



# **M A N U A L**

## **O N**

### **TREE SPADE OPTIMAL 650 o/s**

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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° 7118000001



**KEEP AWAY  
FROM SWING AREA  
WHEN IN OPERATION**

Made in  
Germany

Part N° 7118000008



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

Part N° 7118000015

### 5. Gate Cylinder:



Part N° 7118000007

### 2. Tower:



Part N° 7118000001



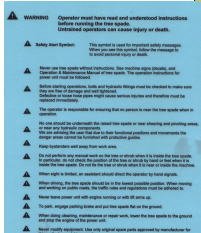
**AVOID INJURY  
Stay Clear!  
This structure  
swings outward**

Part N° 7118000012



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

Part N°



### 7. Frame:



Part N° 7118000004



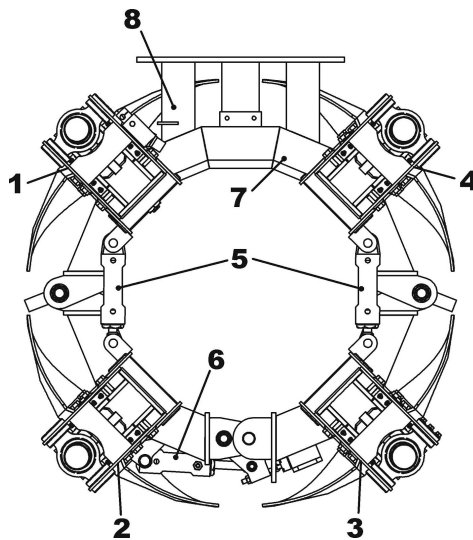
Part N° 7118000005

Part N° 7118000006

### 8. Oil - Manifold:

WARNING  
SHUT OFF  
POWER  
BEFORE  
SERVICING

Part N° 7118000010



### 4. Tower:



Part N° 7118000001



**AVOID INJURY  
Stay Clear  
Of  
Elevated Unit  
And Tree Spade**

Part N° 7118000009



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

Part N° 7118000016

### 5. Gate Cylinder:



Part N° 7118000007

### 3. Tower:



Part N° 7118000001



**MOVING MACHINERY  
KEEP HANDS AND  
FEET CLEAR**

Part N° 7118000014

### 6. Lock Cylinder:



**MAQUINARIA EN MOVIMIENTO  
MANTENGA MANOS Y PIES  
ALEJADOS**

7118000020

Part N° 7118000019

Part N° 7118000017



**WATCH YOUR  
HANDS AND  
FINGERS**



Part N° 7118000018

Part N° 7118000013

## **1. Operating Specifications**

|                                    |                                                                                                               |               |                                  |
|------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------|----------------------------------|
| <b>Description</b>                 | <b>Tree Spade OPTIMAL 650 o/s</b>                                                                             |               |                                  |
| <b>serial number</b>               | <b>650</b>                                                                                                    |               |                                  |
| <b>capacity</b>                    | upper root ball diameter                                                                                      | 65 cm         | (26")                            |
|                                    | root ball depth                                                                                               | 45 cm         | (18")                            |
| <b>dimensions of basic machine</b> | height                                                                                                        | 130 cm        | (51")                            |
|                                    | width, frame closed                                                                                           | 112 cm        | (44")                            |
|                                    | width, frame open                                                                                             | 143 cm        | (56")                            |
|                                    | clearance between open gate                                                                                   | 62 cm         | (24")                            |
| <b>weight</b>                      | basic machine, empty                                                                                          | 425 kg        | (935 lbs.)                       |
| <b>rated type of attachment</b>    | attachment by means of back plate to loader or excavator                                                      |               |                                  |
|                                    | minimum lift capacity                                                                                         | 1000 kg       | (2200 lbs.)                      |
|                                    | the power unit must be equipped with an auxiliary double-acting hydraulic circuit for implements:             |               |                                  |
|                                    | working pressure                                                                                              | 140 - 180 bar | (2000-2560 lbs/in <sup>2</sup> ) |
|                                    | oil flow                                                                                                      | 40 l/min.     | (11 GPM)                         |
| <b>controls</b>                    | electro-hydraulic valves, double-acting, for three or four functions actuated by a rotary switch or joy stick |               |                                  |
| <b>field of application</b>        | 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 11. 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 or joy stick at suitable and dry location in the power unit, e.g. the rotary switch on the instrument panel, or the joy stick at the hydraulic lever.

2.2.2 Install 5-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.



### **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 3.



#### **IMPORTANT:**

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

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

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 The Controls**

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

| <u>Rotary Switch</u> | <u>Joystick<br/>(optional)</u> | <u>Control Valve (actuated<br/>by Manual Lever or Pedal)</u> | <u>Work Movement</u> |
|----------------------|--------------------------------|--------------------------------------------------------------|----------------------|
| function 1:          | T3                             | gate lock                                                    | unlock / lock        |
| function 2:          | T5                             | gate                                                         | open / close         |
| function 3:          | T4                             | blades                                                       | up / down            |
| (function 4:         | T6                             | 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.

## **4.2 Operation**

- 4.2.1 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.
- 4.2.2 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.
- 4.2.3 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.

**Do not slacken the socket head screw (Item 39, page 21) on the mounting plate or alter the position of the safety switch.**

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.

- 4.2.4 If the power unit is furnished with rear stabilizers, extend stabilizers prior to digging.
- 4.2.5 Preset function 3 "blades" and activate "down" with control valve. Now the spade cylinders force the blades into the ground. Because all 4 spade cylinders 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, 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 !**



#### 4.3



#### **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.

#### 4.4 **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").

- 4.5 When the work has been finished, set the rotary switch 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 special care. 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 9 + 15, page 18) of the tension block have to be tightened with a torque of 300 Nm (ft.lb.222).

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 14

### **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**



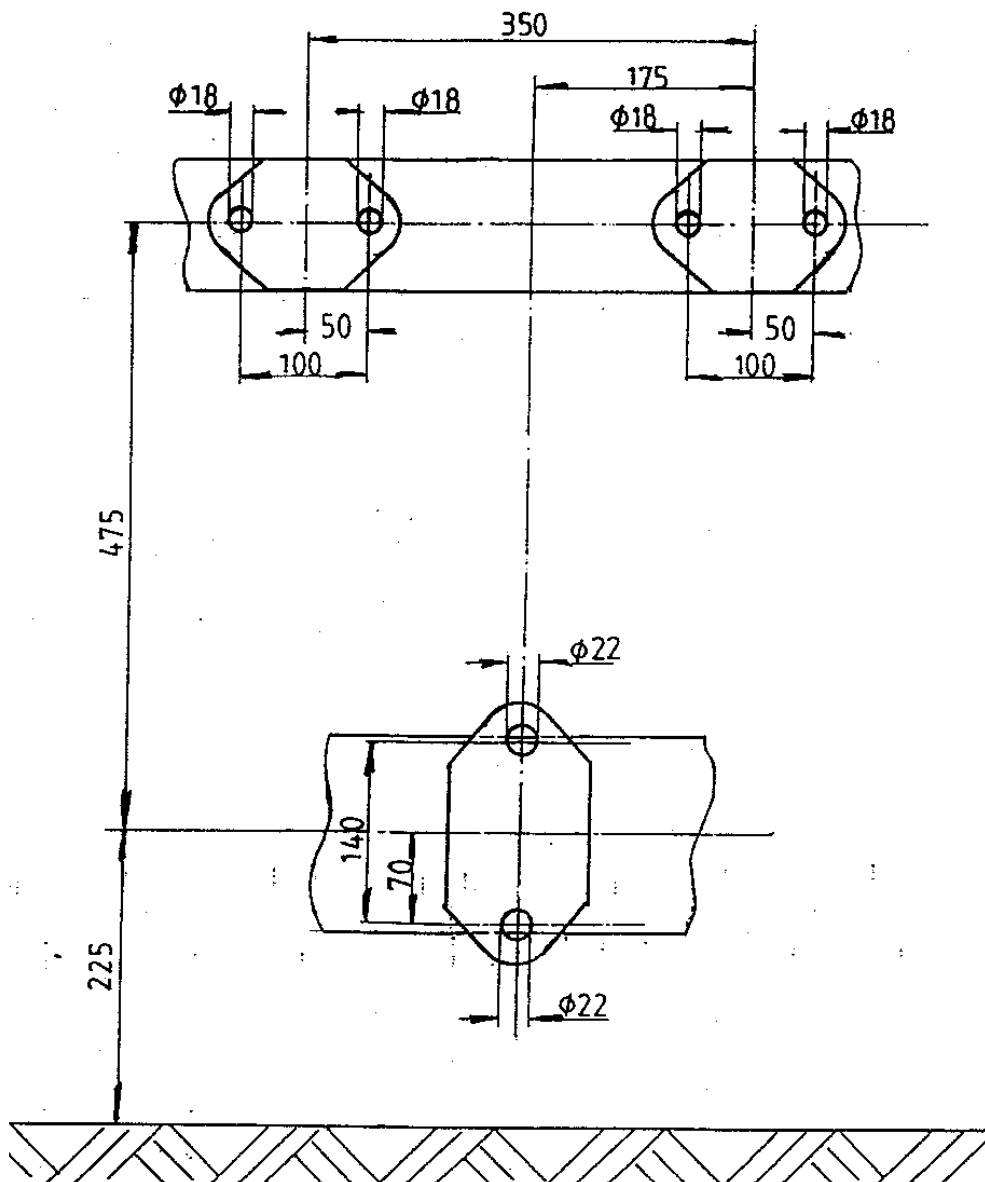
**IMPORTANT:**

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 !

