are always tight !

Keep the guides cleaned.

5.2 Lubrication

Once per week lubricate all greasing points with lithium-based grease, as per lubrication chart, Page 17

5.3 Hydraulic Oil Supply

Check level of hydraulic oil regularly. For checking, retract all blades “up” and lower the tree spade to the ground. If in that position the oil level is below the mark of the sight glass, oil must be refilled.

5.4 Hydraulic Hoses

All hydraulic hoses must be inspected at least once per year. Damaged hoses must be replaced. At least after 6 years all hoses must be replaced.

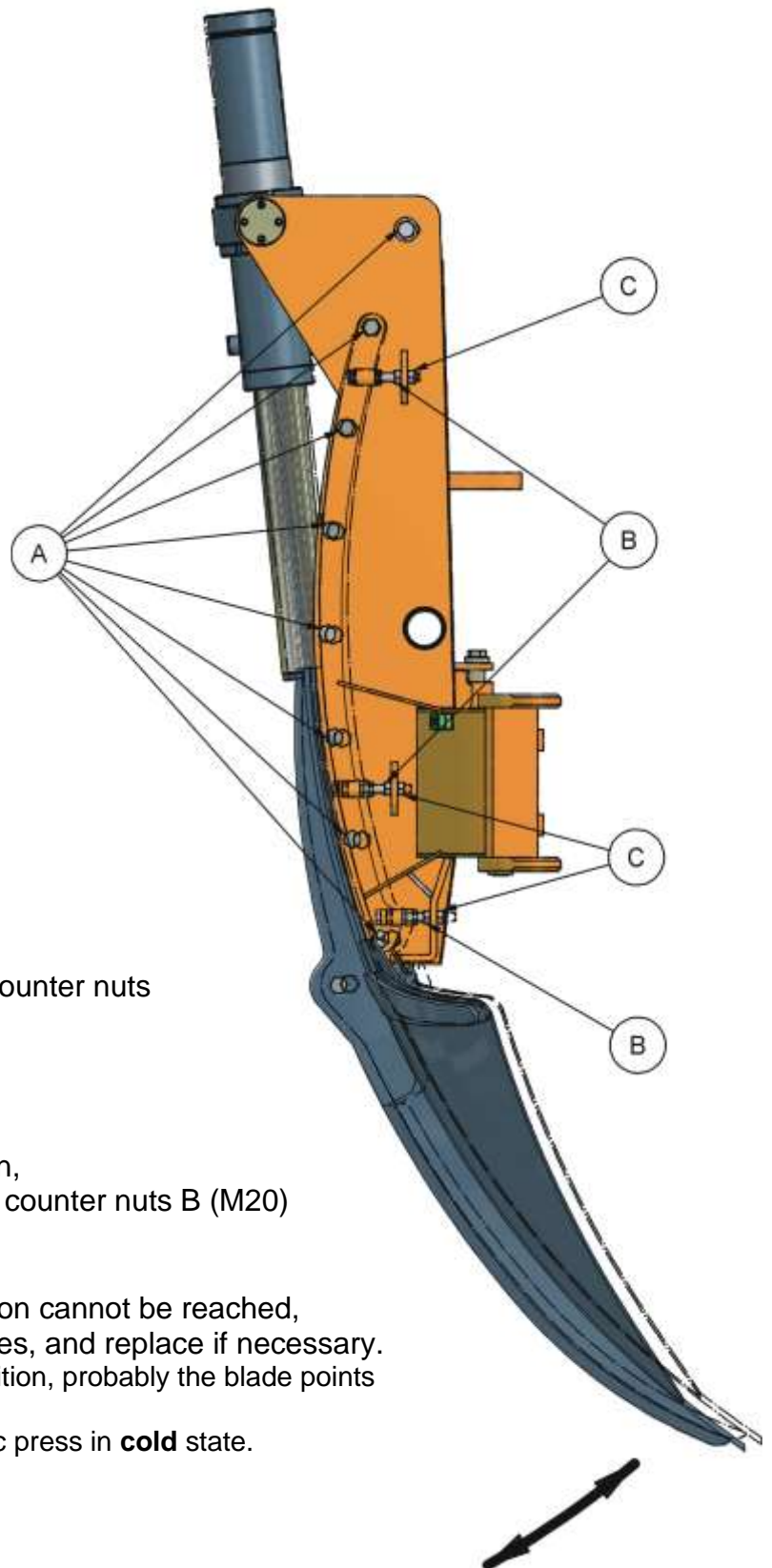
5.5 Cylinders

In case the tree spade is not getting used for two weeks, all piston rods of the hydraulic cylinders must be cleaned and covered with a preserving oil film.

5.6 Safety switch

It must be ensured that the plunger and roller of the safety switch are always able to move smoothly. Particularly after the tree spade has been idle for some period of time, these parts tend to seize. In that case they must be cleaned and lubricated. Operating the tree spade when the safety switch is not functioning properly may cause serious damage

5.7 Adjusting Blades



- Loosen bolts A (M24x50) and counter nuts B (M20) at both sides.
- Adjust blade with nuts C (M20).
- When blade is in proper position, tighten bolts A (M24x50) and counter nuts B (M20) with torque 730Nm.
- In case the desired blade position cannot be reached, check guides and plastic guides, and replace if necessary. When they are still in good condition, probably the blade points must be unbent.
Important: Unbend with hydraulic press in **cold** state.
Never heaten the blade !!!



IMPORTANT:

Tree spade must be lowered to the ground and switched off when doing cleaning, maintenance or repair work !

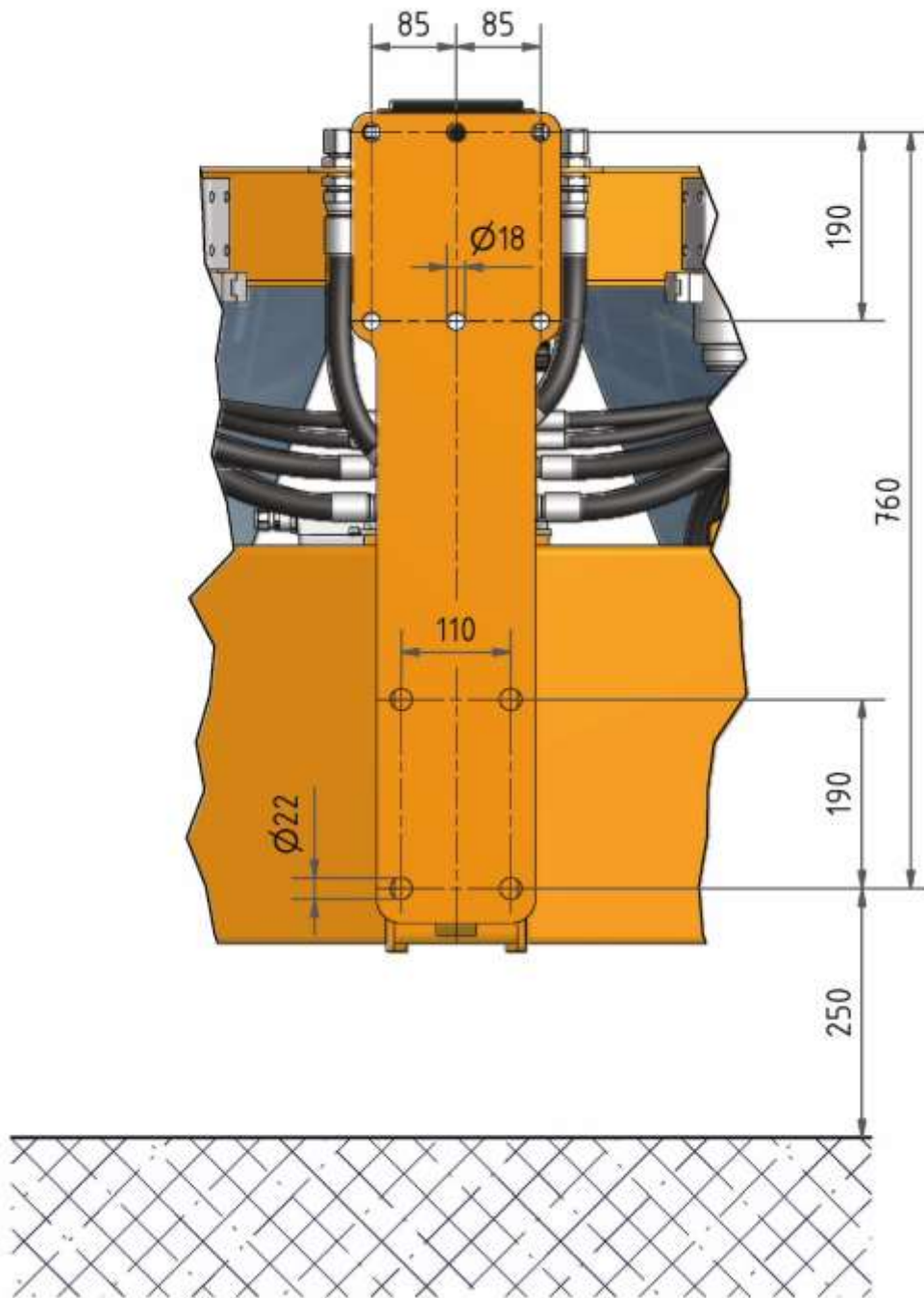
Use original spare parts only !

