



M A N U A L

O N

TREE SPADE OPTIMAL P 650

657031-



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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.

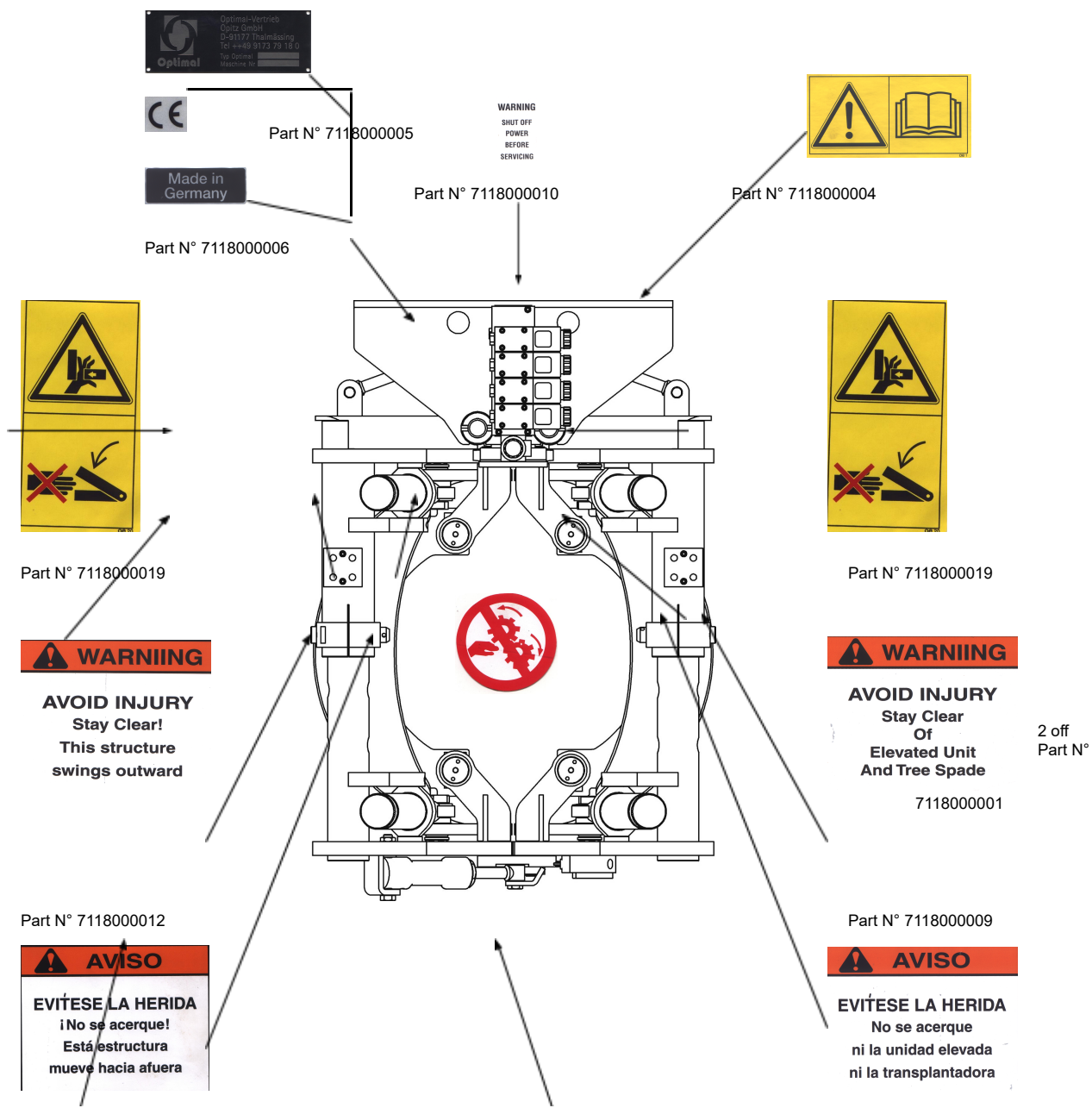


When doing cleaning, maintenance or repair work, lower the tree spade to the ground and stop the engine of the power unit.



- ⚠ 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 3. Fix the stickers on the locations marked on page 3.

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Part N° 7118000020



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

Part N° 7118000015

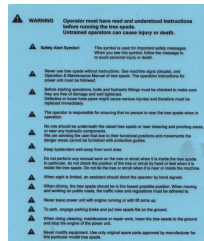


MOVING MACHINERY
KEEP HANDS AND
FEET CLEAR

Part N° 7118000014



Part N° 7118000007



Part N° 7118000018

Part N° 7118000016



KEEP AWAY
FROM SWING AREA
WHEN IN OPERATION

Part N° 7118000008



WATCH YOUR
HANDS AND
FINGERS

Part N° 7118000013

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1. Operating Specifications

Description of machine Tree Spade OPTIMAL P 650

serial number 657

		<u>P 650</u>	<u>P550</u>	<u>P450</u>
capacity 17"	upper root ball diameter	65 cm / 26"	55 cm / 21"	45 cm /
	root ball depth	32 cm / 13"	28 cm / 11"	23 cm / 9"
dimensions of basic machine 29" 20"	working height	66 cm / 26"	65 cm / 26"	64 cm / 25"
	working width, gate closed	73 cm / 29"	73 cm / 29"	73 cm /
	working width, gate open	142 cm / 56"	132 cm / 52"	122 cm / 48"
	clearance between open gate	71 cm / 28"	61 cm / 24"	52 cm /
weight	basic machine only	298 kg / 656 lbs		
		289 kg / 636 lbs		

spades	281 kg / 618 lbs	
	two serrated and overlapping scoop blades	
	interchangeable, for root ball diameters 65 cm / 26", or 55 cm/ 21" or 45 cm/ 17", as detailed above	
rated type of attachment	attachment by means of back plate to loader or excavator	
	minimum tipping load of power unit	800 kg / 1760 lbs
	the power unit must be equipped with an auxiliary double-acting hydraulic circuit for implements:	
	working pressure	140 – 180 bar / 2000 – 2600 psi
	oil flow	40 l/min / 11 GPM
controls	electro-hydraulic valves, double-acting, for five functions actuated by rotary switch	
field of application	tree nurseries, tree farms, gardens	

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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 18.
At these attachment points the tree spade is bolted tightly to the back plate.

2.2 Installation of Electro-Hydraulic Control

- 2.2.1 Install rotary switch at suitable and dry location in the power unit, e.g. on the instrument panel.
- 2.2.2 Install 7-pole electric socket next to hydraulic disconnect of auxiliary hydraulic circuit at the power unit.
- 2.2.3 The blue wire should be connected to 12 VDC, the brown wire to the ground. It is best if the blue wire is connected to a power source that is only available when the ignition switch is on, to avoid inadvertently leaving power on the tree spade.

2.3 Changing of Spades

Please refer to section 5.5, pages 11, 12 and 13.

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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.

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

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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.

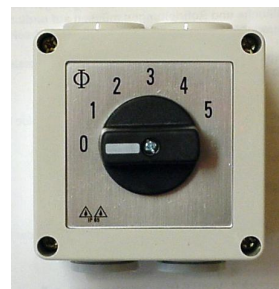
When sight is limited, an assistant should direct the operator by hand signals.

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 The Controls

The electro-hydraulic controls are to be operated as follows:

<u>Rotary Switch</u>	<u>Control Valve</u>	<u>Work Movement (actuated by Manual Lever or Pedal)</u>
function 1:	gate lock	unlock / lock
function 2:	gate	open / close
function 3:	blades	up / down
function 4:	scrapers	up / down
spare function 5:	(e.g. stabilizers	up / down)



The function required is preset with the rotary switch and then activated by the manual control valve of the auxiliary hydraulic circuit of the power unit.

With some loaders this valve might be activated by a pedal.

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4.2 Operation

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

Preset function 1 "gate lock" with rotary switch and activate "unlock" with control valve. Then preset function 2 "gate" and activate "open" with control valve.

With the gate open drive towards the tree. When the tree is positioned in the center of the main frame, preset function 2 "gate" and activate "close".
Then preset function 1 "gate lock" and activate "lock".

Locking the frame before starting the digging operation is of utmost importance and must never be omitted !
If the gate is not locked properly, the frame may be bent !

In order to prevent the spades from digging with the gate not being properly locked, the gate lock is furnished with a safety switch. If the spades do not move although the operator followed above instructions, this malfunction is probably caused by a branch or some other object obstructing the movement of the gate lock latch. Remove the obstruction and try again.

After having locked the gate, lower the tree spade to the ground and get it into level position. Again check if the tree is positioned in the center of the frame and correct, if necessary.

