

## **DOCUMENTATION**

Schwenkwerk-Typ / Slewing Unit Type:

**SW 40 DISK**

Auftrag - Nr. / Com. - no.:

**161.00.154**

Werks - Nr. / Serial - no.:

**7112**

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**Order no.:** 161.00.154  
**Product:** SW 40 DISK  
**Material-Nr.:** 2308.0333 Operating instructions: A 16.0080  
**Serial no.:** 7112  
**Year of construction:** 2005  
**Deadweight:** 2.410 kg  
**Crane lifting capacity SWL:** 40.000 kg  
**Required crane lifting capacity:** 42.300 kg

### Mechanical Data

Rotational speed / axle: 5 / 6 min<sup>-1</sup> firmly adjusted  
 Torque / axle: 3400 Nm

### Electric Data

|                            |                 |                           |                    |
|----------------------------|-----------------|---------------------------|--------------------|
| Mode of operation:         | S 3             | System of protection:     | IP 56 <sup>1</sup> |
| Motor type:                | 100L-4          | Insulation class:         | F                  |
| Intermittent service:      | 40 % duty cycle | max. duty classification: | 120/h              |
| Motor power:               | 2,2 kW          | Circuit diagram no.:      | 2307.9767          |
| Voltage:                   | 400 V           | Plug-in connector:        | ODU-Bo             |
| Frequency:                 | 50 Hz           | Control voltage:          | 230 V AC           |
| Current:                   | threephase      | No. of slip rings:        | 25pol.x60A+PE      |
| Rated current (full load): | 5,0 A ± 10 %    |                           |                    |
| Current consumption:       |                 |                           |                    |

### Hydraulic Data

| max. service pressure | Rotational sense right [± 10 bar] <sup>2)</sup> | Rotational sense left [± 10 bar] <sup>2)</sup> |
|-----------------------|-------------------------------------------------|------------------------------------------------|
| Measuring point MA    |                                                 | 200                                            |
| Measuring point MB    | 200                                             |                                                |

|                                 |                             |
|---------------------------------|-----------------------------|
| Pump type / output:             | P3DB2004 / 6 litre/min      |
| Control block:                  | NG 8                        |
| Hydromotor:                     | MR 300                      |
| Filled oil quality:             | HLP 46                      |
| Oil quantity:                   | 25 l                        |
| Filter type:                    | Argo                        |
| Filter mesh:                    | β <sub>20</sub> ≥ 75 Exapor |
| Admissible service temperature: | - 5 °C up to + 85 °C        |

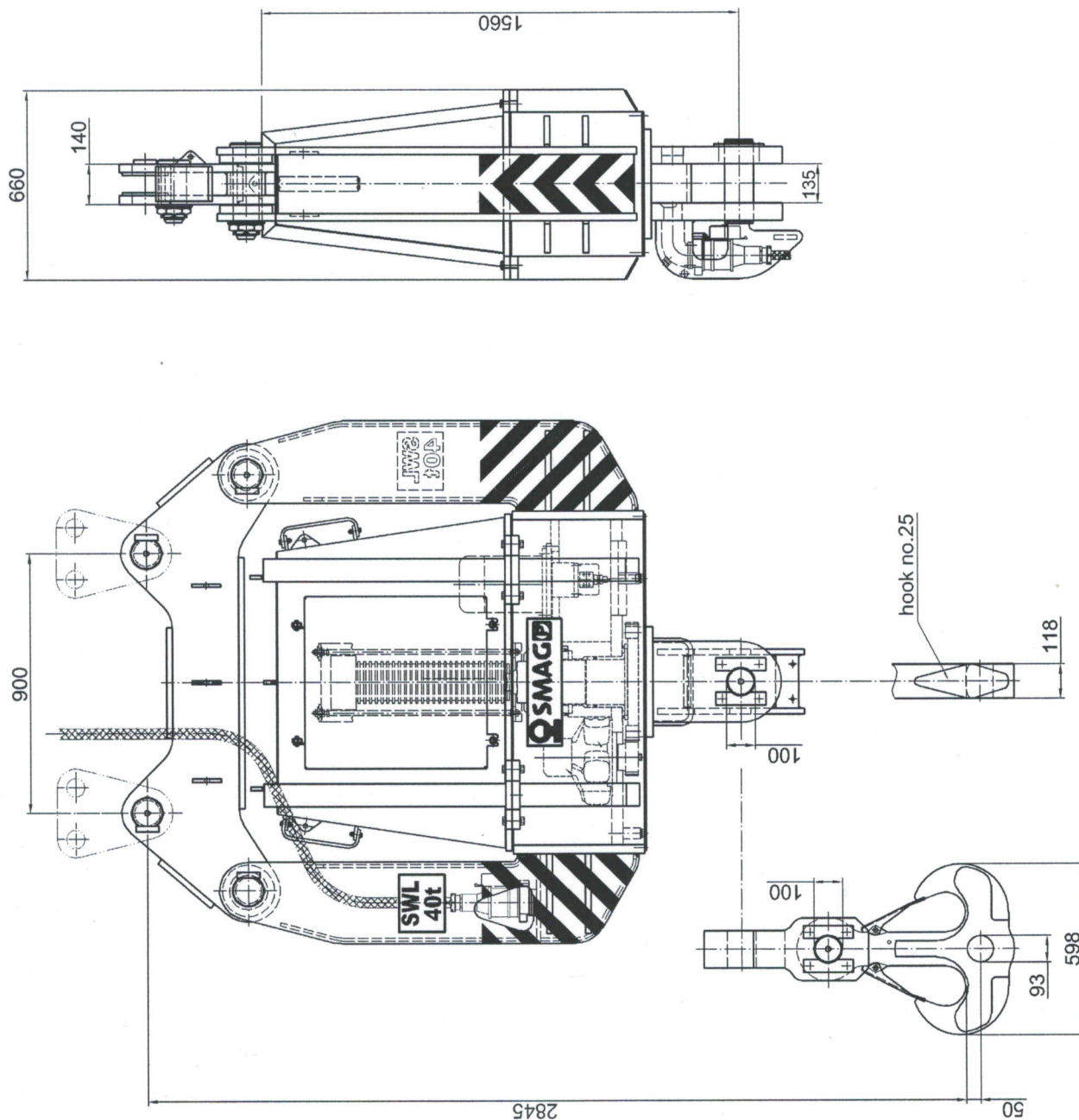
### Accessories

- Crosspiece with double hook no. 25

<sup>1)</sup> System of protection ensured only with mounted and closed hood

<sup>2)</sup> top view onto hood / slip ring transmitter

## Dimensions



## **2.0 Description and Survey of Features**

### **2.1 Base unit: Constructional and Functional Description**

#### **2.1.1 Constructional Description (see parts list, page no. 7-1)**

The PEINER Motor Slewing Unit is designed as follows:

