

S.C. CONFIND S.R.L.

Workover rig 40 tF with mast

MAINTENANCE MANUAL

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:1	Rev: 0

## Table of Contents

<b>1. WORKOVER RIG 40 tF WITH MAST MAINTENANCE MANUAL.....</b>	<b>2</b>
1.1 Cardanic transmission.....	2
1.2. Bevel gear.....	2
1.3. Chain transmission.....	3
1.4. Drawworks.....	5
1.5. Mast.....	8
1.6. The crown block.....	9
1.7. The traveling and hook block assy.....	12
1.8. Cooling system of the hoisting drum.....	14
1.9. Greasing chart and type of lubricants.....	17
<b>2. AM 12 – 40 37.300 VFACHASSIS MAINTENANCE.....</b>	<b>19</b>
<b>2.1. Oils changes.....</b>	<b>20</b>
2.1.1. Oils for drive axles.....	20
2.1.2. Oils for hydraulic steering.....	21
2.1.3. Lubricants.....	22
2.1.4. Oils for Cat transmission.....	22
2.1.5. Oils for Cat engine.....	22
2.1.6. Antifreeze solution.....	24
<b>2.2. Maintenance works.....</b>	<b>28</b>
2.2.1. Cardan shaft maintenance.....	29
2.2.2. Rear axles maintenance.....	30
2.2.3. Front axle type PF 7 maintenance.....	31
2.2.4. Steering system lubrication.....	31
2.2.5. Front and rear suspension maintenance.....	32
2.2.6. Brake system maintenance.....	33
2.2.7. Air dryer maintenance.....	33
2.2.8. Cabin tilt and latch system's maintenance.....	34
2.2.9. Hydraulic power steering maintenance.....	34
2.2.10. Electrical System maintenance.....	35
<b>2.3. Maintenance instructions.....</b>	<b>38</b>
<b>2.4. Protection measures.....</b>	<b>38</b>
<b>2.5. Design and functional features.....</b>	<b>20</b>
<b>3. ELECTRONIC EQUIPMENT FOR MEASUREMENT AND RECORDING - EMIX –AM-100.....</b>	<b>37</b>
<b>4. MAINTENANCE MANUAL FOR CAT C9 ACERT+TH 31 E 61A.....</b>	<b>42</b>
<b>5. MAINTENANCE OPERATIONS AGAINST MODULE CHANGE GEARS, MOTOR PARAMETERS INDICATING PANEL AND SPEED CONTROL PANEL-GENERAL STOP+JUNCTIONS BOX.....</b>	<b>47</b>
<b>6.SAFETY REGULATIONS.....</b>	<b>50</b>

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:2	Rev: 0

## 1. WORKOVER RIG 40 tF WITH MAST –MAINENANCE MANUAL

### 1.1. CARDANIC TRANSMISSION

The cardanic transmission drives the movement from the main distribution box of the Roman 37.300 VFA chassis to the input shaft of the bevel gear and consists of a cardan shaft and the connection parts with the flanges end connections.

#### Technical features of the cardanic shaft

-Maximum torque.....	1200kgfm
-Total length in retracting position.....	1485mm
-Flanges diameter .....	Ø180mm
-Holes number of the flange.....	8 holes
-Pitch diameter.....	Ø155,5 mm
-Flange diameter to the other end.....	Ø155 mm
-Holes number of this flange.....	4 holes
-Pitch diameter.....	Ø130 mm
-Maximum standing.....	110 mm

#### Integral parts of the cardanic transmission:

Item	Denomination	Drawing No - Standard	Pcs.
1	Cardan shaft	89.391055.6949	1
2	Screw M 16x1,5x50	SR EN 28765	16
3	Nut M 16x1,5	STAS 4412	16

#### BEWARE!

Lubrication: Weekly have to be lubricated the grooves and crosses with LiCa3 grease.

### 1.2. BEVEL GEAR

The bevel gear is a subassembly fitted on the main frame, that serves to change the movement direction from engine-transmission→ main distribution box (on the carrier)→ the chain transmission which power the hoisting drum.

The bevel gear has orthogonal axles, placed on horizontal plane and the gear wheels have curved teeth, manufactured by hardening alloy steel, machined with modern technologies and grinded by means of Klinghelberg machine tools.

Input and output shafts are made of high alloyed steels with quenching heat treatment at high levels of the yield.

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:3	Rev: 0

Each shaft is placed on two axial bearings with cylindrical roller and an axial ball bearing with split inner ring. This type of axial bearing has the clearance preset by the manufacturer (no adjustment needed).

The lubrication of the gear and bearings is provided by the gearbox oil bath, as follows:

- at the input shaft bearings, oil is collected in the sacs set on the body of the bearings and is distributed between bearings located on the same end of the shaft and between bearings and its cover when there is only one bearing;
- to the output shaft bearings, oil is collected in a sac existing on the body of the inner radial bearing and distributed through a pipe between the two bearings of the outer bearing;
- the shaft sealing is achieved by gaskets, that are working on grinded and chromium plate surfaces;
- the front seals will be provide with rubber "O" rings and Marsit gaskets;
- for free access to the gear, the casing is provided with a cover easy to be removed;
- as the oil is not forced to go out by gaskets due to the inside pressure of the casing, the bevel gear has an airing device.

On the main frame fixed on the chassis, the bevel gear is fitted in four points: two on the input casing and two on the output casing. The installation on the truck chassis must be done carefully so as not to cause deformation of the bevel gear casing, which can disturb the contact conditions of the bevel gear and can cause noise and vibration.

One of the connections of the input shaft is for cardan shaft from the engine and the other is free, a facility for user or for future developments of the rig.

### Technical features

- Input power.....300 CP
- Maximum output torque .....max. 600 daNm
- Maximum input torque.....max. 588 daNm
- Gear ratio.....30/29 = 1,034
- Input speed.....max. 3100 rpm
- Output speed.....max. 3000 rpm
- Bevel gear type.....taper, with curved teeth, SARATOV type

### Maintenance:

- Weekly check:
    - oil level and if necessary refill it;
    - visual inspection for oil leakage, in which case it will dismantle and move into a workshop for repair.
    - at 400 hours the oil has to be changed.
- Winter and summer oil recommended type is **T90EP2, 14 liters.**

### 1.3. CHAIN TRANSMISSION

The chain transmission translates the power from the bevel gear to the main drum.

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:4	Rev: 0

It is protected by a metal casing, situated on the left side of workover rig, which has also the role of oil bath and support housing of the main drum pneumatically clutch.

Integral parts of the chain transmission :

Three rows chain with bolts and short chain links for main drum	1 pc.
The casing of the chain transmission	1 pc.



The chain transmission casing is fitted on the side wall of the drawworks frame by fastening with screws. The chain transmission casing it is a metallic construction, welded, having on the right side wall holes for the screws used for fastening on the side wall of the drawworks' frame and on the left side wall three sight glasses and a circular cover for free access in the sprocket area.

The seal of the chain transmission casing, towards to the drawworks wall is achieved by rubber ring gaskets-for each fastening screw separately-and for visiting circular covers with rubber ring type "O" mounted in their dedicated places inside the cover.

The seal for the visiting covers existing on the top side, for the lateral visiting covers where chain tighten device are installed and for visiting circular covers is achieved with Marsit type gaskets.

Oil level visor installed with the chain transmission casing:



 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:5	Rev: 0



Oil drain plug installed with the chain transmission casing

**Maintenance:**

➤ **Daily checking :**

- any oil leakage;
- uniform work, without abnormal noises;
- half of the sprocket has to be immersed in oil .

- At 400 hours the oil has to be changed. The quantity of oil: 25 liters.

Recommended oil:

- summer..... T80-EP2 oil according to SR 8960:1996
- winter..... T90-EP2 oil according to SR 8960:1996

➤ **Monthly checking:**

- transmission setting on the drawwork frame;

**1.4. DRAWWORKS**

The drawworks is the most important subassembly of the hoisting system of the workover rig, having the following functions:

- run in / pull out the tubing and the sucker rods;
- fishing jobs;
- well casing (columns) repair;
- production tests;

**Technical features**

- Maximum pull load at 3-rd layer.....10 tf
- Wire rope diameter.....Ø22 mm
- Wire rope length.....300 m
- Break rim's dimension .....Ø1100x212 mm
- Pneumatic clutch type.....AB 700x200

The drawworks as a whole consists of a frame made of welded steel sheets and hot rolled profiles, which is fitted to the basic frame of the unit by means of two connection plates, each one bolted in 4 points.

The drum shaft is assembled inside the frame by means of two bearings, with related elements to fix and seal having installed the hoisting drum itself by means of bearings.

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:6	Rev: 0

The hoisting drum has installed by one side and the other one the brake drums with double walls, for cooling with fresh water circulated inside the cooling system. The sprocket together with sprocket hub is fixed on the shaft by means of two bearings and to whom is fitted the coupling drum. The power is translated from the coupling drum to the hoisting drum by means of AB 700x200 pneumatic bladder clutch.

This is protected by a protection cover.

The shaft of the hoisting drum has adapted at one end a double rotary joint for cooling fluid of the break rims.

The hoisting drum ensure the proper rolling for the wire rope (OD=Ø22mm) by means of the spirally wrapper sector.

The break rims with double walls for cooling fluid are linked together through pipes that provide the circulation of cooling fluid through both rims, simultaneously.

### **Attention!**

**- During the winter time the cooling fluid should be a mixture of antifreeze and water, in proportion of 50%, to avoid freezing.**

The clutch of the hoisting drum is pneumatic bladder type and is operated from the control panel of the driller through a 3/2 pneumatic distributor.

The braking system for the hoisting drum is provided with two shoe band brakes and balancing systems, manually operated from the chief driller location.

The hoisting break control system, is manual achieved from the brake lever located near the chief-driller and conducted to the shoe band brakes by means of dedicated balanced brake shaft and related system of levers and joints.

Safety braking for the hoisting drum is pneumatic done and can be operated either manual (from the pneumatic control distributor located on the chief driller control panel), or automatically, either from the upper limit device for the traveling and/or from hook load limiter transducer (EMIX-100).

The upper limit device for travelling-block is adjustable in accordance with the number of the wire rope (string-up system) and the position for said traveling block inside of mast.

Limiting of the hook load is electronically done and limited at 40tf.

### **Maintenance:**

#### ➤ **Daily checking:**

- the wire rope conditions
- no any oil and grease on the brake shoes surfaces are allowed;
- uniform work without abnormal noise ;
- no any cracks for the band brakes, or the component parts;

#### ➤ **Weekly:**

- check the fastening of the drawworks with the base frame;
- check the uniform distance between the break bands and the rim;
- check the wear of the brake shoes ;
- greasing of the hoisting drum shaft:

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:7	Rev: 0

- greasing points.....3
- grease.....LiCa3
  - o greasing the brake rims:
- greasing points.....2
- grease.....LiCa3

### BEWARE!

- The drawworks maintenance is done regularly and also to the rigging up of the workover rig to another location, respecting those mentioned at chapter „Exploitation”.
- One of the most important operations is the brake system adjustment, to determine the appropriate position of the lever and to compensate the wear of the brake shoes.
- When the brake shoes wear is so big that it cannot be compensated by adjusting, the bolt is to be inserted for the next hole of the fork, acting against the tighten screw, accordingly.
- When the thickness of the brake shoes was reduced by wear under 10 mm, the brake shoes have to be changed. Please note that should replace all the brake shoes on both bands, although some are less worn.
- Also, when you'll change the brake shoes or making adjustments, you should check if the nut buffer is at equal distance to the wall of its place. Otherwise, it must be rotated to reach the middle position, and then secured with threaded pin.

The traveling and hook block assy. has to come down easily even when is not loaded and in generally, for easy rotate of the hoisting drum when is not coupled, it is necessary that the brake shoes to be totally released from the braking rims when is weak enough. The uniform release of the brake bands is obtained by adjusting the limiters.

#### **The limiters adjustment is made as follow:**

- screw nuts of the suspension of the brake bands fastening, as necessary so the springs raise the shoe bands from the rim when brake is released;
- fastening of the brake and fixed the brake lever in this position with drive chain;
- rotating supports rollers up when the distance between the roller and band is 3-4mm, when the brake is rim tight, then is fixed with the nuts in this position;
- release the brake and check if the helper spring lifts the band from rim and release uniformly around the rim periphery, if not, has to fasten or break out the helper nut.

#### **Possible defaults for the drawworks:**





S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG  
40 tF WITH MAST**

Code:  
P3668-MI.E

Date:  
June 2012

Sheet:8

Rev: 0

Item	Default	Symptoms	Root of default	Corrective actions
1.	The wear of the brake rims	Heavy wear of the brake shoes and low efficiency of the brake	Normal wear on time	Changing the brake rim
2.	Decreased the brake efficiency	Lowering the brake lever under normal working position	Normal wear on time	Changing the brake shoes
3.	Movement is not transmitted to the drawworks	Lack of movement to the hoisting drum	Breaking of a chain	The broken chain has to be replaced
4.	Oil leakage on the gaskets level and to the chain oil bath	Oil leakage	The gaskets wear or the damage of the seals or „O” rings	Have to remove the damaged gaskets, seals or „O”
5.	Strong vibrations of the drawworks and abnormal clearances of the shafts	Strong vibrations of the drawworks	Abnormal wear of the bearings	Remove the bearings
6.	The hoisting drum is not released automatically when the traveling and hook block assy. set height is achieved	Decrease of the safety distance between the traveling and hook block assy. and the crown block less than admitted value	Limiter damage	Check the limiter position and if necessary adjust or replace it

### 1.5 THE MAST

The mast is one of the main parts of the workover rig that enables handling of the tubular and the sucker rods with big length.

The mast is done in two sections (upper and lower ones) telescopic, being fitted on the chassis frame, by means of the fix mast section.

It has the possibility to be raised-up and telescoped in vertical working position.

The upper section is foldable against the lower one, by means of a hydraulic cylinder; by extension the two sections at final telescoping will achieve around 20.5 m height for complete extended mast, from the ground up to crown block frame.

Other parts which come assembled with the mast are: locking and safety device

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:9	Rev: 0

(both in the raised position as well as in the folded position), fixed side stairs up to the top, no buckling device for the rod of the folding hydraulic cylinder and that support for transport position of the travelling block.

At the top of the upper section of the mast is assembled the crown block and on the bottom for the lower section there are the safety locking lug where this section is bolted with mas fix section, after the mast is raised in working position.

On the mast is mounted the lighting system and on the top the obstacle signaling red lamp.

In the working position the mast is anchored by means of four guy lines, two fixed at the level of the crown table and two fixed at the top of the lower section; at the other side, the guy lines are fixed with the mast gin pole.

For transport position, the mast is provided with a locking system of the upper section against the lower one (to avoid the longitudinal movement when the braking is ON) and side locking system, to avoid the displacement related to the whole assembly.