The tree Spade must be inspected by an expert on operational safety once per year !

Do not alter the design of the tree spade without having consulted the manufacturer !

6. Appendix

6. 1 Attachment points

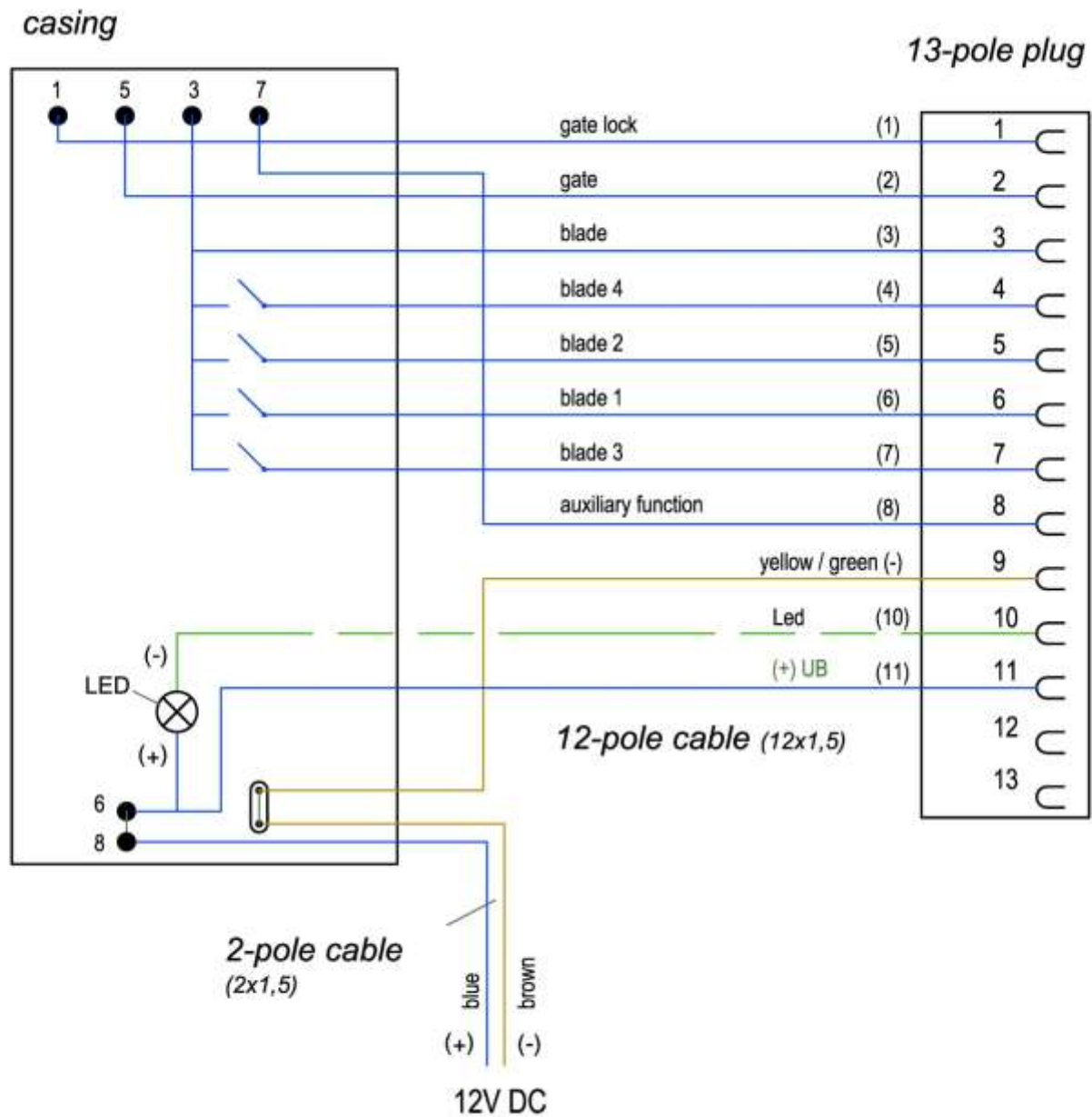


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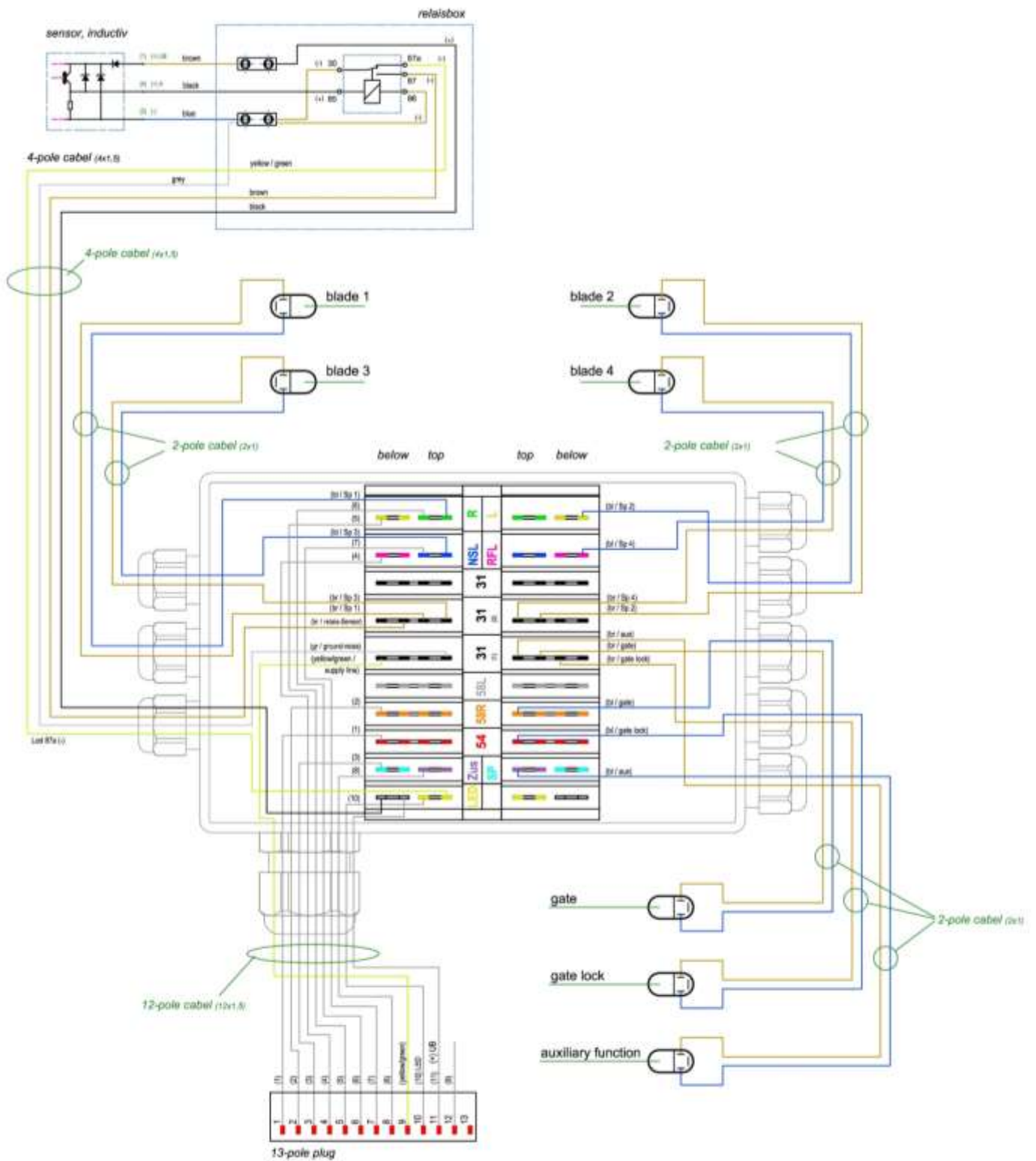
OPTIMAL 1800