The slewing unit consists of a traverse (1) which accommodates the hydraulic unit (22), the hydraulic motor (3) and the hub (4). The hub serves for receiving the hollow shaft (5). The load forces are absorbed by an axial-cylindrical roller bearing (7) being installed in the hub, via a nut (6) being screwed onto the hollow shaft. According to the requirements, a multi-pole slipring transmitter can be fixed onto the hollow shaft. The slipring transmitter leads a cable with an adequate number of conductors through the hollow shaft to the suspended load bearing equipment.

The hydraulic unit (22), as a complete unit, is installed vertically in the traverse and consists of motor (2) and pump (20). By loosening the fastening screws, the complete hydraulic unit can be removed from the slewing unit.

The component parts hydraulic unit, hydraulic motor and slipring transmitter are protected against mechanical damages by means of a hood.

Shackles at the traverse of the slewing unit (1) serve for receiving the slewing unit on the lifting appliance.

The gimbal suspension attached to the hollow shaft guarantees that the forces are led into the hollow shaft as centrically as possible, and thus guards the shaft against too high bending loads. A cable tension relief prevents mechanical stressing of the plug-in connector.



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## 2.1.2 Functional description (see page no. 5-1, wiring diagram)

A hydraulic pump is driven by an electric motor. This pump can be operated by the motor both clockwise and anti-clockwise.

### Turning the slewing unit to the „right“:

When turning the slewing unit to the right, the motor rotates the pump in such a way that the oil stream is lead via connection „P1“ through a pipe to the control block. Here, the non-return valve „RV1“ is closed against the oil tank. Now, the oil stream flows from connection „A“ of the control block through a pipe to the hydraulic motor „H“ and the motor is reserved.

The oil flowing back is supplied through a pipe to control block connection „B“. It can now flow back to the tank through stop valve „SP1“, which is pilot-controlled from the „P1“-side, via filter „F“. If the maximum pressure is reached or exceeded during operation, the pressure relief valve „DV“ opens fully and the oil can flow back to filter „F“. Thus, the pressure relief valve „DV“ protects the whole unit against damages cause by overload. When the pump pushes the oil stream into the oil tank via the pressure relief valve „DV“, the complete electrical energy is converted into heat. The hydraulic oil is heated very much, thus, it should be avoided to operated at maximum pressure for too long.

A pinion arranged on the output shaft of the hydraulic motor drives a spur wheel connected with the hollow shaft. The hollow shaft of the slewing unit now rotates clockwise.

### Turning the slewing unit to the „left“:

Now the oil stream flows via connection „P2“. For the rest, the operating principle is similar to that for turning the slewing unit to the „right“.

### Free-wheeling:

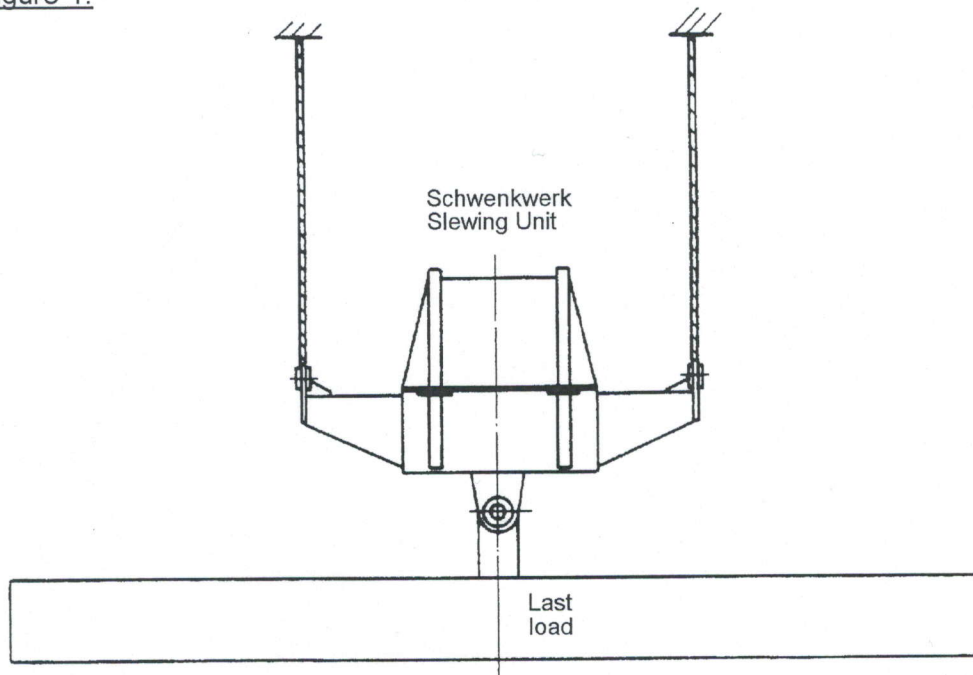
Operation of the solenoid valve „W“ practically results in a free-wheeling of the load that is rotating. Here, the oil stream flows only between hydraulic motor „H“ and solenoid valve „“. Thus, the oil may circulate freely. For an application of the free-wheeling please refer to the following example.