### **WARNING!**

**Observe the enforcement of the guy lines (for details, please to see dedicated paragraph, inside OPERATIONAL MANUAL, when comes about guy-lines!)**

#### **Maintenance:**

- **Before each raising you have to grease:**
  - raising bolt using LiCa3 grease;
- **Before each raising you have to check:**
  - articulations;
  - the non – rotating plate of the bolt and the mounting screws;
  - the bolts of the raising cylinder belong the mast and the base frame;
  - guy lines conditions ;
  - mast locking system;
- **Weekly grease:**
  - mast locking system with LiCa3 grease;
- **Weekly checking:**
  - actual status of the bearing members of the mast;
  - actual status of the cross bars ;
  - setting the mast with the gin pole;
  - the safety locking of the upper into the lower section .

## **1.6 THE CROWN BLOCK**

The crown block is an independent subassembly of the workover rig, where its table is welded with the upper section of the mast.

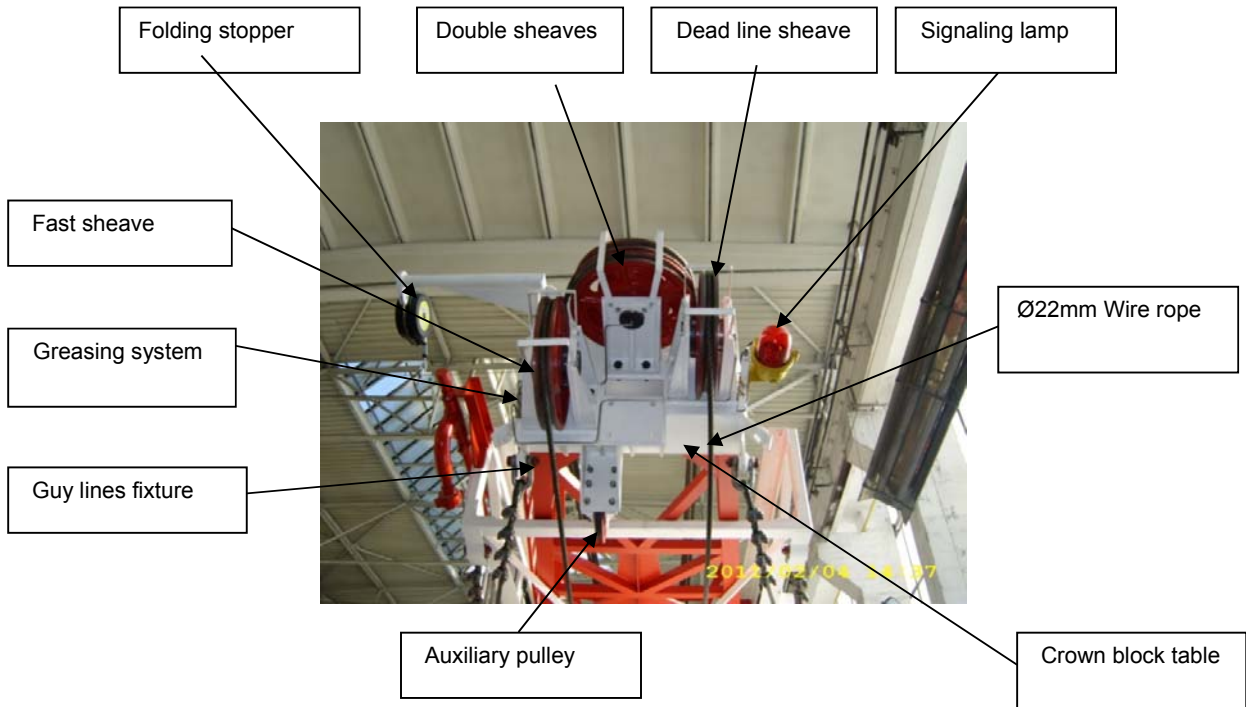
 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:10	Rev: 0

Scope of work for the crown block as follows:

- a. together with the traveling and hook block assy. they compose a pulley mechanism, which reduces the wire rope load by 2 x the number of used pulleys, against the hoisting load;
- b. to be the fixing point for the other pulleys (with different functions inside of the workover rig) ;
- c. to discharge the load created by hoisting load, by means of the assembly mast→ fix mast support→ base frame→ leveling jacks→ ground;
- d. to provide connection points for the mast guy lines, on the upper section ;
- e. to be the fix support for the folding stopper.

### Technical features

- Maximum hook load .....40tf;
- Diameter of the hoisting wire rope.....Ø22mm (7/8in);
- Number of sheaves.....4;
- Sheave diameter..... Ø560mm;
- Design according to.....API 8C ; 4F ;



 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:11	Rev: 0



The main parts of the crown block are the followings:

Description	Drawing no.	Quantity
2 pulleys assy. (for load)	P3376-06-01-00	1pc.
1 pulley assy. (for load)	P3376-06-02-00	2pcs.
Crown block table assy.	P3376-06-04-00	1pc.
1 pulley assy. (auxiliary no.1)	P3376-06-22-00	1pc.
1 pulley assy. (auxiliary no.2)	P3376-06-05-00	1pc.
1 pulley assy. (tong balancing no.3)	P3376-06-23-00	1pc.

The crown block table is made using U300 profile, assembled by welding, provided with the hoisting wire rope crossing areas. On it are mounted all the pulley assemblies through welded plates on it, both, on upper side (hoisting pulleys assy.) and on the lower side (hydraulic winch and tong balancing pulleys assy.).The assemblies fitting is realized with screws, secured with crown nuts and splints.

The pulleys assemblies consist of two side supports which support the pulleys axle.

The block bearings can be lubricated by a ball nipple greaser fitted on the axle end and the bearings are protected by means of weatherproof covers.

The radial-axial bearings are set to the axial clearance by means of special nuts secured by elastic deformation and the axle-pulley assy. is positioned and axial secured by clamps fitted in the axle transversal channels and attached to the supports.

The wire rope sheave is secured against axial displacement by a segmented ring, inside fixed between the outer bearing rings but the hoisting and tong balancing pulley is axial free, the displacement is limited by friction bushings.

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:12	Rev: 0

### Maintenance:

#### ➤ Daily checking:

- fitting of the supports with pulleys on the crown block table;
- the welding of the guy lines fixing plates.

#### ➤ Weekly should be greased with LiCa3 grease:

- 2 pulleys assy.-2 pcs. (4 greasing points);
- 1 pulley assy.-2 pcs. (2 greasing points);
- hoisting pulley assy.-3 pcs. (3 greasing points);

### Possible defaults for the crown block

Item	Default	Root of default	Corrective actions
1	Clearance of the wire rope sheaves	Bearings wear	Bearings replacement
2	Looseness of the fastener elements	Vibrations	Fastening and securing against the looseness
3	Blocking of the wire rope sheave	Abnormal greasing	If needed, replacing the bearings and checking the centralized lubrication system

## 1.7 THE TRAVELING AND HOOK BLOCK ASSY.

The 3.22.560 MC 65 type traveling and hook block assy. is intended for the following operations:

- a) handling the tubing and sucker rods during the workover works ;
- b) running in and pulling out for the tubing and sucker rods ;
- c) running in and pulling out for the tools used in special operations inside the well.

The 3.22.560 MC 65 traveling and hook block assy. has 3 wire rope sheaves (for  $\varnothing$  22 mm wire rope) with outside diameter of 560 mm, but for AM12/40 workover rig is in use 2 sheaves, only.

The traveling and hook block assy. makes the connection between the crown block and the hoisting load by means of the wire rope, passed over the crown block and traveling and hook block assy. sheaves. The wire rope passed over the sheaves is fitted as follow: one end of it at the dead line anchor and the other at on the hoisting drum.

To every use of the traveling and hook block assy. will be controlled that the hoisting sheaves to be easy rotated by hand, the bearings to be grease and the sheaves show no cracks in the groove.



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL**  
**WORKOVER RIG**  
**40 tF WITH MAST**

Code:  
P3668-MI.E

Date:  
June 2012

Sheet:13

Rev: 0

The grooves of the sheaves, will be controlled weekly not to show an advanced stage of wear.

The fitting nuts of the axles will be weekly checked to be secured against the looseness.

**Technical features:**

- Maximum hook load capacity .....65 tons
- Hook stroke .....100 mm
- Wire rope diameter .....22 mm
- Number of used sheaves (3 available).....2 pcs.
- Overall dimensions:
  - Length ..... 2210 mm
  - Width ..... 600 mm
  - Height.....400 mm
  - Fabrication.....according to API – Spec 8C

**POSSIBLE DEFAULTS**

Item	Default	Root of default	Corrective actions
1	The wear of the axial bearing with cylindrical rolls	- Used with abnormal load - No greasing	- Replace the bearing - Greasing
2	Wear of the sheave groove surface	- No hardened groove	- Replace the sheave
3	Abnormal rotation of the sheaves	- Broken or blocked bearings	- Cleaning or replacement of the bearings
4	Operating noises and vibrations of the sheave	- Wearing bearings	- Bearing replacement
5	Groove edges are broken	- Operation shocks	- Sheave replacement
6	The hook can't be locked against the rotation	- The spring of the lock is broken or looseness	- Spring replacement
7	Is not possible to lock the rider	- The spring of the lock is broken or looseness	- Spring replacement

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:14	Rev: 0

For greasing use the LiCa 3 grease – according to ISO 6743-4, as below mentioned:

Operation	Maintenance period (hours)				
	daily	weekly	100	500	3000
Greasing of: sheaves bearings (axle), glass, bolt, hook		X			
Greasing of axial bearing				X	
Greasing of rider bolt			X		
Greasing of index				X	
Checking lock, closing geometry and spring	X				
Checking the rider, fitting geometry and cracks	X				
Checking links shoulders, geometry and cracks					X
Checking sheaves wear, easy rotation, groove geometry					X

### 1.8 COOLING SYSTEM OF THE HOISTING DRUM

The cooling system of the hoisting drum consists of:

- pumping unit (water pump and hydraulic power motor);
- cooling unit ( radiator and fan hydraulic power motor;
- control distributor on the chief driller hydraulic panel;
- rotary coupling for water;
- associated line pipes.

The hoisting drum accommodates two braking rims at each end, that allow inside water circulation, the entrance and the exit of the water being realized by means of double rotary joint.

The parts of the cooling system are:

DESCRIPTION	Quantity
Base frame(radiator + water pump + fan)	1 pc.
Fitting plate for water pump + power motor	1 pc.
Water pump support	1 pc.
Hydraulic power motor support	1 pc.
Water pump	1 pc.
Hydraulic power motor	1 pc.
Elastic coupling	1 pc.
Cooling radiator	1 pc.
Fan	1 pc.
Hydraulic motor to power the fan	1 pc.
Water pipe	1 pc.

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:15	Rev: 0

Expansion tank, airing plug, level indicator	1 pc.
Rotary coupling	1 pc.

**Technical features:**

- working fluid.....mixture: (-60°C) antifreeze (50%) + soft water (50%)
- quantity of working fluid  
inside of system .....80 liters
- water pump .....equips the RABA D2156 HMN8 engine
- hydrostatic motor powering  
water pump & fan.....OT 200 P2 version G28P2
- radiator.....equips the RABA D2156  
HMN8 engine code 81.06.101.6066
- fan.....equips the RABA D2156 engine  
code 89 06.604.2000
- expansion tank level indicator..... FOX LVT3 cod 061104 CE
- rotary coupling .....coupling duo 525-931 Bibus SES SRL Timisoara





 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:16	Rev: 0

The cooling system of the hoisting drum is fitted on the main platform, fabricated in profiles and steel sheets by welding.

Inside of the workover rig, is located on the right side (direction of travel) of the platform, near the water double rotary joint.

The cooling system for hoisting drum consists of the following subassemblies:

- **Pumping unit**, having a hydraulic power motor drive, a flexible coupling with rubber elements and a water pump used on D2156 HMN8 RABA engines. The water pump and the hydraulic motor are mounted on special supports screwed on a fixing plate, fitted in the structure of the base frame.
- **The cooling unit** (radiator and the fan-motor power assy.) is mounted on rubber pads on the same support.  
The fan assy. consists of a hydraulic power motor and a fan placed in front of the radiator.
- **Water double rotating joint** is mounted at the head of the hoisting drum shaft and allow the entry/the exit of the cooling water in/ from the hoisting rims of the hoisting drum.  
Attached to the double joint you have the inlet pipe (from water pump) and discharge pipe (to radiator).
- **The expansion tank** contains the fluid usable storage of the system, allowing also the accumulation of the fluid after by heated.

**BEWARE!**

**No needed for greasing or lubricating for the cooling system!**



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG  
40 tF WITH MAST**

Code:  
P3668-MI.E

Date:  
June 2012

Sheet:17

Rev: 0

**1.9. GREASING CHART AND TYPE OF LUBRICANTS**

Item	Denomination of part	Symbol	The greasing place	Lubricant quality		Quantity	No. of greasing points	Time of greasing	Filing and greasing system
				Summer	Winter				
1	Crown block								
1.1	2 pulleys assy. – 2 pcs.	1	Axel	Grease LiCa3	Grease LiCa3	0,75 kg	4	Weekly	Ball nipple UA3
1.2	1 pulley assy. – 1 pc.	2	Axel	Grease LiCa3	Grease LiCa3	0,75 kg	2	Weekly	Ball nipple UA3
1.3	Hoisting pulley assy.- 3 pcs.	3	Axel	Grease LiCa3	Grease LiCa3	0,75 kg	3	Weekly	Ball nipple UA3
2.1	Traveling & hook block assy.	4	Axel	Grease LiCa3	Grease LiCa3	0,75 kg	3	Weekly	Ball nipple UA3
2.2	Traveling & hook block assy.	5	Glass	Grease LiCa3	Grease LiCa3	0,75 kg	3	Weekly	Ball nipple UA3
2.3	Traveling & hook block assy.	5	Bolt	Grease LiCa3	Grease LiCa3	0,75 kg	3	Weekly	Ball nipple UA3
2.4	Traveling & hook block assy.	5	Hook	Grease LiCa3	Grease LiCa3	0,75 kg	3	Weekly	Ball nipple UA3
3	Folding cylinder	6	Bolts	Grease LiCa3	Grease LiCa3	0,75 kg	2	Weekly	Ball nipple UA3
4	FIXED MAST SECTION	7	Section bolt	Grease LiCa3	Grease LiCa3	0,15 kg	2	Weekly	Ball nipple UA3
5	DRAWWORK – Hoisting drum	8	Hoisting drum shaft	Grease LiCa3	Grease LiCa3	0,75 kg	3	Weekly	Ball nipple B3;SA2
		9	Brake axle	Grease LiCa3	Grease LiCa3	0,75 kg	2	Weekly	Ball nipple A3
6	DRAWWORK – Brake control	10	Bearings	Grease LiCa3	Grease LiCa3	0,15 kg	14	Weekly	Ball nipple UA1
7	BEVEL GEAR	11	Gear bearings	Oil T90EP2	Oil T90EP2	14 l	1	Change at each 400 hours; when necessary fill the oil	Lubrication by splashing
8	DRILLER's PLATFORM	12	Articulation	Grease LiCa3	Grease LiCa3	0,05 kg	2	Weekly	-
9	FOLDABLE WORKING PLATFORM	13	Adjustable screw	Grease LiCa3	Grease LiCa3	0,15 kg	4	Weekly	
10	CARDANIC TRANSMISSION	14	Cardan cross	Grease LiCa3	Grease LiCa3	0,15 kg	4	Weekly	Ball nipple A3