If the power unit is furnished with rear stabilizers, extend stabilizers prior to digging.

Preset function 3 "blades" and activate "down" with control valve. Now the spade cylinders force the blades into the ground.
Because both spades are activated by one valve at the same time, the blades which encounter the least resistance at any given time will penetrate into the soil first.

When the frame begins to lift when digging, retract blades and then continue digging. Do not rock the tree spade forward and backward with the tilting cylinder of the power unit when the blades are in the ground!

Once all blades have been completely pressed into the soil, preset function 4 and activate "down" to press scrapers to the ground.
Now the tree spade with the planting material is lifted out of the ground by means of the lift arms of the power unit.

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") and retract scrapers (function 4 "scrapers", 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 rotary switch in "off"-position (function 0).

5. Care and Maintenance

5.1. **General**

After the initial 10 working hours, check all bolts and nuts and tighten, if necessary. After that examine and tighten bolts before each operation, whenever necessary.

5.2. **Spade Adjustment**

When the scoops do not close properly, readjust as follows: (see illustration page 14)

1. Slacken counter nut.
2. Extend cylinder rod with help of a wrench until blades close.
3. Tighten counter nut.

5.3. **No Lubrication**

All sliding surfaces are made of plastic and do not require any lubrication.

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.



IMPORTANT:

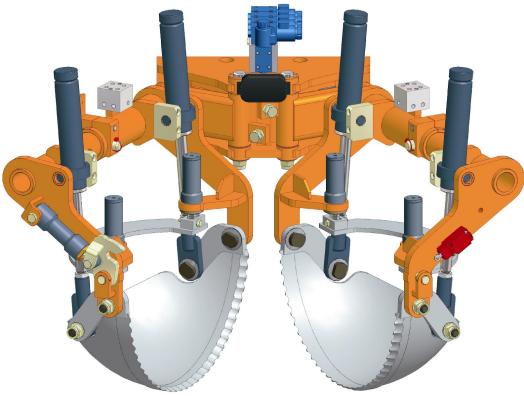
Tree spade must be lowered to the ground and switched off when doing cleaning, maintenance or repair work !

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 !

5.6 Changing of Blades

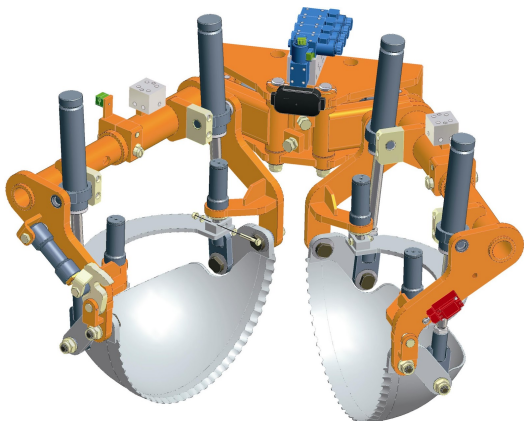


Positioning the Scoop

The tree spade is attached to the loader.

Lift tree spade about 50 cm (20") above the ground and bring it in a level position.

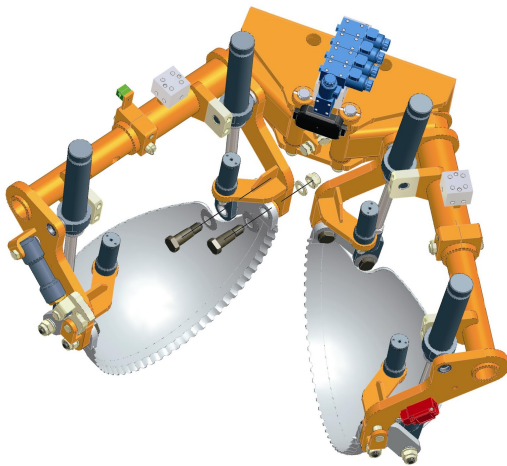
Move blades downwards to bring fastening bolts of blades and scrapers into a conveniently accessible position.



Remove scrapers.

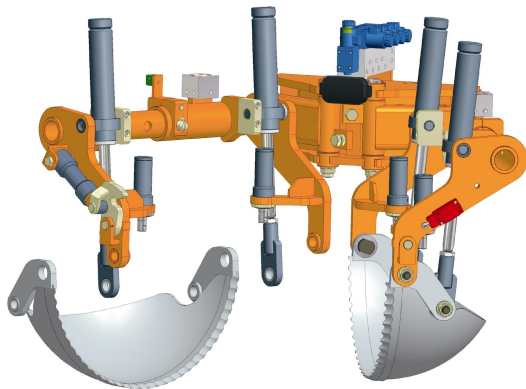
Removal of Scrapers

Unscrew the two fastening bolts of each scraper.

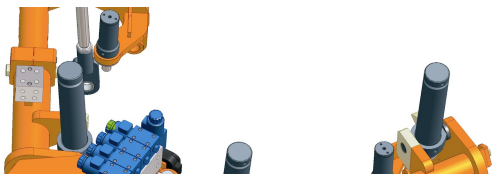


Removal of Blades

First remove tapered pins from piston rods.
Then remove tapered pins from sliding arm
suspension.



Now blades have been dismantled.

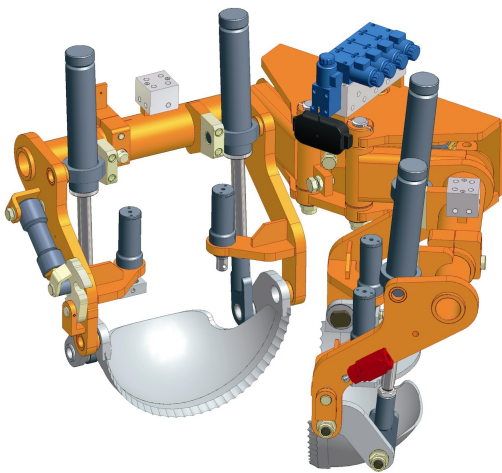


Adjusting Sliding Arms

Remove retention pin (item 48).

Slacken socket head screw (see Spare Parts List, table 1, item 47).
Release locking pin (item 49).

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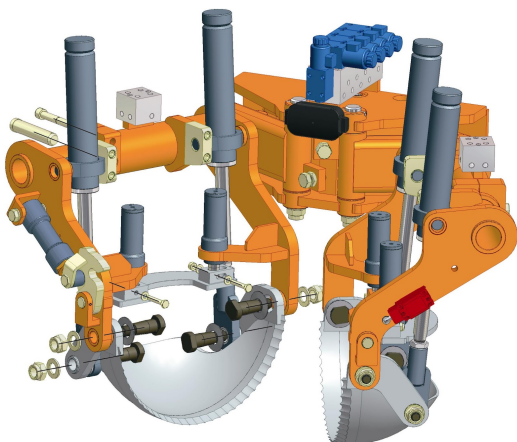


When changing bigger for smaller blades:

Slide guide pipe in until pin holes do agree.

When changing smaller for bigger blades:

Slide guide pipe out until pin holes do agree.
Then secure position with retention pin and locking pin.