### Free-wheeling of the load hook:

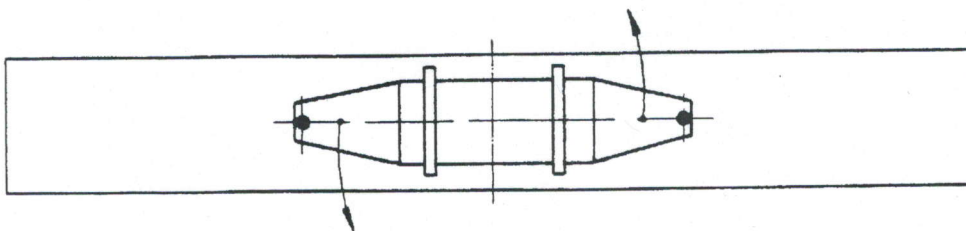
For normal operation, the ball cock (KH1) must always be closed. If it is opened, the load or the load-lifting member can be rotated manually (free-wheeling of the slewing units axle).

**Example:** The load is to be turned clockwise, by 90°.

Figure 1:



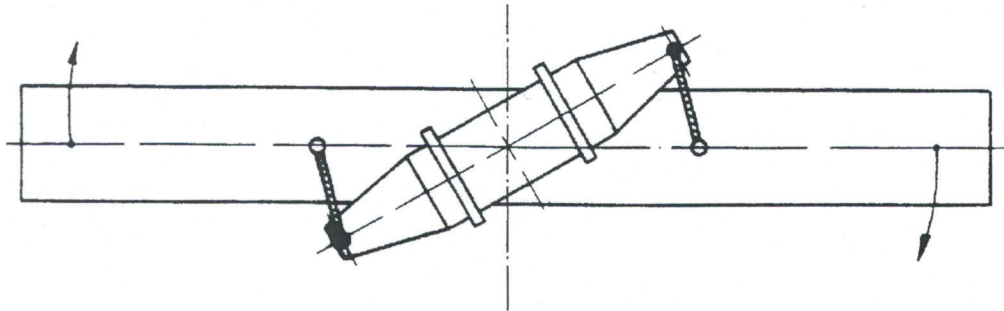
Ausgangsstellung  
initial position



When the slewing unit is switched on, the driving torque (moment of action) is supported by the load at rest; the moment of reaction generates a rapid stressing of the rope field acting in the opposite direction of the desired load rotation (see figure 2).

Figure 2:

In this position, the slewing unit is switched off. By switching-off, a rigid connection between slewing unit and load is achieved. Now the stressed rope field accelerates the slewing unit / load unit:

Figure 3:

This figure shows the turning load after acceleration. Further acceleration is not possible, as the stressing of the rope field is negated and the accelerating moment has thus become zero. At this moment, the rigid connection between slewing unit and load is cancelled by free-wheel control.

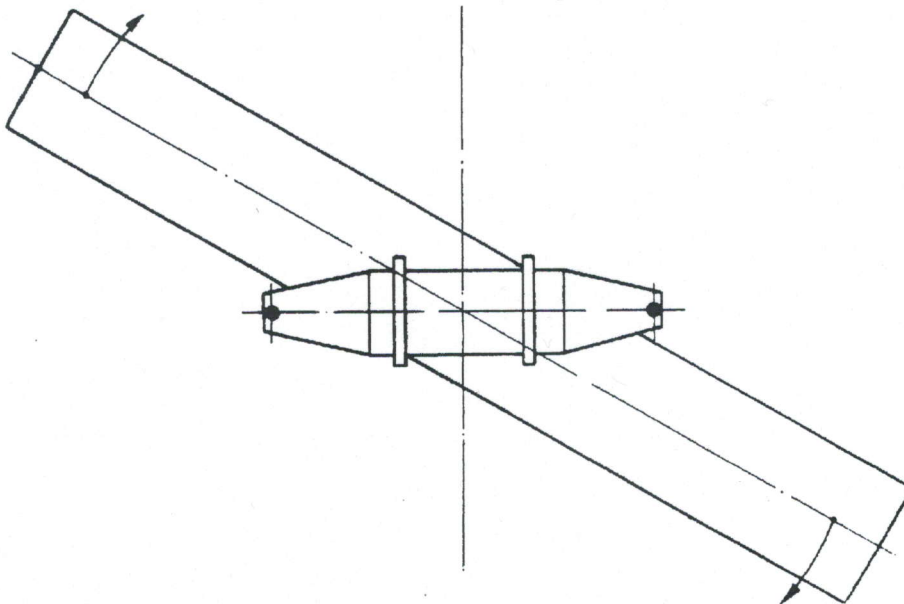
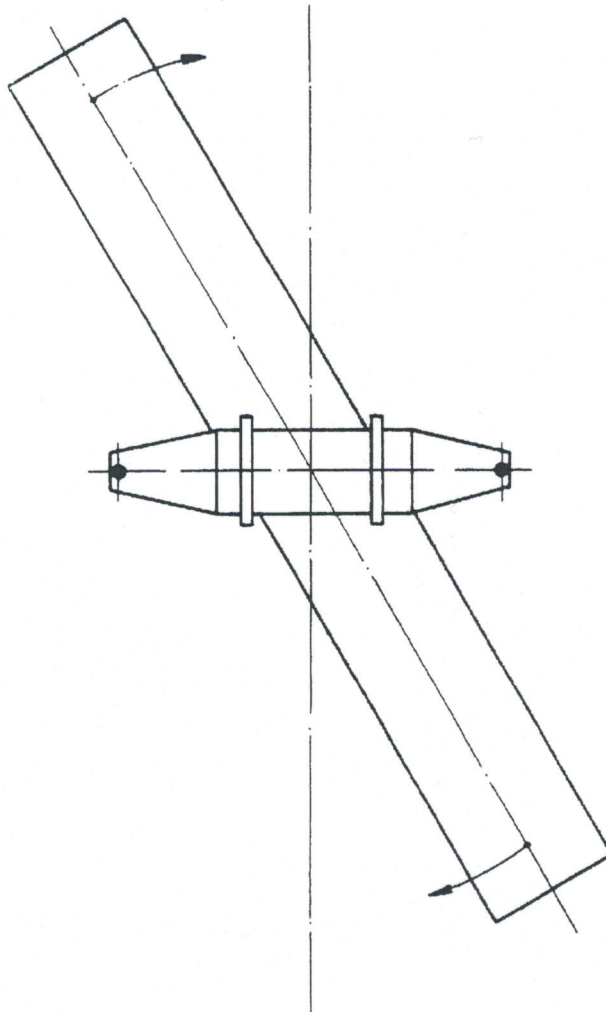