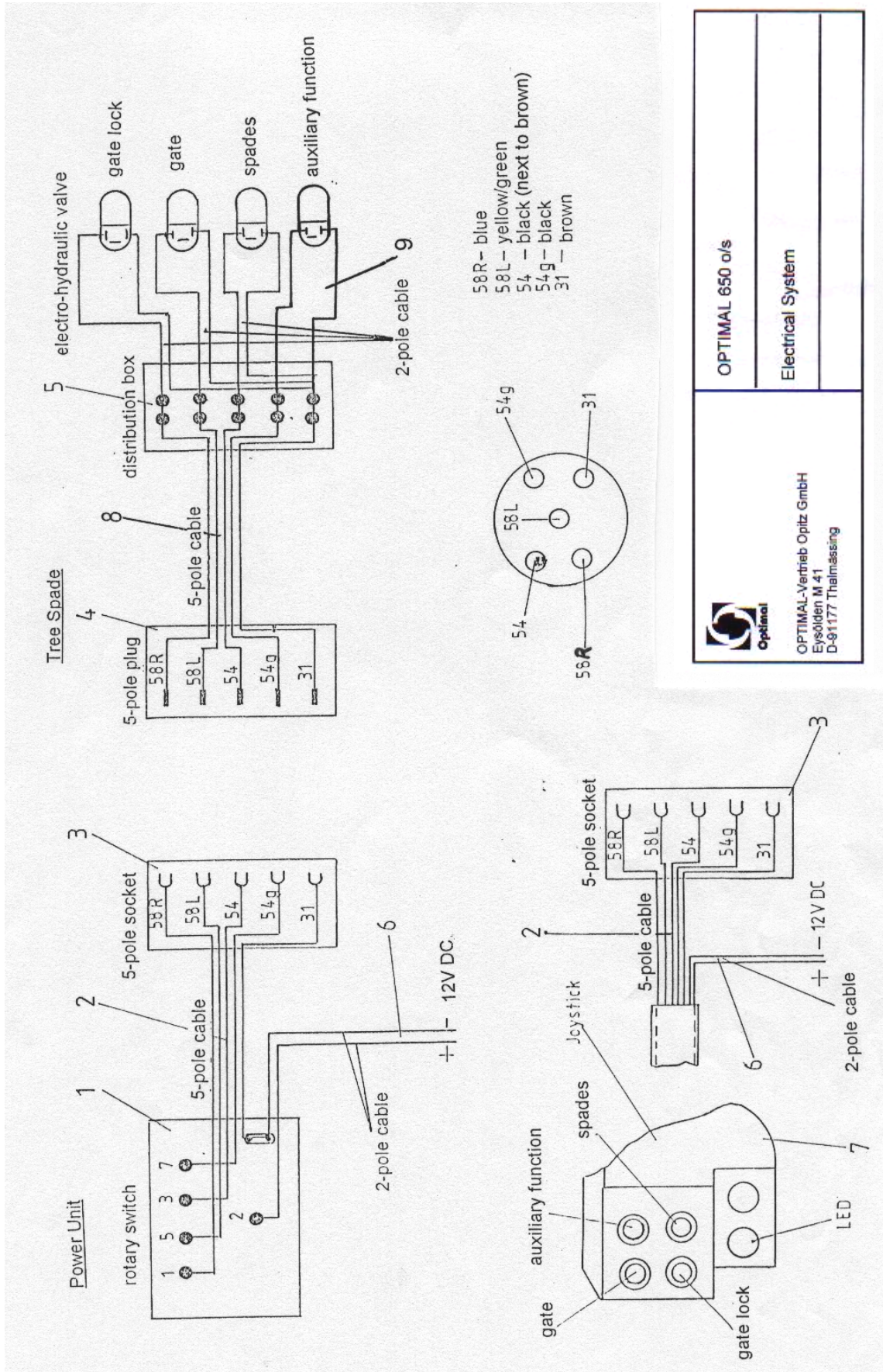


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OPTIMAL 650 o/s

Attachment Points

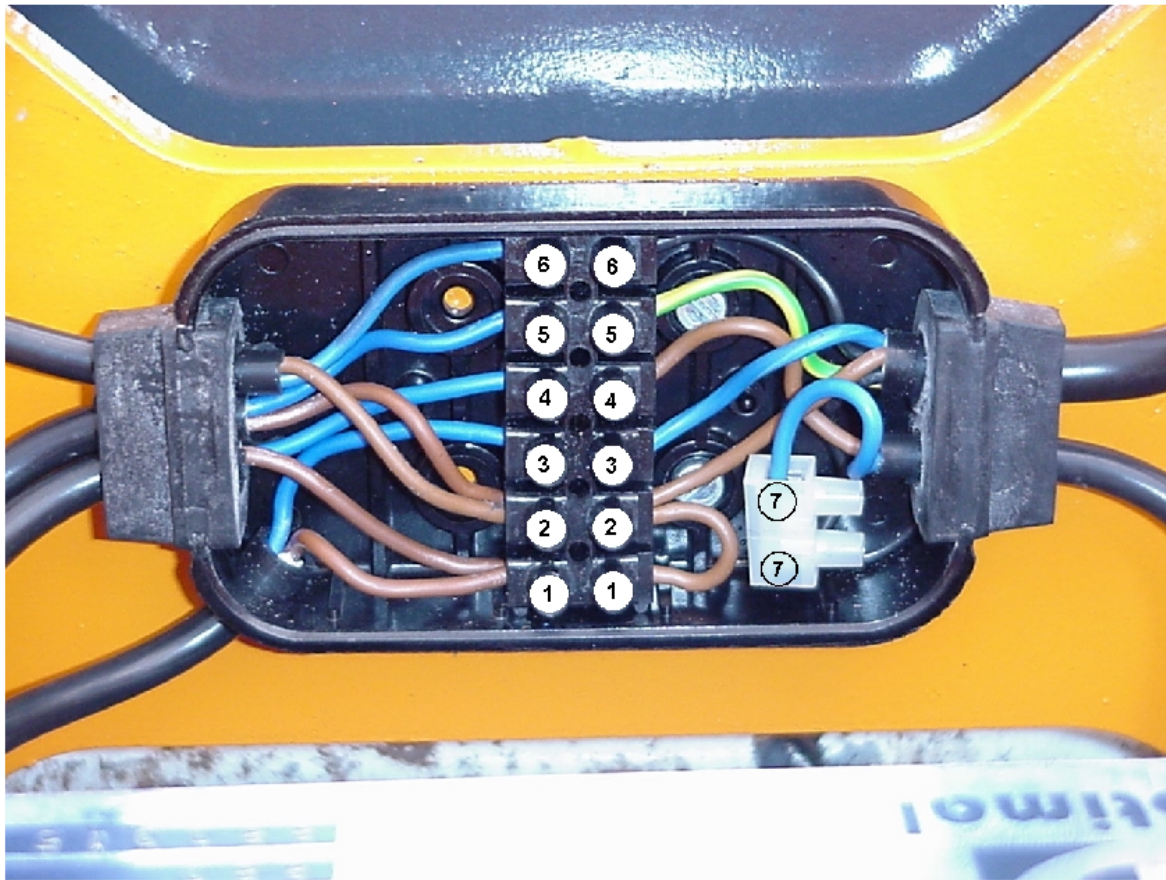




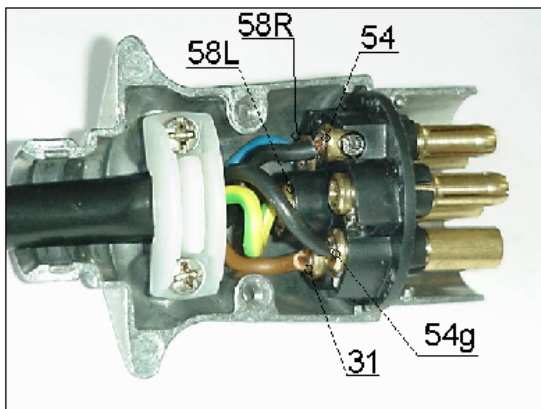




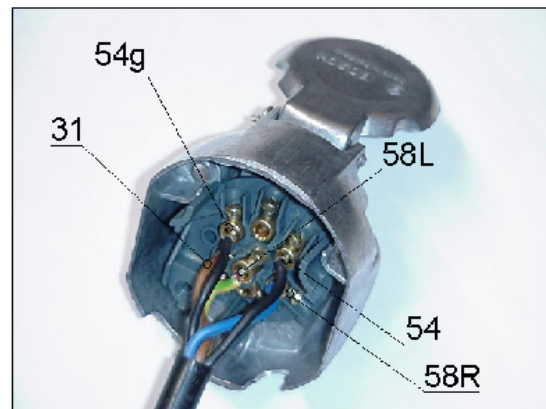
## terminal box



- |                                         |                                 |
|-----------------------------------------|---------------------------------|
| 1) ground                               | 5) gate - yellow/green (58L)    |
| 2) ground - brown (31)                  | 6) stabiliz. - black (54g)      |
| 3) gate lock - blue (58R)               | 7) blue of safety switch (14) - |
| 4) spades - brown of safety switch (13) | black (next to brown) (54)      |