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL**  
**WORKOVER RIG**  
**40 tF WITH MAST**

Code:  
P3668-MI.E

Date:  
June 2012

Sheet:18

Rev: 0

Item	Denomination of part	Symbol	The greasing place	Lubricant quality		Quantity	No. of greasing points	Time of greasing	Filing and greasing system
				Summer	Winter				
11	CHAIN TRANSMISSION	1 5	Cover window	Oil T90EP2	Oil T80EP2	25 l	1	Change at each 400 hours	Lubrication by splashing

**THE SYMBOLS OF THE GREASING CHART**



S.C. CONFIND S.R.L.  
Câmpina

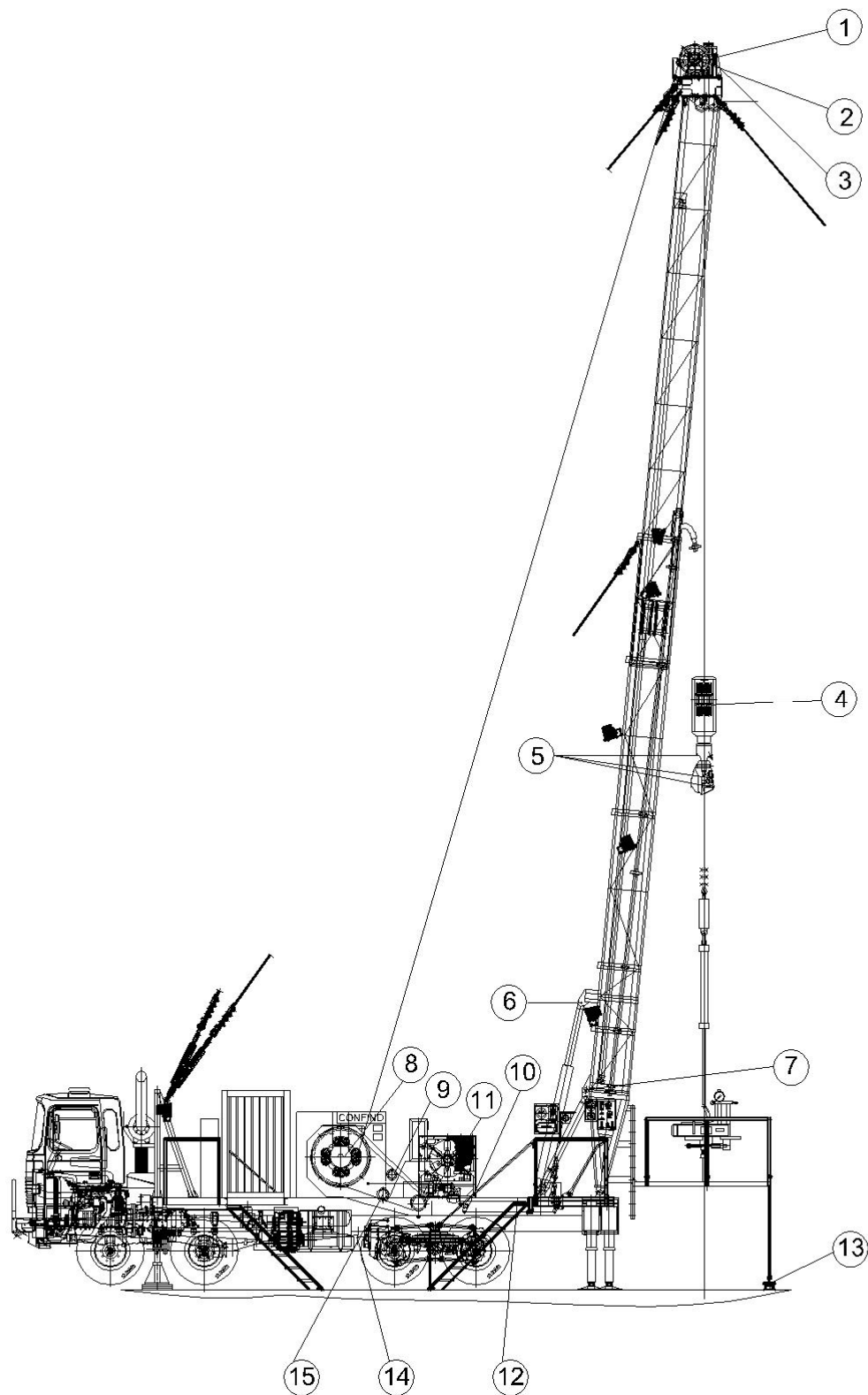
**MAINTENANCE MANUAL**  
**WORKOVER RIG**  
**40 tF WITH MAST**

Code:  
P3668-MI.E

Date:  
June 2012

Sheet:19

Rev: 0



**2. 37.300 VFA Chassis maintenance**



S.C. CONFIND S.R.L.  
Câmpina

## MAINTENANCE MANUAL WORKOVER RIG 40 tF WITH MAST

Code:  
P3668-MI.E

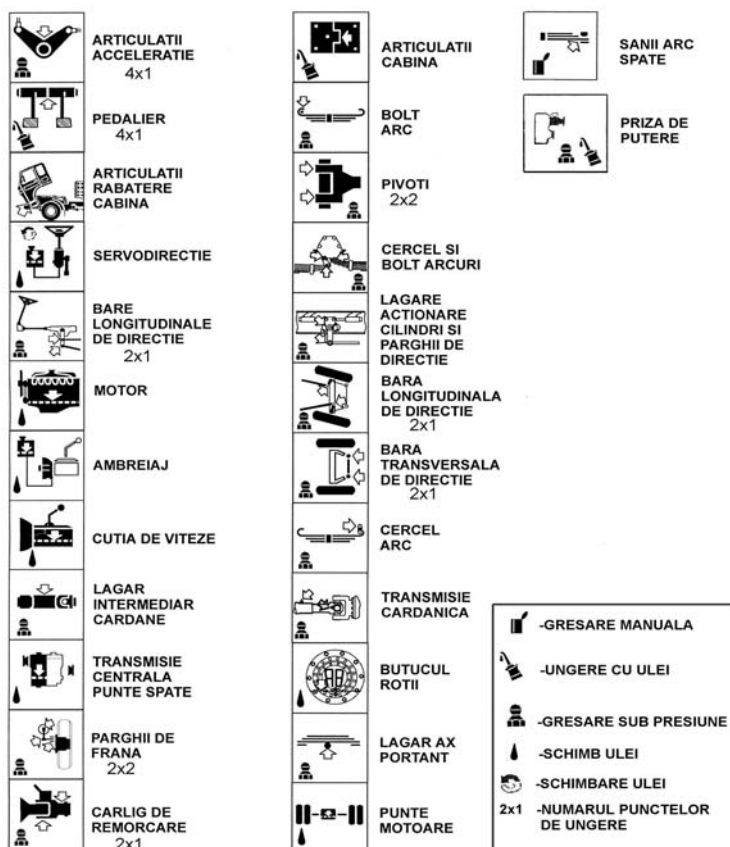
Date:  
June 2012

Sheet:20

Rev: 0

For a proper maintenance of the vehicle, follow maintenance references and periods.  
Not performing at time the maintenance operations indicated in these instructions and confirmed in "*Service and warranty booklet*" will void the warranty.

### Diagram of icons for lubrication points



#### \* Translator's note

Articulatii acceleratie = acceleration joints  
Pedalier = pedale  
Articulatii rabatere cabina = Cabin tilting joints  
Servodirectie = Servo-steering  
Bare longitudinale de directie = Steering longitudinal rods  
Motor = Engine  
Lagar intermediar cardane = Intermediary shaft bearing  
Transmisie centrala punte spate = rear axle center transmission  
Parghii de frana = Brake lever  
Carligh de remorcarea = Towing hook

Articulatii cabina = Cabin joints  
Bolt arc = Spring bolt  
Pivoti = pins  
Cerel si bolt arcuri = Spring bolts and ring  
Lagare actionare cilindrii si parghii de directie = Bearings operating the steering cylinders and steering levers  
Bara longitudinal de directie = Steering longitudinal rod  
Cerel arc = spring ring  
Transmisie cardanica = Cardan drive  
Butucul rotii = wheel hub  
Lagar ax portant = lift axle bearing  
Punte motoare = driving axle

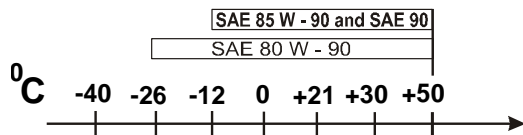
Gresare manuala = manual lubrication  
Ungere cu ulei = oil lubrication  
Gresare sub presiune = Pressure greasing  
Schimb ulei = Oil change  
Schimbare ulei = oil changing  
Numarul punctelor de ungere = No. of lubrication points

 <b>S.C. CONFIND S.R.L.</b> Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:21	Rev: 0

## 2.1 OIL CHANGE

### 2.1.1 OIL USED FOR DRIVE AXLES

PRODUCT NAME	FIELD OF USE	CLASSIFICATION (quality level)		VISCOSITY	OIL NAME	MANUFACTURER
		API	MIL			
Oil	ROMAN DRIVE AXLES	API GL4	MIL L-2105	SAE 90 80W90 85W90	T 90 EP2S SR 8960 Oil	SC PETROTEL SA Teleajen
					ARAL EP SAE 85 W 90	ARAL Germany
					SHELL SPIRAX EP 90	SHELL INTERNATIONAL
					VALVOLINE TRANS GEAR OIL X 18 SAE 80 W 90	VALVOLINE INTERNATIONAL
					CARRIER HIKOMOL SAE 80 W 90	MOL HUNGARIAN OIL & GASCO
					T 90 EP3 Oil	LUBRIFIN SA Bv.
		GL5	L-2105 B.C.D	SAE 90 80W90 85W90	ARAL HYP SAE 85 W 90	ARAL Germany
					ESSO GEAR OIL GX SAE 80 W 90	ESSO Italy
					CARRIER HIKOMOL K SAE 85 W 90	MOL HUNGARIAN OIL & GASCO
					OMV GEAR B SAE 85 W 90	OMV Austria
					TAMOIL TAMGEAR MP SAE 80 W 90	TAMOIL Italy
					SHELL SPIRAX HD SAE 80 W 90	SHELL INTERNATIONAL
					VALVOLINE HP GEAR OIL X MD SAE 80 W 90	VALVOLINE INTERNATIONAL
					MOGUL TRANS SAE 80 W 90-H	KORAMO Czech



### 2.1.2 OILS USED FOR HYDRAULIC STEERING SYSTEM

PRODUCT NAME	FIELD OF USE	OIL QUALITY	OIL NAME	MANUFACTURER
Oil	Hydraulic servo-mechanism for ROMAN steering	ATF type A Suffix A (TASA)	TA 32 STAS 10582 oil	SC LUBRIFIN SA Bv
			CARRIER HIDROFLUID A	MOL HUNGARIAN OIL & GASCO
			ARAL SGF 84 typ A Suffix A	ARAL-Germany
			SHELL DONAX TM	SHELL INTERNATIONAL
		Or ATF-DEXRON II	ESSO-ATF-D	ESSO-Italy
			TAMOIL ATF IID	TAMOIL-Italy
			VALVOLINE ATF TYPE D	VALVOLINE INTERNATIONAL

 <b>S.C. CONFIND S.R.L.</b> Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:22	Rev: 0

			CARRIER ATF	MOL HUNGARIAN OIL & GASCO
--	--	--	-------------	---------------------------

### 2.1.3 LUBRICANTS

PRODUCT NAME	FIELD OF USE	CLASSIFICATION (quality level)	RECOMMENDED PRODUCT	MANUFACTURER
LUBRICANTS	Hubs, wheels, joints, fork, adjustment rod, bearings for ROMAN products	Multifunctional lubricant NLGI-2-Li (K2K-30) (Based on Li hydroxystearate) with dripping point at min. 180°C.	UM 185 Li 2 STAS 12721	LUBRIFIN S.A. Bv.
			ESSO-BEACON 2	ESSO-Italy
			SHELL ALVANIA R 2	SHELL- Austria
			CARRIER LZS 2	MOL Hungarian Oil & Gas Co
			TEXACO MULTIFAK EP 2	TXACO-Belgium
			ARAL- Langzaitfett H Li 2-K P2K-30	ARAL-Germany
	Grooves, cardan shafts, crossheads, spring bolts for ROMAN products	Multifunctional lubricant NLGI-2- Li + MOS2 (based on 12 Li hydroxystearate with molybdenum sulphur) with dripping point at min. 180°C.	76 UNOBA EP2	UNOCAL LUBRICANTS Co 76
			CARRIER LZS 2 EP	MOL Hungarian Oil & Gas Co
			UM 185 Li2M SR 12 627	LUBRIFIN S.A. Bv
			MOLYTEX EP2	TXYCO-Belgium
			ESSO-BEACON Q2	ESSO-Italy
			SHELL RTINAX AM	SHELL-Austria
		CARRIER LZS 2 EP	MOL Hungarian Oil & Gas Co	

### 2.1.4 OILS FOR CAT TRANSMISSION

Type of automatic transmission	Type of fluid / liquid	Oil viscosity	Temperatures			
			° C		° F	
			Min.	Max.	Min.	Max.
CATERPILLAR TH31-E61	Caterpillar TDTO Caterpillar TDTO-TMS Caterpillar TO-4	SAE 0W20	-40	22	-40	72
		SAE 0W30	-40	30	-40	86
		SAE 5W30	-30	30	-22	86
		SAE 10W	-20	22	-4	72
		SAE 30	10	50	50	122
		TDTO-TMS	10	50	50	122

**NECESSARY QUANTITY: 46 liters**

**BEWARE! Also consult the power group operating and maintenance manual C91-TH31 CATERPILLAR, SEBU8462**

### 2.1.5 OILS FOR CAT ENGINE

Field of use	Oil quality	Oil name	Manufacturer
CATERPILLAR C9-ACERT	API CG-4 (preferred oils)	CATERPILLAR – DEO	CATERPILLAR SUA
		MULTIGRAD	
		TAMOIL SUPER DIESEL	TAMOIL Italy

 <b>S.C. CONFIND S.R.L.</b> <b>Câmpina</b>	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG</b> <b>40 tF WITH MAST</b>	Code: P3668-MI.E	Date: June 2012
		Sheet:23	Rev: 0

		TURBO SAE 15W40	
		OMV Truck-SAE 15 W40	OMV AUSTRIA

**NECESSARY QUANTITY: 35 liters**

Viscosity recommendations:

Lubricant Viscosities for Ambient Temperatures		
Viscosity Grade	Ambient Temperature	
	Minimum	Maximum
SAE 0W-20	-40 °C (-40 °F)	10 °C (50 °F)
SAE 0W-30	-40 °C (-40 °F)	30 °C (86 °F)
SAE 0W-40	-40 °C (-40 °F)	40 °C (104 °F)
SAE 5W-30	-30 °C (-22 °F)	30 °C (86 °F)
SAE 5W-40	-30 °C (-22 °F)	50 °C (122 °F)
SAE 10W-30 <sup>(2)</sup>	-18 °C (0 °F)	40 °C (104 °F)
SAE 10W-40	-18 °C (0 °F)	50 °C (122 °F)
SAE 15W-40	-9.5 °C (15 °F)	50 °C (122 °F)

### Engine oil change intervals

tip ulei multigrad	intervalul de schimbare a uleiului			
	conditii de operare			
	Normal	incarcare mare consum motorina peste 43 litri / ora	continut de sulf in motorina 0.3% — 0.5%	altitudine peste 1830 m (6000 ft)
Cat DEO Preferred	250 hr	250 hr	250 hr	250 hr
Cat DEO-ULS Preferred	250 hr	250 hr	250 hr	250 hr
API CH-4 11.0 minimum TBN <sup>(4)</sup> Preferred	250 hr	250 hr	250 hr	250 hr
API CH-4 TBN <sup>(4)</sup> below 11.0	250 hr	250 hr	250 hr	250 hr

**\* Translator's note**

Tip ulei multigrad = Multigrade oil type

Interval de schimbare a uleiului = Oil change interval

Conditii de operare = Operating conditions

Normal = normal

Severe = Severe

Incarcare mare consum motorina peste 43 litri / ora = High load diesel consumption over 43 liter / hour

Continut de sulf in motorina = Sulphur content in diesel

Altitudine peste 1830 m (6000 ft)= Altitude over 1830 m (6000 ft)





S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

Sheet:24

Rev: 0

**BEWARE!**

**To change the oil and the oil filter consult the power group operating and maintenance manual C91-TH31 CATERPILLAR, SEBU8462**

**2.1.6 ANTIFREEZE SOLUTION**

TYPE OF ANTIFREEZE:

- Preferred: - CAT (ELC)
- Accepted: - CAT DEAC or an antifreeze acc.to ASTM D6210 standard

**ANTIFREEZE CAPACITY: 70 LITERS**

Antifreeze lifetime:

durata de utilizare a antigelului	
antigel	durata de utilizare
Cat® ELC	965.606 Km (600.000 miles), 12000 ore sau 6 ani
Commercial coolant that meets the Caterpillar EC-1 specification	482.803 Km (300.000 miles), 6000 ore sau 3 ani
CAT® DEAC	321.869 Km (200.000 miles), 3000 ore sau 3 ani
Commercial Heavy-Duty coolant that meets "ASTM D6210"	241.402 Km (150.000 miles), 3000 ore sau 2 ani

*\* Translator's note*

Durata de utilizare a antigelului = antifreeze lifetime

Antigel = antifreeze

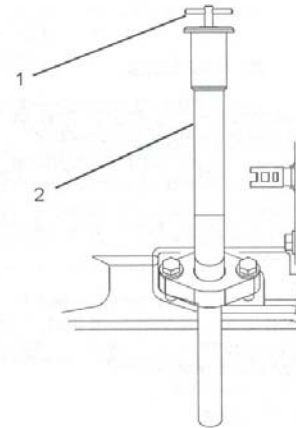
Durata de utilizare = lifetime

Ore sau 6 ani = hours or 6 years

Ore sau 3 ani = hours or 3 years

Ore sau 2 ani = hours or 2 years

**Also consult the power group operating and maintenance manual C91-TH31 CATERPILLAR, SEBU8462**



**CAT Transmission Gear Box oil**

Use SAE 85 W 90 oil.

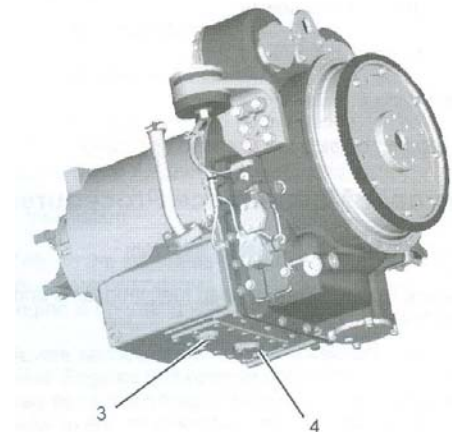
- CATERPILLAR C91-TH31 power group maintenance works


**Consult the operating and maintenance manual C91-TH31 CATERPILLAR SEBU8462**

**TH-31 gearbox oil change**

**BEWARE!**

Observe the provisions in force regarding *\*illegible* and storage of used oils.



 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG TRUCK</b> <b>MOUNTED WITH MAST</b> <b>AM 12/40 TYPE</b>	Code: P3668-MI	Date: June 2012
		Sheet:25	Rev: 0

**CAUTION:**

Contact with the transmission or transmission oil may cause burns.

Following steps will be done when to have the oil change for CAT transmission:

1. Start the engine.
2. The transmission must work until the oil reaches the working temperature.  
(Between 66 -82 degrees Celsius).
3. Leave engine in idle.
4. Put transmission on NEUTRAL (N).
5. Engage hand brake.
6. Clean the area around the filling plug (1) rotate the plug and take out the oil level dipstick (the oil level dipstick is joint to the plug); 2- filling tube  
**Note:** *the filling tube is placed on the right side of the transmission.*
7. Clean the area around the draining magnetic plug (3) (see image attached). Take of the cork (3) or sealing ring, allow oil to drain in a suitable collector.
8. Clean magnetic plug (3) and put it back together with the sealing ring.
9. Fill the transmission with new oil through a filling tube (2) up to the maximum level of the oil level dipstick („FULL”).
10. Tighten filling plug (1) to ensure necessary sealing.
11. Check for any leakages.
12. Take out again the oil level dipstick.
13. Clean the oil level dipstick with a cloth.
14. Enter again the oil level dipstick on the filling tube and tighten the plug.
15. Take out the oil level dipstick and check the level. This must be between „LOW” and „FULL”. If necessary add oil.
16. Enter the oil level dipstick and tighten the plug.
17. Bring the transmission at a working temperature (between 66 -82 degrees celsius).
18. Repeat steps 12-14.
19. Take out the oil level dipstick and recheck the level. Add oil if necessary up to the maximum level („FULL”).
20. Enter the oil level dipstick and tighten the plug.
21. Stop engine.
22. Clean oil traces.

**Check transmission oil level**

- Check oil level at regular intervals:
- Check oil level with the vehicle stationary on an leveled ground;
- Begin checking before using the transmission (at cold);
- Untighten oil filler plug (1) take out the oil level dipstick and check the oil;
- The transmission is functional if the oil level is between „LOW” and „FULL” ;
- Enter the oil level dipstick and tighten the plug.
- Bring the transmission at a working temperature (66-82 degrees celsius).
- Recheck level; if necessary add oil for completion.
- Put back the oil level dipstick and tighten the plug.

**NOTE**

Whenever you check the oil, check wether the transmission presents any oil leakages.

**CAUTION!**

Insufficient oil in transmission can damage it. Risk of accidents

SC CONFIND SRL	Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania Tel/Fax : 0244333160 / 0244374719 ; E-mail : <a href="mailto:confind@confind.ro">confind@confind.ro</a>
----------------	--



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

Sheet:26

Rev: 0

Oil in transmission

46 liters

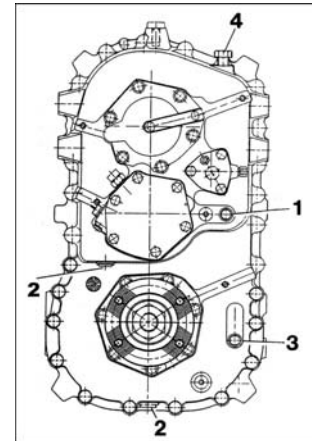
**MAIN DISTRIBUTION GEAR**

**Oil change :**

- Drain oil when case is warm;
- Drain oil through draining plugs (2);
- Clean plug magnets;
- Install plug in its place;
- Enter oil through filler plug (1);
- Oil level must be up to level inlet threshold (3);
- Install plugs (1) and (3) with new fittings;
- Clean and reinstall the vent plug (4)

**CAUTION!**

*Ensure the right oil level. If oil level is below admitted limit, greasing is critical and distributor's gear life decreases. Too high level causes excessive splashing and overheating of the case.*



**Oil: TEXAMATIC 7045 E - 7.3 l.**

Operation – specific maintenance works	Running in (1000 up to 5000 km)	At every 6 months	Every year
<b>Technical safety – general information</b>			
- CHECK: status, correct operation, efficiency, sealing, location, damage, corrosion, attrition			
- Engine (visual inspection)	X	X	
- Hydrostatical actuation of fan	X	X	
<b>Preventive inspection</b>			
- CHECK: status, correct operation, efficiency, sealing, location, damage, corrosion, attrition			
- Fuel system	X	X	
- Intake / exhaust system	X	X	
- Actuation: engine brake flap	X	X	
- Cooling system and heating system, including impurities found on water radiator and intercooler fins	X	X	
- Cable links, setting and location: battery, starter, alternator, mass point	X	X	
- CHECK: firm location, safety degree			
Nuts and bolts: engine, engine support	X		

SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

Sheet:27

Rev: 0

Retighten cooling and air intake system hose clamps	X		
---	---	--	--

Checks and minor maintenance works	Running in (1000 up to 5000 km)	At every 6 months	Every year
CHECK: fluid / liquid level			
- engine oil	X	X	X
- hydrostatic actuating for the fan		X	X
- cooling / heating system		X	X
- CHECK: correct operation, status, efficiency			
- electrical system: alternator, power consumers		X	X

**Maintenance works**

◆ **Check correct operation**

- Check if the equipment, the unit and the device are in service.
- Functional check also includes a trial run.

◆ **Check the adjustment**

- Determine the real adjustment and correct it obtaining the prescribed adjustment, if necessary

◆ **Check firm location**

- Tighten fittings and connections to see whether there are any loose screws and nuts ex.  
Paint cracks, flattening and rust;
- Tighten all screw and bolt joints that have weakened
- Check whether slotted / castled nuts have locking elements;
- If locking element is loosened or missing, unscrew the slotted / castled nut and tighten it again.  
Install a new cotter pin and if necessary apply marking paint.

◆ **Check sealing**

- Check housing, pipe and connection joints. Tighten the loosened joints.
- Depressurize the system before retightening a screwed connection presenting leakages;
- Install at once new hydraulic hoses if you notice any damages or porosities on old ones;
- Fix at once major leakages / leakiness involving continuous oil or liquid loses.

◆ **Check wear**

- Determine the degree of wear, repair or change the component in question if indicated wear limit is reached.


◆ **Check clearance**

- Calculate the real clearance: check whether the real clearance is within admitted values: repair / change the component in question if necessary.

◆ **Check oil and liquid level**

SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG TRUCK</b> <b>MOUNTED WITH MAST</b> <b>AM 12/40 TYPE</b>	Code: P3668-MI	Date: June 2012
		Sheet:28	Rev: 0

- Park the vehicle on a flat surface, leveled;
- If possible check oil level when the engine is cold; you can expect differences between measurements made with warm engine and measurements made with cold engine. The only method to establish oil level is with cold engine after the vehicle has been parked for a few hours on a flat, leveled surface.
- Fill up with engine oil only if oil level has dropped to "MIN" mark on the oil level dipstick. Never fill up with oil so that the level overpasses the "MAX" mark. This may lead to oil pumping in engine vent holes and it isn't economic.
- If you notice that the unit loses oil or liquid, frequently check the unit in question and determine the cause of the leakage.

◆ **Oil and liquid change**

- Park the vehicle on a flat, leveled surface;
- Drain the oil while it's warm;
- Use an appropriate vessel to collect draining oil or liquid;
- Clean threaded plugs and install new sealing fittings;
- Do not use materials necessary to contaminated exploitation;
- Conclusive factors in obtaining the exact oil volume are: correct filling up with oil and appropriate accomplishment of subsequent oil level check;
- The mentioned filling volumes apply only to oil and liquid changes and not to complete refilling; ex. maintenance works.

◆ **Lubrication**

- Before lubrication clean all lubrication points, if necessary;
- Before greasing, clean the lubricators / oilers;
- Install new lubricators / oilers if existing ones are damaged;
- Remove excess grease after lubrication.

## 2.2 MAINTENANCE WORKS

PERIODICITY	NAME OF WORK
DAILY	<ul style="list-style-type: none"> <li>- Check levels for: engine oil, transmission and servo-steering tank, cooling liquid, fuel, windshield washer tank;</li> <li>- Sealing (leakages) at: supply unit, greasing / lubrication, cooling, overfeeding, gas exhaust, hydraulic servo-steering;</li> <li>- Correct operation: steering, brake, lighting and signaling.</li> </ul>

SC CONFIND SRL	Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania Tel/Fax : 0244333160 / 0244374719 ; E-mail : <a href="mailto:confind@confind.ro">confind@confind.ro</a>
----------------	--



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL**  
**WORKOVER RIG TRUCK**  
**MOUNTED WITH MAST**  
**AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

Sheet:29

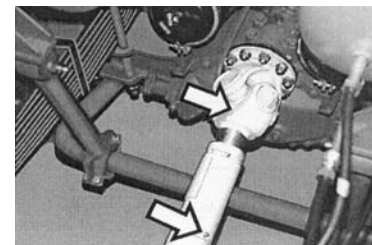
Rev: 0

<p>OPERATION TO BE MADE DURING RUNNING IN</p>	<p>After the first 5 000 km</p>	<p><u>Oil change:</u> - gearbox, axles, central transmission, servo-steering; <u>Tightening:</u> - threaded joints, steering elements (rod ends, levers). <u>Check:</u> - Steering wheels convergence; - Tire pressure; - Brake shoe clearance; - Brake operation. <u>Oil lubrication:</u> - Brake and accelerator pedal - Windshield washer unit - Door hinges and locks</p> <p style="text-align: center;"><u>Greasing</u></p> <p>- cardan shafts, grooves, bearings, spring bolts and slides, levers, steering rods and levers, rod ends, cam shafts and brake levers.</p>
---	---	---

PERIODICITY	NAME OF WORK
<p>After every 5 000 km</p>	<p><u>neck</u> - Oil check: axles, central transmission and servo-steering tank; - Threaded joints tightening; - Tire pressure; - Steering elements (clearances, wears, tightenings); - Steering wheels convergence. <u>Oil lubrication:</u> - Brake and accelerator pedal - Windshield washer unit - Door hinges and locks</p> <p style="text-align: center;"><u>Greasing</u></p> <p>- cardan shafts, grooves, bearings, spring bolts and slides, levers, steering rods and levers, rod ends, cam shafts and brake levers.</p>
<p>After every 20 000 km</p>	<p>- Change oil on drive axles and central transmission; - Check wheel hubs clearance, in bearings; - Check pins clearance; - Check wear between brake shoe bolts and sockets (max. clearance 0,2 mm); When changing the brake shoes, grease brake sockets by filling the cells with (brake shoe bolts don't have oil cap).</p>
<p>After every 60 000 km</p>	<p>- Change servo-steering oil and filters; - Clean fuel tank; - Replace grease from wheel hub bearings.</p>

**2.2.1 Cardan shaft maintenance**

Greasing of cardan shafts is made by lubricators in image attached (see arrow). Before performing this greasing operation, clean lubricators.



SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

Sheet:30

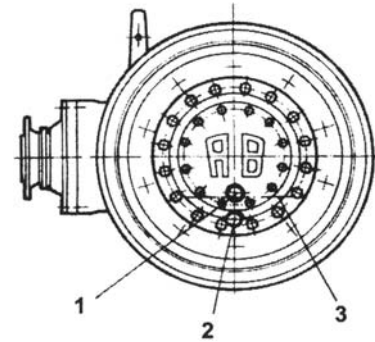
Rev: 0

**2.2.2 Rear axles maintenance**

**1. Check and change oil in wheel hubs (side reducers)**

Is performed immediately after the vehicle is back from cruise and includes the following:

- Spin vehicle wheel so that the draining plug (2) reaches in lower position;
- Take out drain cap and discharge oil from wheel hub. Protect tires against contamination with oil.
  1. Level cap
  2. Draining cap
  3. Oil level

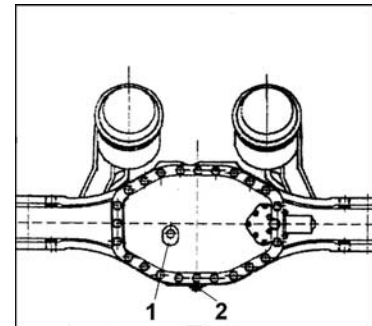


The necessary oil amount T90EP2 in each hub is of 1,6 liters.

- **Check oil level and change oil in rear axle PS13 central reducer**

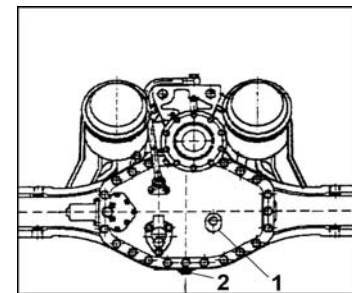
- Oil level check is made by unloosing the level cap – filling (1);
- Oil change is made by unloosing the draining cap (2);

The necessary oil amount T90EP2 in rear axle PS13 central reducer is 9 liters.



- **Check oil level and oil change in rear axle central reducer PT13**

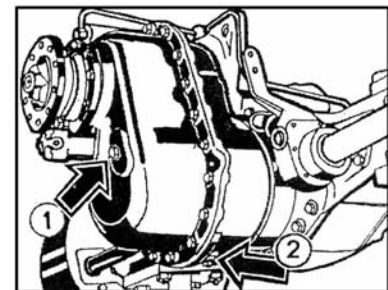
- Oil level check is made by unloosing the level cap – filling (1);
- Oil change is made by unloosing the draining cap (2);



- **Check oil level and oil change in rear axle central transmission tandem PT13 + PS13**

- Oil level check is made by unloosing the level cap – filling (1);
- Oil change is made by unloosing the draining cap (2);

The necessary oil amount T90EP2 in central transmission together with the axle's central reducer is of 16,8 liters.





### 2.2.3 Front axle type PF 7 maintenance

#### 1. Check oil level and oil change in wheel hubs (side reducers)

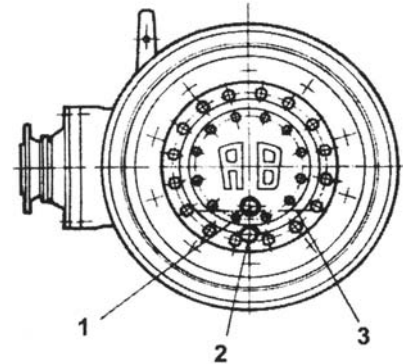
Is performed immediately after the vehicle is back from cruise and includes the following:

- Spin vehicle wheel so that the draining plug (2) KM24x1,5 reaches in lower position;
- Take out drain cap and discharge oil from wheel hub.

Protect tyres against contamination with oil.

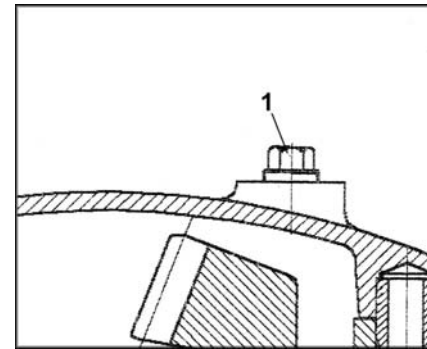
4. Level cap
5. Draining cap
6. Oil level

The necessary oil amount T90EP2 in each hub is of 1,2 liters.



- **Check oil level in front axle type central reducer PF 7**

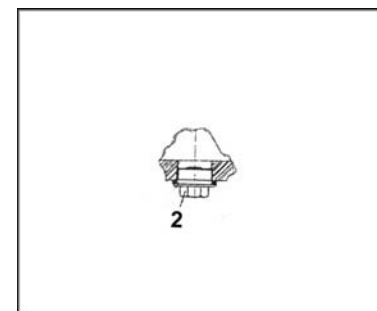
Oil level check is made by unloosening the level – filling plug / cap. (1).



- ◆ **Oil change in front axle central reducer type PF 7**

Oil change in front axle central reducer is made through the draining plug / cap (2).

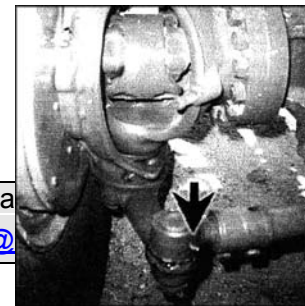
The necessary oil amount in front axle central reducer type PF 7 is about 10 liters.



### 2.2.4 Steering system lubrication

#### Greasing connecting rod ends

- is made by means of lubricators (see arrow in attached image), found on







S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

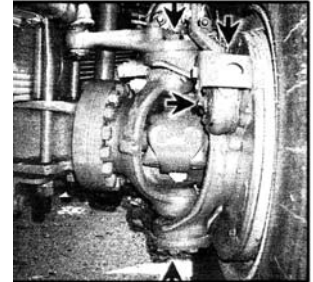
Sheet:32

Rev: 0

each of the two rod ends of all connecting rods

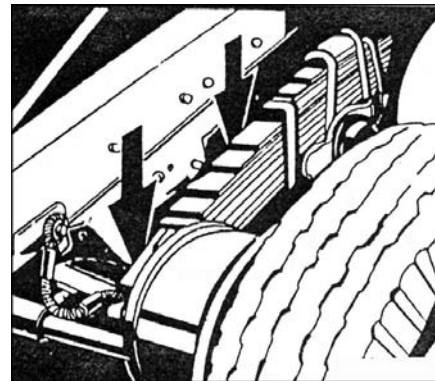
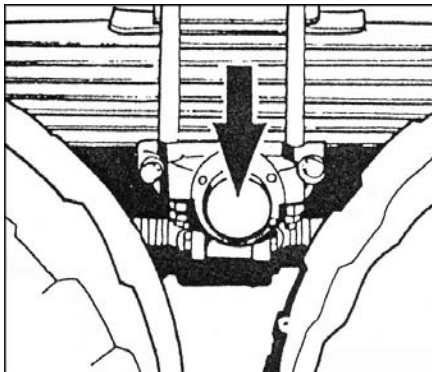
**Axle pin lubrication**

- Is made by means of lubricators (see arrows in attached image).  
Similar at non-driving front axle.



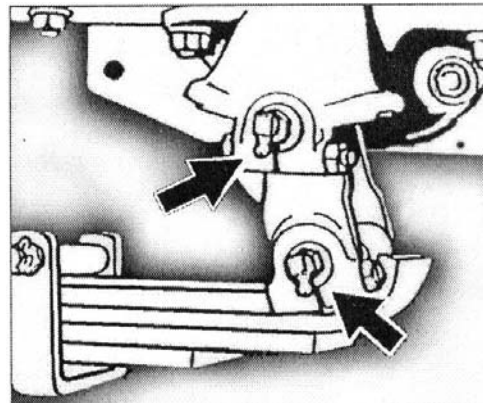
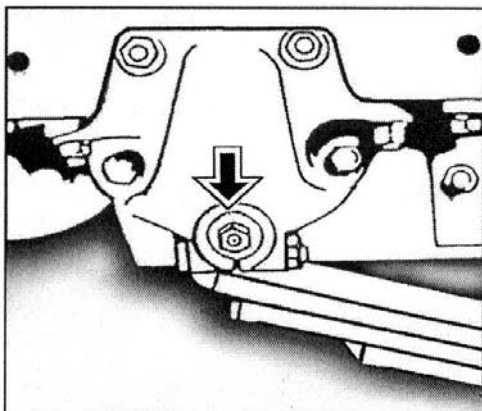
**2.2.5. Front and rear suspension maintenance**

**1. Rear suspension double bridge / axle PT13 + PS13**



**2. Front suspension**

Grease front suspension spring bolts through respective lubricators (see arrows).





S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

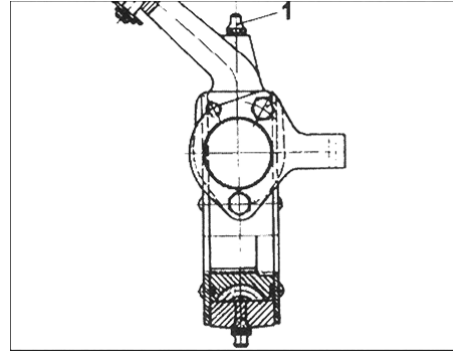
Sheet:33

Rev: 0

### 2.2.6 Brake system maintenance

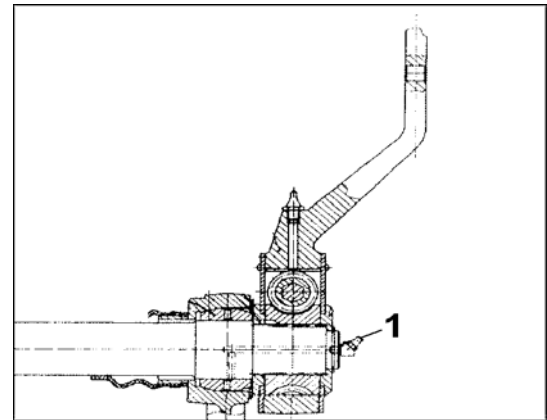
#### ◆ Greasing brake levers

- Grease brake lever by the ball lubricator (1) until grease appears through lubricator hole found at the bottom. Then install the lubricator in the lower part of the brake lever and continue greasing until grease appears through the space between cover and spiral wheel.



#### 1. Rear axle brake cam shaft greasing

- is made through lubricator (1).



### 2.2.7. Air dryer maintenance

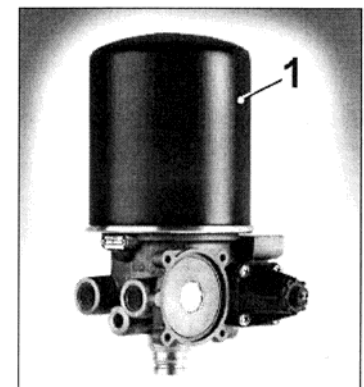
The air dryer maintenance consist in the recurrent change of the cartridge.

Unscrew the dryer's cartridge (1) and replace it with a new one.

Before the new cartridge screwing up, lubricate the gasket.

The screwing up torque is of 15 Nm.


The replacement of the air dryer's cartridge is recommended after maximum 2 (two) years of use.



#### **CAUTION!**

**Change the air dryer's cartridge only when the engine is shut-down and the air dryer's regeneration tank is decompressed!**

**The worn cartridge cannot be renewed.**

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG TRUCK</b> <b>MOUNTED WITH MAST</b> <b>AM 12/40 TYPE</b>	Code: P3668-MI	Date: June 2012
		Sheet:34	Rev: 0

### 2.2.8. Cabin tilt and latch system's maintenance

Cabin tilt and latch system's maintenance consist in the check of the hydraulic system tightness: pump, pipes, hoses, as well as in the vent cap cleaning (5).

#### Oil change :

-put a recipient for oil collection under the hydraulic pump and unscrew the nut (4).

-Remove the tank (1) and collect the oil;

-Clean the tank , the filtering screen and the plug's vent (5)

- check the tightening gaskets and replace them if necessary

- Install in place the tank (1) and tighten the nut (4)

-Fill aprox. 0,850 l of fresh oil through the filler's hole (5).

Check the opening of the gate valve on the hydraulic cylinder and deactivate the cabin's lock system.

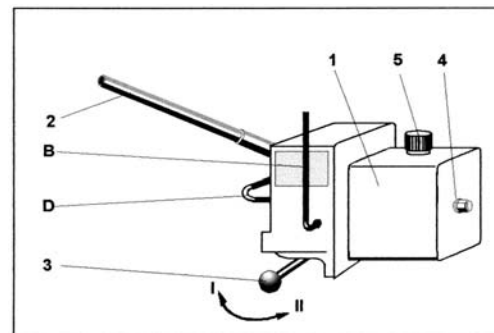
- put the manual pump's distributor lever (3) on the position "I"(cabin's lift)

- remove the connector "B", push the lever (2) until the complete lift of the cabin and collect the oil.

- re-install the connector "B" and refill with aprox. 0,25 l of fresh oil.

- install the plug (5);

- pass the lever (3) on the position "II" (droop the cabin) and push the lever (2) until the cabin's droop and lock. Check and remove accidental leaks.



### 2.2.9. Hydraulic power steering maintenance

Check regularly the oil level in the oil tank (1)!

The oil level must be with 1...2 cm over the lower mark on the oil dipstick (2) when the engine is shut-down. The oil must reach the lower mark on the dipstick when the engine is running.

Oil and filter cartridge must be changed together according the terms provided in the lubrication chart.

#### ATTENTION!

Avoid mixing different oil brands!

