

## **Operating instructions for HPT offloading system, tractor unit with electric distributor V310/V320**

### Index of contents

1.	Safety instructions .....	2
2.	Operation.....	2
3.	Fault memory read out .....	3
4.	Overview Fault codes.....	4
5.	Fuses of the offloading system .....	4
6.	Possible faults of the HPT offloading system.....	5
7.	Maintenance instructions for the HPT system .....	7

## **1. Safety instructions**

- 1.1. Have all work at the system, especially safety-related work performed by a suitable specialist contractor. The contractor should have the required specialist know-how and tools for performing the required work.
- 1.2. A hydraulic system is a special potential source of danger. Media under pressure can cause serious injury; media can gush from holes the size of a pinhead in a hydraulic hose, etc. and penetrate the body. Never touch a pressurized hose. If an accident happens and the body is penetrated by medium, see a doctor immediately.
- 1.3. Observe all statutory safety regulations and the precautions established by the owner for the site of the system. Observe local and regional safety regulations. This particularly includes industrial safety regulations and special guidelines for loading/offloading stations.  
Damage and defective functions should be repaired by a specialist contractor without delay. Oil leaks, damaged hydraulic hoses or couplings must be repaired/changed immediately. Oil leaks can cause severe environmental damage.
- 1.4. In extreme cases, a damaged or poorly lubricated cardan shaft in the P.T.O. can cause mechanical damage by breakage of the shaft. Carefully observe all maintenance instructions.
- 1.5. Make sure that no unauthorized persons enter the area of the truck when the pump is running.
- 1.6. If components mounted externally on the truck are removed or modified, make sure that operator protection is provided in the area of the cardan shaft.
- 1.7. Use only original parts for repairs. Otherwise the proper function of the part cannot be guaranteed.
- 1.8. It is forbidden to mount any external parts on the HPT unit; such parts should be attached to the frame or in another suitable place.
- 1.9. When the HPT system is in operation, make sure that all hydraulic couplings are seated tightly. If a coupling is not tight enough, proper operation is not possible.

## **2. Operation**

- 2.1. Apply the parking brake.

- 2.2. Switch on the ignition; a lamp test is performed (1 red indicator lamp for immobilizer, 1 green indicator lamp for oil level in the hydraulic tank).
- 2.3. Depending on the type of diesel engine and P.T.O., both can be started either from the control box of the semitrailer or manually as described by the manufacturer. The front-mounted unit should be switched as shown on the adhesive label on the instrument panel. Depending on the make, the front-mounted unit is automatically switched in the programmed unit. Slowly engage the clutch.
- 2.4. In automatic transmissions, the P.T.O. is switched on after 6 seconds and the front-mounted unit is switched as shown on the label on the instrument panel or is switched into the programmed unit automatically.
- 2.5. Once the P.T.O. has started, the accelerator pedal and the cruise control must not be operated.
- 2.6. Continue offloading as described in the owner's/tank producer's instructions.

### **3. Fault memory read out**

- 3.1. All vehicles have a V310/320 electrical distributor attached to the HPT attachment unit. This has an integrated fault memory read out, which records all fault conditions of the sampling system. (Depending on the design, all faults can also be read in the control panel in the dashboard, which should be the preferred method.)

To read the last fault state, proceed as follows:

  - 3.1.1. Stop the vehicle, apply the parking brake, turn on the ignition. Please wait for the lamp test of the immobilizer and insulation monitor lights. After this, it is possible to display the error code on the red WFS indicator light as a flash code by switching the switch for the dashboard lighting on and off twice.
  - 3.1.2. Successful entry into the fault memory is announced by a single sounding of the buzzer. The last fault is now signaled by a flashing code of the red WFS indicator light (immobilizer). If several errors have occurred simultaneously, the different blinking codes follow one after the other.

(If, in the meantime, the vehicle is started, the power take-off (PTO) is engaged or the parking brake is released, the fault memory switches off.)

## 4. Overview Fault codes

Error code corresponds to the number of flashing frequencies of the red WFS indicator light.