Figure 4:

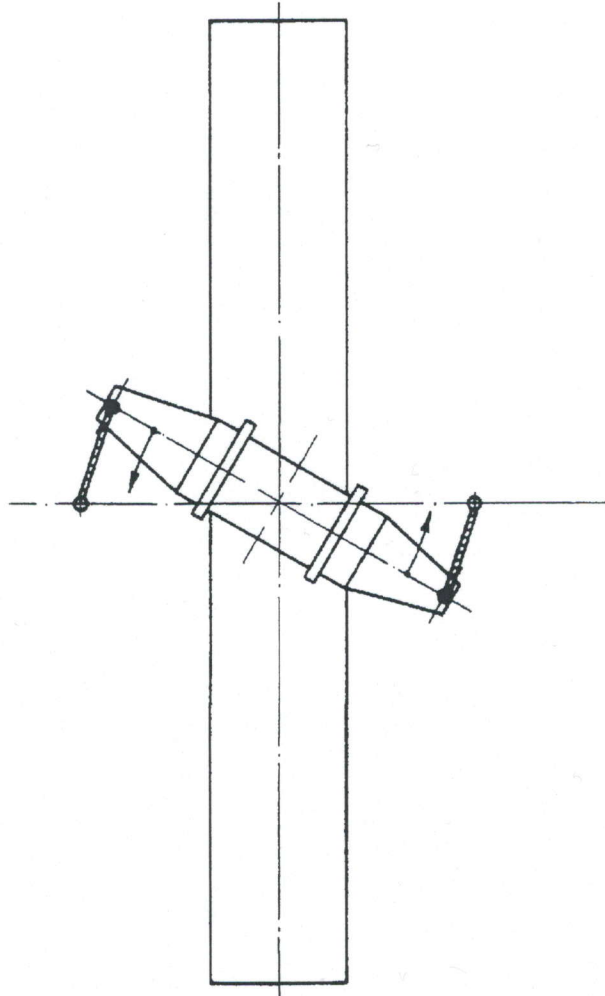
Owing to the energy of rotation, the load can continue to freely turn clockwise, only the friction moment of the output end bearing acting in a decelerating manner.



In order to bring the load to a standstill at a turning angle of  $90^\circ$ , a braking phase must be initiated. This is achieved by again rigidly connecting slewing unit and load, the further rotation of the whole unit resulting in a stressing of the ropes in the opposite direction. (The free-wheel control is inoperative again).

Figure 5:

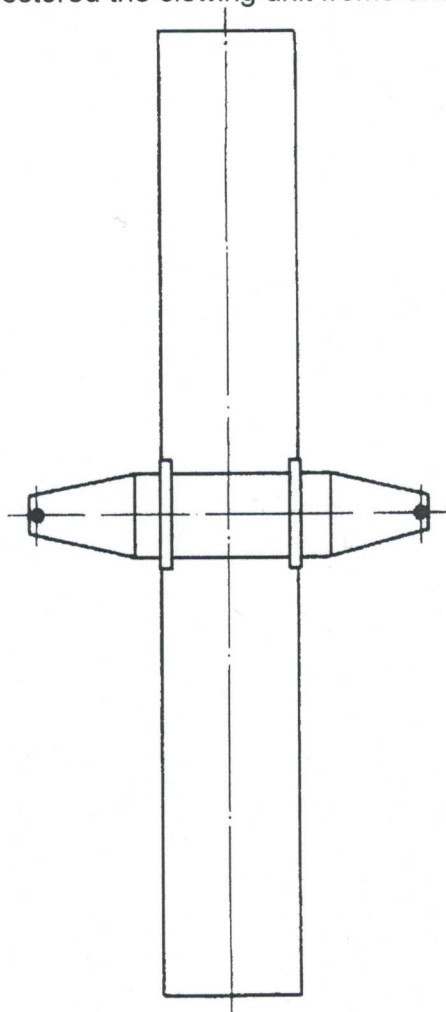
This figure shows the stressed rope field. The rope field torque has steadily increased from zero and decelerates the rotating load until the desired angle of rotating load until the desired angle of rotation of the load of  $90^\circ$  has been reached.