#### Power steering oil draining:

- ◆ Raise the front axle on the trestle;
- ◆ Remove the oil tank's cap;
- ◆ Unplug the drain plug(1) on the CALZZONI steering box lower side;
- ◆ Turn the steering wheel until the piston in the steering box reaches the (right) rear limit position ;
- ◆ Start the engine ( for maximum 10 sec. ) until all the oil is drained from the oil tank;
- ◆ After the engine shut-down, turn the steering wheel from one extremity to the other, until no oil is draining;

SC CONFIND SRL	Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania Tel/Fax : 0244333160 / 0244374719 ; E-mail : <a href="mailto:confind@confind.ro">confind@confind.ro</a>
----------------	--



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL**  
**WORKOVER RIG TRUCK**  
**MOUNTED WITH MAST**  
**AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

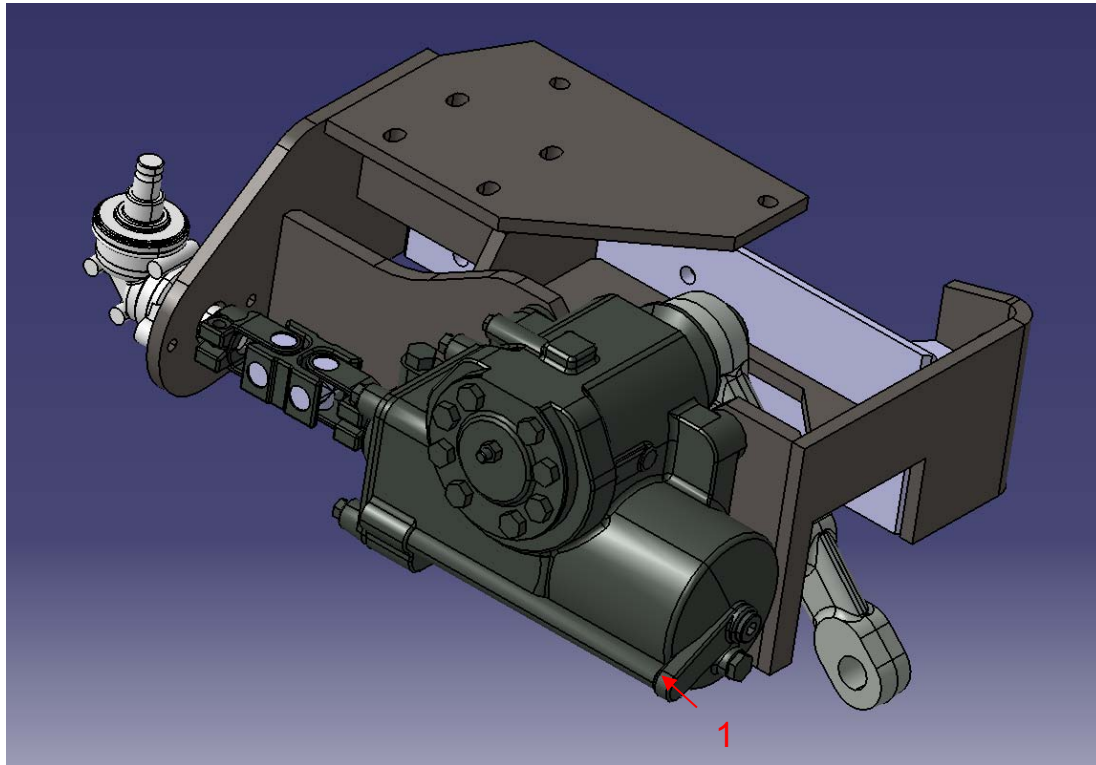
Sheet:35

Rev: 0

### Hydraulic power steering fill and airing

During the filling work, do not put the pump under pressure, and in the sequel, the following instructions must be observed:

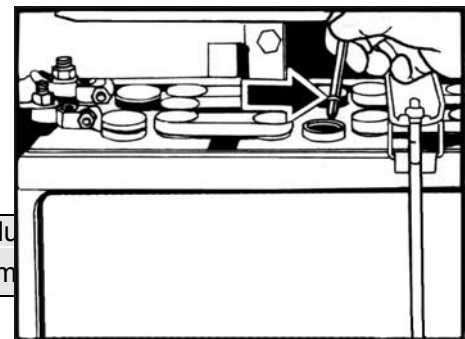
- ◆ Turn slightly the steering wheel to avoid the control valves displacement from their neutral position; so you will avoid the seizure of the pump.
- ◆ fill the tank at a superior level of the dipstick;
- ◆ operate the starter and fill continuously the oil tank to avoid the air intrusion in the system;
- ◆ start the engine and turn the steering wheel several times from one extreme position to the other, to evacuate the air through the tank. Check permanently the oil level and re-fill with oil until no air bubbles are coming out and the level remains constant ;
- ◆ next step is the air evacuation from the steering box;
- ◆ after the engine shut-down, the oil level in the tank must not increase with more than 1...2 cm;



### 2.2.10. Electrical System maintenance

#### Battery maintenance

The level of the bath solution (electrolyte) must be checked monthly, and more often in the warm seasons.



SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresulu  
Tel/Fax : 0244333160 / 0244374719 ; E-m



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

Sheet:36

Rev: 0

This work must done using a glass or wooden dipstick.

The level in each battery cell must be with almost 10...15 mm over the battery plates (see arrow in the Adjoining image).

The battery outside must be clean or dry.

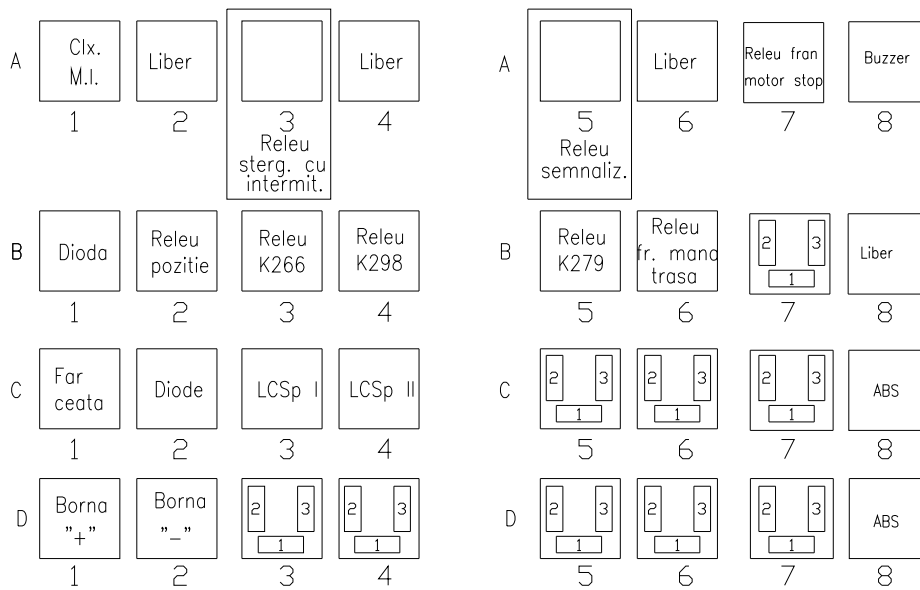
The battery terminals must be lubricated with a thin layer of an acid-resistant grease.

The breather plugs must be free.

Supplement the battery fluid only with distilled water!

**Electrical equipment with modular station.**

The single components of the electric modular station, respectively the relays and the plug fuses, are grouped in functional modules. Their marking and significance can be found on the labels mounted on the back side of the cover of the electric modular station.



*Translator's note:*

1	Clx. M.I.	M.I. horn
2	Liber	Free
3	Releu sterg. cu intermit.	Intermittent wiper relay
4	Liber	free
5	Releu semnaliz.	Annunciator relay
6	Liber	free
7	Releu fran motor spate	Rear engine brake relay
8	Buzzer	Buzzer
1	Dioda	Diode
2	Releu pozitie	Sidelights relay
3	Releu K266	Relay K266
4	Releu K298	Relay K298
5	Releu K279	Relay K279
6	Releu fr. mana trasa	hand-brake tell-tale relay
7		
8	liber	free
1	Far ceata	Fog lamp

SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

Sheet:37

Rev: 0

2	Diode	Diode
3	LCSp I	LCSp I
4	LCSpII	LCSpII
5		
6		
7		
8	ABS	ABS
1	Borna "+"	Terminal "+"
2	Borna "-"	Terminal "-"
3		
4		
5		
6		
7		
8	ABS	ABS


Pos.	Front lights	Type – Lamp code	Bulb type – Voltage / Power
1	Indicating lights for: steering system, front side light,( left/right -ELBA	LSF-9E (stg. / dr.)	AS2 – 24V / 21W – BA15S
2	Front fender light - ELBA	LPF 1	AS1 – 24V / 10W – BA15S
3	Anterolateral indicating light , (left/right.)- HELLA	2BM 006 692-027	AS2 – 24V / 21W – BA15S
4	Headlight (left/right.) - ELBA	FA-M-170	A Bea 24V/55x50W

Pos.	Rear lights	Type – Lamp code	Bulb type – Voltage / Power
1	Rear indicating lights,(left/right), sidelights, stop lights, signal lights , back-up lights ,fog lights, fender lights, number plate light, catadioptr - HELLA	2VD 008-204-061 2VD 008-204-071	24V 5WR5W 24V 10WR10W 24V 21WR21W

Pos.	Other lamps/ lights	Type – Lamp code	Bulb type – Voltage / Power- lamp press
1	Fender light -HELLA	2PS 963-959-001	24V 4WT4W
2	Fluorescent ceiling lights - ELBA	PFA – 8W (ELBA)	HELLA fluorescent tube – 24V / 8W
3	Ladder lighting lamp (2 pcs.) - ELBA	LIS – 2	AS1 – 24V / 10W – BA15S
4	Door lamp - HELLA	2XA 959 610-40	LED

SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG TRUCK</b> <b>MOUNTED WITH MAST</b> <b>AM 12/40 TYPE</b>	Code: P3668-MI	Date: June 2012
		Sheet:38	Rev: 0

### 2.3 Maintenance instructions

The following wrong interventions in the electrical system will be avoided:

1. the touch of the alternator's excitation terminal and plus post ,as well as the conducting wires ;
2. reversal of B<sup>+</sup> and D<sup>-</sup> connections of the alternator;
3. control of the alternator's operation by touching some terminals at grounding;
4. shunt of the telltale lamp of the alternator's excitation circuit;
5. alternator or battery disconnection or any other action in order to brake connections while the combustion engine is running. Therefore, in case of any technical intervention, first stop the engine and then disconnect the battery; at putting in operation, the last works will be: check of correct connections, battery connection and then the start of the engine.
6. battery charging from an outside source (rectifier, etc.)without disconnecting the + and - terminals from the rest of the circuit ;
7. electric arc welding or resistance welding directly on the vehicle.

### 2.4 PROTECTION MEASURES

In case of works on the vehicle, the following protection measures must be taken:

1. disconnect the battery's earthing switch;
2. disconnect the wires of the battery's terminals ("+" and "-");
3. disconnect the wires of the alternator's terminals;
4. disconnect all the devices with electric components.

### **ATTENTION!**

**!!! To do all these operations, stop the engine!**

#### ◆ Protection measures specific to the engine electronics:


1. Voltage measurement will be done with a device having at least 10 MΩ on the input.
2. The coupling of the electronic EDC device will be removed or will be engaged on the "St" position (stand), using the key.
3. Starting with quick charging feeder is not allowed. Quick charging is permitted only with the battery disconnected from the conductors '+ ' and '-'.

### 3. Electronic Equipment for Measurement and Recording the Cable Load, Fuel Consumption EMIX -100

Maintenance operations are compulsory for the equipment to function at the designed parameters and in safety conditions.

### **ATTENTION!**

SC CONFIND SRL	Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania
	Tel/Fax : 0244333160 / 0244374719 ; E-mail : <a href="mailto:confind@confind.ro">confind@confind.ro</a>

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG TRUCK</b> <b>MOUNTED WITH MAST</b> <b>AM 12/40 TYPE</b>	Code: P3668-MI	Date: June 2012
		Sheet:39	Rev: 0

- Every time you raise the telescopic mast, check the load transducer Ex 10 tF mounting at the dead end of the cable, the tightening and fastening of the fixture bolts and for those six threaded screws for fixing with the connection plate to the base frame of the unit.
- After every one year of working is mandatory to recalibrate-by a notified laboratory-the load transducer alongside with its dedicated weight indicator and signal amplifier!

1. Perform the following operations weekly or whenever necessary:

- Check the tightness of the fuel supply joints;
- Check the hoses conditions;
- Check the condition and position of the impulse transmitter's power supply cable;
- Check the condition and position of the load transducer's power supply and signal cable;
- Check the condition and position of the load indicator's power supply cable;
- Check the condition and position of the acoustic warning device power supply cable;
- Check all connections in the electric panel;
- Check the closing of the metal boxes where equipment components are mounted;
- Check the alarming module operation;
- Clean the equipment components (load transducer, load indicator) that are dirty of mud, oil or other substances;

2. Perform the following operations every 6 months or whenever necessary:

- Clean the flow-meters' 100 microns safety filters;
- Check computer's operation (delete the unnecessary files, perform antivirus verification, defragmentation of the storing space etc.);
- Check the operation of the alarming module and the acoustic warning device;
- Clean the touch-screen and the monitor;
- Check the fastening of the mounting systems;

3. Perform the following verifications after every year of operation:

- Check the adequate operation of the protection relay to the under and over voltages supplied by the stabilized supply sources;
- **Check the hook load transducer calibration;**
- Check and clean the flow transducers;
- **Check and gauge the hook load indicator;**
- **Check the galvanic separation intrinsic barrier calibration and the signal amplification for the load transducer;**
- **Check the galvanic separation intrinsic barrier operation and the signal conversion for the load indicator;**
- Check and calibrate the data acquisition module;
- Check the operation of the opt-galvanic separation modules;
- Check the operation of the electric circuit for overload installation blocking;

Non-performance of the above operations as well as other accidental conditions may lead to equipment failure or malfunction.

For proper operation of such equipment the followings must be complied with:


It is compulsory to close the metal protection boxes of the load indicator and the central unit during the transport, while the installation is parked in the garage, or while the equipment is not operated; the central unit box cover may remain closed during operation too if it is not necessary to watch the monitor.

When putting it into operation, the mounting and starting steps shall be followed unconditionally.

The equipment could function intermittently or incorrectly because of accidental loosening of the electric

SC CONFIND SRL	Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania
	Tel/Fax : 0244333160 / 0244374719 ; E-mail : <a href="mailto:confind@confind.ro">confind@confind.ro</a>



 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG TRUCK</b> <b>MOUNTED WITH MAST</b> <b>AM 12/40 TYPE</b>	Code: P3668-MI	Date: June 2012
		Sheet:40	Rev: 0

connections;

Check the electric connections periodically and tighten the loose ones;

**Attention!**

The electrical connections are carried out only by specialized personnel, observing the applicable instructions and norms in force regarding the automotive electric installations.

All pieces of equipment marked ATEX code is not repaired they will be replaced with identical component from the same manufacturer

Using external USB memory sticks to transfer the databases in order to print the working charts, without checking them with antivirus programs may result in infecting the computer with viruses that can determine computer's malfunction or damaging.

It is recommended to check the computer periodically for unwanted files, and possibly to clean it.

Due to the use of the Panel PC with touch screen, all commands to the computer are made by touching the screen with the finger or a non-metallic object. Using sharp metallic objects (nails, wires, screws etc.) may result in damages to the touch screen, which makes the computer inoperative and requires mandatory replacement.

Touching the screen with dirty fingers leads to computer malfunction because of the false commands generated by the touch screen system.