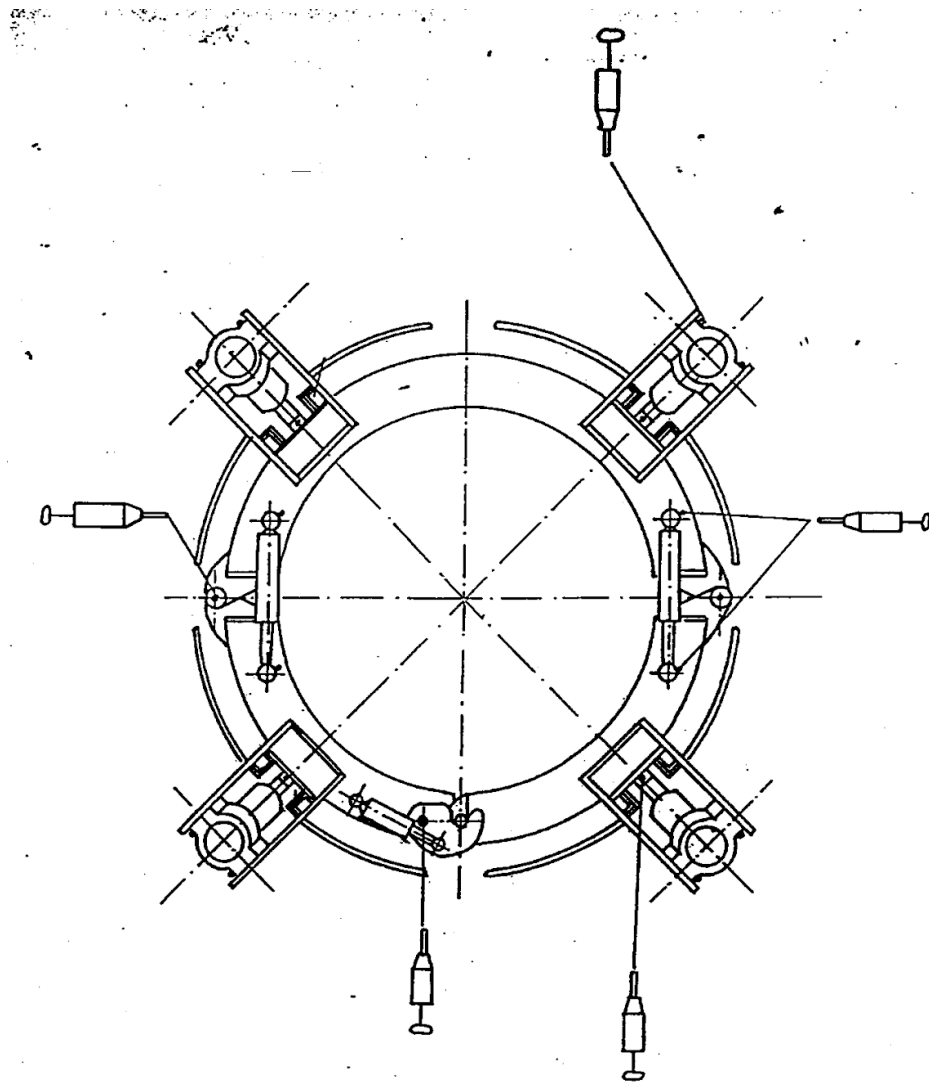


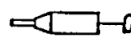
7-pole plug



7-pole socket





 - lubricate once per week



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OPTIMAL 650 o/s

Lubrication chart





**S P A R E   P A R T S**

**O N**

**TREE SPADE OPTIMAL 650 o/s**



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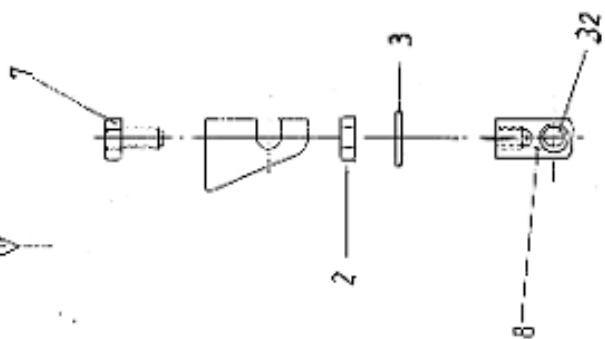
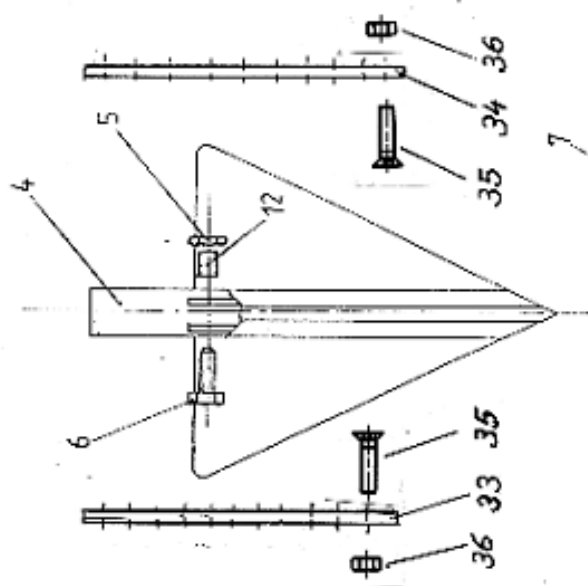
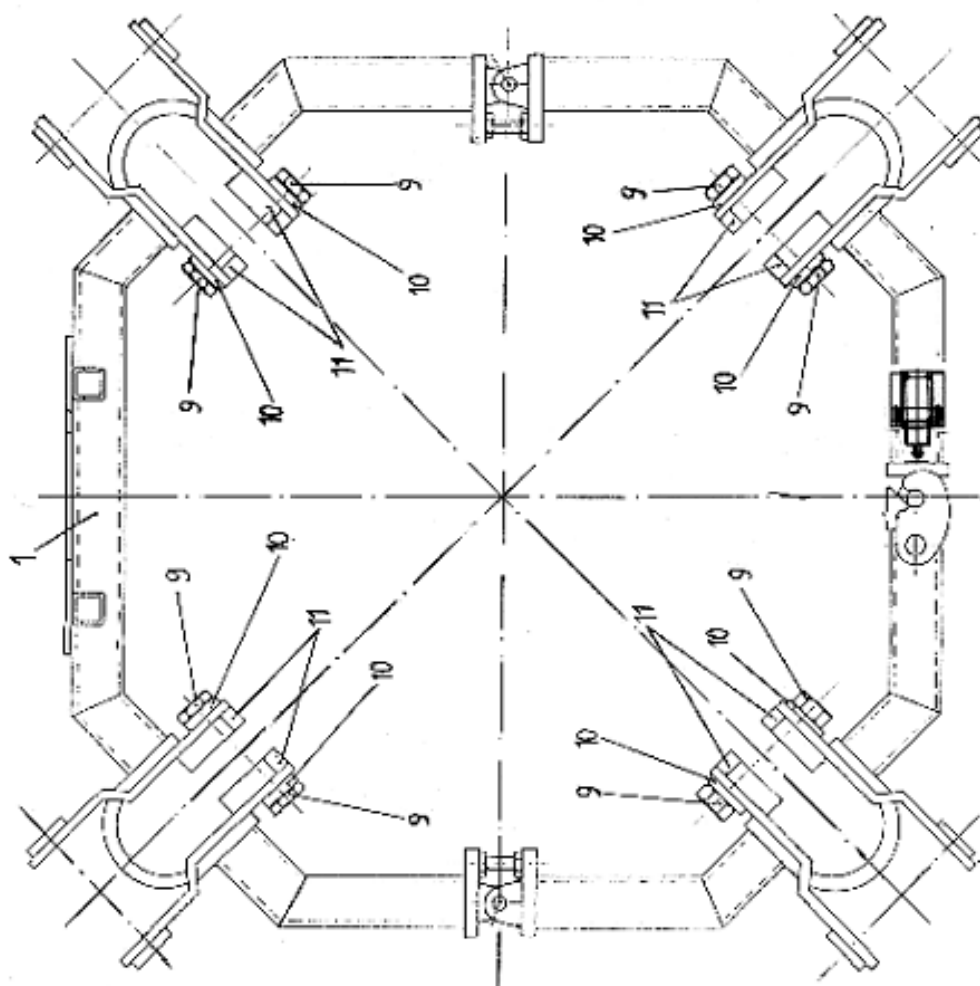
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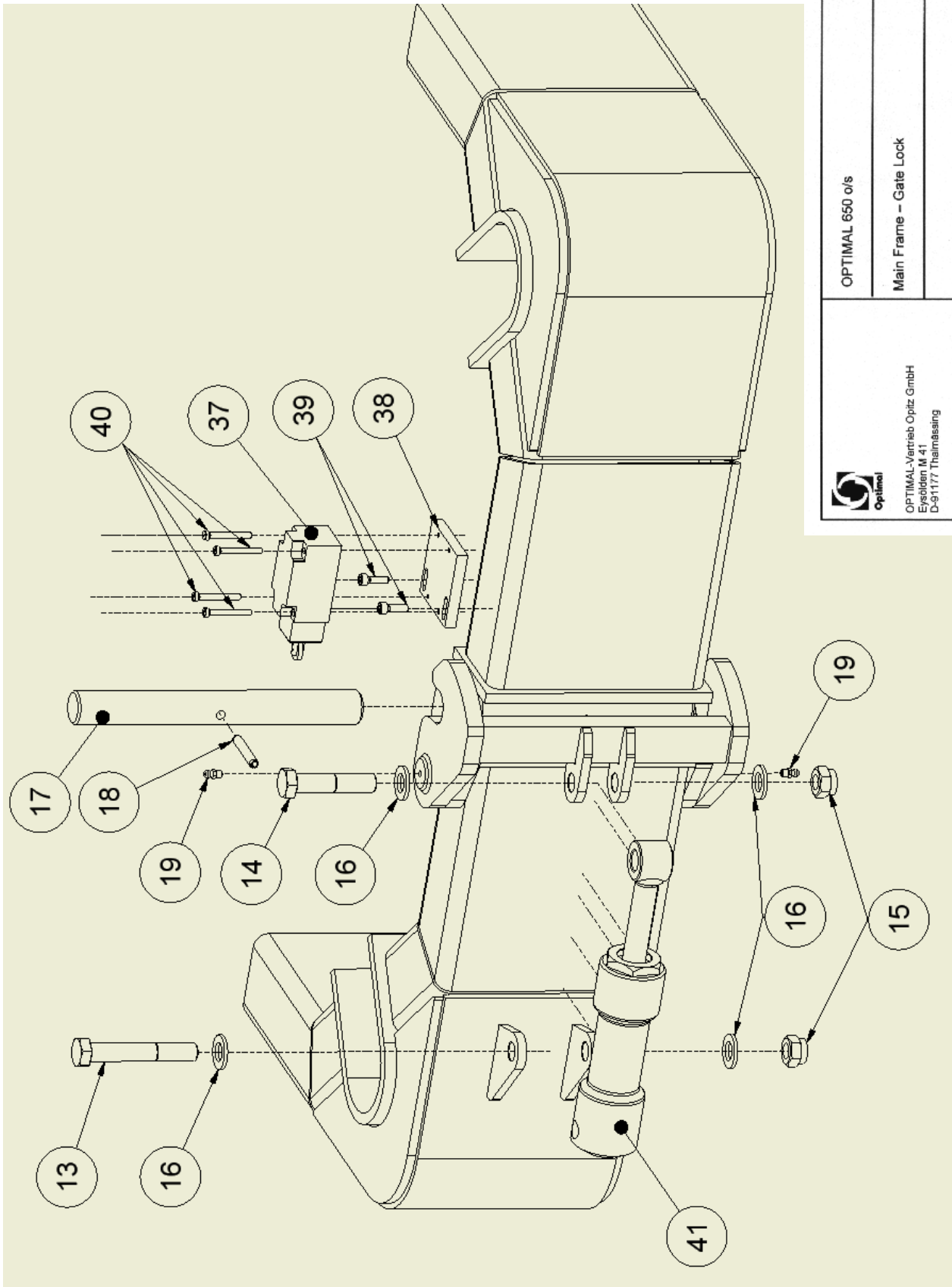
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|                 |                                                                                                                                                              |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OPTIMAL 650 o/s | <br>OPTIMAL-Vertrieb Optiz GmbH<br>Eysölden IM 41<br>D-81177 Thalmissing |
| Main Frame      |                                                                                                                                                              |