Re-Assembling Scoop

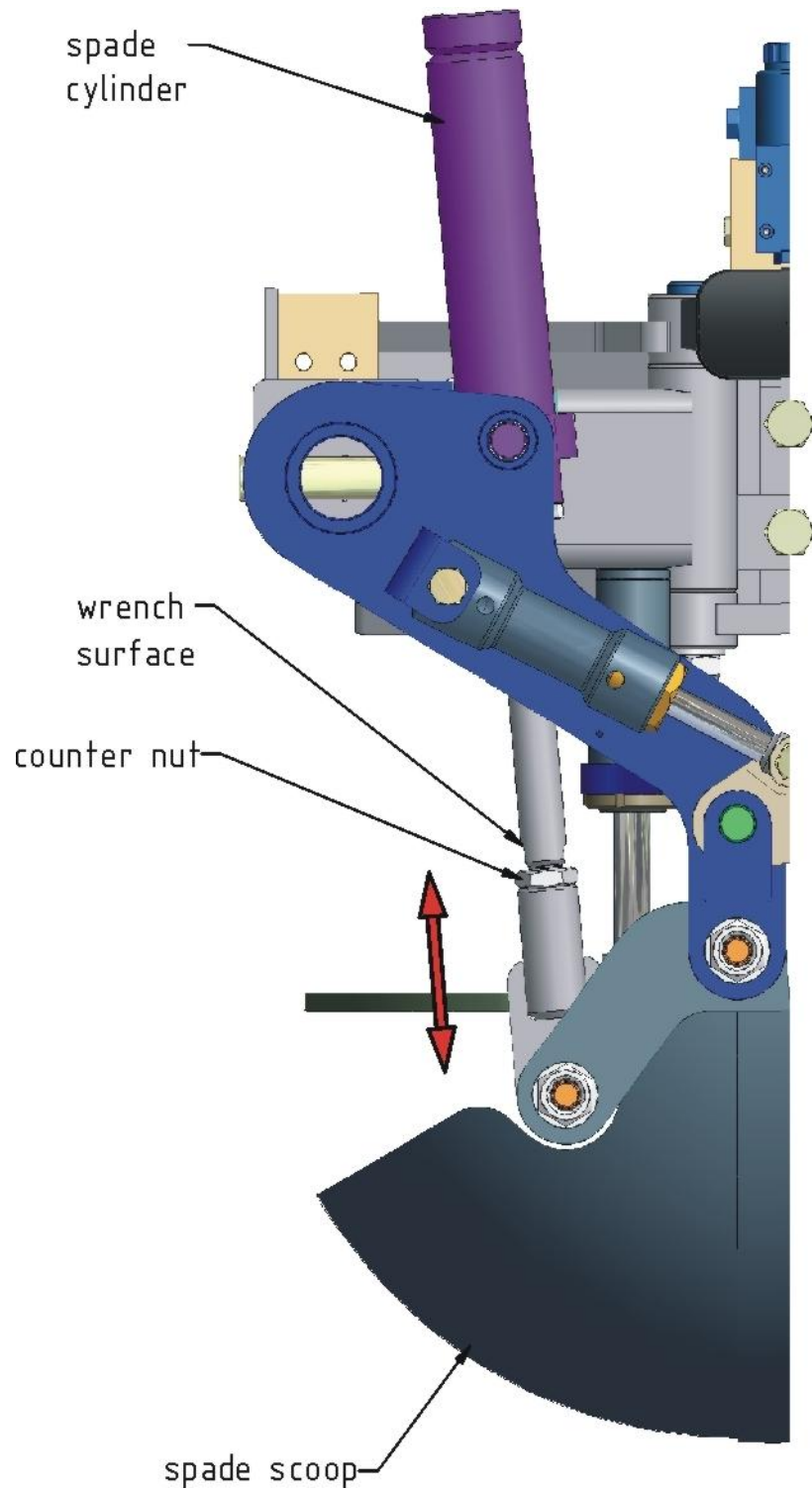
Put blades into position; fasten them to piston rods and sliding arms respectively.

Make sure that blades close properly. If necessary, adjust as shown on page 15.

Make sure that all bolts and screws are tightened properly !

5.7 Adjustment of Spades

-



-
-
-
-

6. Trouble Shooting

1. Nothing moves. (none of the hydraulic functions works)
 - Electricity supply to rotary switch 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.

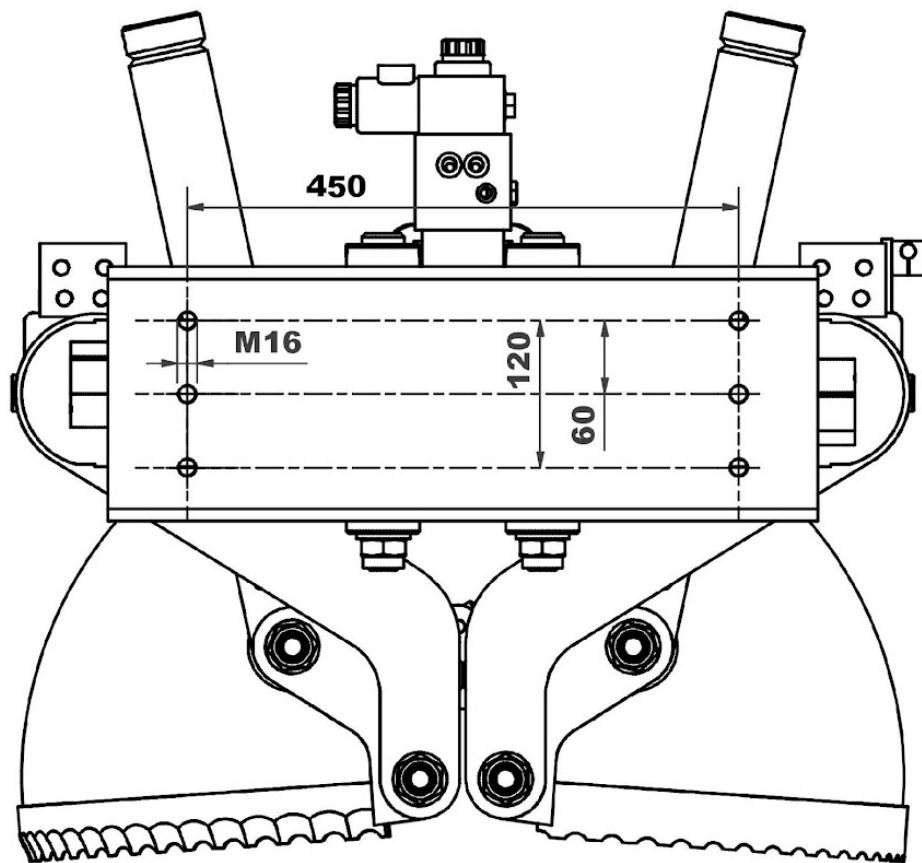
7. One function (any) does not work.
 - The electricity supply is interrupted. Check power circuit.
 - The magnet of the respective control valve is defect. Valve must be replaced.
 - The plunger of the control valve is seized, probably due to a dirt particle in the hydraulic oil. Disassemble valve and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

Trouble Shooting - individual spade control

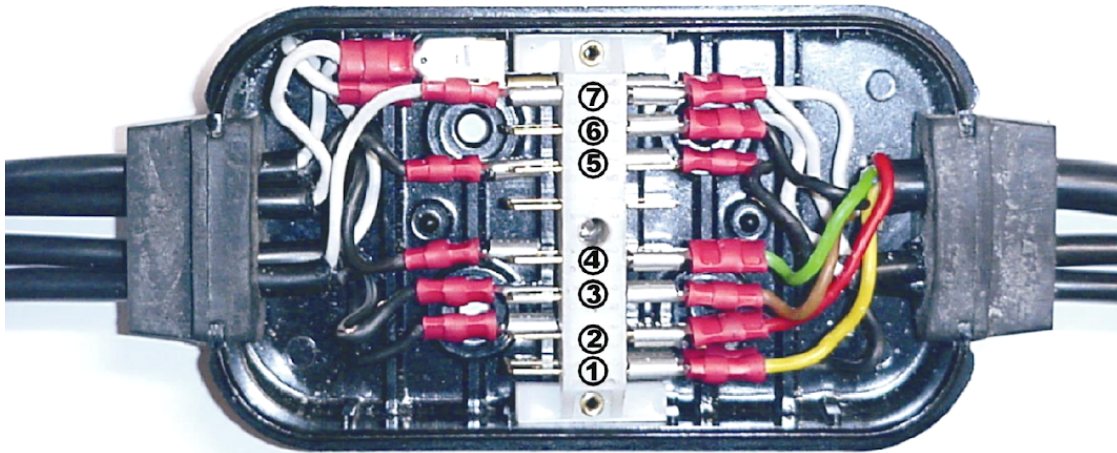
8. The spades cannot be operated individually, i.e. all spades move at the same time.
 - Controls were not switched to individual control. (When working in the individual control mode, the red light must show red.)
 - Circuit board is defect and must be replaced.

9. One of the blades moves even when not actuated.
 - The electricity between valve and blade has been interrupted.
 - Valve of the respective blade is defect. Replace valve.

10. None of the hydraulic functions works.
 - Electricity supply to joy stick is interrupted. Check fuses at power unit.
 - Hydraulic disconnect is not properly attached. Check attachment.
 - Circuit board is defect and must be replaced.