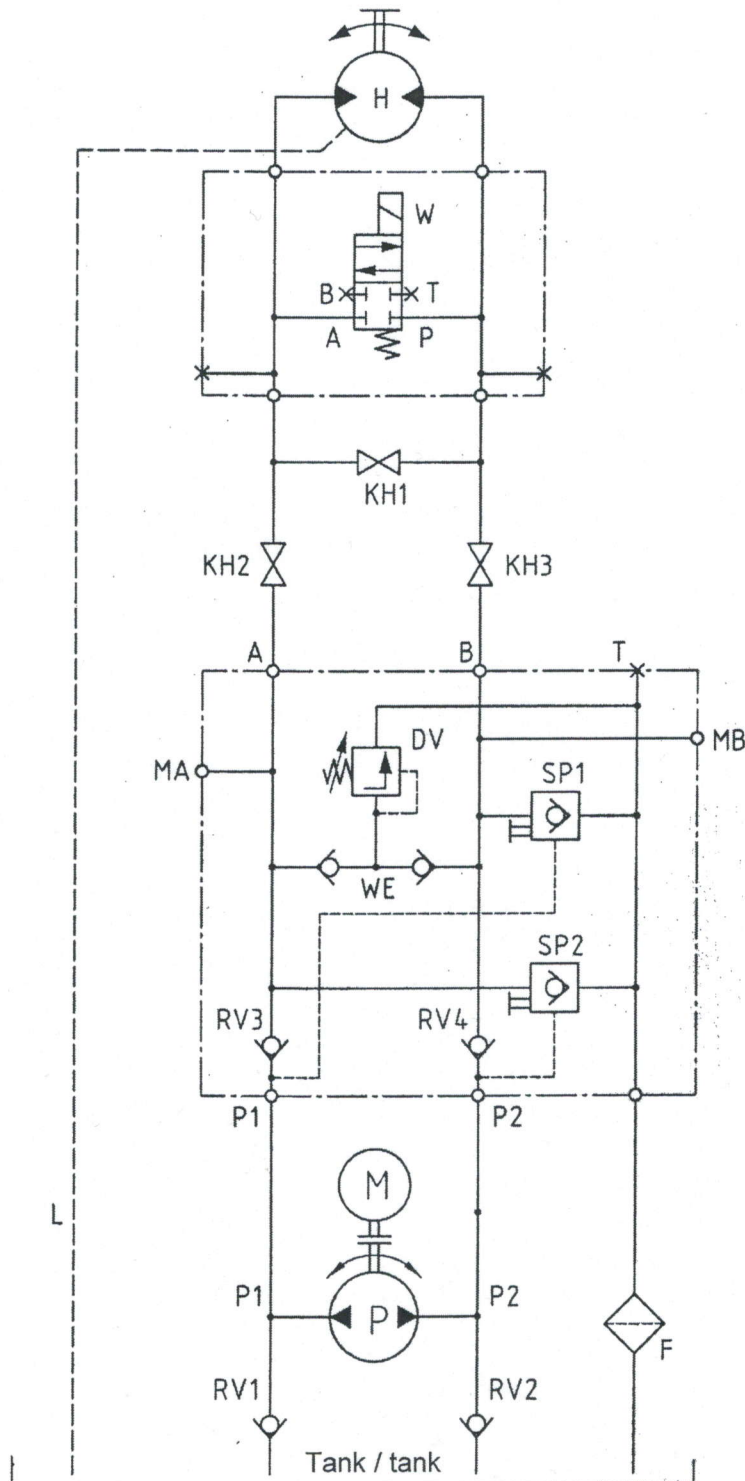
As soon the angle of rotation of  $90^\circ$  has been reached, the rigid connection of slewing unit and load (free-wheeling) is cancelled from second to the other in order to avoid another acceleration as a result of the rope field being stressed in the opposite direction.

**Figure 6:**

By the cancelling of the rigid connection between slewing unit and load (free-wheel position), the rope field torque has restored the slewing unit from one second to the other to its initial position.



**2.2 Hydraulic diagram**      **2300.8999**  
**max. working pressure: 230 bar**



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**OPERATING INSTRUCTIONS  
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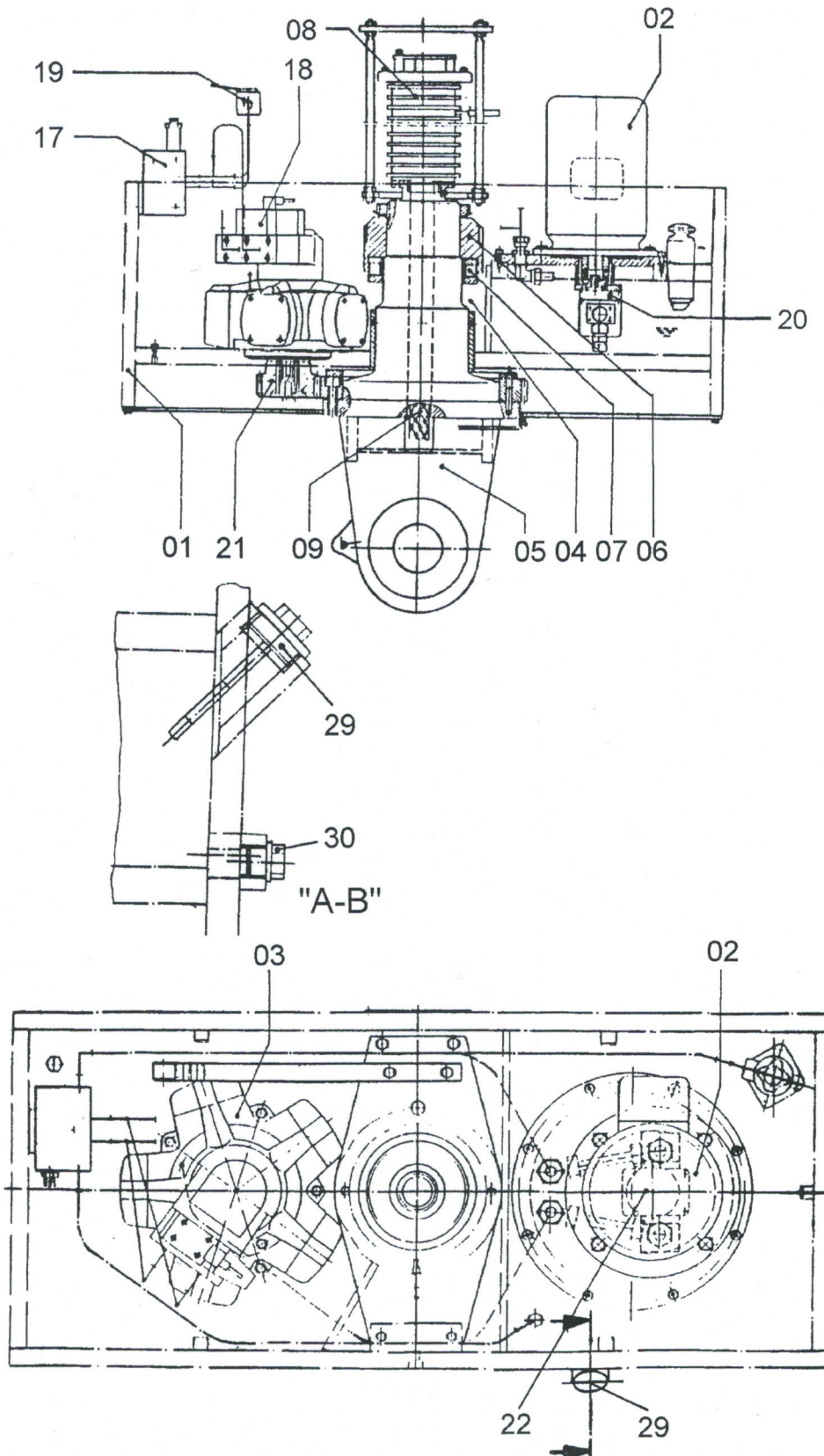
**A 16.0805-2 E**