It is compulsory to clean the monitor periodically (once every 6 months) or whenever necessary, by wiping the screen with special products.

Cleaning with other substances, detergents or materials may result in touch screen destruction, being necessary to replace it.

Even though the supply voltage is not dangerous during the verification and replacement of electric and electronic components, you must comply with the electrical equipment installation instructions and proceed as follows:

- Turn off the power supply of the hook load electronic measuring and registration equipment and disconnect the electric fuse;
- Make sure that nobody can power on the installation;
- Use only bifilar electric cable provided by the producer or having similar technical properties;
- The electric cable shall be compulsorily protected with Copex metallic tube;
- Follow cables' mounting position in order to avoid the contact with motor hot parts or interference with cabin swing over or access to the motor;
- Tighten the packing and sealing glands on the cable;
- Fasten the Copex tube with plastic collars whenever necessary to avoid looping or possible detachment during operation;
- Connect the electric fuse and power on (start up) the hook load electronic measuring and registration equipment;

The cleaning cycle of the fuel consumption registration equipment largely depends on the working conditions.

As a first action to ensure the adequate operation of the equipment and the motor, it is compulsory to clean the safety filters every 6 months.

The filters are mounted inside the flow-meter by the Swiss producer and can be removed and cleaned by specialized personnel only at the same time with the device unsealing.

Once the sieve is removed, it can be cleaned by air blowing or washed with thinner or fuel, in case of paraffin deposits.


Deterioration of the filtering sieve compulsorily requires filter replacement.

One draws the attention that during the winter, if you don't use an adequate fuel, paraffin deposits may occur very often and the filter needs to be cleaned for as many times as it is necessary.

Periodically check joints tightness and re-tighten the connections and clamps, if necessary.

Replace the metal clamps that do not ensure hose tightness.

SC CONFIND SRL	Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania
	Tel/Fax : 0244333160 / 0244374719 ; E-mail : <a href="mailto:confind@confind.ro">confind@confind.ro</a>

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG TRUCK</b> <b>MOUNTED WITH MAST</b> <b>AM 12/40 TYPE</b>	Code: P3668-MI	Date: June 2012
		Sheet:41	Rev: 0

Check the hoses to be free from cracks, constrictions, burn marks or other defects that may result in leaking fuel.

If such defects are found, it is compulsory to replace the hose;

The leaking joints result in fuel loss and thus, incorrect registration, or the fuel supply circuit aspirates air, which generates motor malfunction.

Check the condition and position of the impulse transmitter's power supply cable, and if defects are found to the electric insulation or protection tube, they must be replaced.

For repairs always use components identical with those of the equipment.

You are only allowed to use replacement fuel hoses having identical properties with the ones supplied with the equipment.

**Attention!**

Perform all verifications and works to the fuel flow transducers with the motor turned off.

Because fuel leaks may occur during any of the above maintenance works, it is compulsory to use special collecting containers.

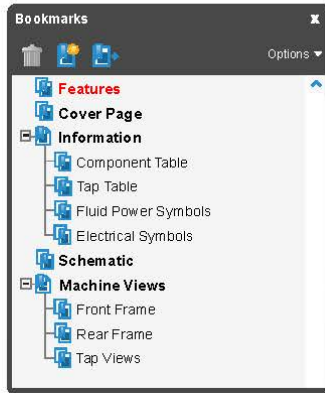
- First of all, wash the installation and take it out of operation;
- Make sure that nobody can put the installation into operation during the maintenance work;
- Thoroughly protect the eyes, skin and clothes in the presence of hazardous materials;
- Place a container under the installation to collect possible fuel leaks from pipes and hoses;
- No quantity of fuel or another dangerous substance should be allowed to escape into the environment;
- Remove the existing pipes/hoses and prepare for equipment re-assembly;
- Consider the possible risk of fire or explosion during the works to the fuel supply circuit;
- Remove any flammable object or fluid from the working place;
- Connect and disconnect the circuit transducers observing the fluid flowing indication;
- Tighten the clamps and the sealing joints;
- Select hoses routes so that they do not touch the hot parts of the motor or be at risk from being cut, caught or obstructed by installation or motor components (if necessary, fasten with plastic collars);
- After the maintenance work was done, put the engine in operation;

SC CONFIND SRL	Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania
	Tel/Fax : 0244333160 / 0244374719 ; E-mail : <a href="mailto:confind@confind.ro">confind@confind.ro</a>



4. MAINTENANCE MANUAL FOR CAT C9 ACERT+TH 31 E 61A

# INTERACTIVE SCHEMATIC



**This document is best viewed at a screen resolution of 1024 X 768.**

To set your screen resolution do the following:

**RIGHT CLICK** on the **DESKTOP**.

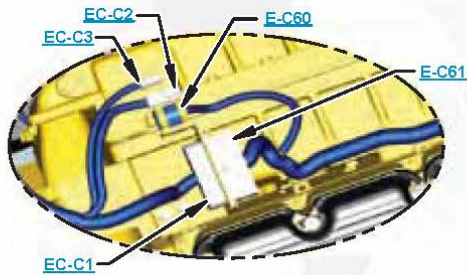
Select **PROPERTIES**.

**CLICK** the **SETTINGS TAB**.

**MOVE THE SLIDER** under **SCREEN RESOLUTION** until it shows **1024 X 768**.

**CLICK OK** to apply the resolution.

The Bookmarks panel will allow you to quickly navigate to points of interest.



Click on any text that is BLUE and underlined. These are hyperlinks that can be used to navigate the schematic and machine views.

**VIEW ALL CALLOUTS**

When only one callout is showing on a machine view this button will make all of the callouts visible. This button is located in the top right corner of every machine view page.

### HOTKEYS (Keyboard Shortcuts)

	FUNCTION	KEYS
	Zoom In	"CTRL" / "+"
	Zoom Out	"CTRL" / "-"
	Fit to Page	"CTRL" / "0" (zero)
	Hand Tool	"SPACEBAR" (hold down)
	Find	"CTRL" / "F"





S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL**  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE

Code:  
P3668-MI

Date:  
June 2012

Sheet:43

Rev: 0



KENR6699-02  
January 2010

# Schematic

## **TH31 and TH35 Petroleum Transmission Electrical System**

TH31 Transmission:	TH35 Transmission:	TH31 Package:	TH35 Package:
DDB321-UP	TNB419-UP	PAY1-UP	PBL1-UP
LWC126-UP	TZM171-UP	PAZ151-UP	PBN151-UP
LAD126-UP	SDS329-UP	PFZ1-UP	PBW152-UP
SSD206-UP	SMS300-UP		PBY152-UP
SKY138-UP	PZT297-UP		PBZ1-UP

**With Dropbox Option**

© 2010 Caterpillar, All Rights Reserved

Printed in U.S.A.

SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

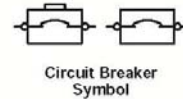
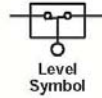
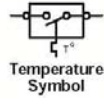
Sheet:44

Rev: 0







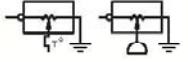



**HARNESS and WIRE**  
Electrical Schematic Symbols



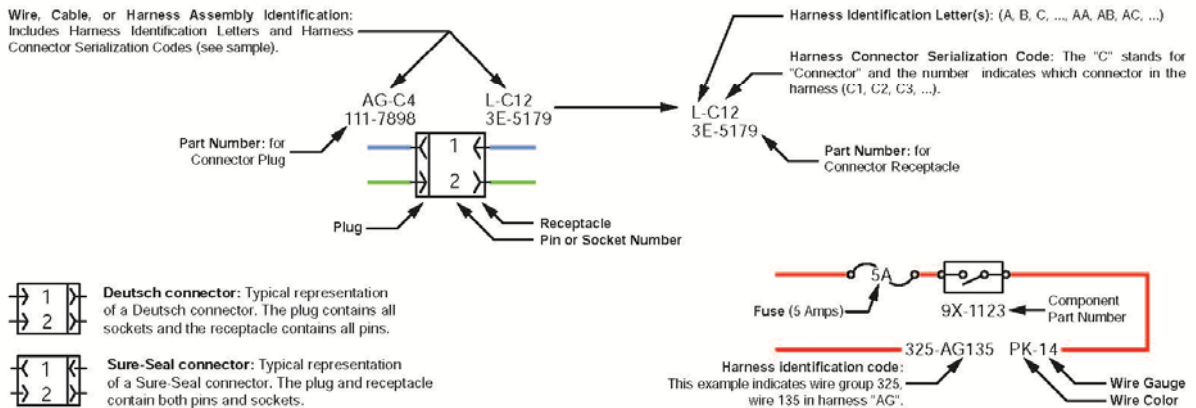
**Symbols**



**Symbols and Definitions**

-  **Fuse:** A component in an electrical circuit that will open the circuit if too much current flows through it.
-  **Switch (Normally Open):** A switch that will close at a specified point (temp, press, etc.). The circle indicates that the component has screw terminals and a wire can be disconnected from it.
-  **Switch (Normally Closed):** A switch that will open at a specified point (temp, press, etc.). No circle indicates that the wire cannot be disconnected from the component.
-  **Ground (Wired):** This indicates that the component is connected to a grounded wire. The grounded wire is fastened to the machine.
-  **Ground (Case):** This indicates that the component does not have a wire connected to ground. It is grounded by being fastened to the machine.
-  **Reed Switch:** A switch whose contacts are controlled by a magnet. A magnet closes the contacts of a normally open reed switch; it opens the contacts of a normally closed reed switch.
-  **Sender:** A component that is used with a temperature or pressure gauge. The sender measures the temperature or pressure. Its resistance changes to give an indication to the gauge of the temperature or pressure.
-  **Relay (Magnetic Switch):** A relay is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close the switch part of the relay.
-  **Solenoid:** A solenoid is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close a valve or move a piece of metal that can do work.
-  **Magnetic Latch Solenoid:** A magnetic latch solenoid is an electrical component that is activated by electricity and held latched by a permanent magnet. It has two coils (latch and unlatch) that make electromagnet when current flows through them. It also has an internal switch that places the latch coil circuit open at the time the coil latches.

**Harness and Wire Symbols**



© 2010 Caterpillar, All Rights Reserved

SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

Sheet:45

Rev: 0

## WIRE DESCRIPTION



Wire Description					
Wire Number	Wire Color	Description	Wire Number	Wire Color	Description
Power Circuits			Control Circuits (Continued)		
101	RD	Battery To Battery Breaker	E964	WH	Engine Output Speed Sensor (+)
126	PK	Battery (+)	K900	YL	Can Data Link (+)
Ground Circuits			K952	BR	Solenoid Return
202	BK	Battery (-)	K972	BR	Start Relay / Backup Alarm Relay Return
A234	BK	Can Data Link Shield	K977	PK	Transmission Oil Temperature Sensor
Control Circuits			K990	GN	Can Data Link (-)
306	GN	Start Relay	L910	PK	Torque Converter Output Speed Sensor (+)
307	OR	Key Switch "Start"	L911	YL	Torque Converter Output Speed Sensor (-)
308	YL	Key Switch "Run"	X952	OR	Quick To Neutral Switch
331	OR	Backup Alarm Relay	X953	BU	Work Mode Fork Position Sensor
410	WH	Transmission Warning Lamp	X954	PK	Front Wheel Drive Fork Position Sensor
419	YL	Park Brake Pressure Switch	X955	GN	Rear Wheel Drive Fork Position Sensor
426	BR	Transmission Filter Bypass Switch	X956	OR	Work Mode Engage Solenoid
705	PK	Lockup Clutch Solenoid	X957	YL	Work Mode Disengage Solenoid
709	OR	Sensor Power Supply	X958	GN	Rear Wheel Drive Engage Solenoid
720	PU	Service Brake Pressure Switch	X959	BU	Rear Wheel Drive Disengage Solenoid
751	GN	Transmission Shift Solenoid #1	X960	PU	Front Wheel Drive Engage Solenoid
752	YL	Transmission Shift Solenoid #2	X961	GY	Front Wheel Drive Disengage Solenoid
754	BU	Transmission Shift Solenoid #3	X962	WH	Front Wheel Drive Disconnect Speed Sensor (+)
755	OR	Transmission Shift Solenoid #4	X963	GY	Front Wheel Drive Disconnect Speed Sensor (-)
F704	YL	Torque Converter Oil Temperature Sensor	X966	BR	Rear Wheel Drive Disconnect Speed Sensor (+)
J765	BU	Sensor Return	X967	OR	Rear Wheel Drive Disconnect Speed Sensor (-)
K744	BU	Not Used	Y974	BU	PTO #1 Increment Switch
M739	YL	Solenoid Return	Y975	BU	PTO #1 Decrement Switch
892	BR	Cat Data Link (-)	Y976	BU	PTO #2 Increment Switch
893	GN	Cat Data Link (+)	Y977	BU	PTO #2 Decrement Switch
K808	GY	2WD/4WD Selector Switch	Y978	BU	Alternate Max Gear (Primary Shifter) Switch
900	PU	Transmission Shift Solenoid #5	Y979	BU	Output Speed Driver
901	WH	Transmission Shift Solenoid #6 (TH35 ONLY)	Y980	BU	Converter Output Speed Driver
921	WH	Transmission Shift Solenoid Return #1	Y981	BU	PTO #1 Enable Switch
922	BR	Transmission Shift Solenoid Return #2	Y982	BU	PTO #2 Enable Switch
961	BR	Shifter Selector Switch	Y984	BR	Lockup Clutch Disable Switch (N/C)
E900	WH	Transmission Output Speed Sensor A+	Y985	BR	Lockup Clutch Lamp
E901	GN	Transmission Output Speed Sensor A-	Y986	BR	Alternate Max Gear (Secondary Shifter) Switch
E906	OR	Transmission Output Speed Sensor B+	Y987	BR	Primary Shifter Mode Lamp
E907	GY	Transmission Output Speed Sensor B-	Y988	BR	Lockup Clutch Disable Switch (N/O)
E963	BK	Engine Output Speed Sensor (-)	Y989	BR	Secondary Shifter Mode Lamp

© 2010 Caterpillar, All Rights Reserved

SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL  
WORKOVER RIG TRUCK  
MOUNTED WITH MAST  
AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

Sheet:46

Rev: 0

## CODES AND RELATED MANUALS



### Related Electrical Service Manuals

Title	Form Number
Specs./SysOp/T&A:	KENR5097
Troubleshooting/SysOp/T&A:	KENR5902

### Event Codes Transmission Control

Event Code	Condition
0047	Transmission Abuse Warning
0049	Coasting in Neutral Warning
0084	Machine Overspeed Warning
0155	High Hydraulic Retarder Oil Temperature Warning
0329	Transmission Oil Filter Plugged
0330	Transmission Output Speed Mismatch

### Failure Mode Identifiers (FMI)<sup>1</sup>

FMI No.	Failure Description
0	Data valid but above normal operational range.
1	Data valid but below normal operational range.
2	Data erratic, intermittent, or incorrect.
3	Voltage above normal or shorted high.
4	Voltage below normal or shorted low.
5	Current below normal or open circuit.
6	Current above normal or grounded circuit.
7	Mechanical system not responding properly.
8	Abnormal frequency, pulse width, or period.
9	Abnormal update.
10	Abnormal rate of change.
11	Failure mode not identifiable.
12	Bad device or component.
13	Out of calibration.
14	Parameter failures.
15	Parameter failures.
16	Parameter not available.
17	Module not responding.
18	Sensor supply fault.
19	Condition not met.
20	Parameter failures.