<b>Fault code (red WFS indicator light)</b>	<b>Meaning</b>	<b>Cause/remedy</b>
<b>1</b>	Oil level in the hydraulic system is below minimum	<ul style="list-style-type: none"><li>Oil loss from the hydraulic system: check the oil level in the display of the oil tank as described in cl. 6.1.2; repair the leak</li></ul>
<b>2</b>	Leak oil filter is soiled	<ul style="list-style-type: none"><li>Replace the contaminated filter cartridge; eliminate the cause of the contamination</li><li>See cl. 6.1.4 and cl. 6.2.3</li></ul>
<b>3</b>	Return-line oil filter soiled	<ul style="list-style-type: none"><li>Replace the contaminated filter cartridge; eliminate the cause of the contamination</li><li>See cl. 6.1.4 and cl. 6.2.3</li></ul>
<b>4</b>	Temperature monitor 90°C	<ul style="list-style-type: none"><li>Hydraulic oil temperature is too high; Let the system cool down</li><li>See cl. 6.1.3 and cl. 6.2.2</li></ul>
<b>5</b>	Emergency stop in the control box of the semitrailer/tank trailer used	<ul style="list-style-type: none"><li>The pressure switch of the leak oil circuit has tripped: Inspect the leak oil coupling between the tractor and the semitrailer</li><li>Leak in the area of the oil motor: check for/repair the leak</li><li>Emergency stop button at the control box was pressed</li></ul>

## 5. Fuses of the offloading system

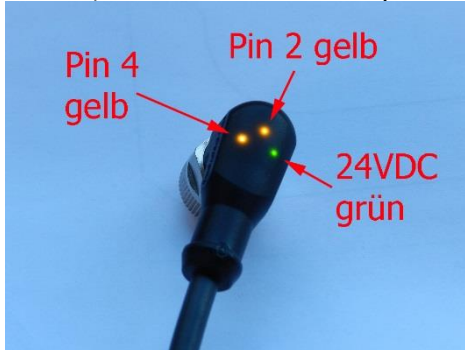
- 5.1. The main fuse for the voltage supply of the HPT pump system is located in/at the battery box, depending on the truck model. The fuse is either a screw or plug type inside the battery box or it is located in the terminal box at the energy distributor next to the truck battery.
- 5.2. All secondary fuses are installed in the distributor V310/320. The distributor is mounted on the HPT unit. The fuses are labeled.

## **6. Possible faults of the HPT offloading system**

- 6.1. Diesel engine stops when the P.T.O. starts.
- 6.1.1. Parking brake indicator lamp not lighting.  
Cause: Control switch defective.  
Remedy: Contact service center, check the control device
- 6.1.2. Oil level in the oil tank too low. Read the level at the oil tank display (level in cm)  
Displayed value 32-37: Oil level is O.K.  
Displayed value <32: Oil level early warning  
Displayed value <27: Switch-off  
The above filling levels are for cold oil (ambient temperature) and switch-off P.T.O. The fact that the oil level drops when the P.T.O. is running and that it rises when the oil becomes hot is normal and not a cause for concern.)  
Cause: leak in the hydraulic system (oil loss).  
Remedy: Contact service center, repair the oil loss, add oil (use only the prescribed oil grade), see cl. 7.1.
- 6.1.3. Switch-off by temperature sensor:  
Cause: Temperature sensor or the evaluation logic are defective.  
Remedy: Contact service center.

6.1.4. Switch-off by differential pressure switch of leak and/or reflux filter is constantly active.

Cause: Oil filter heavily soiled or differential pressure switch defective. Whether a differential pressure switch has tripped can be seen at the LEDs on the plug (with ignition switched on). For this, the cover on the HPT system must be removed.



Pin 4: Differential pressure switch has tripped

Pin 2: Differential pressure switch O.K.

Remedy: Contact service center.

6.2. Diesel engine is switched off during the offloading process.

6.2.1. Oil level in oil tank is too low. See cl. 6.1.2.

6.2.2. Temperature evaluation logic has switched off the system.  
(Depending on the model, the temperature of the oil is displayed in the control box.)

6.2.2.1. Cause: Hydraulic oil is too hot (over 90° C);  
outdoor temperature is very high and at the same time the system has been operating at full load for a longer time.