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**5-2**

|          |                             |
|----------|-----------------------------|
| A        | = pipe (turn right)         |
| B        | = pipe (turn left)          |
| DV       | = pressure relief valve     |
| F        | = filter                    |
| H        | = hydraulic motor           |
| KH       | = ball cock                 |
| L        | = pipe for leakage oil      |
| M        | = motor                     |
| MA, MB   | = pressure gauge connection |
| P        | = pump                      |
| P1, P2   | = pump connection           |
| RV1, RV2 | = nonreturn valve           |
| SP1, SP2 | = stop valve                |
| W        | = solenoid valve            |

### 2.4 Parts list





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## Legend

- 01. traverse
- 02. motor
- 03. hydraulic motor
- 04. hub
- 05. axle
- 06. nut
- 07. axial-cylindrical roller bearing
- 08. slipring transmitter
- 09. cable
- 17. control block
- 18. solenoid valve
- 19. ball cock
- 20. pump
- 21. pinion
- 22. hydraulic unit
- 29. oil dipstick
- 30. oil drain plug



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# OPERATING INSTRUCTIONS SLEWING UNIT

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**8-1**

## 3.0 Operating instructions

### 3.1 Observation of UVV-regulations

The UVV-regulations for load bearing equipment must be complied with.

### 3.2 Putting into operation

#### 3.2.1 Initial start-up

- Existing stress-strain relations with those of the slewing unit are be checked out (refer to machine card)
- Check the hydraulic oil level (see point 4.2.1).  
Replace oil which may have been lost during transportation of equipment (look at oil recommendation, page-no. 11-1)
- In temperatures below  $-10^{\circ}\text{C}$ , either preheat the hydraulic oil or slewing unit with closed check valves in spacer from 2-3 min., 1 min. locked against over pressure until the oil has warmed to about  $0^{\circ}\text{C}$ .
- Attach the suspension to the load-bearing equipment, check the load bearing capacity of the hoist (crane).
- Connect the plug-in connector to the slewing unit. If the motor rotates in the wrong direction, unclamp the plug-in connector and interchange terminal leads. If the plug outlet is not hocked up, connect it according to the hydraulic diagram.
- Tension relief in the line, rubber hose must not exert any tension on the plug outlet.
- Check all screw connections for leaks.
- After approx. 50 operational hours, clean hydraulic oil filter (see page-no. 10-1)

#### 3.2.2 Daily start-up

- Check oil level (see point 4.2.1)
- In temperatures below  $-10^{\circ}\text{C}$ , either preheat the hydraulic oil or slewing unit with closed check valves in spacer from 2-3 min., 1 min. locked against over pressure until the oil has warmed to about  $0^{\circ}\text{C}$ .
- Check tension relief and plug-in connector.
- Check all screw connections and hoses for leaks.

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**OPERATING INSTRUCTIONS  
SLEWING UNIT**

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**9-1****3.3 Operation****3.3.1 Information for operation**

**ATTENTION!** Collisions of the slewing unit with other objects are to be avoided in order to prevent damages.

**3.3.2 Manual operation**

The slewing unit is controlled by its actuation switch. In order to turn the slewing unit clockwise, the actuation switch must be switched to the right. When reversing the sense of rotation, the actuation switch must be switched to the left. When letting go of the slewing unit's actuation switch it will automatically return to its zero position.

**3.4 Shut-down**

- The slewing unit must be put down on a suitable support (wooden beam) since otherwise the turner can be damaged.
- During putting down it is to be seen to it that the hanging cable is neither broken nor pinched.
- The plug-in connector is to be provided with protective caps.
- In addition, for longer periods out of service, the slewing unit should be exercised every 3 month to prevent corrosion and gumming of the hydraulic oil in the control elements.