ATTACHMENT POINTS

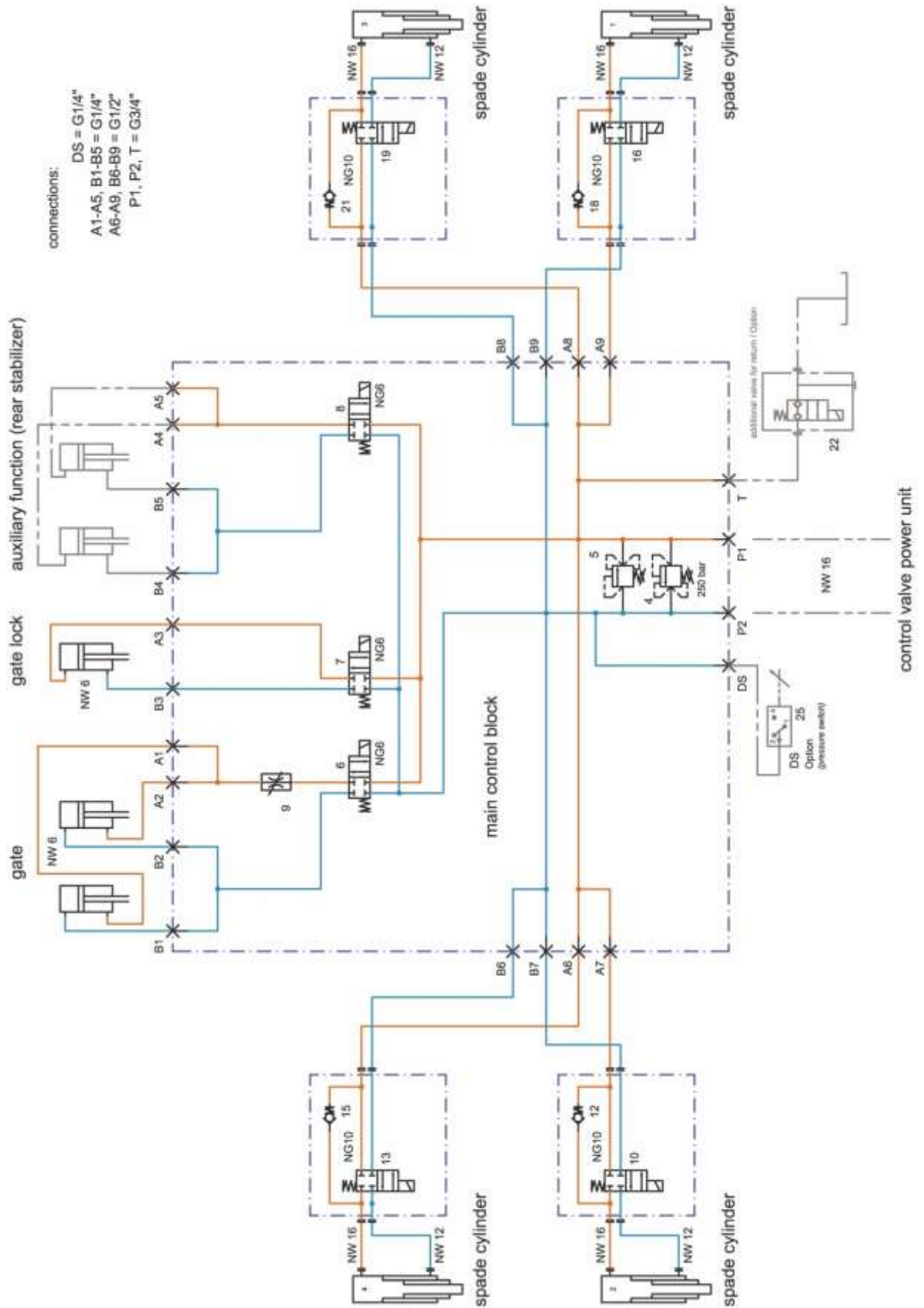
6.2 Wiring Diagram for Control Box



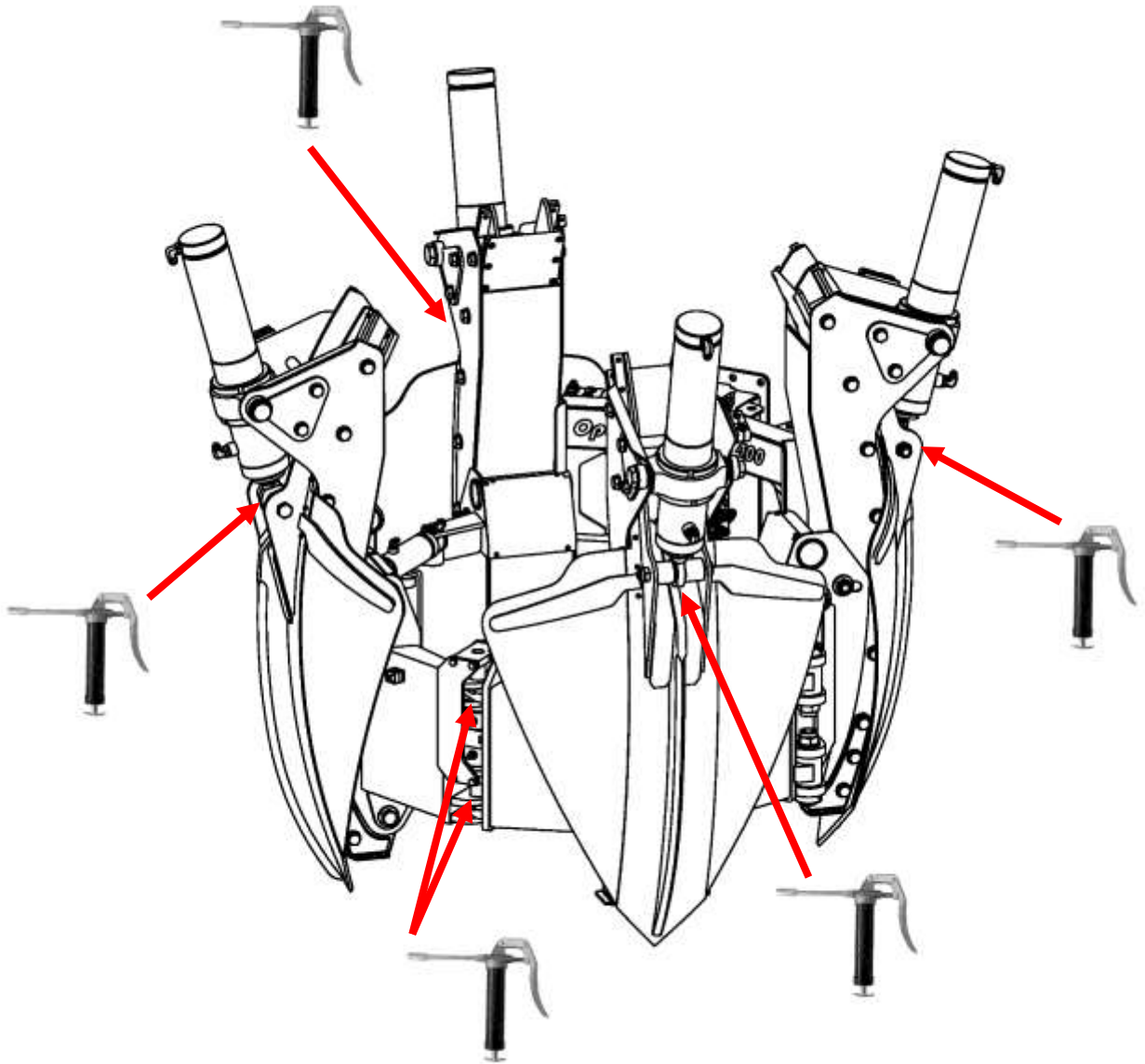
6.3 Wiring Diagram for Control System



6.4 Hydraulic system



6.5 lubrication chart



-- lubricate once per week

Trouble Shooting

1. Nothing moves. (none of the hydraulic functions works)
 - Electricity supply to control box is interrupted. Check fuses at power unit.
 - Hydraulic disconnect is not properly attached. Check attachment.

2. Two hydraulic functions (e.g. gate lock and spades) work at the same time.
 - On one of the valves the plunger does not move.
This defect might be caused by a dirt particle. Disassemble and clean the respective valve.
 - If this does not solve the problem, the valve is damaged and must be replaced.

3. After the blades have been retracted and the valve has been relieved, they immediately move down again.
 - If the spades move down a short way only, the oil supply of the pump might be too high.
Oil flow of power unit must be regulated by service of manufacturer.
 - If the spades move down all the way, the seals in the spade cylinder might be defect und must be replaced.
 - If the spades move down all the way, the spade valve might be defect and must be replaced.

4. The gate does not close and / or lock completely.
 - The adjustment screw at the hinge wants readjustment.
Adjust adjustment screw.
 - The eye joint is worn, bushes must be replaced.

5. Although the gate has been closed and locked properly, the blades do not move down.
 - The safety switch at the lock needs readjustment.
 - The electricity supply is interrupted. Check fuses at power unit.

6. The blades do not close properly although the spade cylinders are fully extended.
 - Guides are worn and must be replaced.
 - Blades are bent and have to be adjusted.

7. One function (any) does not work.
 - The electricity supply is interrupted. Check power circuit.
 - The magnet of the respective control valve is defect. Valve must be replaced.
 - The plunger of the control valve is seized, probably due to a dirt particle in the hydraulic oil. Disassemble valve and clean.



LIMITED WARRANTY

Optimal-Vertrieb Opitz GmbH ("Opitz") warrants that this product will be free from defects in material and workmanship for a period of 6 months from the date of purchase (the "Warranty Period"). If, during the Warranty Period, this product proves to be defective, Opitz will remedy the defect by either repairing or replacing the product or any of its defective parts, at Opitz's option.