Remedy: Allow the hydraulic system to cool down a little, for this, start the diesel engine, engage the P.T.O. and allow the oil to cool.

6.2.2.2. Cause: Heat exchanger fan drive defective:

Remedy: Inspect the fuse of the fan drive, replace the fuse if necessary and contact the service center when the fan drive is defective. When this fault occurs, the offloading process can continue but the system may switch off repeatedly when the temperature becomes too high.

- 6.2.3. Differential pressure switch of the leak and/or reflux filter trips:  
Cause: Filter heavily soiled.  
Remedy: Do not operate the system. Contact the service center and have the hydraulic system inspected.
- 6.2.4. Hydraulic oil level indicator lamp in the instrument panel lights.  
Cause: Low oil level in the oil tank.  
Remedy: Inspect the offloading system for leaks. If no leak is found, add hydraulic oil of the prescribed grade at the earliest occasion. For adding oil, switch off the P.T.O and allow the oil to cool.
- 6.3. No lamp test is run when the ignition is switched on and offloading cannot start:  
Contact service center.

## **7. Maintenance instructions for the HPT system**

- 7.1. Make regular (at least weekly) checks of the oil level in the hydraulic tank. Place the truck on level ground; the oil should have ambient temperature. Do not start the P.T.O. The optimum level is when the display at the oil tank (with the ignition switched on) shows approximately 37 (see cl. 6.1.2). If the value is smaller, add oil to this level.  
Do not overfill the oil tank. When the tank is overfilled, oil gushes from the venting cap when the oil is hot. Only use approved oil grades:  
- Shell Tellus S3 V32  
- Shell Naturelle HFE46 (if bio-oil is necessary)  
Do not use other oil grades, do not mix different oil grades.
- 7.2. Important notes for P.T.O. cardan shaft maintenance:  
Perform maintenance only when the ignition is off. The cardan shaft is a high-temperature cardan shaft; it is lubricated with special "Castrol Braycote Inertox 500-2" lubricant in the cardan joints. This grease is not miscible with other greases.  
If the cardan joints are greased with different grease, our warranty is voided. The slider should be lubricated with lithium saponified grease of consistency class 2 with penetration 265/295 and drop point around 180°C. The lubricants must not contain MoS<sub>2</sub> additives.

- 7.3. Lubrication intervals:  
As operating conditions vary widely and we cannot know each of them it has been shown that generally lubrication intervals of 4 weeks are sufficient in normal conditions. Harsh environments may require shorter intervals. Therefore, inspect the cardan shaft regularly for proper lubrication and adjust the interval as needed.
- 7.4. Lubrication:  
Each cardan shaft has 3 lubricating points (joint at the fixed flange and at the sliding flange and the slider). Clean the grease nipples before lubrication.  
Needle and roller bearings should be lubricated until spent grease emerges at the seals. Avoid positive surges during lubrication. Positive surges damage the seals. The maximum pressure is 20 bar.
- 7.5. Wear and tear:  
Wear and tear at the cardan shafts is normal and can be kept at a minimum by regular maintenance. Check the cardan shaft for play in the cardan joints and the slider every time you lubricate the shaft. If play is noted, the cardan shaft should be replaced (obtain opinion of the specialist repair center). The cardan shaft must only be installed with suitable hexagon head bolts of quality class 10.9 and grade 10 hexagon locknuts. Replace all bolts and nuts.
- 7.6. Shift lock:  
The truck must have a shift lock which prevents that a travel gear and the P.T.O. can be engaged at the same time.  
If the truck has no shift lock, the driver must see that the P.T.O. is switched off at the end of offloading. If this is ignored, substantial damage will be caused to the P.T.O., the cardan shaft and the hydraulic pump in a short time
- 7.7. Visual inspection of hydraulic hoses and screwed/bolted connections:  
The hydraulic hoses, particularly the drag hoses, should be inspected visually in regular intervals. Abrasion, porosity, corrosion and leaks should be noted.

Prepared		Changed		Approved		Version
By	Jens Stötzel	By	Martina Wehn-Maag	By	Jens Stötzel	01.06
on	24.04.2012	on	07.12.2020	on	07.12.2020	