Terminal Box



← to valve

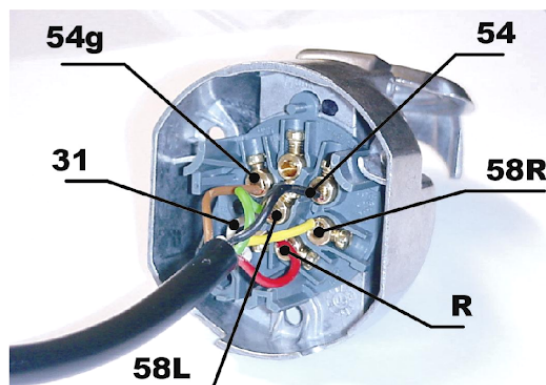
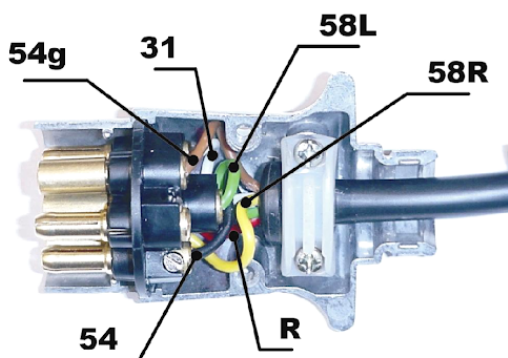
← from 7-pole plug

cable to valve <=> cable from 7-pole plug // function

- 1) black <=> yellow // gate lock
- 2) black <=> red // spare function
- 3) black <=> brown // scrapers
brown)

- 4) black <=> green // gate
- 5) black <=> black of safety switch // spades
- 6) white of safety switch <=> black (next to
brown)

- 7) white <=> white // ground



7-pole plug

7-pole socket

58R

-
54g

yellow // gate lock

-

brown // scrapers

58L

-

green // gate
R

-

red // spare function

54

-

black // spades

31

-

white // ground



SPARE PARTS LIST

ON

TREE SPADE OPTIMAL P 650



Manufacturer:

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Eysoelden M 41
91177 Thalmaessing
Germany**

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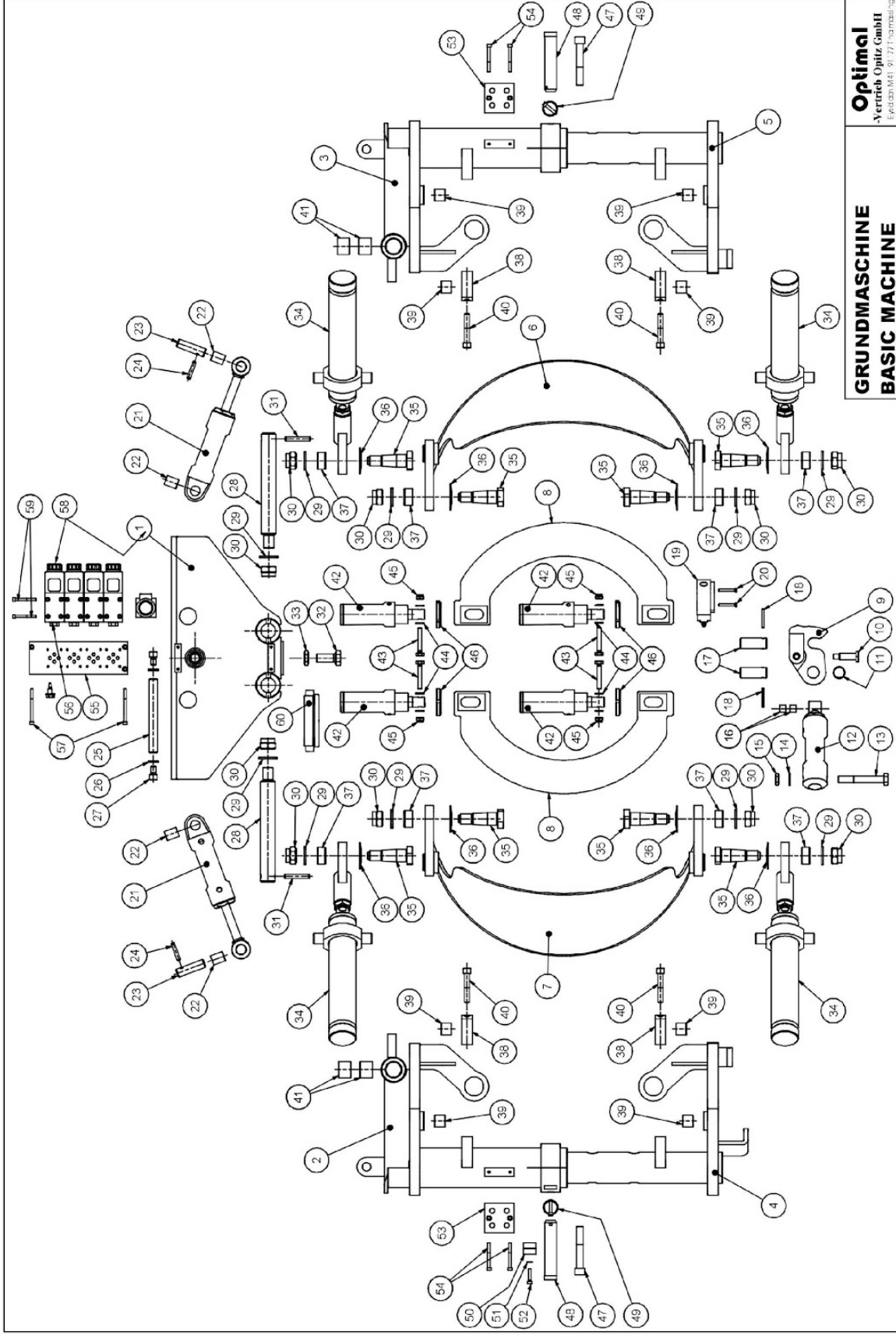
Distributor:

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Ersatzteilliste - Spare Parts List

Tafel - Table 1



Optimal
Verrich Optik GmbH
Egidien-Mal. 91 771 Tormaringen

GRUNDMASCHINE
BASIC MACHINE

Tafel – Table 1**OPTIMAL P 650 - ERSATZTEILLISTE - SPARE PARTS LIST****Grundmaschine – basic machine**

<u>Pos.</u> <u>Item</u>	<u>Menge</u> <u>Quantity</u>	<u>Bezeichnung</u> <u>Description</u>	<u>ET- Nummer</u> <u>Part Number</u>
1	1	Rahmenkasten, geschw main frame	3180657120
2	1	Grundrahmen, re articulating arm, RH	3180657260
3	1	Grundrahmen, li articulating arm, LH	3180657270
4	1	Schieberahmen, re sliding arm, RH	3180657280
5	1	Schieberahmen, li sliding arm, LH	3180657290
6	1	Spaten, re – P650 blade P650, RH	3160657010
7	1	Spaten, li – P650 blade P650, LH	3160657020
8	2	Abstreifer P650 scraper P650	3160657040
9	1	Verriegelungshaken, geschw – P650 latch P650	3180657140
10	1	Ansatzschraube M12 / Ø16 shoulder bolt, M12/16 mm dia.	3140657010
11	1	Lagerbuchse 25/28/20 bush 25/28/20	544252820
12	1	Verriegelungszylinder HZ32/20 gate lock cylinder HZ32/20	3010300041
13	1	6kt. Schraube DIN 931 – M16 x 110 hex. Bolt M16 x 110 – DIN 931	50116110931
14	1	Scheibe DIN 125 – A 17 washer DIN 125 – A 17	506916

Tafel – Table 1

OPTIMAL P 650 - ERSATZTEILLISTE - SPARE PARTS LIST

Grundmaschine – basic machine

<u>Pos.</u> <u>Item</u>	<u>Menge</u> <u>Quantity</u>	<u>Bezeichnung</u> <u>Description</u>	<u>ET- Nummer</u> <u>Part Number</u>
15	1	6kt. Mutter DIN 936 – M16 hex nut M16 – DIN 936	502160936
16	2	Lagerbuchse 16/18/15 bush 16/18/15	544161815
17	2	Verriegelungsbolzen Ø25 lock pin 25 mm dia.	307065780
18	2	Spannhülse – 5 x 45 tapered sleeve – 5 x 45	506705451481
19	1	Sicherheitsschalter safety switch	5990043782
20	2	Zylinderschraube DIN 84 – M5 x 40 slotted hex bolt M5 x 40 – DIN 84	50105040084
21	2	Öffnungszylinder HZ32/20 gate cylinder HZ32/20	3010200040
22	4	Lagerbuchse 20/23/30 bush 20/23/30	544202330
23	2	Bolzen Ø20 f. Öffnungszylinder pin 20 mm dia., for gate cylinder	3070657060
24	2	Spannhülse – 8 x 45 tapered sleeve 8 x 45	506708451481
25	1	Bolzen Ø20 f. Öffnungszylinder pin 20 mm dia., for gate cylinder	3070657050
26	2	Scheibe DIN 125 – A 13 washer A 13 - DIN 125	506913
27	2	Zylinderschraube DIN 912 – M12 x 20 socket head screw M12 x 20 – DIN 912	50112020912

28	4	Scharnierbolzen ø35 hinge pin 35 mm dia.	3070657070
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Tafel – Table 1