If you need warranty service, you must, prior to the lapse of the Warranty Period, file a claim, together with proof of purchase and your original Warranty Certificate received at the purchase of the product, with Fieldworks Nursery Equipment, Grand Bay AL 36541; USA. After a warranty claim is properly filed, Opitz or its designated representative will evaluate the warranty claim. This warranty is conditioned upon your reasonable cooperation with Opitz in the evaluation of your warranty claim and the implementation of any remedy. When supplying replacement product or parts under this warranty, Opitz reserves the right to substitute product or parts of comparable value and design for any discontinued designs. This warranty is not transferable and applies only to the original consumer purchaser.

Opitz does not assume any responsibility for failures, breakage or causes which result from abuse, misuse, negligence, faulty operation, unauthorized repair or alteration, accident, fire, winds, floods, moisture, other unfavorable atmospheric conditions or other causes beyond Opitz's reasonable control or from failure to operate or maintain the product in accordance with the Opitz Operation Manual (a copy of which is provided to you with the product) or from normal wear and tear under normal usage. **OPITZ EXCLUDES AND WILL NOT PAY ANY INCIDENTAL AND CONSEQUENTIAL DAMAGES ARISING OUT OF THE PURCHASE OR USE OF THE PRODUCT.** By this Opitz means any loss, expense or damage other than to the product itself that may result from a defect in the product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

THE DURATION OF ANY IMPLIED WARRANTIES ARE LIMITED TO THE DURATION OF THE COVERAGE PROVIDED BY THIS LIMITED WARRANTY AS INDICATED ABOVE; PROVIDED, HOWEVER, THAT NOTHING IN THIS LIMITED WARRANTY SHALL GIVE YOU ANY IMPLIED WARRANTIES YOU WOULD NOT OTHERWISE HAVE, EXTEND THE SAME BEYOND THEIR CUSTOMARY DURATION, OR MAKE OPITZ LIABLE FOR ANY IMPLIED WARRANTIES THAT IT WOULD NOT BE LIABLE FOR IF THIS LIMITED WARRANTY HAD NOT BEEN GIVEN. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

This warranty shall apply only to product that is purchased and used within the United States. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Date of Sale: Product Sold:

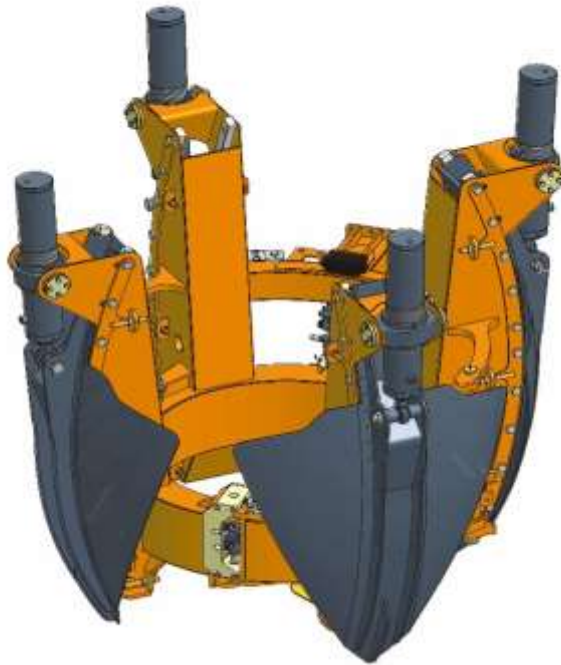
Product Serial Number: Expiration Date of the Warranty:

Name and Address of Buyer:
.....
.....
.....

Signature of Buyer:



SPARE PARTS
ON
TREE SPADE OPTIMAL 1800



Manufacturer:

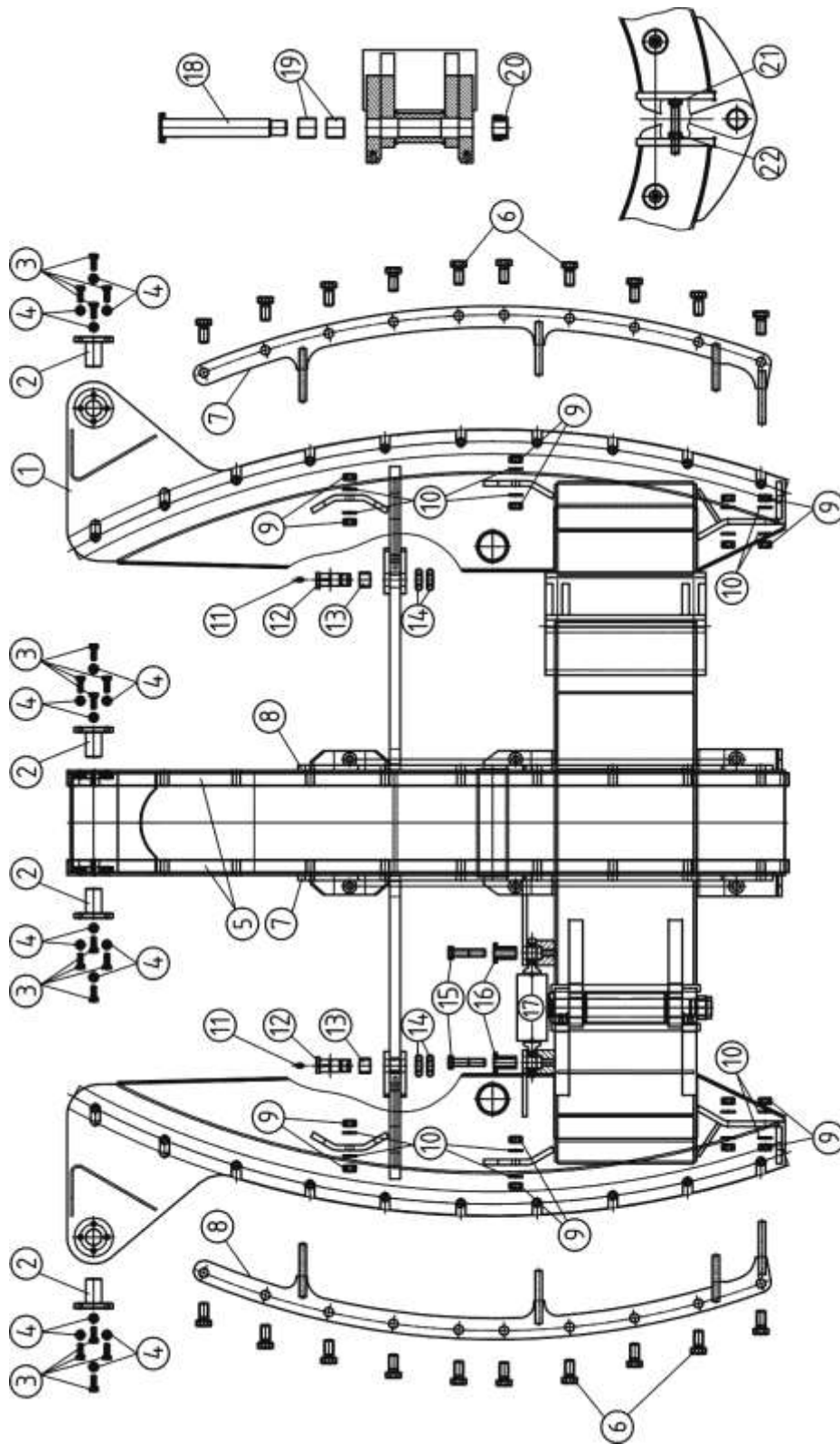
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OPTIMAL-Vertrieb Opitz GmbH
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OPTIMAL 1800