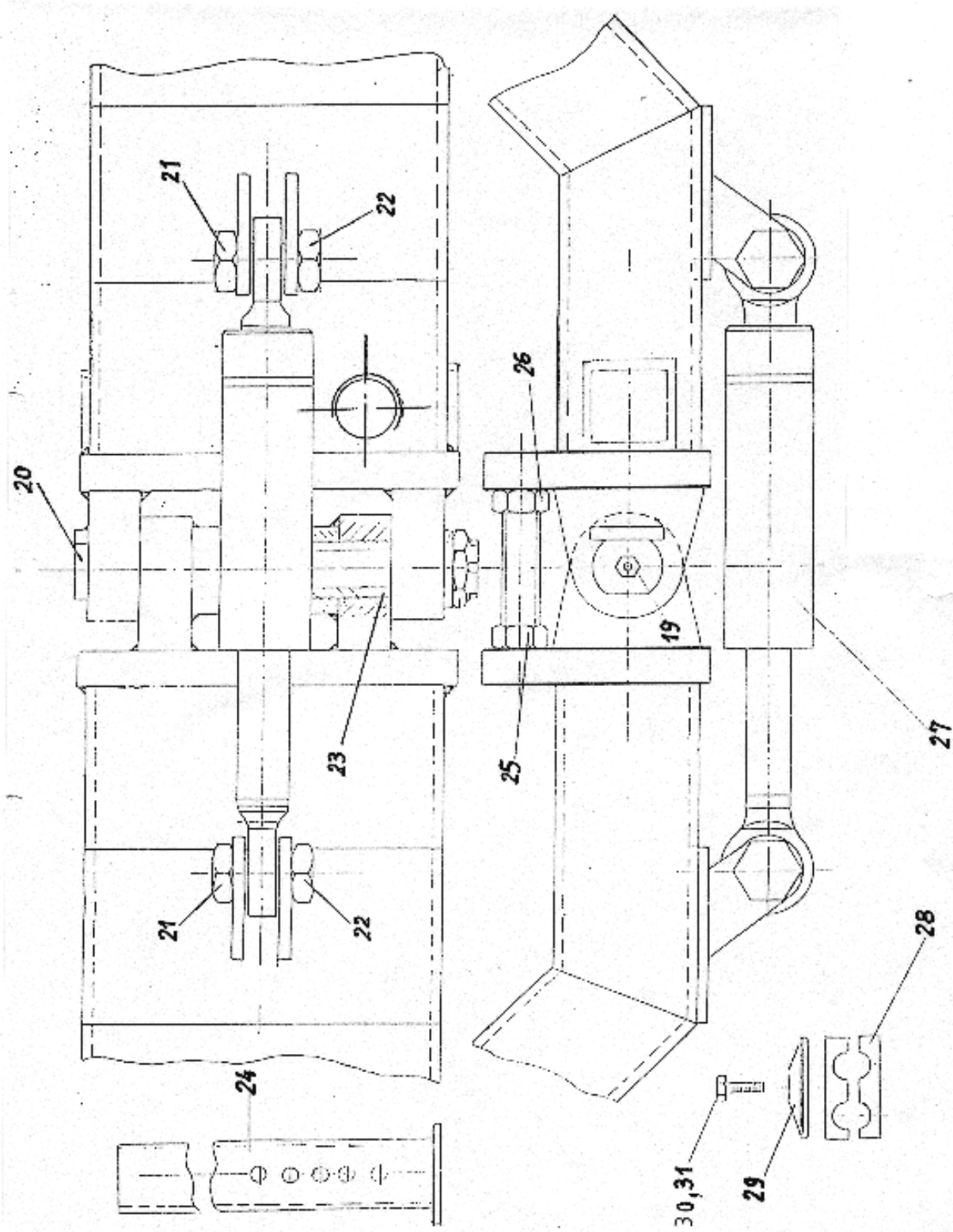




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OPTIMAL 650 o/s

Main Frame - Gate Lock







**TREE SPADE OPTIMAL 650 o/s - SPARE PARTS**

**MAIN FRAME AND SPADES**

| <u>Item</u> | <u>Quantity</u> | <u>Description</u>                           | <u>Part Number</u> |
|-------------|-----------------|----------------------------------------------|--------------------|
| 1           | 1               | main frame                                   | 31865002           |
| 2           | 8               | nut M 16                                     | 502160SW22         |
| 3           | 8               | washer M 16, DIN 125                         | 5069161            |
| 4           | 4               | spades                                       | 31665300           |
| 5           | 4               | nut M 16, DIN 985                            | 502160985          |
| 6           | 4               | screw M 16 x 55, DIN 931                     | 50116055931        |
| 7           | 8               | screw M 16 x 80, DIN 913                     | 50116080913        |
| 8           | 8               | tension block                                | 309850371          |
| 9           | 32              | screw M 16 x 30, DIN 933                     | 501160309330       |
| 10          | 32              | tapered washer 38 x 17 x 4, DIN 6769         | 504166769          |
| 11          | 8               | guide                                        | 306650231          |
| 12          | 4               | bush                                         | 31111029           |
| 13          | 1               | bolt M 16 x 100, DIN 931                     | 50116100931        |
| 14          | 1               | bolt M 16 x 80, DIN 931                      | 50116080931        |
| 15          | 2               | nut M 16, DIN 985                            | 502160985          |
| 16          | 4               | washer A17, DIN 125                          | 506916             |
| 17          | 1               | lock pin                                     | 307650120          |
| 18          | 1               | clamping sleeve 8 x 50, DIN 1481506708501481 |                    |



**TREE SPADE OPTIMAL 650 o/s - SPARE PARTS**

**MAIN FRAME AND SPADES**

| <b><u>Item</u></b> | <b><u>Quantity</u></b> | <b><u>Description</u></b>    | <b><u>Part Number</u></b> |
|--------------------|------------------------|------------------------------|---------------------------|
| 19                 | 20                     | grease nipple M6 H1          | 59908H1M6                 |
| 20                 | 2                      | hinge pin 30 x 200           | 50830200                  |
| 21                 | 4                      | shoulder bolt M16 / ø20      | 3140650010                |
| 22                 | 4                      | nut M 16, DIN 985            | 502160985                 |
| 23                 | 4                      | hinge bush 30 x 36 x 70      | 5083036070                |
| 24                 | 2                      | adjustable foot              | 39965800                  |
| 25                 | 2                      | screw M 16 x 80, DIN 933     | 501160809330              |
| 26                 | 2                      | nut M 16, DIN 934            | 5021609340                |
| 27                 | 2                      | gate cylinder                | 3010200040                |
| 28                 | 1                      | double pipe clamp AS-11/12PP | 510112                    |
| 29                 | 15                     | cover                        | 5100DP-B1                 |
| 30                 | 11                     | socket head screw M 6 x 45   | 50106045912               |
| 31                 | 4                      | socket head screw M 6 x 40   | 50106040912               |
| 32                 | 8                      | socket head screw M 16 x 40  | 50116040912               |
| 33                 | 8                      | plastic guide                | 3066502311                |
| 34                 | 8                      | plastic guide                | 3066502312                |
| 35                 | 96                     | screw M 6 x 25               | 501060257991              |
| 36                 | 96                     | nut M 6 DIN 985              | 502060985                 |

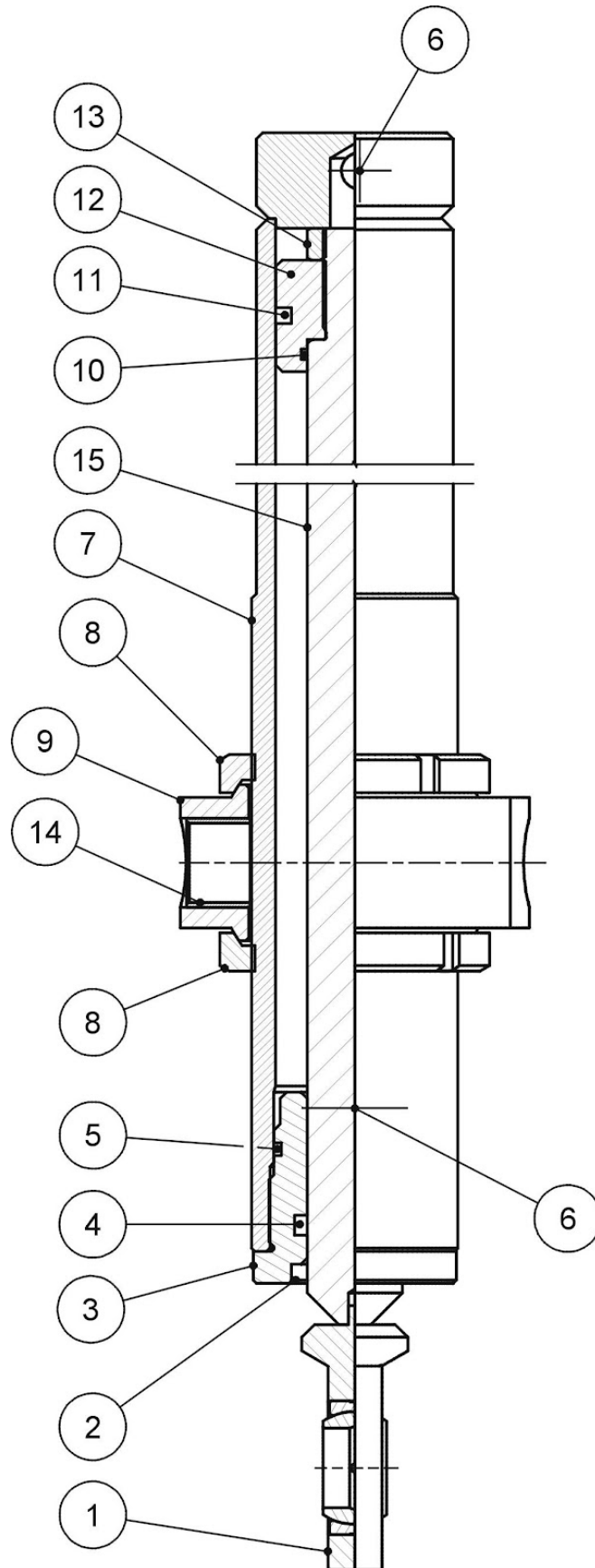



**TREE SPADE OPTIMAL 650 o/s - SPARE PARTS**

**MAIN FRAME AND SPADES**

| <b><u>Item</u></b> | <b><u>Quantity</u></b> | <b><u>Description</u></b>  | <b><u>Part Number</u></b> |
|--------------------|------------------------|----------------------------|---------------------------|
| 37                 | 1                      | safety switch              | 599043782                 |
| 38                 | 1                      | mounting plate             | 3981400010                |
| 39                 | 2                      | socket head screw M 6 x 20 | 50106020912               |
| 40                 | 4                      | socket head screw M 5 x 40 | 50105040084               |
| 41                 | 1                      | gate lock cylinder         | 3010300040                |





|                                                                                                                                                                    |                |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--|
| OPTIMAL 650 o/s                                                                                                                                                    | Spade Cylinder |  |
|  <p>OPTIMAL-Vertrieb Optiz GmbH<br/>Eysölden M 41<br/>D-91177 Thalmassing</p> |                |  |