OPTIMAL P 650 - ERSATZTEILLISTE - SPARE PARTS LIST

Grundmaschine – basic machine

<u>Pos. Item</u>	<u>Menge Quantity</u>	<u>Bezeichnung Description</u>	<u>ET-Nummer Part Number</u>
29	10	Scheibe DIN 125 – A 25 washer A 25 – DIN 125	506924
30	10	6kt. Mutter DIN 985 – M24 x 1,5 hex nut M24 x 1,5 – DIN 985	50224150985
31	2	Spannhülse – 10 x 60 tapered sleeve 10 x 60	506710060148
32	6	6kt. Schraube DIN 961 – M20 x 45 hex. Bolt M20 x 45 – DIN 961	501201504596
33	2	6kt. Mutter DIN 936 – M20 x 1,5 hex nut M20 x 1,5 – DIN 936	50220150936
34	4	Spatenzylinder HZ 50/30 spade cylinder HZ 50/30	3010100040
35	8	Konusbolzen P657 tapered pin P657	3070657010
36	8	Tellerfeder DIN 2093 A63, 1,8 saucer spring A63, 1,8 – DIN 2093	5046331018
37	4	Einspannbuchse DIN 1498 – 30x40x20 tapered bush 30/40/20 – DIN1498	506304020
38	4	Lagerbock ø28 bearing bracket 28 mm dia.	3180657170
39	8	Lagerbuchse 25/28/25 bush 25/28/25	544252825
40	8	Zylinderschraube DIN 912 – M12 x 70 Socket head screw M12 x 70 – DIN 912	50112070912

41	4	Lagerbuchse 35/39/30 bush 35/39/30	544353930
42	4	Ballenpresszylinder HZ 35/25 scraper cylinder HZ 35/25	3019000040

Tafel – Table 1

OPTIMAL P 650 - ERSATZTEILLISTE - SPARE PARTS LIST

Grundmaschine – basic machine

<u>Pos.</u> <u>Item</u>	<u>Menge</u> <u>Quantity</u>	<u>Bezeichnung</u> <u>Description</u>	<u>ET-Nummer</u> <u>Part Number</u>
43	4	6kt. Schraube DIN 933 – M10 x 60 hex. Bolt M10 x 60 – DIN 933	50110060933
44	8	Scheibe DIN 125 – A 10.5 washer A 10.5 – DIN 125	506910
45	4	6kt. Mutter DIN 985 – M10 hex nut M10 – DIN 985	502100985
46	4	Wellenmutter KM9 – M45 x 1,5 shank nut KM9 – M45 x 1,5	31350309
47	2	Zylinderschraube DIN 912 – M16 x 100 Socket head screw M16 x 100 – DIN 912	50116100912
48	2	Verdrehsicherung ø28 retention pin 28 mm dia.	3070657020
49	2	Klappstecker ø6 locking pin 6 mm dia.	59904060
50	1	Schlauchschelle hose retainer	510112
51	1	Scheibe DIN 125 – A 6.4 washer A 6.4 – DIN 125	506906
52	1	Zylinderschraube DIN 912 – M6 x 30 socket head screw M6 x 30 – DIN 912	50106030912
53	2	Ölverteiler oil manifold	3050657010

54	4	Zylinderschraube DIN 912 – M6 x 6050106060912 socket head screw M6 x 60 – DIN 912	
55	1	Steuerblock 5-fach control block for 5 functions	5470657010
56	1	Ventilschraube M10 mit Mutter oil flow adjuster M10 with nut	515179832

Tafel – Table 1

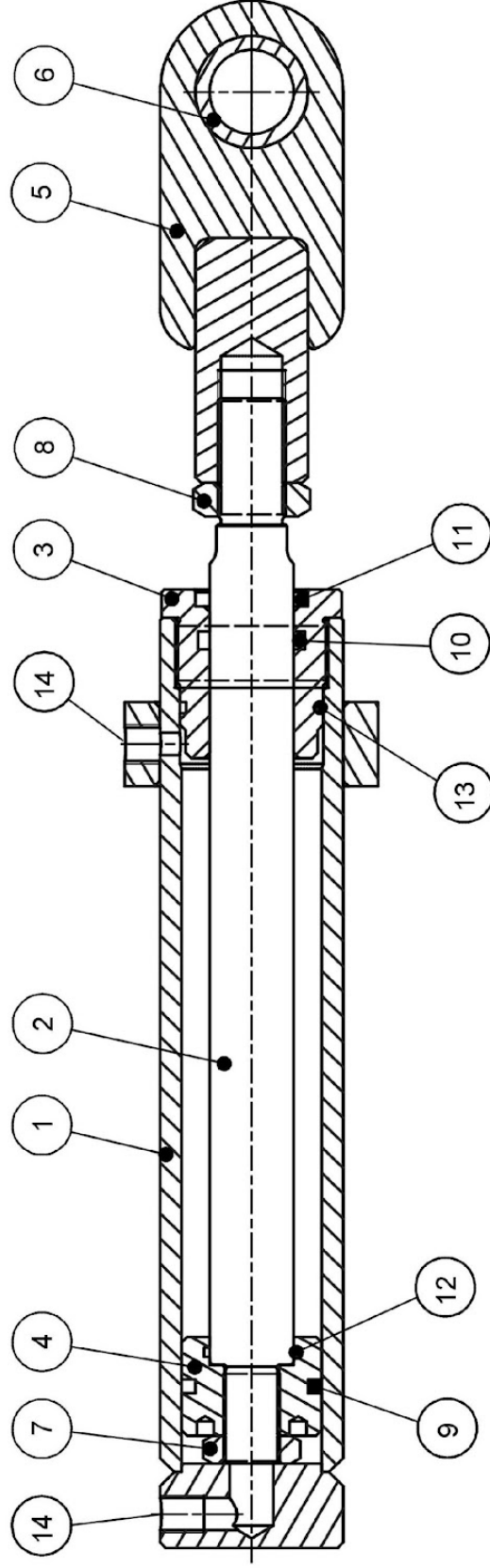
OPTIMAL P 650 - ERSATZTEILLISTE - SPARE PARTS LIST

Grundmaschine – basic machine

<u>Pos.</u> <u>Item</u>	<u>Menge</u> <u>Quantity</u>	<u>Bezeichnung</u> <u>Description</u>	<u>ET-Nummer</u> <u>Part Number</u>
57	3	Zylinderschraube DIN 912 – M6 x 8050106080912 socket head screw M6 x 80 – DIN 912	
58	5	Einzelventil NG6 el. hydr. valve NG6	547001
59	20	Zylinderschraube DIN 912 – M5 x 5050105050912 socket head screw M5 x 50 – DIN 912	
60	1	Verteilerdose, klein distributor box, small	5998KV002142

Ersatzteilliste - Spare Parts List

Tafel - Table 2



Optimal
Avertrick Optics GmbH
14195 Berlin, Germany

SPATENZYLINDER
SPADE CYLINDER

Tafel – Table 2**OPTIMAL P 650 - ERSATZTEILLISTE - SPARE PARTS LIST****Spatenzylinder – spade cylinder**

<u>Pos. Item</u>	<u>Menge Quantity</u>	<u>Bezeichnung Description</u>	<u>ET-Nummer Part Number</u>
1	1	Zylinderrohr, geschw. HZ50/30 cylinder body, HZ50/30	3020500090
2	1	Kolbenstange ø30 x 379 piston rod, 30 mm dia. x 379 mm	3030300090
3	1	Führungsbüchse 50 30 360 guide bush 50 30 360	3115030360
4	1	Kolben 50 30 235 piston 50 30 235	3125030235
5	1	Gelenkauge ø30, geschw. eye joint 30 mm dia.	3070657040
6	1	Einspannbuchse 30 x 40 x 20 DIN 14 tapered bush 30 x 40 x 20 mm, DIN 14	506304020
7	1	Mutter M 20 x 1,5, 8.8 vz. DIN nut M 20 x 1.5, 8.8 DIN, galvanized	50220150936
8	1	Mutter M 24 x 1,5, 8.8 vz. DIN nut M 20 x 1.5, 8.8 DIN, galvanized	50224150936
9	1	Kolbendichtsatz OMK 50 seal kit for piston OMK 50	5160150
10	1	Stangendichtung S 8 – 30 (blau) piston rod seal S 8 – 30 (blue)	5160230
11	1	Abstreifer P7 – 30 (W4-30) scraper P7 – 30 (W4-30)	5160330
12	1	O-Ring 30 x 2,5 70 Shore O-ring 30 x 2.5, 780 Shore	5170300025
13	1	O-Ring 45,2 x 3 90 Shore O-ring 45.2 x 3, 90 Shore	5170452030
14	2	Verschraubung 107051-08-13 union 107051-08-13	515070510813