MAIN FRAME

TREE SPADE OPTIMAL 1800 - SPARE PARTS

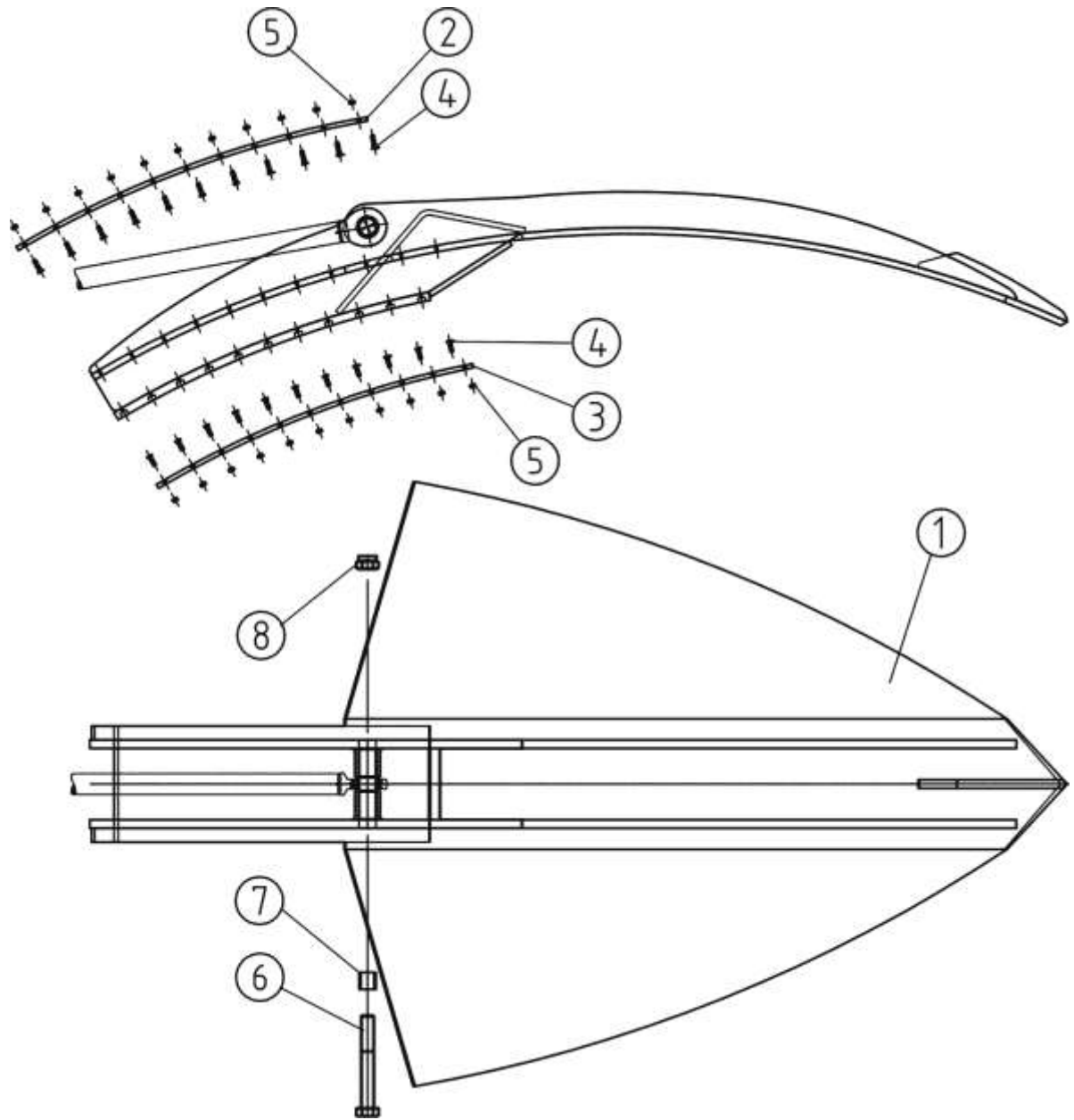
MAIN FRAME


<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
1		digging head frame	318180003
2	8	cylinder suspension pin	30716022
3	32	screw M 12 x 30, DIN 933	50112030933
4	32	spring washer DIN 127	50612
5	8	guide	30617024
6	80	screw M 24 x 50, DIN 933	50124050933
7	4	tensioner, RH	309160811, RE
8	4	tensioner, LH	309160811, LI
9	64	nut M 20, DIN 934	502200934
10	64	washer 20 – DIN125	506920
11	2	grease nipple	59908H1M6
12	2	additional hinge pin	3071900010
13	2	bush	31114155
14	2	castellated nut M 33x1.5	50233150985
15	4	screw M 20 x 80, DIN 931	50120080931
16	4	bush 14138	31114138
17	2	gate cylinder	301021600
18	2	hinge pin	30716025
19	4	bush	544505550
20	2	castellated nut M 42x1.5	50242150985
21	4	screw M 20 x 120, DIN 933	50120120933

TREE SPADE OPTIMAL 1800 - SPARE PARTS

MAIN FRAME

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
22	4	nut M20, DIN 985	502200934

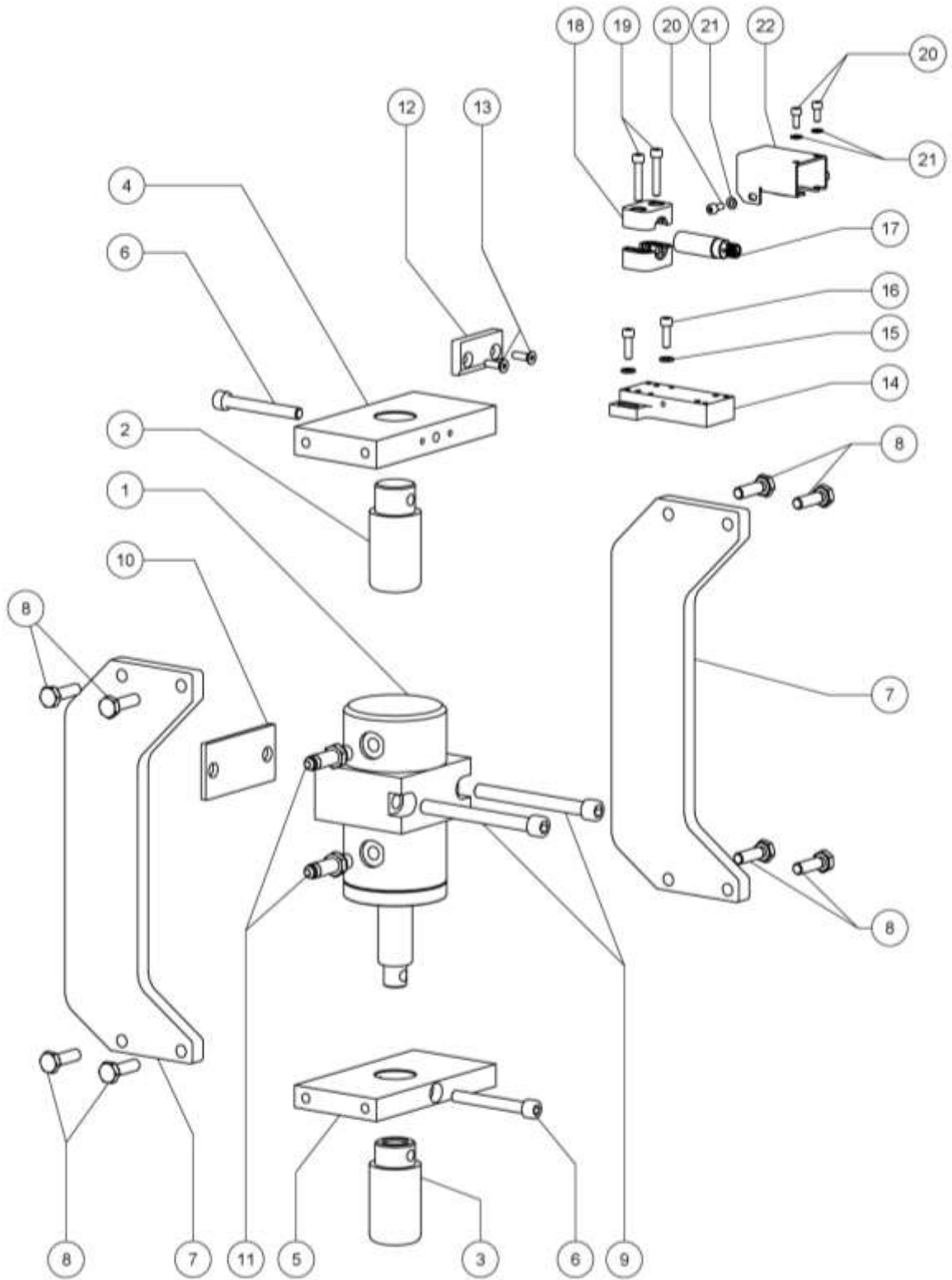



 <p>Optimal</p>	<p>OPTIMAL 1800</p>
<p>OPTIMAL-Vertrieb Opitz GmbH Eysölden M 41 D-91177 Thalmassing</p>	<p>SPADE</p>

TREE SPADE OPTIMAL 1800 - SPARE PARTS

SPADE

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
1	4	blade	316163001
2	8	plastic lining for guide, 920 mm long	30618024001
3	8	plastic lining for guide, 820 mm long	30618024000
4	184	countersunk M 6 x 25, DIN 7991	501060257991
5	184	nut M 6, DIN 9855	502060985
6	4	screw M 30 x 200, DIN 931	50130220931
7	4	bush	311163061
8	4	nut M 30, DIN 985	502300985