**TREE SPADE OPTIMAL 650 o/s - SPARE PARTS**

**SPADE CYLINDER**

| <b><u>Item</u></b> | <b><u>Quantity</u></b> | <b><u>Description</u></b> | <b><u>Part Number</u></b> |
|--------------------|------------------------|---------------------------|---------------------------|
| 1                  | 1                      | eye joint GK 25DO         | 507250                    |
| 2                  | 1                      | oil scraper P 7-30        | 5160330                   |
| 3                  | 1                      | guide bush                | 3115030360                |
| 4                  | 1                      | rod seal S8-30            | 5160230                   |
| 5                  | 1                      | O-ring 45.2 x 3, 88 HBR   | 517452030                 |
| 6                  | 2                      | elbow                     | 515070510813              |
| 7                  | 1                      | cylinder pipe             | 3025030053                |
| 8                  | 2                      | slotted nut KM 13         | 50313                     |
| 9                  | 1                      | cylinder suspension       | 3090650010                |
| 10                 |                        | O-ring 30 x 2.5           | 5170300025                |
| 11                 | 1                      | piston seal OMK50         | 50160150                  |
| 12                 | 1                      | piston                    | 3125030235                |
| 13                 | 1                      | nut M 20 x 1.5, DIN 936   | 502201509360              |
| 14                 | 2                      | bush                      | 544252820                 |
| 15                 | 1                      | piston rod                | 3035030150                |
| 16                 | 1                      | seal kit                  | 516005030601              |







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D-91177 Thalmässing

OPTIMAL 650 o/s

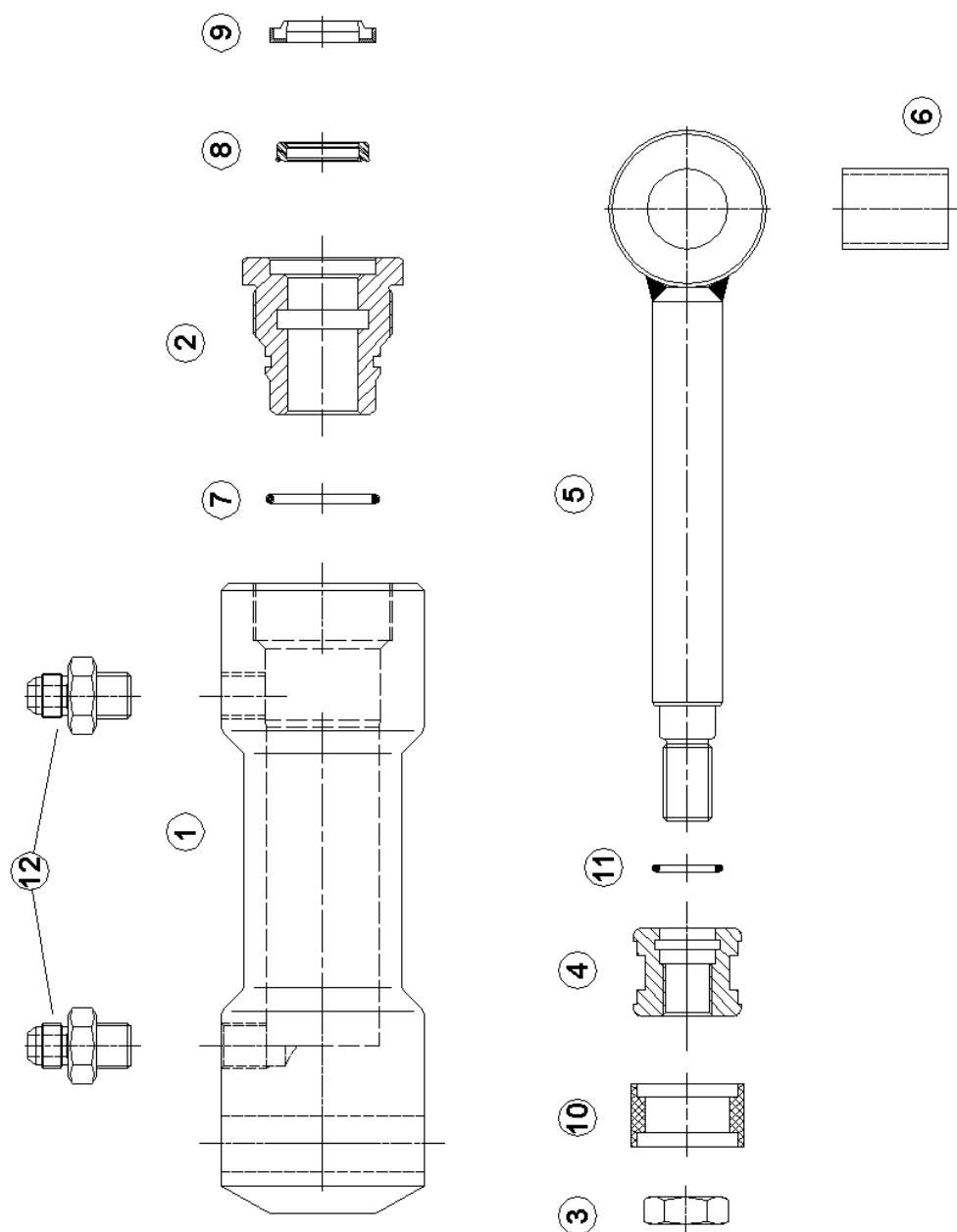
Gate Cylinder

**TREE SPADE OPTIMAL 650 o/s - SPARE PARTS**

**Gate Cylinder**

| <b><u>Item</u></b> | <b><u>Quantity</u></b> | <b><u>Description</u></b> | <b><u>Part Number</u></b> |
|--------------------|------------------------|---------------------------|---------------------------|
| 1                  | 1                      | cylinder body             | 3020320020                |
| 2                  | 1                      | guide bush                | 3113220010                |
| 3                  | 1                      | nut M 14 x 1,5 DIN 936    | 50214150936               |
| 4                  | 1                      | piston                    | 3123220010                |
| 5                  | 1                      | piston rod Ø 20 x 171     | 3030200020                |
| 6                  | 2                      | bush 2023-30              | 544202330                 |
| 7                  | 1                      | O-ring 28 x 2,5 90 Shore  | 5170280025                |
| 8                  | 1                      | rod seal T7 20 x 26       | 5160220                   |
| 9                  | 1                      | scraper W4 – 20 x 30      | 5160320                   |
| 10                 | 1                      | piston seal TPM 32 x 24   | 5160132                   |
| 11                 | 1                      | O-ring 16 x 2 90 Shore    | 5170160020                |
| 12                 | 2                      | union                     | 515021000813              |
|                    | 1                      | seal kit                  | 516003220601              |