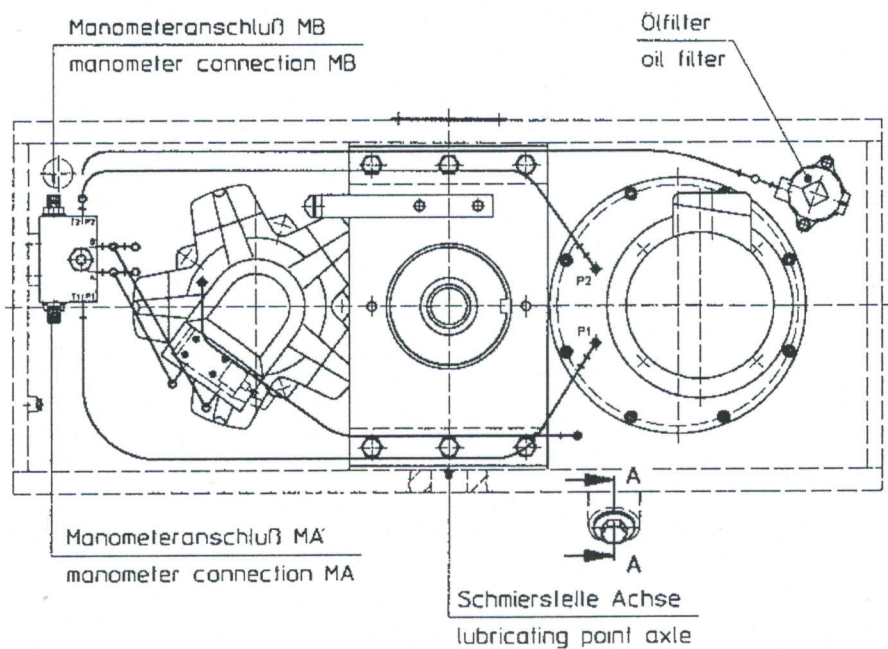
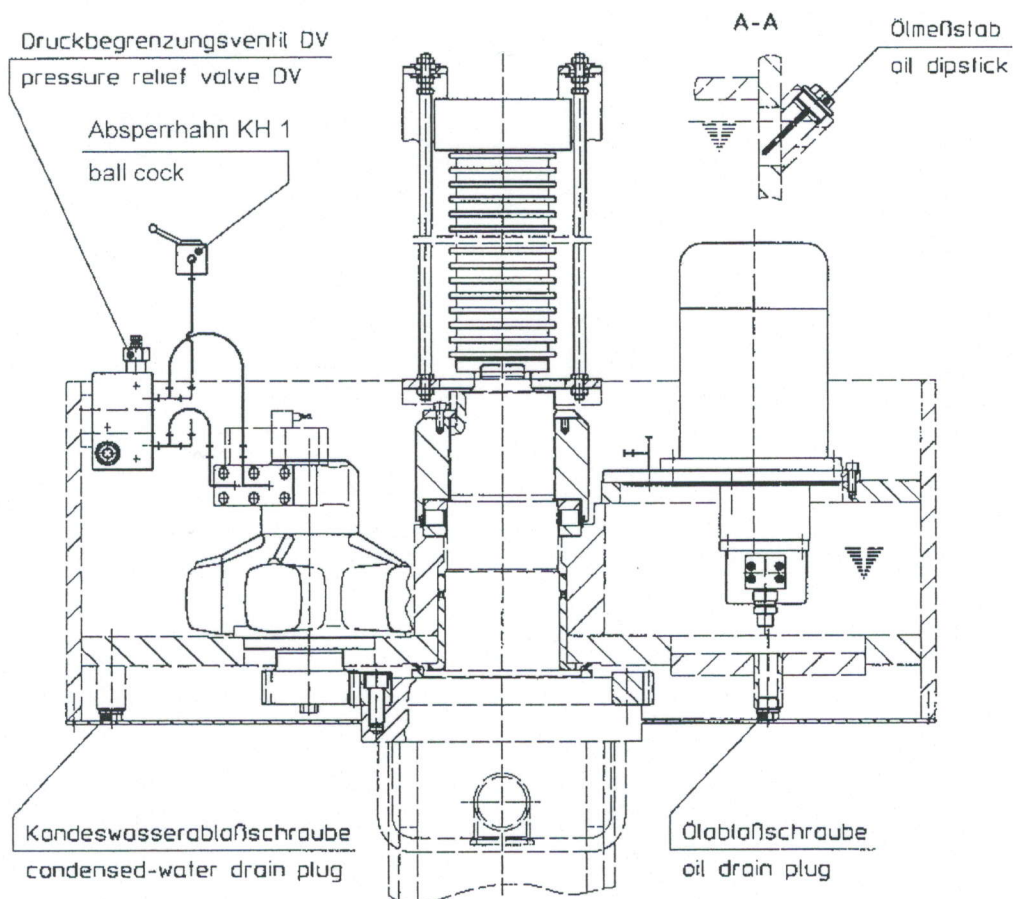
**3.5 Reoperation**

- Observe all the specifications of point 3.2 and 3.3
- Check the device for possible damages

**3.6 Transportation**

- The slewing unit must be transported on a suitable support since otherwise damages can occur.
- The slewing unit is to be secured against overturning.

#### 4.0 Maintenance and repair





## **4.1 Maintenance**

### **4.1.1 Oil change**

The first oil is to be carried out after about 500 service hours.  
Further oil changes every 1000 service hours - after one year at the latest.

- Oil brands (recommended hydraulic oil page-no. 11-1)
- Proceeding:
  1. Set down the opened slewing unit
  2. Unscrew oil dipstick (tank ventilation)
  3. Put a suitable collecting basin under the oil drain plug
  4. Unscrew and clean oil drain plug
  5. Drain oil out of the tank (at operating temperature of the slewing unit)
  6. Clean the tank
  7. Replace oil filter insert
  8. Rescrew oil drain plug
  9. Fill the tank (via oil filter)
  10. Check oil level (see 4.2.1)

### **4.1.3 Oil filter**

In case of new slewing units, the filter insert is to be replaced after about 50 service hours, in any other case after every oil change.  
Furthermore, the oil filter must be checked after repairs of the hydraulic system and, if necessary, the filter insert must be cleaned or replaced.

### **4.1.4 Motor**

After 15000 service hours, the bearings are to be cleaned and half-filled with lithium-saponified grease, dropping point 160-180°C.

## 4.2 Required checks

### 4.2.1 Check oil level

- The slewing unit must be standing level
- Maximum or minimum oil level is read from oil dipstick
- Excessive oil will cause overheating in the tank
- Insufficient oil will cause overheating in the hydraulic system and can lead to pump damage
- If oil needs to be topped up, see table of approved oil, page-no. 11-1

### 4.2.2 Check and adjust pressure (see page-no. 10-1)

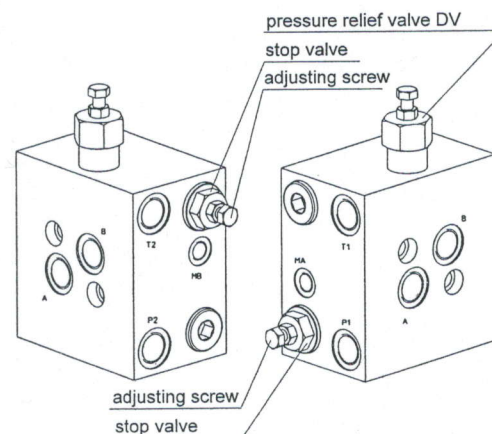
Pressure can be checked at following points

- Pressure gauge connection MA or MB
- The max. pressure is adjusted by resetting pressure relief valve DV

**ATTENTION!** During the adjusting procedure, the blocking screw of the stop valve must be totally screwed in (to be tightened with key). After adjustment the screw must be loosened again and and screwed totally back.

If the unit is equipped with stop-cocks KH2, KH3, they must be closed during measuring operations. The stop valves must not be closed in this case.

control block



### 4.2.3 Miscellaneous checks

- Check hoses for damage
- Check bolted joints for leaks
- Check all threaded fasteners
- Check for bearing wear
- Check plug-in connector and tension relief
- Monitor oil temperatures



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### **4.3 Repairs**

#### **4.3.1 General**

The following points should always be observed when making repairs:

Disconnect the slewing unit from the power supply. After every disassembly or repair, it is necessary to check the maximum pressure given on the data plate resp. the machine card. Suitably calibrated manometers are to be used.