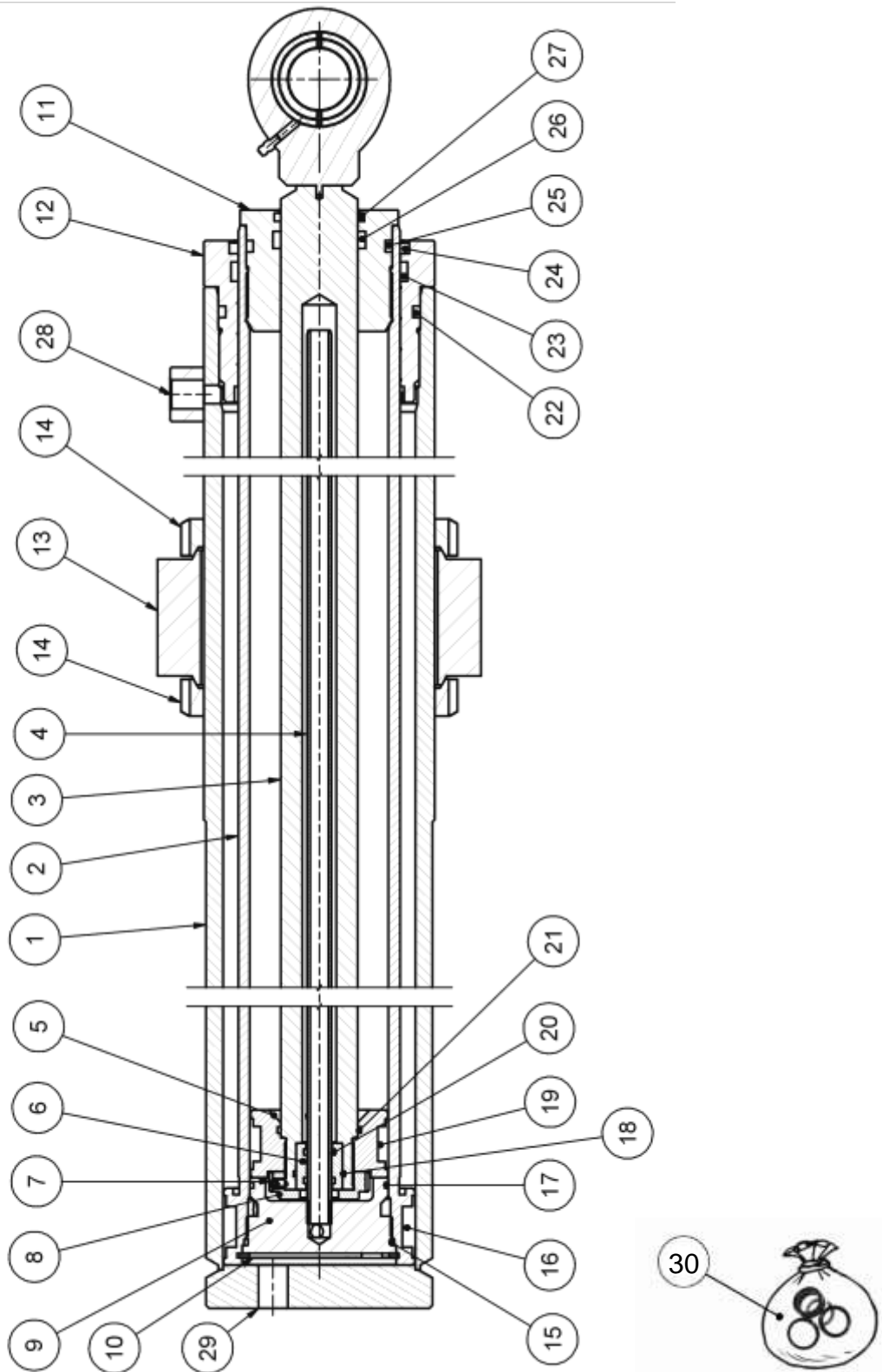



 <p>Optimal</p>	<p>OPTIMAL 1800</p>
<p>OPTIMAL-Vertrieb Opitz GmbH Eysölden M 41 D-91177 Thalmassing</p>	<p>GATE LOCK</p>

TREE SPADE OPTIMAL 1800 - SPARE PARTS

GATE LOCK

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
1	1	gate lock cylinder	3010300120
2	1	lock pin, top	3071700170
3	1	lock pin, bottom	3071700180
4	1	transvers plate, top	3181700110
5	1	transvers plate, bottom	3181700120
6	2	socket head screw M 10 x 80	50110080912
7	2	butt plate	3181700130
8	8	hex head screw M 10 x 30	50110030933
9	2	socket head screw M 12 x 120	50112120912
10	1	spacer	3181700140
11	2	union	515GE6LANG
12	1	plate for sensor	3181800090
13	2	countersunk M 6 x 20	501060207991
14	1	fixing plate	3981700013
15	2	washer 6,4 DIN 125	506906
16	2	socket head screw M 6 x 20	50106020912
17	1	Inductive sensor	5990040228
18	1	pipe clamp	510RAPR-218
19	2	socket head screw M 6 x 35	50106035912
20	4	socket head screw M 5 x 12	50105012912
21	4	washer 5,4 DIN 125	506905
22	1	protection for sensor	5971701550



 <p>OPTIMAL-Vertrieb Opitz GmbH Eysölden M 41 D-91177 Thalmässing</p>	<p>OPTIMAL 1800</p>
	<p>TELESCOPIC SPADE CYLINDER</p>

TREE SPADE OPTIMAL 1800 - SPARE PARTS

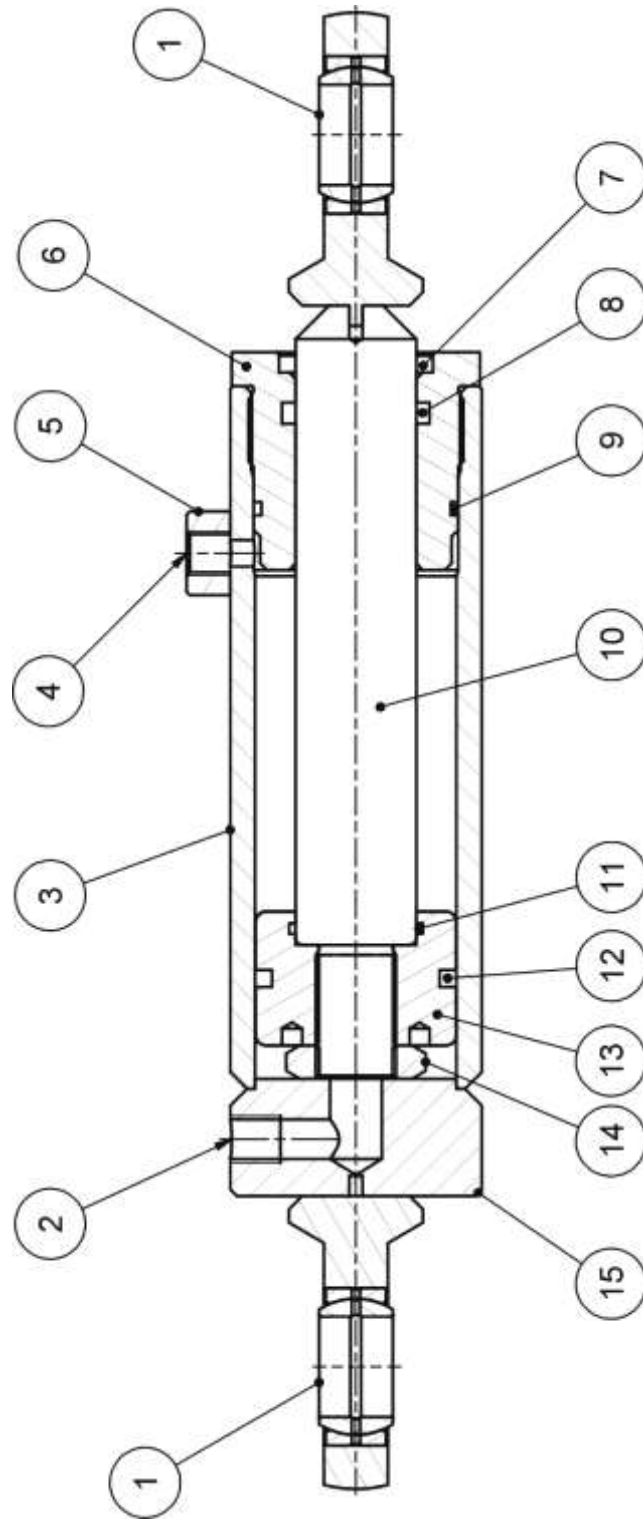
TELESCOPIC SPADE CYLINDER


<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
1	1	cylinder body	302010012
2	1	cylinder body	302010022
3	1	piston rod	3020100322
4	1	cylinder body	302010042
5	1	piston	312012012
6	1	guide bush	31101302
7	1	screw M6x10	50106010914
8	1	slotted nut	3131800010
9	1	cover	30401401
10	1	circlip ring 100 x 3	599021003
11	1	guide bush	311013011
12	1	guide bush	311013001
13	1	cylinder suspension	3091700010
	2	bush	544455040
14	2	slotted nut KM30	31350330
15	1	o-ring 92 x 3	5170920030
16	1	piston seal	51604125108
17	1	o-ring 84 x 3-Ring 84 x 3	5170840030
18	1	o-ring 30 x 2,5	517050030
19	1	piston seal	51604090076
20	2	piston rod seal	51602016206
21	1	o-ring 50 x 3	5170500030

TREE SPADE OPTIMAL 1800 - SPARE PARTS

TELESCOPIC SPADE CYLINDER

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
22	1	o-ring 119,2 x 5,7	5171192057
23	1	rod seal	51602105112
24	1	scraper	51603105
25	1	o-ring 84,2 x 5,7	5170842057
26	1	piston rod seal	516020501
27	1	scraper	5160350
28	1	union	515070391221
29	1	union	515070511621
30		seal kit	5160001611