OPTIMAL-Vertrieb Opitz GmbH  
Eysölden M 41  
D-91177 Thalmässing

OPTIMAL 650 o/s

Gate lock Cylinder

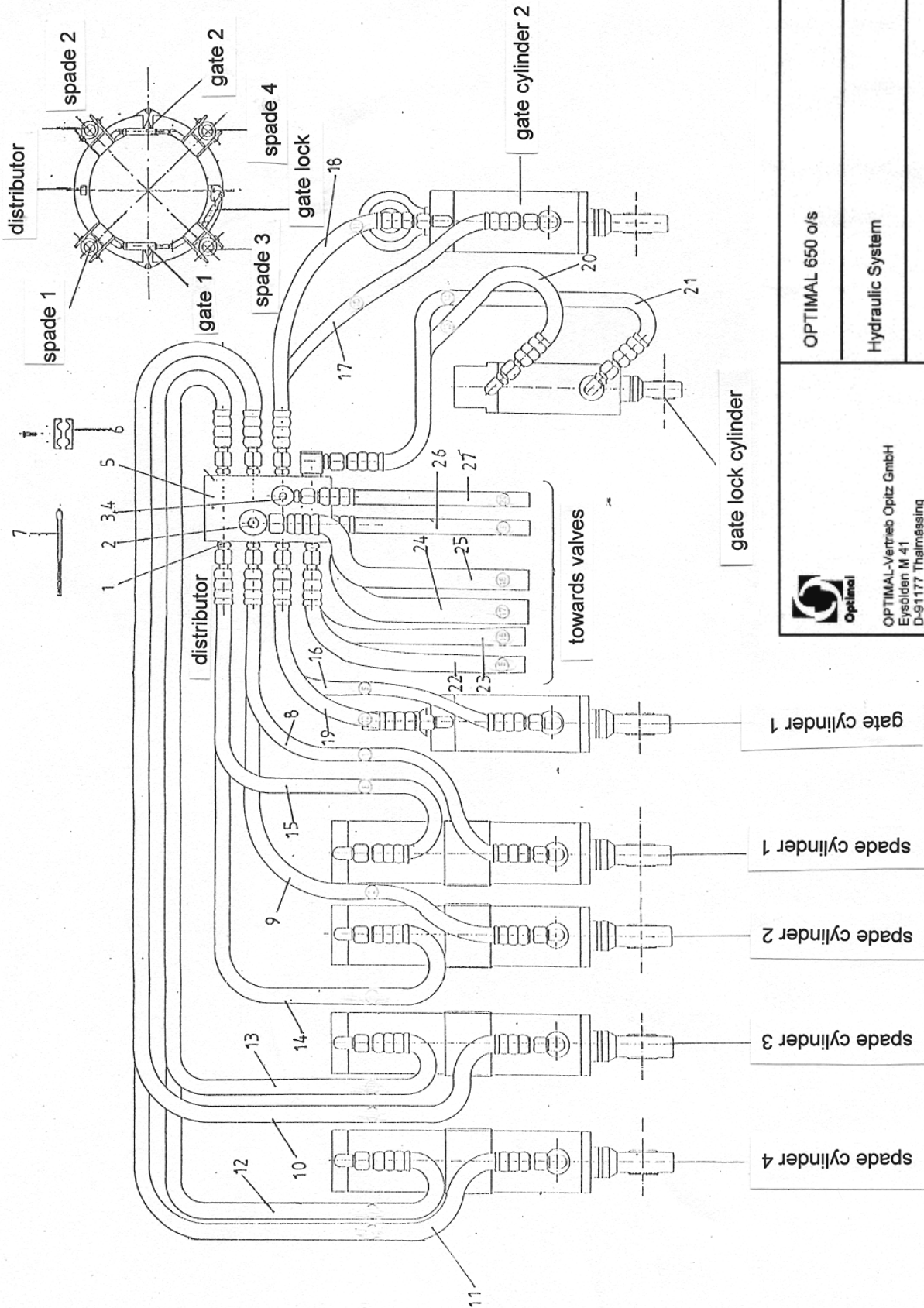


**TREE SPADE OPTIMAL 650 o/s - SPARE PARTS**

**GATE LOCK CYLINDER**

| <b><u>Item</u></b> | <b><u>Quantity</u></b> | <b><u>Description</u></b>  | <b><u>Part Number</u></b> |
|--------------------|------------------------|----------------------------|---------------------------|
| 1                  | 1                      | cylinder body              | 3020320010                |
| 2                  | 1                      | guide bush                 | 3113220010                |
| 3                  | 1                      | nut M 14 x 1,5 DIN 936     | 50214150936               |
| 4                  | 1                      | piston                     | 3123220010                |
| 5                  | 1                      | piston rod ø 20 x 152,5    | 3030200010                |
| 6                  | 2                      | bush 1618-15               | 544161815                 |
| 7                  | 1                      | o-ring 28 x 2,5, 90 shore  | 5170280025                |
| 8                  | 1                      | piston rod seal T7 20 x 26 | 5160220                   |
| 9                  | 1                      | scraper W4 – 20 x 30       | 5160320                   |
| 10                 | 1                      | piston seal TPM 32 x 24    | 5160132                   |
| 11                 | 1                      | o-ring 16 x 2, 90 shore    | 5170160020                |
| 12                 | 2                      | straight union             | 515021000813              |
|                    |                        | seal kit                   | 516003220601              |





OPTIMAL-Vertres Optiz GmbH  
Eysolden M 41  
D-91177 Thalmassing

OPTIMAL 650 o/s

Hydraulic System



**TREE SPADE OPTIMAL 650 o/s - SPARE PARTS**

**HYDRAULIC SYSTEM**

| <b><u>Item</u></b> | <b><u>Quantity</u></b> | <b><u>Description</u></b>        | <b><u>Part Number</u></b> |
|--------------------|------------------------|----------------------------------|---------------------------|
| 1                  | 14                     | union                            | 515021000813              |
| 2                  | 2                      | union                            | 515070511017              |
| 3                  | 3                      | union                            | 515070510813              |
| 4                  | 1                      | oil flow regulator               | 515DSSS6                  |
|                    | 1                      | metric adaptor, JIC ½ -20 UNF    | 39985910                  |
| 5                  | 1                      | manifold                         | 30511033                  |
| 6                  | 4                      | double pipe clamps               | 510112                    |
| 7                  | 4                      | hose retainer                    | 50960080                  |
| 8                  | 1                      | hydraulic hose 1 – 91 cm (36")   | 513062091013              |
| 9                  | 1                      | hydraulic hose 2 – 125 cm (49")  | 513062125011              |
| 10                 | 1                      | hydraulic hose 3 – 261 cm (103") | 513062261011              |
| 11                 | 1                      | hydraulic hose 4 – 166 cm (65")  | 513062166011              |
| 12                 | 1                      | hydraulic hose 5 – 193 cm (76")  | 513062193011              |
| 13                 | 1                      | hydraulic hose 6 – 287 cm (113") | 513062287011              |
| 14                 | 1                      | hydraulic hose 7 – 150 cm (59")  | 513062150011              |
| 15                 | 1                      | hydraulic hose 8 – 111 cm (44")  | 513062111011              |
| 16                 | 1                      | hydraulic hose 9 – 33 cm (13")   | 513062033011              |
| 17                 | 1                      | hydraulic hose 10 – 170 cm (67") | 513062170011              |
| 18                 | 1                      | hydraulic hose 11 – 170 cm (67") | 513062170012              |



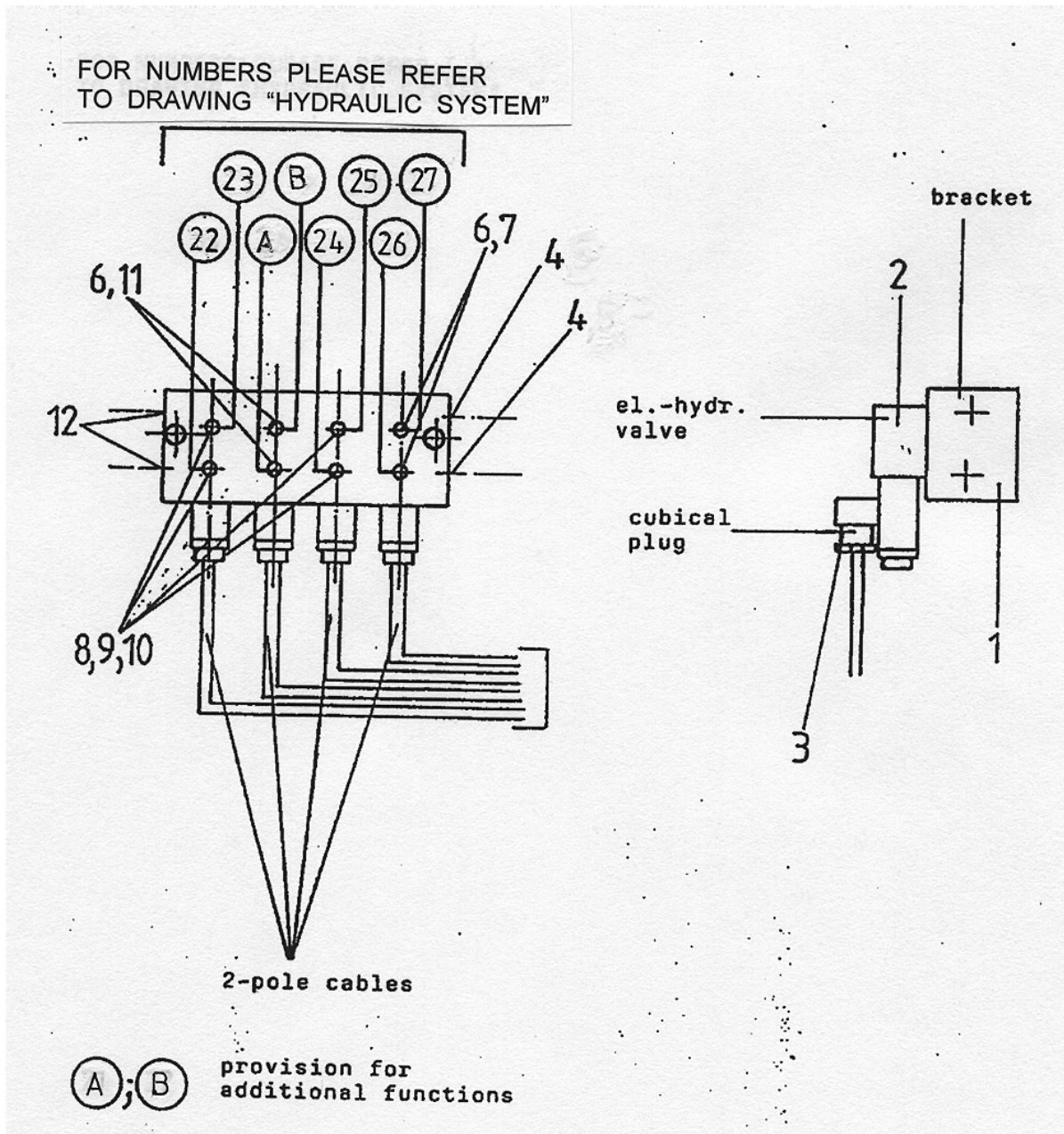
**TREE SPADE OPTIMAL 650 o/s - SPARE PARTS**