1	Dichtsatz, komplett seal kit, complete	516005030601
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Tafel – Table 3

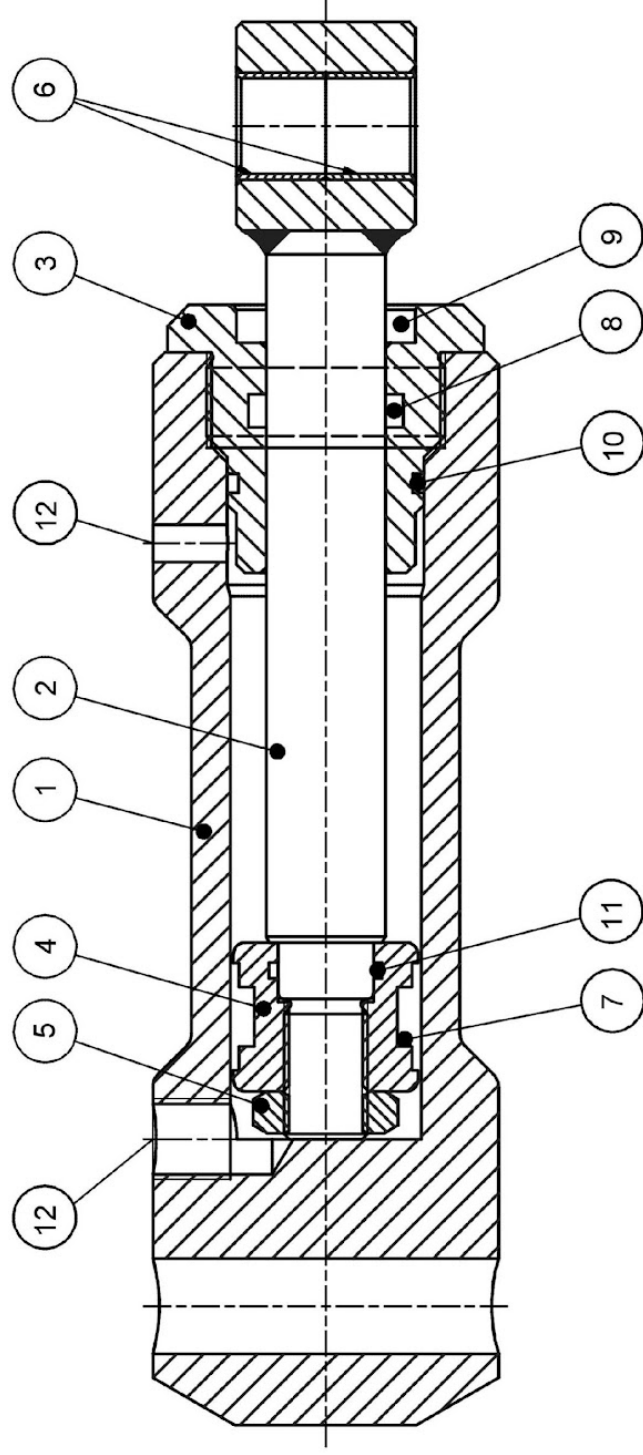
OPTIMAL P 650 - ERSATZTEILLISTE - SPARE PARTS LIST

Öffnungszylinder – gate cylinder

<u>Pos.</u> <u>Item</u>	<u>Menge</u> <u>Quantity</u>	<u>Bezeichnung</u> <u>Description</u>	<u>ET-Nummer</u> <u>Part Number</u>
1	1	Zylinderrohr f. Öffnungszyl. 8 cylinder body for gate cylinder 8	3020320020
2	1	Kolbenstange Ø20 x 171 piston rod 20 mm dia. x 171 mm	3030200020
3	1	Führungsbuchse, HZ 32/20 guide bush HZ 32/20	3113220010
4	1	Kolben, HZ 32/20 piston HZ 32/20	3123220010
5	1	Mutter M 14 x 1,5 vz. DIN 936 nut M 14 x 1.5 DIN 936, galvanized	50214150936
6	2	Lagerbuchse GSM-2023-30 bush GSM-2023-30	544202330
7	1	Kolbendichtsatz TPM 32 x 24 seal kit for piston, TPM 32 x 24	5160132
8	1	Stangendichtung T7 20 x 26 piston rod seal T7 20 x 26	5160220
9	1	Abstreifer W4 – 20 x 30 scraper W\$ - 20 x 30	5160320
10	1	O-Ring 28 x 2,5 90 Shore O-ring 28 x 2.5 90 Shore	5170280025
11	1	O-Ring 16 x 2 90 Shore O-ring 16 x 2 90 Shore	5170160020
12	2	Verschraubung 107051-08-13 union 107051-08-13	515070510813
	1	Dichtsatz, komplett seal kit, complete	516003220601

Ersatzteilliste - Spare Parts List

Tafel - Table 4



VERRIEGELUNGSSZYL.
GATE LOCK CYLINDER

Optimal
 Avertice Optica GmbH
 Industriestraße 10
 42699 Solingen

Tafel – Table 4

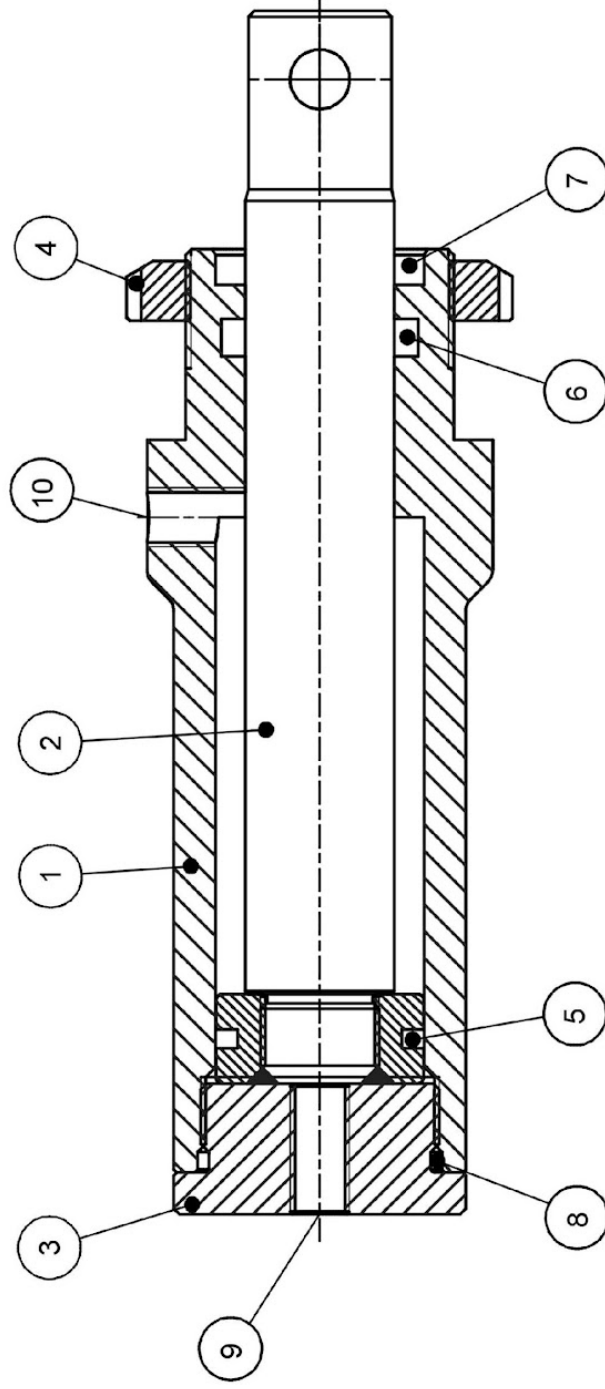
OPTIMAL P 650 - ERSATZTEILLISTE - SPARE PARTS LIST

Verriegelungszyylinder – gate lock cylinder

<u>Pos. Item</u>	<u>Menge Quantity</u>	<u>Bezeichnung Description</u>	<u>ET-Nummer Part Number</u>
1	1	Zylinderrohr f. Verriegelungszyl. 8 cylinder body for gate lock cylinder	3020320011
2	1	Kolbenstange ø20 x 152.5 piston rod 20 mm dia. x 152.5	3030200010
3	1	Führungsbuchse, HZ 32/20 guide bush HZ 32/20	3113220010
4	1	Kolben, HZ 32/20 piston HZ 32/20	3123220010
5	1	Mutter M 14 x 1,5 vz. DIN 936 nut M 14 x 1.5 DIN 936, galvanized	50214150936
6	2	Lagerbuchse GSM-1618-15 bush GSM-1618-15	544161815
7	1	Kolbendichtsatz TPM 32 x 24 seal kit for piston TPM 32 x 24	5160132
8	1	Stangendichtung T7 20 x 26 piston rod seal T7 20 x 26	5160220
9	1	Abstreifer W4 – 20 x 30 scraper W4 – 20 x 30	5160320
10	1	O-Ring 28 x 2,5 90 Shore O-ring 28 x 2.5 90 Shore	5170280025
11	1	O-Ring 16 x 2 90 Shore O-ring 16 x 2 90 Shore	5170160020
12	2	Verschraubung 102100-08-13 union 102100-08-13	515021000813
	1	Dichtsatz, komplett seal kit, complete	516003220601