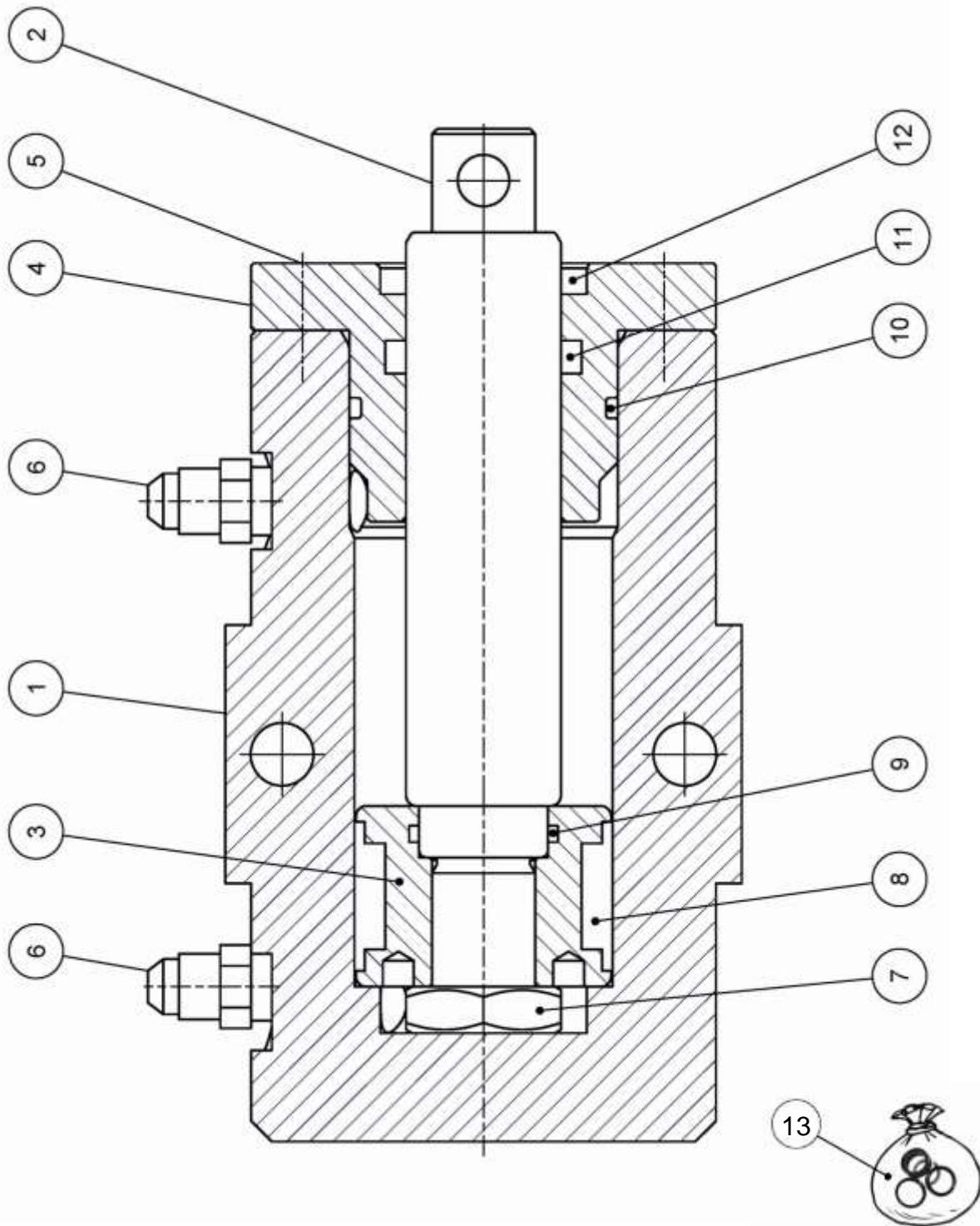



 <p>OPTIMAL-Vertrieb Opitz GmbH Eysölden M 41 D-91177 Thalmässing</p>	<p>OPTIMAL 1800</p>
	<p>GATE CYLINDER</p>

TREE SPADE OPTIMAL 1800 - SPARE PARTS

GATE CYLINDER

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
1	2	eye joint GK 30 – DO	5070300
2	1	union	515021000813
3	1	cylinder body	3026036062
4	1	elbow	515070510813
5	1	hydr. socket G1/4	3135030501
6	1	guide bush	3116036365
7	1	oil scraper	5160336
8	1	rod seal	5160236446
9	1	o-ring 55.2 x 3	5170552030
10	1	piston rod	3036036164
11	1	o-ring 36 x 2.5	5170360025
12	1	piston seal OMK 60	5160160
13	1	piston	3126036240
14	1	nut M 24 x 1.5, DIN 936	50224150936
15	1	cylinder bottom	3046036435
16		seal kit	516006036601

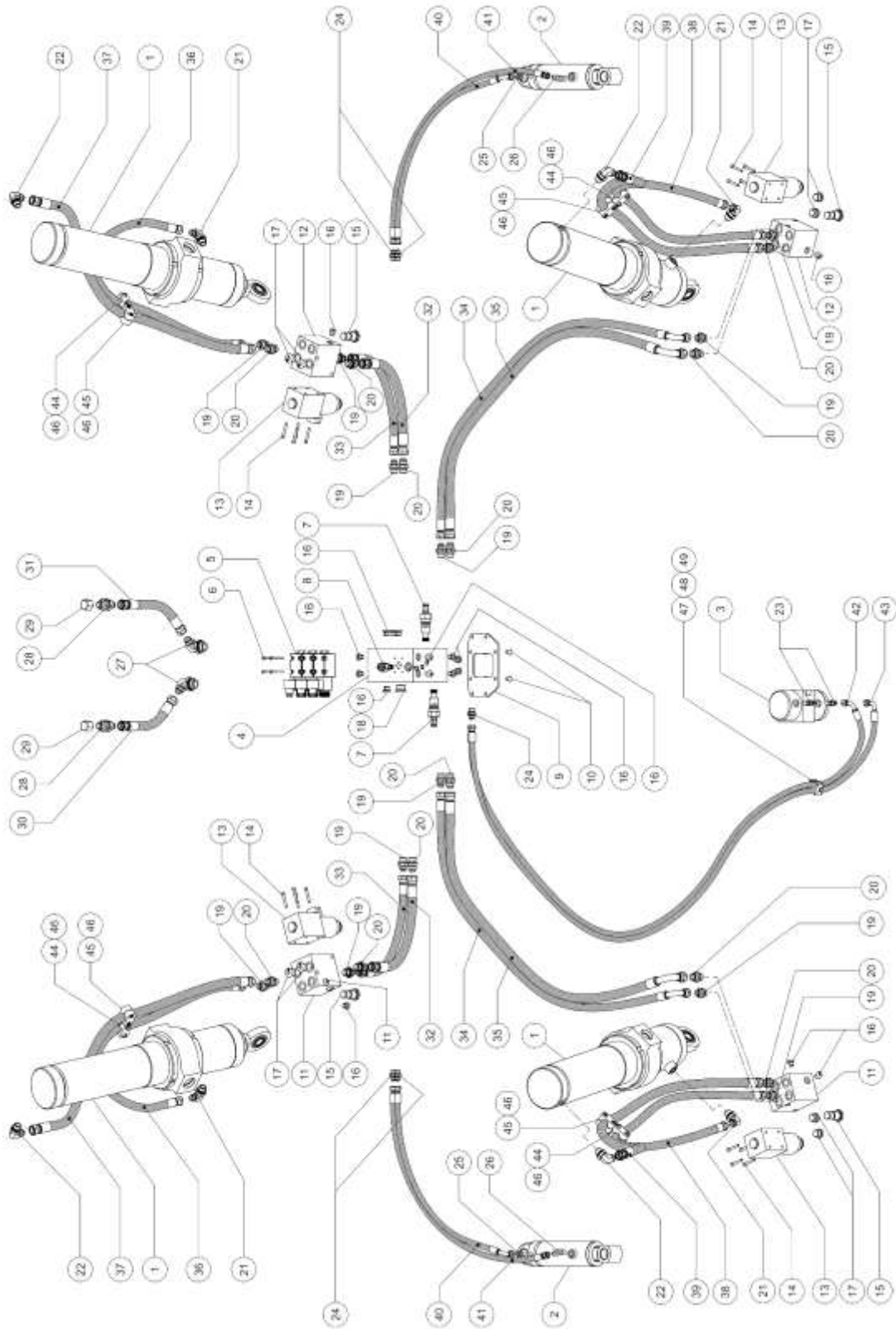



 <p>OPTIMAL-Vertrieb Opitz GmbH Eysölden M 41 D-91177 Thalmässing</p>	<p>OPTIMAL 1800</p>
	<p>GATE LOCK CYLINDER</p>

TREE SPADE OPTIMAL 1800 - SPARE PARTS

GATE LOCK CYLINDER

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
1	1	cylinder body, HZ 50/30	3020500160
2	1	piston rod \varnothing 30 x 175	3030300150
3	1	piston, HZ 50/30	3125030250
4	1	guide bush HZ 50/30	3115030020
5	6	socket head screw M 8 x 20	50108020912
6	2	union	3991410010
7	1	nut M 20 x 1,5	50220150936
8	1	piston seal 5038	51604050038
9	1	o-Ring 25 x 2,5	5170250025
10	1	o-Ring 45,2 x 3	5170452030
11	1	piston rod seal	5160230
12	1	scraper P7 - 30	5160330
13		seal kit	516005030612