**HYDRAULIC SYSTEM**

| <b><u>Item</u></b> | <b><u>Quantity</u></b> | <b><u>Description</u></b>        | <b><u>Part Number</u></b> |
|--------------------|------------------------|----------------------------------|---------------------------|
| 19                 | 1                      | hydraulic hose 12 – 33 cm (13")  | 513062033012              |
| 20                 | 1                      | hydraulic hose 13 – 114 cm (45") | 513062114011              |
| 21                 | 1                      | hydraulic hose 14 – 113 cm (44") | 513062113011              |
| 22                 | 1                      | hydraulic hose 15 – 25 cm (10")  | 513062025012              |
| 23                 | 1                      | hydraulic hose 16 – 27 cm (11")  | 513062027013              |
| 24                 | 1                      | hydraulic hose 17 – 29 cm (12")  | 513102029013              |
| 25                 | 1                      | hydraulic hose 18 – 27 cm (11")  | 513102027013              |
| 26                 | 1                      | hydraulic hose 19 – 19 cm (7")   | 513062019013              |
| 27                 | 1                      | hydraulic hose 20 – 15 cm (6")   | 513062015013              |





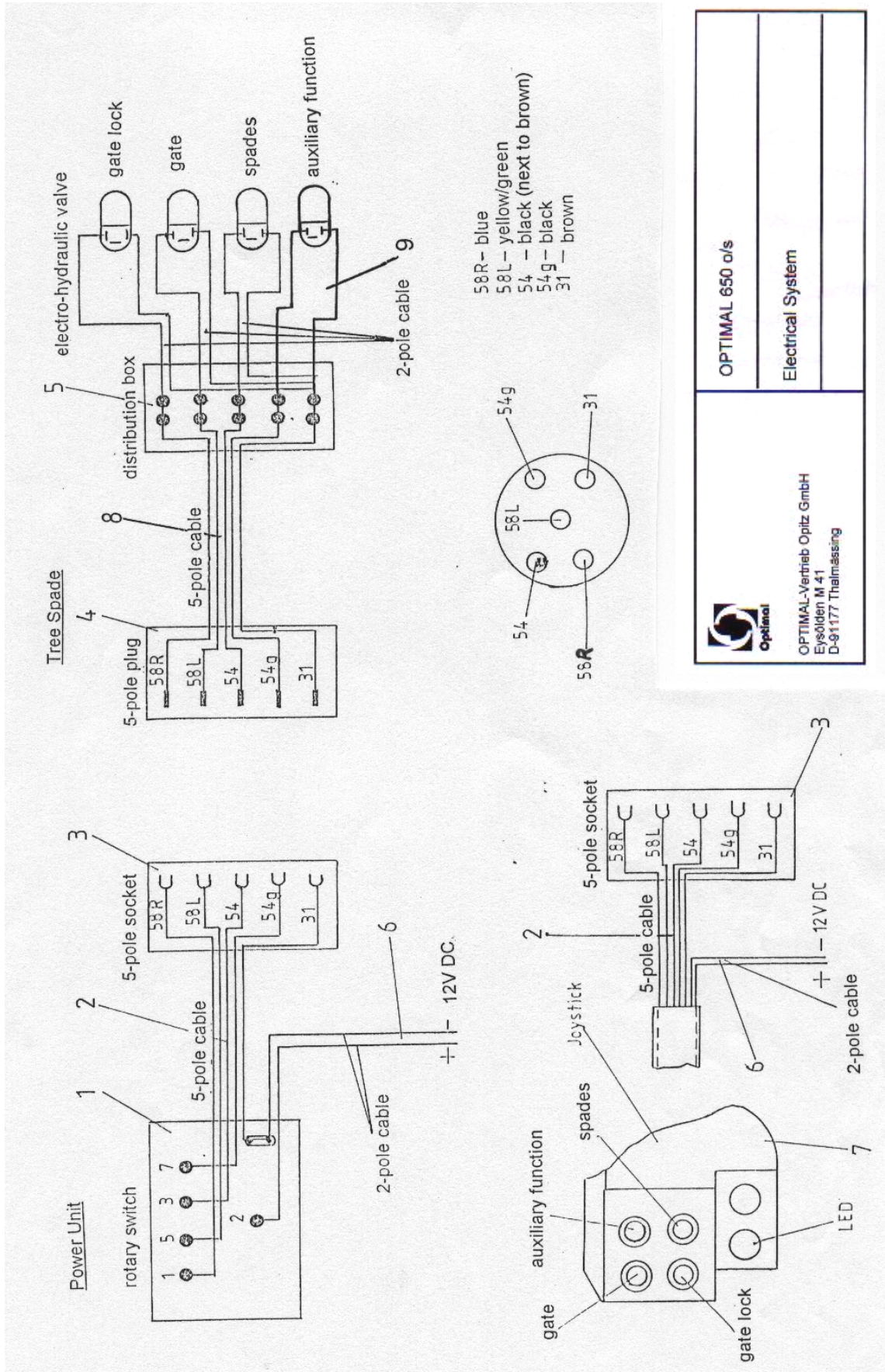


**TREE SPADE OPTIMAL 650 o/s -SPARE PARTS**

**HYDRAULIC SYSTEM - VALVE BANK**

| <b><u>Item</u></b> | <b><u>Quantity</u></b> | <b><u>Description</u></b>              | <b><u>Part Number</u></b> |
|--------------------|------------------------|----------------------------------------|---------------------------|
| 1                  | 1                      | bracket                                | 547005                    |
| 2                  | 4                      | electro-hydraulic valve NG06 12U547001 |                           |
| 3                  | 4                      | cubical plug 6DM-211-RE-GRAU-A         | 5476DM                    |
| 4                  | 2                      | union                                  | 515070391221              |
| 5                  | 2                      | union                                  | 5150103312                |
| 6                  | 4                      | union                                  | 515021001017              |
| 7                  | 2                      | union                                  | 5150701710                |
| 8                  | 4                      | union                                  | 515021000813              |
| 9                  | 4                      | union                                  | 515RI3/8x1/4              |
| 10                 | 4                      | union                                  | 515071708                 |
| 11                 | 2                      | union                                  | 5150103310                |
| 12                 | 2                      | union                                  | 515VSTI1/2                |





**TREE SPADE OPTIMAL 650 o/s - SPARE PARTS**

**ELECTRIC CONTROLS**

| <b><u>Item</u></b> | <b><u>Quantity</u></b> | <b><u>Description</u></b>            | <b><u>Part Number</u></b> |
|--------------------|------------------------|--------------------------------------|---------------------------|
| 1                  | 1                      | switch CA10A                         | 5470A242-521              |
| 2                  | 2                      | cable 5 x 1.5, length 20'            | 5125015                   |
| 3                  | 1                      | 5-pole socket                        | 5998JB001940              |
| 4                  | 1                      | 5-pole plug                          | 5998JA001916              |
| 5                  | 1                      | el. distributor box                  | 5998KV002142              |
| 6                  | 2                      | cable 2 x 1.5 - 5" long              | 5122015                   |
| 7                  | 1                      | Joystick                             | 560001                    |
| 8                  | 1                      | cable 5 x 1,5 – 67" long             | 5125015                   |
| 9                  | 1                      | auxiliary - cable 2 x 1,5 – 16" long | 5122015                   |
|                    | 1                      | spades - cable 2 x 1,5 – 18" long    | 5122015                   |
|                    | 1                      | gate - cable 2 x 1,5 – 20" long      | 5122015                   |
|                    | 1                      | gate lock - cable 2 x 1,5 – 21" long | 5122015                   |



## 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.



### LIMITED WARRANTY

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.

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:

.....