#### 4.4 Table: Oil recommendation - Hydraulic fluids

For normal operation, a hydraulic fluid of ISO-viscosity VG 46 shall be used. For summer or winter operation, a hydraulic fluid of ISO-viscosity VG 68 or FB 32 is to be used according to the ambient temperature.

Some suitable fluid types are listed below, others may be chosen according to the a. m. criteria:

|                          | ← <b>Winter</b>                   |                              | <b>Summer</b> →              |
|--------------------------|-----------------------------------|------------------------------|------------------------------|
| ISO viscosity            | VG 32                             | VG 46                        | VG 68                        |
| Standard                 | HVLP 32<br>acc. to DIN 51524/3 HV | HLP 46<br>acc. to DIN51524/2 | HLP 68<br>acc. to DIN51524/2 |
| Range of oil temperature | -20°C to +80°C                    | -5°C to +80°C                | 0°C to +80°C                 |
| Ambient temperature      | < -5°C to -20°C                   | -5°C to +30°C                | > +30°C                      |
| ARAL                     | Vitam HF 32                       | Vitam GF 46                  | Vitam GF 68                  |
| BP                       | ENERGOL SHF 32                    | ENERGOL HLP 46               | ENERGOL HLP 68               |
| CASTROL                  | HYSPIN AWH 32                     | HYSPIN AWS 46                | HYSPIN AWS 68                |
| ESSO                     | UNIVIS J 32                       | NUTO H 46                    | NUTO H 68                    |
| MOBIL                    | DTE 13                            | DTE 25                       | DTE 26                       |
| SHELL                    | Tellus Oel T 32                   | Tellus Oel 46                | Tellus Oel 68                |
| TEXACO                   | Rando Oil HD AZ-32                | Rando Oil HD B-46            | Rando Oil HD C-68            |

In case these fluids are not obtainable, ATF oils (Automatic Transmission Fluid) can be used as an alternative.

|         | <b>ATFoils according to<br/>specification<br/>type A, Suffix A</b> | <b>DEXRON® quality</b>           |
|---------|--------------------------------------------------------------------|----------------------------------|
| ARAL    | Getriebeöl SGF 84 (gear oil)                                       | Getriebeöl ATF 22 (gear oil)     |
| BP      | Autran ATF                                                         | Autran DX II                     |
| CASTROL | Castrol TQ                                                         | Castrol TQ-Dexron II, Fluid 9226 |
| ESSO    | ATF-Type A Suffix A                                                | ATF Dexron                       |
| MOBIL   | ATF 200                                                            | ATF 220                          |
| SHELL   | Donax TM                                                           | Donax TA                         |
| DEA     | Deafluid 1585                                                      | Deafluid 4011                    |

|                  | <b>Adhesive grease</b> | <b>Lithium saponified grease lubricant</b> |
|------------------|------------------------|--------------------------------------------|
|                  | <b>DIN 51513 BC</b>    | <b>DIN 51825/2 KTA-L2k</b>                 |
| <b>AGIP</b>      | FIN 332/F              | Longlime Grease 2                          |
| <b>ARAL</b>      | Sinit FZL 3            | Aralub HL 2                                |
| <b>AVIA</b>      | Avilub BB 21           | Avilub special grease WL                   |
| <b>BP</b>        | Energol WRL            | Energrease LS 2                            |
| <b>Calypsol</b>  | Eculit ST              | Calypsol H 442                             |
| <b>Castrol</b>   | Grippa 60 S            | Spheerol AP 2 LZV-EP<br>Spheerol E PL 2    |
| <b>DEA</b>       | Trixolit 2X            | Glissando 20                               |
| <b>DEFROL</b>    | Defrol BC              | Defrol Fett KTA-L2k                        |
| <b>ESSO</b>      | Surett Fluid 4K        | Beacon 2                                   |
| <b>FINA</b>      | Cabline 1060           | Marson LU                                  |
| <b>Fuchs</b>     | Duotac F 310 L         | Renolit MP                                 |
| <b>Mobil Oil</b> | Mobiltac D             | Mobilux 2                                  |
| <b>Shell</b>     | Cardium Fluid C        | Alvania R 2<br>Alvania G 2                 |


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## **5.0 Failure - Symptoms - Sources of failures**

| <b>- Failure</b>                                                    | <b>- Symptoms</b>                                                                                                                                         | <b>- Sources of failures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>5.1 Slewing unit does not work (axle does not turn)</b>          | <ul style="list-style-type: none"> <li>- motor is not running, motor does not receive current</li> <li>- current o.k.</li> <li>- motor running</li> </ul> | <ul style="list-style-type: none"> <li>- fuses</li> <li>- contactors</li> <li>- hoses</li> <li>- connecting terminal</li> <li>- sliprings and brushes in cable drum</li> <li>- plug-in connector</li> <li>- motor defect</li> <li>- nonreturn valve on the pump's suction hole is jammed (due to dirty oil)</li> <li>- pressure line pump / control block is defect</li> <li>- spring inside the pressure relief valve is broken</li> <li>- tubes are not tight</li> <li>- shut-off valve is still open</li> <li>- solenoid valve is defect (jammed)</li> <li>- motor is defect</li> <li>- pinion is defect</li> <li>- flow regulator is opened too wide</li> <li>- shuttle valve is defect</li> <li>- nonreturn valves are defect</li> </ul> |
| <b>5.2 Slewing unit does not render enough out-put (axle turns)</b> | <ul style="list-style-type: none"> <li>- turning time and number of rotations are considerably slower</li> <li>- torque is too low</li> </ul>             | <ul style="list-style-type: none"> <li>- pressure relief valve is maladjusted (see 4.2.2)</li> <li>- pump is worn</li> <li>- either dirt in the pressure relief valve or the spring is too old - pressure adjustment is required</li> <li>- oil level in the tank is too low<br/>In case the pump sucks air, this mostly leads to a destruction of the pump.</li> <li>- connection between pump and control block is loose or damaged</li> <li>- slide piston in the control block is jammed; this might be caused by foreign matter in the oil or a broken spring</li> <li>- tubes are not tight</li> <li>- solenoid valve is defect (jammed)</li> <li>- flow regulator</li> </ul>                                                           |