 <p>Optimal</p>	<p>OPTIMAL 1800</p>
<p>OPTIMAL-Vertrieb Opitz GmbH Eysölden M 41 D-91177 Thalmassing</p>	<p>HYDRAULIC SYSTEM</p>

TREE SPADE OPTIMAL 1800 - SPARE PARTS

HYDRAULIC SYSTEM

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
1	4	spade cylinder	3010118021
2	2	gate cylinder	301021600
3	1	gate lock cylinder	3010300120
4	1	control block	5471410010
5	3	control valve NG06	547001
6	12	socket head screw M 5 x 50 DIN 912	50105050912
7	2	pressure relief valve	547VSPC150
8	1	flow control valve	547OD21356
9	1	fixing plate	3151410020
10	4	hex bolt M 8 x 16 DIN 7991	501080167991
11	2	control block, LH	5471410030
12	2	control block, RH	5471410020
13	4	control valve NG10	547010
14	16	socket head screw M6 x 40 DIN 912	50106040912
15	4	check valve	547VUCN12A
16	23	plug VSTI ¼"	515VSTI1/4
17	8	plug VSTI ½"	515VSTI1/2
18	1	plug VSTI ¾"	515VSTI3/4
19	12	union	515020231221
20	12	union	515020231621
21	4	elbow, male	515070511221

TREE SPADE OPTIMAL 1800 - SPARE PARTS

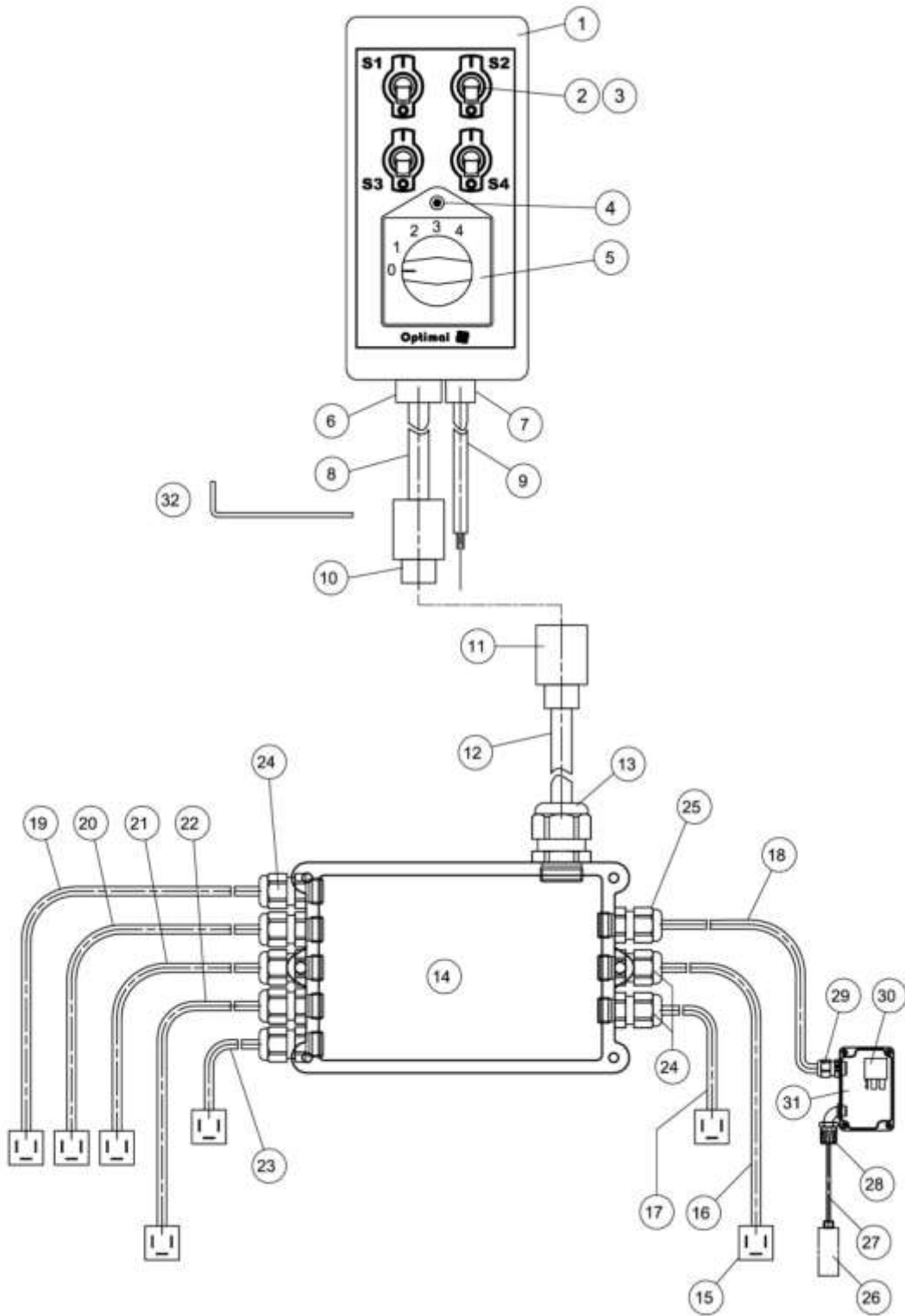
HYDRAULIC SYSTEM


<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
22	4	elbow, male	515070511621
23	2	union	3991410010
24	6	union	515020230813
25	2	union	515021000813
26	2	union	515070510813
27	2	union	515070391626
28	2	union 7/8-14UNF	5150300216
29	2	plug	5150103316
30	1	hydraulic hose NW16, length 15,3"	513162039011
31	1	hydraulic hose NW16, length 16"	513162041011
32	2	hydraulic hose NW12, length 22,4"	513122057011
33	2	hydraulic hose NW16, length 23,2"	513162059011
34	2	hydraulic hose NW12, length 72"	513122183012
35	2	hydraulic hose NW16, length 73"	513162185012
36	2	hydraulic hose NW12, length 51,5"	513122131011
37	2	hydraulic hose NW16, length 55,5"	513162141013
38	2	hydraulic hose NW12, length 53,5"	513122136011
39	2	hydraulic hose NW16, length 57"	513162145013
40	2	hydraulic hose NW6, length 41,3"	513062105013
41	2	hydraulic hose NW6, length 47,6"	513062121011
42	1	hydraulic hose NW6, length 102,7"	513062261013

TREE SPADE OPTIMAL 1800 - SPARE PARTS

HYDRAULIC SYSTEM

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
43	1	hydraulic hose NW6, length 105"	513062267013
44	4	pipe clamp	510RAPR-320
45	4	pipe clamp	510RAPR-325
46	16	socket head screw M 6 x 35	50106035912
47	1	pipe clamp DS112/12	510112
48	1	cover plate	5100DP-B1
49	1	bolt M 6 x 35 DIN 931	50106035931



 Optimal OPTIMAL-Vertrieb Opitz GmbH Eysölden M 41 D-91177 Thalmässing	OPTIMAL 1800
	CONTROL BOX

TREE SPADE OPTIMAL 1800 - SPARE PARTS

CONTROL BOX

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
1	1	casing	3981110010
2	4	toggle switch	5470700728
3	4	name plate	5470700168
4	1	indicator lamp, 12V	5997149845
5	1	rotary switch 0,1,2,3,4	5470A242600E
6	1	straight cable fitting M20x1,5	5997527727
7	1	straight cable fitting M12x1,5	5997527701
8	1	cable 12x1,5 – 560cm (220,5")	5121215
9	1	cable 2x1,5 – 170cm (67")	5122015
10	1	13-pole socket	5998JB005949
11	1	13-pole plug	5998JA005951
12	1	cable 12x1,5 – 250cm (98")	5121215
13	1	straight cable fitting M20x1,5	5997527727
14	1	distributor box	3981410010
15	7	standard plug	54743650
16	1	cable 2x1 – 102" – blade 1	5122010
17	1	cable 2x1 – 25" – blade 3	5122010
18	1	cable 4x1,5 – 79" – sensor	5124015
19	1	cable 2x1 – 23" – optional function	5122010
20	1	cable 2x1 – 23" – gate lock	5122010
21	1	cable 2x1 – 25" – gate	5122010

TREE SPADE OPTIMAL 1800 - SPARE PARTS

CONTROL BOX

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
22	1	cable 2x1 – 102“ – blade 2	5122010
23	1	cable 2x1 – 25“ – blade 4	5122010
24	7	straight cable fitting M12x1,5	5997527702
25	1	straight cable fitting M16x1,5	5997527714
26	1	sensor	5990040754
27	1	sensor – cable, 4-pole	5990040300
28	1	cable fitting, M12 x 1,5	5997499110
29	1	cable fitting, M16 x 1,5	5997527713
30	1	relais	5994RD3520
31	1	relais box PK 102	5990038103
32	1	bracket for 13-pole socket.	3159990010