Ersatzteilliste - Spare Parts List

Tafel - Table 5



P 650

**BALLENPRESSZYL.
ROOT BALL PAD CYL.**

Optimal
-Vertrieb Opitz GmbH
Eysiedler M-41 91 77* no missing

Tafel – Table 5

OPTIMAL P 650 - ERSATZTEILLISTE - SPARE PARTS LIST

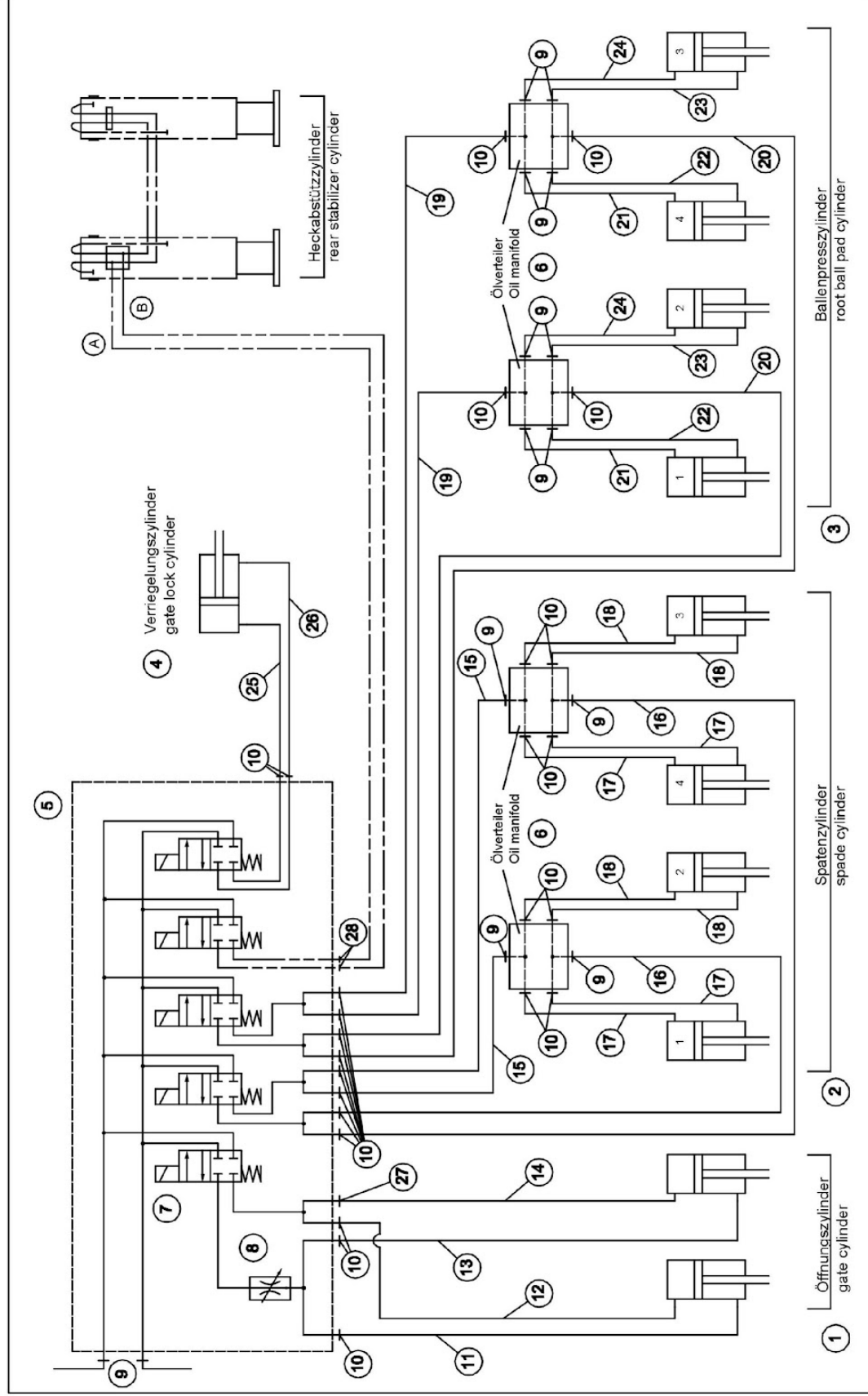
Ballenpresszylinder – scraper cylinder

<u>Pos.</u> <u>Item</u>	<u>Menge</u> <u>Quantity</u>	<u>Bezeichnung</u> <u>Description</u>	<u>ET-Nummer</u> <u>Part Number</u>
1	1	Zylinderrohr f. Ballenpresszyl cylinder body for scraper cylinder	3020350010
2	1	Kolbenstange Ø25 x 180, gesch piston rod 25 mm dia. x 180 mm	3030250040
3	1	Bodendeckel, HZ 35/25 bottom cover HZ 35/25	3040350010
4		Wellenmutter KM9 shank nut KM9	31350309
5	1	Kolbendichtsatz NPS – 035 -PB seal kit for piston NPS – 035-PB	5160135
6	1	Stangendichtung S 8 – 25 (blau) piston rod seal S 8 – 25 (blue)	5160225
7	1	Abstreifer P7 – 25 (W4-25) scraper P7 – 25 (W4-25)	5160325
8	1	O-Ring 36 x 2,5 70 Shore O-ring 36 x 2.5 70 Shore	5170360025
	1	Dichtsatz, komplett seal kit, complete	516003525601

Ersatzteilliste - Spare Parts List

Tafel - Table

6



Optimal
HYDRAULIKSYSTEM
HYDRAULIC SYSTEM

Tafel – Table 6

OPTIMAL P650 - ERSATZTEILLISTE - SPARE PARTS LIST

Hydrauliksystem – Hydraulic system

<u>Pos.</u> <u>Item</u>	<u>Menge</u> <u>Quantity</u>	<u>Bezeichnung</u> <u>Description</u>	<u>ET-Nummer</u> <u>Part Number</u>
1	2	Öffnungszylinder gate cylinder	3010200040
2	4	Spatenzylinder spade cylinder	3010100040
3	4	Ballenpresszylinder scraper cylinder	3019000040
4	1	Verriegelungszylinder gate lock cylinder	3010300041
5	1	Steuerblock 5-fach valve bank, 5 functions	5470657010
6	2	Ölverteiler oil manifold	3050657010
7	5	Einzelventil NG06 – 12V el. hydr. valve NG06 – 12V	547001
8	1	Ventilschraube M10 m. Mutter oil flow adjuster M10 with nut	515179832
9	14	Verschraubung, 90° elbow union 90°	515070510813
10	27	Verschraubung, gerade straight union	515021000813
11	1	Hydr. Schlauch NW6, 720mm 1x gerade, 1x 45° hydr. hose NW6, length 28 “, c/w one straight crimped fitting and one 45°-crimped fitting	513062072012
12	1	Hydr. Schlauch NW6, 720mm 1x gerade, 1x 45° hydr. hose NW6, length 28 “, c/w one straight crimped fitting and one 45°-crimped fitting	513062072012