<sup>1</sup>The FMI is a diagnostic code that indicates what type of failure has occurred.

### Component Identifiers (CID)<sup>1</sup>

#### Module Identifier (MID)<sup>2</sup>

#### Transmission Control (MID No. 027)

CID	Component
0041	8 Volt DC Supply
0144	Backup Alarm Relay
0168	Electrical System Voltage
0177	Transmission Oil Temperature Sensor
0190	Engine Speed Sensor
0247	J1939 Data Link
0262	5 Volt DC Supply
0444	Starter Motor Relay
0585	Transmission Output Speed Sensor #1
0668	Transmission Shift Lever
0672	Torque Converter Output Speed Sensor
0673	Transmission Output Speed Sensor #2
0709	Transmission Lockup Clutch Solenoid
0718	Transmission System
0826	Torque Converter Oil Temperature Sensor
1326	ECM Location Code
1401	Transmission Solenoid #1
1402	Transmission Solenoid #2
1403	Transmission Solenoid #3
1404	Transmission Solenoid #4
1405	Transmission Solenoid #5
1406	Transmission Solenoid #6 (For TH35 Only)
1823	Shift Rail #1 Position Sensor (Work Mode)
1824	Shift Rail #2 Position Sensor (Rear Wheel)
1825	Shift Rail #3 Position Sensor (Front Wheel)
1834	Ignition Key Switch
2859	Transmission Dropbox Disconnect #1 Engage (Work Mode)
2860	Transmission Dropbox Disconnect #2 Engage (Rear Wheel)
2861	Transmission Dropbox Disconnect #3 Engage (Front Wheel)
2862	Transmission Dropbox Disconnect #1 Disengage (Work Mode)
2863	Transmission Dropbox Disconnect #2 Disengage (Rear Wheel)
2864	Transmission Dropbox Disconnect #3 Disengage (Front Wheel)
2991	Transmission Shifter #2
2998	Transmission Dropbox Disconnect #1 Speed Sensor
2999	Transmission Dropbox Disconnect #2 Speed Sensor
3000	Transmission Dropbox Disconnect #3 Speed Sensor
3013	Lockup Clutch Disable Switch

<sup>1</sup> The CID is a diagnostic code that indicates which circuit is faulty.

<sup>2</sup> The MID is a diagnostic code that indicates which electronic control module diagnosed the fault.

© 2010 Caterpillar, All Rights Reserved

SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)



S.C. CONFIND S.R.L.  
Câmpina

**MAINTENANCE MANUAL**  
**WORKOVER RIG TRUCK**  
**MOUNTED WITH MAST**  
**AM 12/40 TYPE**

Code:  
P3668-MI

Date:  
June 2012

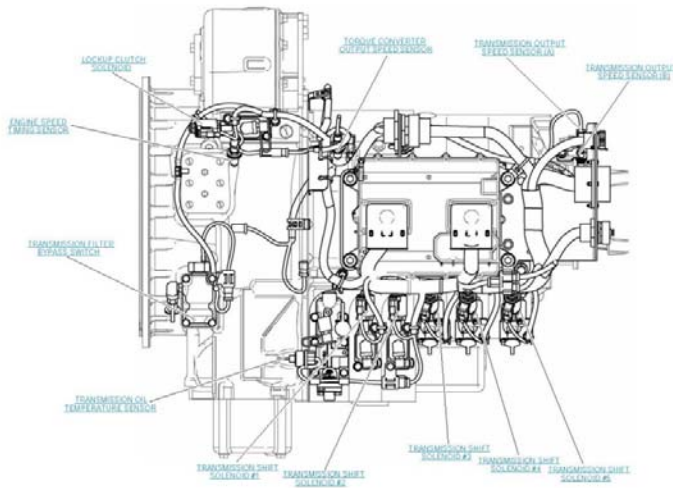
Sheet:47

Rev: 0

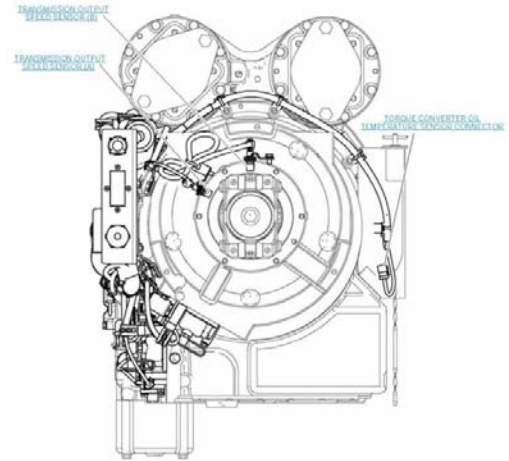
**TH31 TRANSMISSION WITHOUT DROPBOX**



VIEW ALL CALLOUTS



LEFT SIDE VIEW OF TRANSMISSION



REAR VIEW OF TRANSMISSION

© 2010 Caterpillar, All Rights Reserved

The power package will be under maintenance made off by appointed representative for CAT package in Romania, named Eneria.  
When current planned maintenance-during warranty period-after each 250 working hours will be done against the w/o rig by CONFIND's representatives, meantime current maintenance against power package will be done, as well!

For any problem connected with the power package, do not interfere yourself, as far you'll disturb the functionality of the package which is leaded by its own computer!

When consumables are to be replaced, please to make use by originals ones!

SC CONFIND SRL

Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania  
Tel/Fax : 0244333160 / 0244374719 ; E-mail : [confind@confind.ro](mailto:confind@confind.ro)





**5. MAINTENANCE OPERATIONS AGAINST MODULE CHANGE GEARS,  
MOTOR PARAMETERS INDICATING PANEL AND SPEED CONTROL  
PANEL-GENERAL STOP+JUNCTIONS BOX**

The control group functioning drive (motor + speed circuits) installed on AM 40 is composed of three functional modules:

1. Module changing speed
2. Engine parameter indicating module
3. Speed module control panel - General Stop + Junction box

Modules are made in Ex protection which allows them to work in potentially explosive atmospheres, but require an increased requirement related to personnel performing equipment maintenance.

**NOTE**

**MODULES IN Ex CONSTRUCTION: Intervention is done only by qualified and authorized for such operations.**

**5.1. Maintenance operations "Module change gears"**

Daily Operations in commissioning of equipment								
Maintenance operations to 200 working hours								
Maintenance operations to 600 working hours								
Maintenance operations to 1000 working hours								
Maintenance operations to 1400 working hours								
Maintenance operations to 1800 working hours								
Maintenance operations to 2200 working hours								
Technical Revision to 2500 working hours								
X	X	X	X	X	X	X	X	Integrity checking electrical connections and cable glade
X	X	X	X	X	X	X	X	Check operation indicator parameters and action buttons
			X		X		X	Open enclosure and check electrical connections
			X		X		X	Open enclosure and electrical and mechanical connection cleaning (flameproof surface with silicone grease lubrication)
							X	Check operation and grease lubrication with silicone rods Shifter caterpillar key action buttons
X	X	X	X	X	X		X	Verification in terms of corrosion of electrical connection
							X	Dismantling electrical connections, cleaning, lubrication, replacement or repair any defective parts and faulty functional verification



**Possible defects:**

- Not display lights indicating the gear shifter

Fixing:

- Check the electrical system was powered
- Check if the connections are in good contact

If the fault persists, contact the servicing AMPLO SA and Caterpillar

- Does not shifting the gear but the shifter indicator lits on diplay

Fixing: check function key action buttons Shifter

If the fault persists, contact the servicing AMPLO SA and Caterpillar

**5. 2. Maintenance operations "Module engine parameter indication"**

Daily Operations in commissioning of equipment								
Maintenance operations to 200 working hours								
Maintenance operations to 600 working hours								
Maintenance operations to 1000 working hours								
Maintenance operations to 1400 working hours								
Maintenance operations to 1800 working hours								
Maintenance operations to 2200 working hours								
Technical Revision to 2500 working hours								
X	X	X	X	X	X	X	X	Integrity checking electrical connections and cable glade
X	X	X	X	X	X	X	X	Check operation indicator parameters
			X		X		X	Open enclosure and check electrical connections
			X		X		X	Open enclosure and electrical and mechanical connection cleaning (flameproof surface with silicone grease lubrication)
X	X	X	X	X	X		X	Verification in terms of corrosion of electrical connection
							X	Dismantling electrical connections, cleaning, lubrication, replacement or repair any defective parts and faulty functional verification

Possible defects:

Indicators not working

Fix

Check if there is voltage

Check the wiring integrity

If the defect remains contact the servicing AMPLO SA and Caterpillar

Signs are indications fluctuating

Fix

Check the electrical connections continuity

If the defect remains contact the servicing AMPLO SA and Caterpillar



**5. 3. Maintenance operations "Module speed control panel - General Stop + Junctions box"**

Daily Operations in commissioning of equipment								
Maintenance operations to 200 working hours								
Maintenance operations to 600 working hours								
Maintenance operations to 1000 working hours								
Maintenance operations to 1400 working hours								
Maintenance operations to 1800 working hours								
Maintenance operations to 2200 working hours								
Technical Revision to 2500 working hours								
X	X	X	X	X	X	X	X	Integrity checking electrical connections and cable glade
X	X	X	X	X	X	X	X	Check buttons operation
			X		X		X	Open enclosure and check electrical connections
			X		X		X	Open enclosure and electrical and mechanical connection cleaning (flameproof surface with silicone grease lubrication)
X	X	X	X	X	X		X	Verification in terms of corrosion of electrical connection
							X	Dismantling electrical connections, cleaning, lubrication, replacement or repair any defective parts and faulty functional verification

Possible defects:

Generally stop button does not work


Fix

Check if the button is released

If the defect does not remove contact servicing AMPLO SA and Caterpillar

Precise information about how to do operations that are performed during maintenance activities:

- Check integrity of electrical connections are made by qualified and trained personnel for electrical troubleshooting activities.
- Work is performed using only tools and measurement equipment in good condition and the measurement made with checks as directed.
- Ex enclosures opening operation is performed only by authorized personnel.
- Opening is done carefully using appropriate tools to not destroy landmarks.
- When checking "Module change gears", the containment will have to check carefully Shifter's.
- Shifter will be checked in terms of integrity keys, surface keys damage etc.
- Checking corrosion refers to corrosion both mechanical parts and electrical components.
- Terminal blocks for electrical connections must be checked for tightening screws or mounting bolts are corroded other elements are present corrosion.
- If this is a high degree of corrosion was replaced corroded elements.
- Operation of lubricating surfaces with neutral silicone Vaseline will be made carefully to avoid a thick layer, as far will affect flameproof conditions after closing the panel.
- Washing operations in the technical revisions made to 2500 hours with solutions operations dedicated to washing (cleaning) of electrical equipment.
- For cleaning the mecha

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG TRUCK</b> <b>MOUNTED WITH MAST</b> <b>AM 12/40 TYPE</b>	Code: P3668-MI	Date: June 2012
		Sheet:51	Rev: 0

## 6. Safety instructions when in operating

6.1-Is mandatory to stop the workover rig when any maintenance for the components will occur!

6.2-No any personnel without training will be allowed to interfere solving any issue against the unit!

6.3-If during maintenance works, the safeguards will be dismantled from their place, after finishing the job, installing the guards in their place is mandatory!

6.4-Is forbidden for the unit to operate if the safe guards are not in their place!

6.5-Before starting to dismantle any electrical component, make sure the circuit is not under the voltage!

6.6-Before operation at site, is mandatory to be checked the functionality for each electrical & hydraulically parts inside the unit; if any defaults are revealed do not start the work before solving the matter!

6.7 -At the beginning for each shift, checking for proper work for power and control systems of the unit is mandatory!


6.8-In accordance with the law No. 319/2006 health and safety at work, chapter III, section 4, article 13, subparagraph (e), the beneficiary is obliged to draw up instructions for completing and/or the application of safety and health at work, taking into account the particularities of the workplaces under their responsibility;

6.9-The workers have the obligation to acquire and to follow up the rules and guidelines for safety labor and to implement all such safety regulations, working with proper technology, discipline at work, to use the correct protective equipment; they are fully responsible to report any technical failure or other situation may lead for an accident or professional illness. The access inside the rig area is prohibited for the persons who are not skilled to work with such equipment; access is permitted only after graduating for a training course regarding accident prevention;

6.10-Commissioning and start-up for the workover rig, as well as for those auxiliary equipment will be done on the basis of the final acceptance report, made at the rig side. No any exception from the safety regulations will be accepted; start up for the rig will be possible, when the final inspection report will be signed, only.

6.11.-Any work performed against the w/o rig (review, repair, adjustment, greasing, cleanup, removal of parts, removing the chain, the belts or any covers) will be done, but after complete stopping of the equipment, cut off the voltage and make sure against any accidental start up.

SC CONFIND SRL	Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania
	Tel/Fax : 0244333160 / 0244374719 ; E-mail : <a href="mailto:confind@confind.ro">confind@confind.ro</a>

 S.C. CONFIND S.R.L. Câmpina	<b>MAINTENANCE MANUAL</b> <b>WORKOVER RIG TRUCK</b> <b>MOUNTED WITH MAST</b> <b>AM 12/40 TYPE</b>	Code: P3668-MI	Date: June 2012
		Sheet:52	Rev: 0

6.12.-The work to be performed at the height will use hand tools with hand fastening bracelet to prevent accidental falls.

6.13-It's forbidden:

- to modify any inside the w/o rig, without designer's agreement;
- running the equipment without covers, safety devices or instruments to indicate and control the parameters of the rig;
- dismounting said protective devices and covers when the rig is operating.

6.14-All those equipment inside the w/o rig will be inspected regularly and repaired if necessary, according to the instructions issued by the manufacturer.

Chief driller is that responsible person to ensure against continuity in operating for all those apparatus and devices for protection and safety;

6.15-All those indicating gauges, load sensor, signal amplifier for load sensor is mandatory to be recalibrated by a notified authority once per working year!

**DO NOT RELY ON YOUR MEMORY!**  
**IF YOU DO IT, THAT MAY LEAD TO SERIOUS ACCIDENTS.**  
**YOU ARE RECOMMENDED STUDYING THESE INSTRUCTIONS CAREFULLY**  
**BEFORE INSTALLATION AND DURING THE USE!**

SC CONFIND SRL	Address : 105600, Câmpina, 2 Progresului St., Prahova County, Romania
	Tel/Fax : 0244333160 / 0244374719 ; E-mail : <a href="mailto:confind@confind.ro">confind@confind.ro</a>