Tafel – Table 6

OPTIMAL P650 - ERSATZTEILLISTE - SPARE PARTS LIST

Hydrauliksystem – Hydraulic system

<u>Pos.</u> <u>Item</u>	<u>Menge</u> <u>Quantity</u>	<u>Bezeichnung</u> <u>Description</u>	<u>ET-Nummer</u> <u>Part Number</u>
13	1	Hydr. Schlauch NW6, 820mm 2x gerade hydr. hose NW6, length 32 ¼ “, c/w two straight crimped fitting	513062082011
14	1	Hydr. Schlauch NW6, 600mm 2x gerade hydr. hose NW6, length 23 ½ “, c/w two straight crimped fitting	513062060011
15	2	Hydr. Schlauch NW6, 525mm 2x gerade hydr. hose NW6, length 20 ¾ “, c/w two straight crimped fitting	513062052511
16	2	Hydr. Schlauch NW6, 600mm 2x gerade hydr. hose NW6, length 23½ “, c/w two straight crimped fitting	513062060011
17	4	Hydr. Schlauch NW6, 415mm 2x gerade hydr. hose NW6, length 16 ¼ “, c/w two straight crimped fitting	513062041511
18	4	Hydr. Schlauch NW6, 600mm 1x gerade, 1x 45° hydr. hose NW6, length 23 ½ “, c/w one straight crimped fitting and one 45°-crimped fitting	513062060012
19	2	Hydr. Schlauch NW6, 465mm 2x gerade hydr. hose NW6, length 18 ¼ “, c/w two straight crimped fitting	513062046511
20	2	Hydr. Schlauch NW6, 520mm 2x gerade hydr. hose NW6, length 20 ½ “,	513062052011

c/w two straight crimped fitting

Tafel – Table 6

OPTIMAL P650 - ERSATZTEILLISTE - SPARE PARTS LIST

Hydrauliksystem – Hydraulic system

<u>Pos. Item</u>	<u>Menge Quantity</u>	<u>Bezeichnung Description</u>	<u>ET-Nummer Part Number</u>
21	2	Hydr. Schlauch NW6, 550mm 1x gerade, 1x 45° hydr. hose NW6, length 21 ¾ “, c/w one straight crimped fitting and one 45°-crimped fitting	513062055012
22	2	Hydr. Schlauch NW6, 680mm 2x gerade hydr. hose NW6, length 26 ¾ “, c/w two straight crimped fitting	513062068011
23	2	Hydr. Schlauch NW6, 915mm 2x gerade hydr. hose NW6, length 36“, c/w two straight crimped fitting	513062091511
24	2	Hydr. Schlauch NW6, 810mm 1x gerade, 1x 45° hydr. hose NW6, length 32“, c/w one straight crimped fitting and one 45°-crimped fitting	513062081012
25	1	Hydr. Schlauch NW6, 1265mm 1x gerade, 1x 45° hydr. hose NW6, length 49 ¾ “, c/w one straight crimped fitting and one 45°-crimped fitting	513062126512
26	1	Hydr. Schlauch NW6, 1345mm 1x gerade, 1x 45° hydr. hose NW6, length 73 ¼ “, c/w one straight crimped fitting and one 45°-crimped fitting	513062186012
27	1	Verschraubung, lg., gerade straight union	3990657010

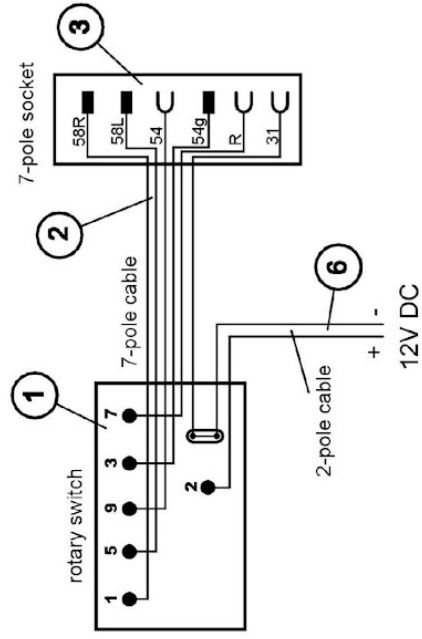
28	2	Verschlußstopfen VSTI ¼ plug VSTI ¼	515 VSTI ¼
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Ersatzteilliste - Spare Parts List

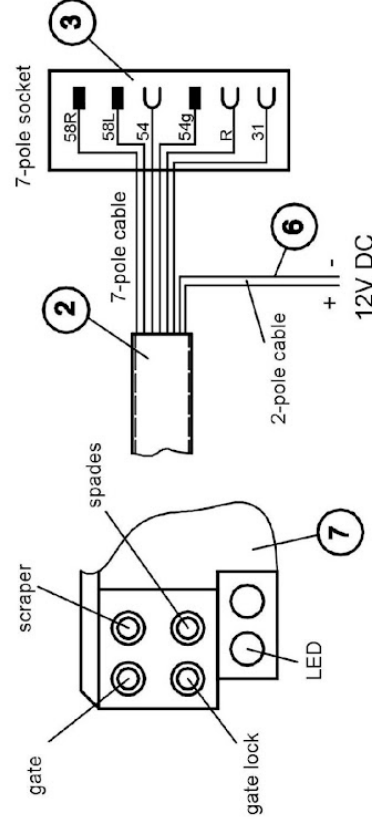
Tafel - Table

7

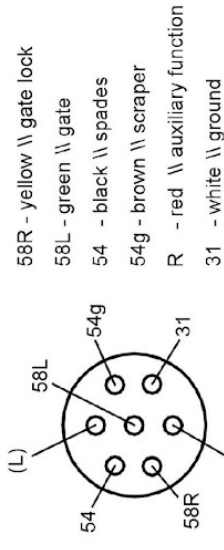
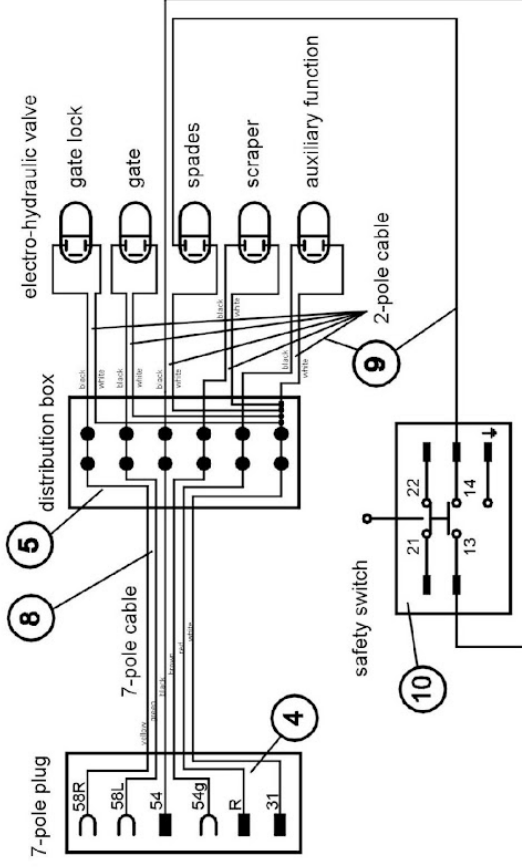
Power Unit



Joystick



Tree Spade



ELEKTRO-ANSCHLUSS
ELECTRICAL SYSTEM

Optimal
-Yantrick Quality Control
-Kontrolle nach ISO 9001

Tafel – Table 7**OPTIMAL P650 - ERSATZTEILLISTE - SPARE PARTS LIST****Elektro-Anschluß – Electrical system**

<u>Pos. Item</u>	<u>Menge Quantity</u>	<u>Bezeichnung Description</u>	<u>ET-Nummer Part Number</u>
1	1	Drehschalter 5-fach rotary switch, 5 functions	547OA243-521
2	5,5 m 18'1"	Kabel 7-polig 7-pole cable	5127010
3	1	Steckdose 7-polig 7-pole socket	5998JB7-Pol
4	1	Stecker 7-polig 7-pole plug	5998JA7-Pol
5	1	Verteilerdose terminal box	5998KV002142
6	1,5 m 4'11"	Kabel 2-polig 2-pole cable	5122010
7	1	Joystick joy stick	560001
8	2 m 6'7"	Kabel 7-polig 7-pole cable	5127010
9	0,32 m 1'1"	Kabel 2-polig f. Verriegelung 2-pole cable for gate lock	5122010
	0,6 m 2'	Kabel 2-polig f. öffnen-schließen 2-pole cable for gate	5122010
	0,6 m 2'	Kabel 2-polig f. Spaten 2-pole cable for spades	5122010
	0,5 m 1'8"	Kabel 2-polig f. Abstreifer 2-pole cable for scraper	5122010
	0,5 m 1'8"	Kabel 2-polig f. Zusatzfunkt. 2-pole cable for spare function	5122010
	1,45 m 4'9"	Kabel 2-polig f. Sicherheitsschalter 2-pole cable for safety switch	5122010

Tafel – Table 7

OPTIMAL P650 - ERSATZTEILLISTE - SPARE PARTS LIST

Elektro-Anschluß – Electrical system

<u>Pos.</u> <u>Item</u>	<u>Menge</u> <u>Quantity</u>	<u>Bezeichnung</u> <u>Description</u>	<u>ET-Nummer</u> <u>Part Number</u>
10	1	Sicherheitsschalter safety switch	5990043782



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OptimalVertrieb 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, 5191 Dawes Rd, 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.

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Date of Sale: Product Sold:

Product Serial Number: Expiration Date of the Warranty:

Name and Address of Buyer:

Signature of Buyer: