CEAW003900

Field Assembly Manual

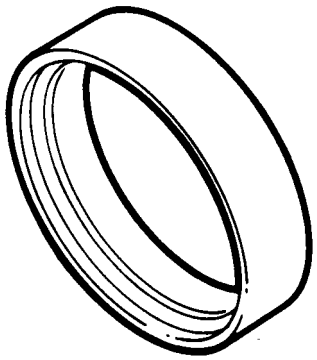
930E-3

DUMP TRUCK

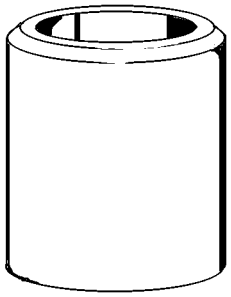
SERIAL NUMBERS **A30304 & UP**

KOMATSU®

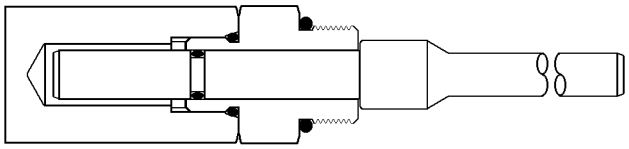
Part Number	Description	Use
BF4117	Seal Installation Tool	Front & Rear Disc Brake Floating Ring Seal Installation
ED3347	Seal Installation Tool	Rear Axle/Hub Adaptor Floating Ring Seal Installation



Part Number	Description	Use
EH4638	Sleeve Alignment Tool	Steering Linkage and Tie Rod



Part Number	Description	Use
EF9302	Wear Indicator	Brake Disc Wear
EB1723	Cap, Indicator	
EF9301	Pin Indicator	
WA0010	O-ring, Indicator Pin	
TL3995	O-ring, Indicator Cap	
EB4813	Housing, Indicator	
SV9812	O-ring, housing	



ITEM	KILOGRAMS	POUNDS
POWER MODULE		
Air Intake Duct	168	370
Engine Sub-Frame	955	2,105
Engine Sub-Module (less Grille)	19,200	42,329
Air Cleaner Assembly (Double	154	340
Retard Grid Assembly	2,742	6,045
Electrical Control Cabinet	3,045	6,713
Auxiliary Control Cabinet	202	445
Traction Alternator	4,710	10,384
Engine (Komatsu SSDA16V160)	9,305	20,514
Radiator & Shroud	1,996	4,400
HYDRAULIC COMPONENTS		
Steering Accumulator	172	380
Hoist Cylinder	962	2,120
Steering Cylinder	145	320
Hydraulic Tank	684	1,508
FRONT AXLE COMPONENTS		
Front Brake Assembly	1,496	3,300
Spindle And Brake Assembly	5,393	11,890
Steering Arm	333	734
Front Suspension Cylinder	2,790	6,150
REAR AXLE COMPONENTS		
Rear Suspension Cylinder	1,120	2,470
Parking Brake Assembly	159	350
Wheel Motor Duct	79	174
Pivot Eye Assembly	346	763
Rear Axle Housing w/Pivot Eye	6,600	14,550
Anti-Sway Bar	150	330
Wheel Motor & Service Brake Assembly	18,000	39,683
Wheel Ring Adapter	426	940

NOTES

2. Remove the auxiliary control cabinet (Figure 6-3) from the LH frame rail where it is supported and tack welded for shipment. The weight of the auxiliary control cabinet is approximately 202 kg (445 lb).

   The electrical wiring for the auxiliary control cabinet has already been connected to the truck and cannot easily be disconnected. Temporarily place the auxiliary cabinet on the control cabinet support to allow the LH deck support to be placed into position and welded to the horsecollar (Figure 6-4).

10. Connect the piping to the hydraulic tank and properly tighten all fittings.

    Refer to Figures 6-14 and 6-15.

NOTE: When the machine is ready for operation, the hydraulic tank shut-off valves must be opened. The valves are open when the handles are parallel with the hoses.

16. If installed (some trucks are shipped with the center deck not installed), remove the center deck to enable easy installation of the air intake tubing and the two diagonal cross tubes. The weight of the center deck is approximately 250 kg (550 lb).

    Refer to Figure 6-25.

17. Lift the LH diagonal tube into position (Figure 6-26). The weight of the tube is approximately 135 kg (298 lb).

    Do not tighten the cap screws until the deck and the cab are in place.

FIGURE 6-34.

FIGURE 6-35.

33. Install any remaining handrails. Tighten the cap screws to standard torque.

41. Connect the power cables and the speed sensors to each of the wheel motors. Connect the apply lines, brake cooling supply lines, and return lines to each wheel.

    Refer to Figures 6-54 thru 6-57.

50. Install the front LH & RH mud-flaps on the underside of each deck.
51. Weld both rear LH & RH mud-flap brackets into place on the backside of the deck supports. Install the mud-flaps.

    Refer to Figures 6-65 and 6-66.

FIGURE 7-12.

FIGURE 7-13.

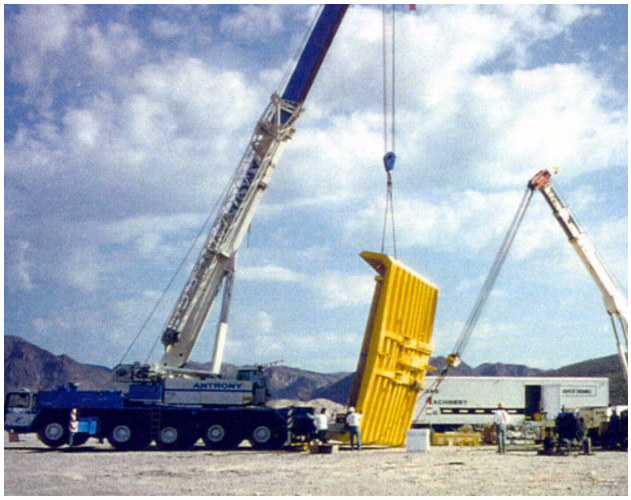


FIGURE 7-14.

FIGURE 7-15.

FIGURE 7-16.

6. Align the hoist cylinder upper bushings with the body. Refer to Figure 8-6. Align the retaining cap screw hole and install pin (2, Figure 8-7).

   Install the pin retaining cap screws and nuts. Tighten to to **407 N·m (300 ft lbs)**.

11. Install the mud flaps onto the body and chassis (Figures 8-17 & 8-18).

20. Install the exhaust tubing blankets (Figure 8-27).

21. Install the LH & RH engine inspection lights (Figure 8-28).

27. After completing the assembly of the truck, verify that all cap screw heads or nuts are marked with paint, indicating they have been properly tightened.

    Check all hydraulic lines and electrical connections for secure installation.

    Notify qualified maintenance personnel that the truck is ready for final static and dynamic systems checkout.

3. Ensure outlet valves (3) and inlet valve (4) are closed (turned completely clockwise).
4. Turn swivel nut (small hex) on the charging valve three full turns counterclockwise to unseat the valve.
5. Attach charging valve adapters (2) to each suspension charging valve stem.
6. Turn "T" handles (1) clockwise. This will depress core of charging valve and open the gas chamber of the suspension.
7. Open both outlet valves (3).

NOTE: By selective opening and closing of outlet valves (3), and inlet valve (4), suspensions may be charged separately or together.

Removal of Charging Kit

1. Close both outlet valves (3).
2. Turn "T" handles (1) counterclockwise to release the charging valve cores.
3. Remove charging valve adapters (2) from the charging valves.
4. Tighten the swivel nut (small hex) on the charging valve. If a new charging valve is being used, tighten the swivel nut to **15 N•m (11 ft. lbs.)**, then loosen and retighten the swivel nut to **15 N•m (11 ft. lbs.)**. Loosen the swivel nut again and retighten to **6 N•m (50 in. lbs.)**. Install the valve cap finger-tight.
5. Install the charging valve caps and protective covers on both suspensions.

Support Blocks For Oiling And Charging Dimensions

Before starting the oiling and charging procedures, supports should be fabricated to maintain the correct exposed piston rod extensions.

⚠ IMPORTANT ⚠

Nitrogen charging support blocks for the rear suspension are no longer necessary. However, oiling blocks are necessary to properly set the oiling height.

Exposed piston rod extensions are specified for both oil level and nitrogen charging for Hydrair II suspensions. These dimensions are listed in the tables below Figures 4-2 and 4-5. Measure the dimensions from the face of the cylinder gland to the machined surface on the spindle at the front suspension. At the rear suspension, measure from the face of the cylinder gland to the piston flange.

Support blocks may be made in various forms. Mild steel materials are recommended. Square stock or pipe segments at least 25 mm (1 in.) may be used. Blocks must be capable of supporting the weight of the truck during oiling and charging procedures while avoiding contact with plated surfaces and seals on the suspension. Refer to Figure 4-2 for front suspension support block placement and Figure 4-4 for rear support block placement.

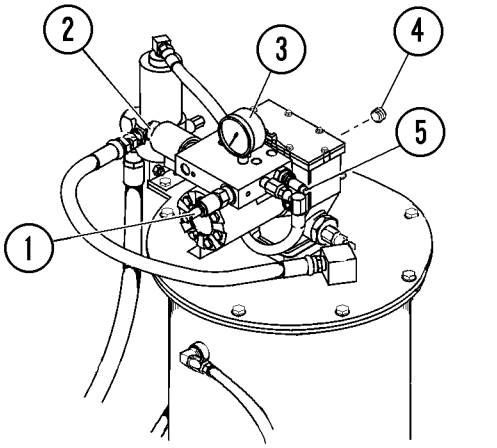


FIGURE 3-2. PUMP CONTROLS

1. Pressure Reducing Valve
2. Manual Override Switch (Test)
3. Pressure Gauge
4. Oil Level Plug
5. Flow Control Valve

SYSTEM CHECKOUT

To check system operation (not including timer), proceed as follows:

1. Turn key switch ON and start the engine.
2. Actuate the lube system test switch at the reservoir/pump assembly on the front bumper.
3. The motor and pump should operate until the system attains 2500 psi (17 237 kPa).
4. Once the required pressure is reached, the pump motor should turn off and the system should vent.
5. Check for pump, hose or injector damage or leakage with the system pressurized.
6. After checking the system, shut off the engine. Repair the lube system as necessary.

Note: Leave brake cooling supply and return hoses connected together during this entire checkout procedure if brakes are not installed.

17. Flush accumulators by starting engine and running until accumulator pressure is approximately 3025 psi, until unloader valve shifts and unloads the steering pump. If pressure will not reach 3025 psi, refer to pump adjustment procedure in step 24. If pressure reaches 3025 psi, stop engine and let accumulators completely discharge. Open needle valves in brake cabinet to allow brake accumulators to discharge. Close needle valves. Repeat this entire step five times.

Note: This procedure cannot be combined with the flushing done in steps 13, 14 and 15. This flushing procedure must be performed after step 16 is completed.

Note: Do not steer or apply the brakes at any time during the accumulator flushing procedure. Steering flushing is done in step 18.

18. After completing steering accumulator and brake accumulator flushing, steering system must be flushed. Start truck, and allow accumulators to fully charge and pump to unload. Steer lock-to-lock at least 10 times. Stop truck, add oil if necessary.

Component checkout and adjustment (steps 19 through 32)

19 In preparation for steering shock valve checkout, adjust unloader valve on piston pump by turning unloader adjustment in until a minimum pressure of approximately 3300 psi is measured at base of steering accumulator.

Note: Unloader valve adjustment screw and pressure compensator adjustment screw are located on bottom side of pump as installed on truck. Unloader valve adjustment is located forward of the pressure compensator adjustment.

Steer to verify that at least 3300 psi is maintained. Since this pressure is nearing pump compensator pressure, pump may not unload. It may maintain a constant pressure at steering pump test port "GPA". This is acceptable pump performance for this part of the check out procedure.

20. Before checking steering shock valves, raise steering relief valve pressure. First remove external plug on flow amplifier with 8 mm. allen wrench, then turn adjustment to gently bottom out the valve using a 5 mm. allen wrench.

2. Open each brake accumulator bleed down valve and precharge brake accumulators to 1400 psi. Allow gas temperature to approach ambient temperature before completing precharge process.

3. Close both accumulator bleed down valves. If brakes have not been assembled to truck when checkout is performed, attach brake simulators to the brake application lines.

4. * Start engine to fill accumulators with oil. Observe rising brake pressures as system charges. Brake pressure should begin to fall when the auto apply valve releases. The brake pressures when auto apply releases should be approximately 1650 psi front and 1650 psi rear. Record the brake pressures at auto apply release (BR & BF).

5. Partially depress brake pedal and bleed air from each brake or brake simulator.

6. * Slowly depress brake pedal. Force feedback of pedal on foot should be smooth with no abnormal noise or mechanical roughness. Slowly depress brake pedal and record the rear brake pressure (BR) at which the stop lights energize. (this pressure should be 75 ± 5 psi.)

7. * Quickly and completely depress pedal and check to see that front brake pressure is 2500 ± 75 psi (BF) and that the rear brake pressure is 2500 ± 75 psi (BR) within 1 second. Holding pedal fully applied, both pressures should remain above their minimum values for a minimum of 20 seconds.

Brake Lock/Secondary

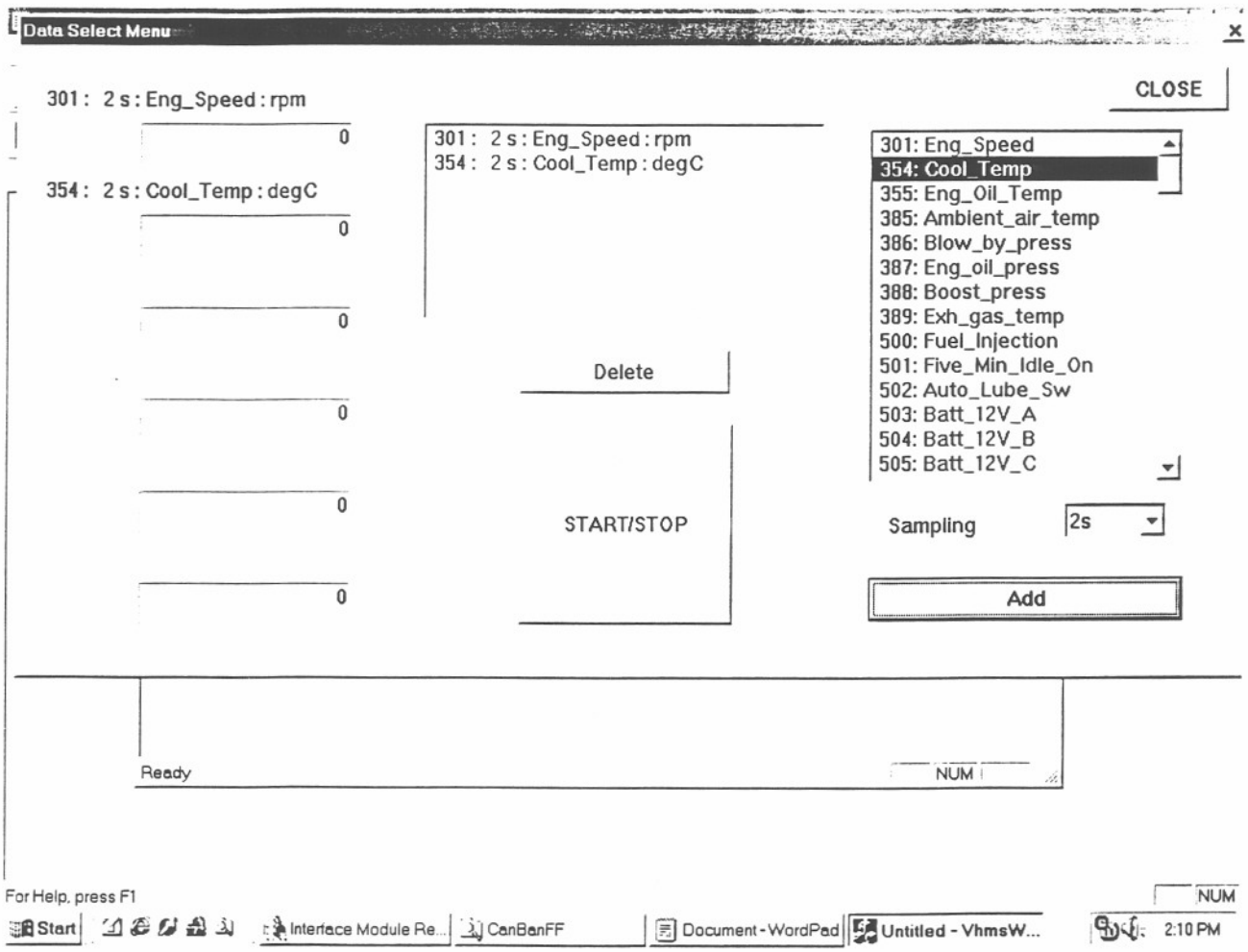
8. Disconnect lead wire on brake lock solenoid, located on brake manifold in hydraulic cabinet and to the immediate right of the PK2 port.

9. * Apply brake lock. Brake lock pressure degradation switch should sound warning buzzer. Depress brake pedal until warning stops and then very slowly release pedal until warning resumes. Record BR pressure at which warning resumes.

Note: Brake lock degradation switch should trigger when BR pressure drops to 1000 ± 25 psi, however, there is a two second delay between the time the switch makes and the lamp/buzzer activates.

10. Connect lead wire on brake lock solenoid.

6. Next, click VHMS item on menu bar again, when the menu pops up, this time click Regist&Display, then a screen like this will show up:



That is the main screen of the Watcher program. On the table list on the right, click to highlight the selected item we want to view the value, then click the "Add" bar. The selected item will show up in the 6 slots on the left of the screen (so we can view up to 6 items at a time). The screen shows an example when only two items are selected to view: Eng_Speed and Cool_Temp. After finishing selecting items to view, click on the START/STOP button, the values of the items will show up. This button is like a toggle switch, click it a second time, then the data capture is disabled. When 6 items are selected, to view another item, we have to remove one item by clicking the Delete button, then repeat the process of Add a new item to view. Remember, before Delete, need to click the START/STOP button, so that the data capture is disabled, after removing an item and replacing with a new item by ADD, need to click the START/STOP button again to enable data capture.

VHMS Installation Check-out Sheet (Form 3)

Read before installation Don't start engine before item No. 1 through 16 are completed.
After installation, fill out this sheet and send back to Call Center by FAX or e-Mail.
(WebCARE setting will be made after Call Center receives this sheet.)

VHMS/WebCARE Call Center Phone +81-3-5561-2765
FAX +81-3-5561-4766
Mail: webcare@komatsu.co.jp

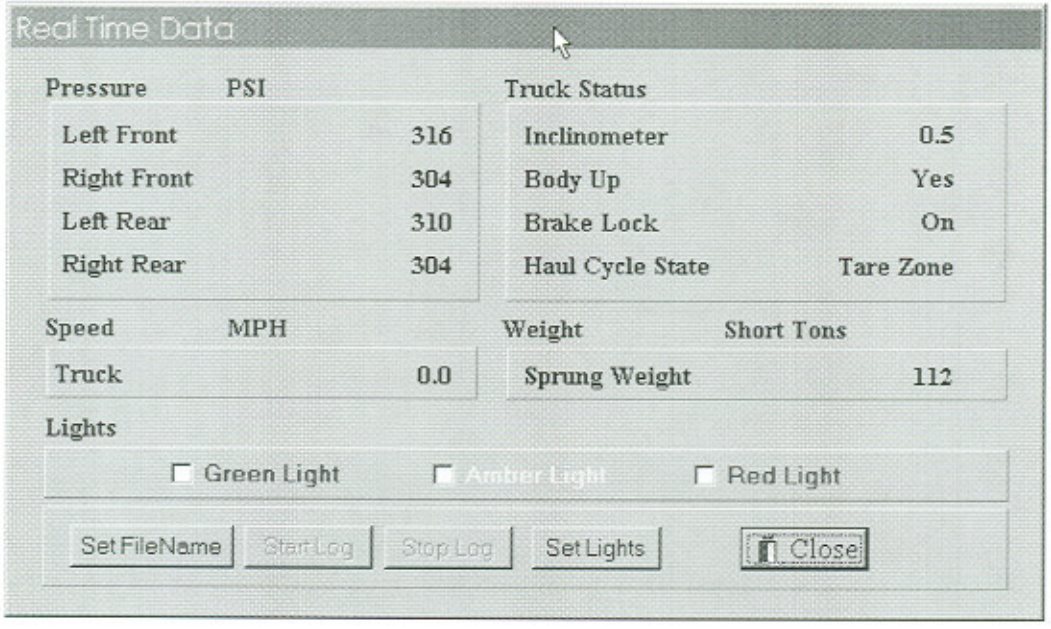
Designed to be filled in by KMS PS and confirmed by Call Center before installation.

Must be completed before starting engine

Item No.	To be checked when	Check items	Check if	Check Result	Date
1	Keyswith is off				
2	Installation	Machine serial number			
3	Installation	VHMS box serial number			
4	Installation	OrbComm box serial number			
5	Keyswitch is on	Seven segment LED display	Red display is counting up	Yes or No	
6	Setting VHMS	Date/Time (DST yes/no)	engine has been started before setting date and time	Yes or No	
		notes:	Data and number displayed on PC before inputting anything		
		If it's in Eastern Standard Time zone and in winter the setting should be LOCAL DATE TIME -05:00 DST no. If it becomes summerand daylight saving time is effective, the setting should be LOCAL DATE TIME -05:00 DST yes.	after inputting current date and time		
			Time difference from GMT (standard time)		
			DST setting (yes/no)	Yes or No	
7	Setting VHMS	Machine type variation serial number	Truck model (ex. 930E)		
			type (ex. -2)		
			variation (ex. SE)		
			Truck serial number		
8	Setting VHMS	Engine serial number			
9	Setting VHMS	component serial number		———	
10	Setting VHMS	service meter hours	Enter truck SMR reading		
11	Setting VHMS	OrbComm transmission settings	Fault Code transmission settings		
			Trend Data transmission settings		
			Short load map transmission settings		
			Payload data transmissin settings		
12	Setting VHMS	ORBCOMM GCC setting			
		Retry Interval			
		Retry count			
		Address #1		ON or OFF	
		Address #2		ON or OFF	
		Address #3		ON or OFF	
		Address #4		ON or OFF	
		Address #5		ON or OFF	
		Address #6		ON or OFF	
		Address #7		ON or OFF	
		Address #8		ON or OFF	
13	Setting payload meter	Date, Time	VHMS Date Time = Payload meter Date Time +/- 2 min		

30. From the Connection Menu select "Configure Payload Meter". Confirm that all previous changes have been saved and close the Truck Configuration form.

31. From the Connection Menu select "Real Time Data".



Note - The weight shown on the real time data screen is the sprung weight and includes the weight of the truck. Given the suspension pressure dummy loads, the nominal value shown should be 112 short tons (101 metric tons).

32. Confirm that the suspension pressures are within range. The nominal value should be 23.4 kg/cm^2 (332psi). Values between 17.6 and 29.2 kg/cm^2 (250 psi and 416 psi) are acceptable. Record the values displayed.

33. Confirm that the inclinometer is within range and record the value.

34. Confirm that the Body Up input is working correctly. Place a steel washer on the body up switch. The real time data screen should indicate "No". Remove the washer and the real time data screen should indicate "Yes". The Haul Cycle State should change to "Dumping".

35. Confirm that the Brake Lock input is working correctly. Turn the Brake Lock on using the switch on the dashboard. The real time data screen should indicate "On". Turn the Brake Lock off. The real time data screen should indicate "Off".

E. Preliminary procedure for establishing the AC Drive System is safe for maintenance personnel to perform service and welding on:

NOTE: While the AC Drive System Truck is running (**engine on**), none of the cabinet doors or covers should be open or removed. None of the power cables should be used as hand or foot holds and the retard grid elements should not be touched. Even after shutting off the engine, the following procedure should be used before opening any cabinets or touching a grid element or a power cable. **The system (link hot) is not dependent on selector switch position or accelerator pedal being pushed, (If the GF cutoff switch is in the normal position (up), the Rest Switch (Rest Switch has only a amber (circuit activated.) LED light),is turned off, and the engine is running, the drive system link is "hot" with dangerous voltage).**

NOTE: Normal operation of the drive system at shutdown should leave the system safe to operate. In the event of a system failure, performing the following procedure will insure that hazardous voltages are not present in the drive system.

NOTE: If there is any question whether the system has potential hazardous voltage, return to operator cab and perform normal shutdown.

1. Before shutting down the engine, verify the status of the drive system warning lights on the overhead display. Use lamp check to verify proper lamp function. If any of the red drive system link warning lights are on, do not attempt to open any cabinets, disconnect any cables, or reach inside the retarder grid cabinet without a trained drive system technician present - even after shutting down the engine. At this time, only the GE engineers or KAC personnel onsite qualify for this service (**NOTE: The link energized lights on the control cabinet are not lamp checked).**

to be started (Note: New models have start relay in battery control box.).

- DDEC and QSK – 21B or MTU – 21SR and 21SS.

4. Put the GF cutout switch on the side of the control cabinet in the cutout position, which is down. Note: On older control groups, the two inverter switches need to be turned off.

5. Disconnect the CCLR1 connector and the CCLR2 connectors which are located in the center compartment near the top of each vertical bus bar.

6. Disconnect the output plug on:
   a.VAM1, VAM2 and VAM4 (located in the AFSE compartment)
   b. VAM3 located behind the front center panel on the bottom of the back wall.

7. Remove the wires off the GNDB ground block located behind the left door below the ICP2. NOTE: Make sure that the battery lugs on these wires are not touching one another after the wires are removed. If the lugs are touching, the Megger reading will be zero.

8. Remove both plugs on GDPC1 and GDPC2 (behind the right cabinet door, Gate Driver Power Converter).

9. Remove FAULTP02 wire on GRR9 (stick resistor behind the right cabinet door).

10. Disconnect the CN1 connector on the Power Supply (SPS – behind the right cabinet door).

11. Pull the all the GE Panel cards forward to disconnect them from the backplane (Except the 127 power supply card, where installed.).

5. Turn on the Battery Disconnect Switches.

6. Turn on the Ground level shutdown/prop lockout switch.

7. Turn on all circuit breakers.

8. Check the polarity of the battery voltage at the BATFU located on the left wall behind the control cabinet door. Connect a voltmeter positive lead to BATP and the negative meter lead to RTN. The value should be at least +24 volts.

E. Check truck functions with the key switch turned to the on position.
Note: Verify DID panel connector is disconnected (step VI.D.2).

1. Turn key switch on.

2. Check Circuit 712 to ground. It should equal the Circuit "11" value (Step V.D.).

3. Check Circuit 71CK to ground. It should equal the Circuit "11" value (Step V.D.).

4. Turn on the Control Power Switch (CPS) in the control cabinet. Verify that all five green LED's on the front cover of the power supply are lit. (On new truck models only.).

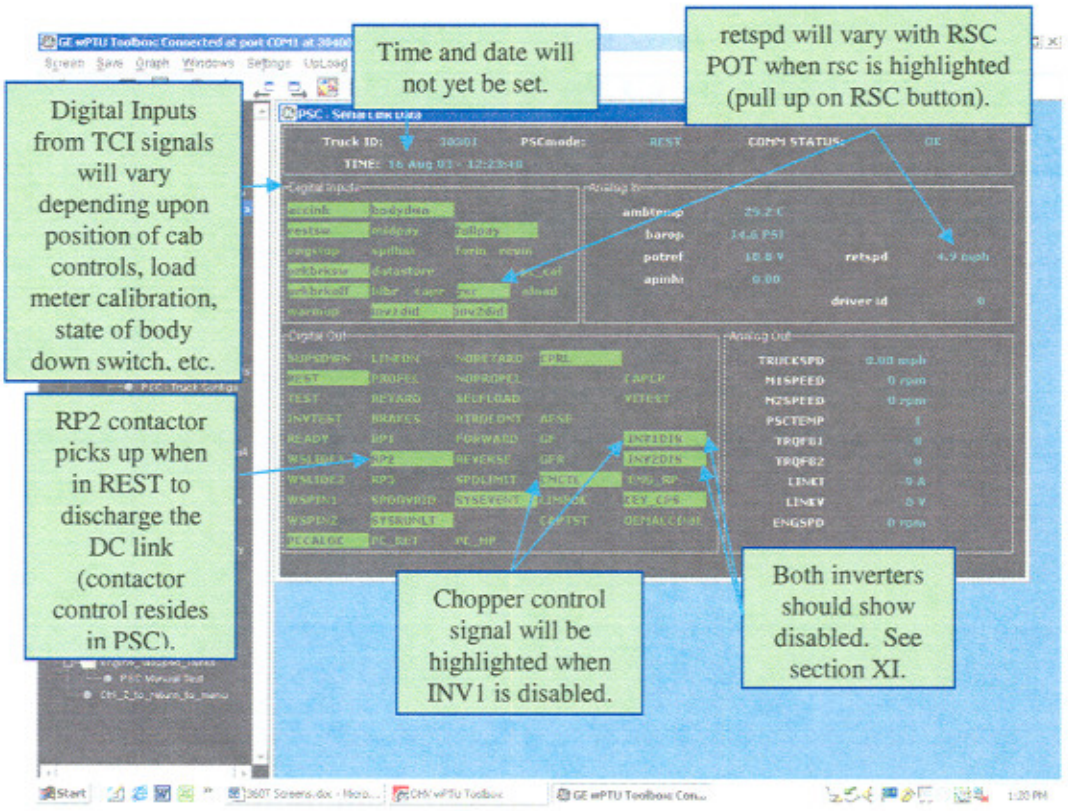
5. Measure the following voltages on the DID panel 10 pin connector in the operators cab. Note: the pins are numbered 1-10 starting from the bottom of the plug. Also, pin 10 is the return or common for the power supply voltages.
   a. Pin 9 – 10: approximately –15V.
   b. Pin 6 – 10: approximately 15V.
   c. Pin 5 – 10: 4.95V or greater.

9. Normal power on Digital inputs should be highlighted: KEYSW,PSOK, CNX, CPSFB, and CNFB.
10. BRAKEON – will be highlighted with wire 44R (TB26) jumpered to 712 (TB32). Wires do not have to be removed.

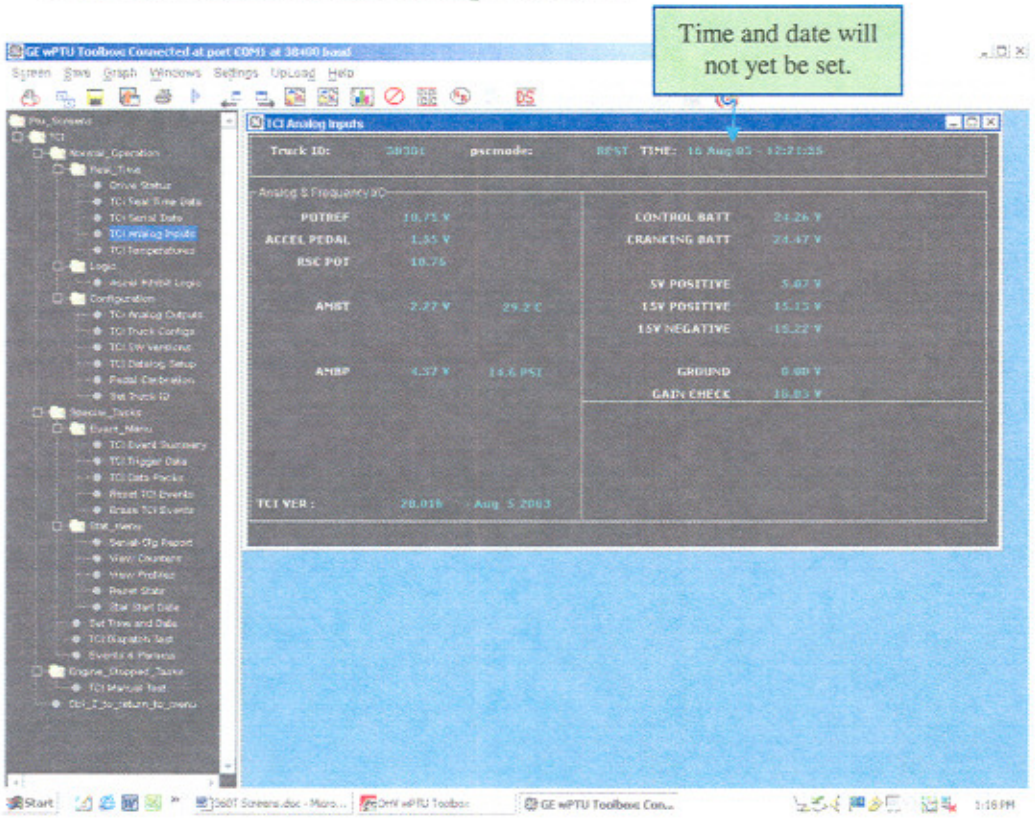
11. GFNCO – GF contactor NOT Cutout – toggle GF cutout switch is to be left in the NORMAL (up) position (GFNCO highlighted).

12. Close the " PSC – Real Time Data" screen and double click on "PSC-Serial Data".

13. Verify that analog and digital values are similar to the example below:



12. Verify that all analog values except ACCEL PEDAL and RSC POT are similar to the example below:



13. With Accel. Pedal NOT depressed, verify the ACCEL PEDAL signal reads app. 1.5V. With the Accel. Pedal depressed fully, Verify that the ACCEL PEDAL signal reads app. 8.5V.

14. With RSC button up and RSC POT fully counter clockwise (turtle), verify RSC POT signal reads app. 10.7V. With RSC POT fully clockwise (rabbit), verify signal reads app. 0V.

15. Close the "TCI Analog Inputs" screen and double click "TCI Temperatures" screen.

16. Verify that the temperature values are similar to the example

1. Connect the serial communication cable from the PTU to the TCI port which is located on the backside of the cab center consol, closest to the passenger seat.
2. Turn the Park Brake Switch on.
3. Turn on the (CPS) Control Power Switch and cab key switch.
4. START > Programs > GEOHVPTU_2.0 > AC TOOLS > wPTU AC v21.01 or v20.01 depending on version downloaded.
5. Under "Special Tasks" heading double click on "Erase TCI Events".
6. Click "YES".
7. Double click on "TCI Event Summary".
8. There should NO events listed or active.
9. Troubleshoot / investigate any events.
10. Close Screen.

B. TCI Setting Time

Note: Setting Time and Date are only permitted when no TCI Events are active.

1. Under "Special Tasks" heading double click on "Set Time and Date"
2. Set date and time, then click on "SET CLOCK".

Note: The PSC time and date are sync'd to those in the TCI. That is why these values are not also set in the PSC.

3. Close screen.

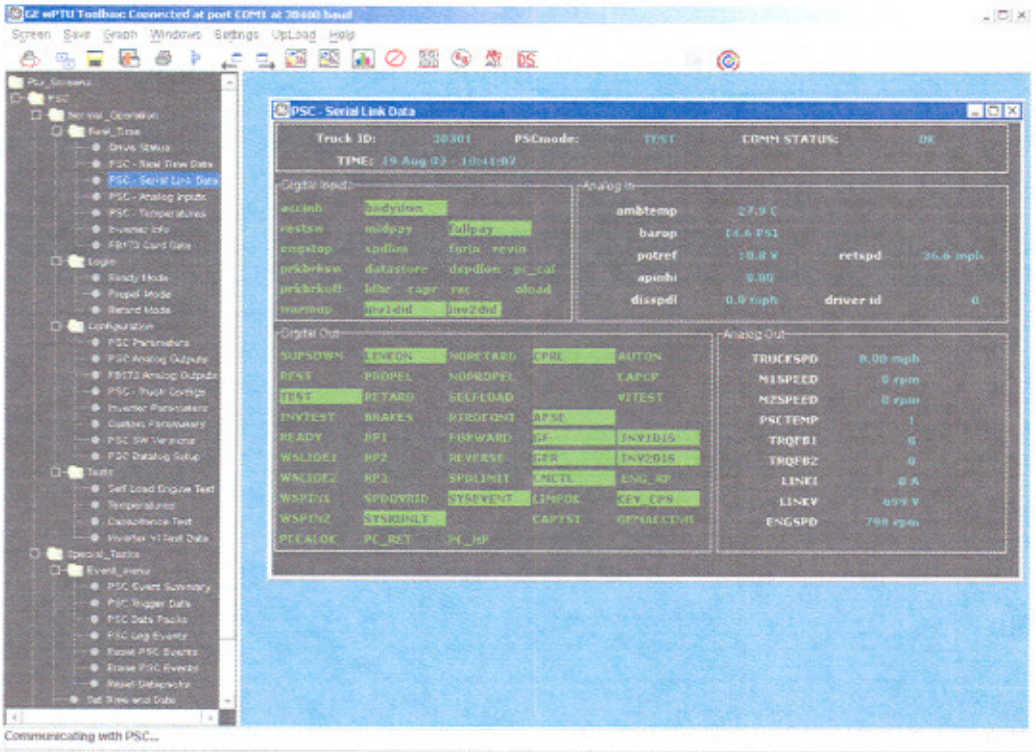
C. TCI Resetting Stats

1. Under "Special Tasks" heading double click on "Reset Stats".
2. Click on "Reset MINE Statistics" button.
3. Click "YES".

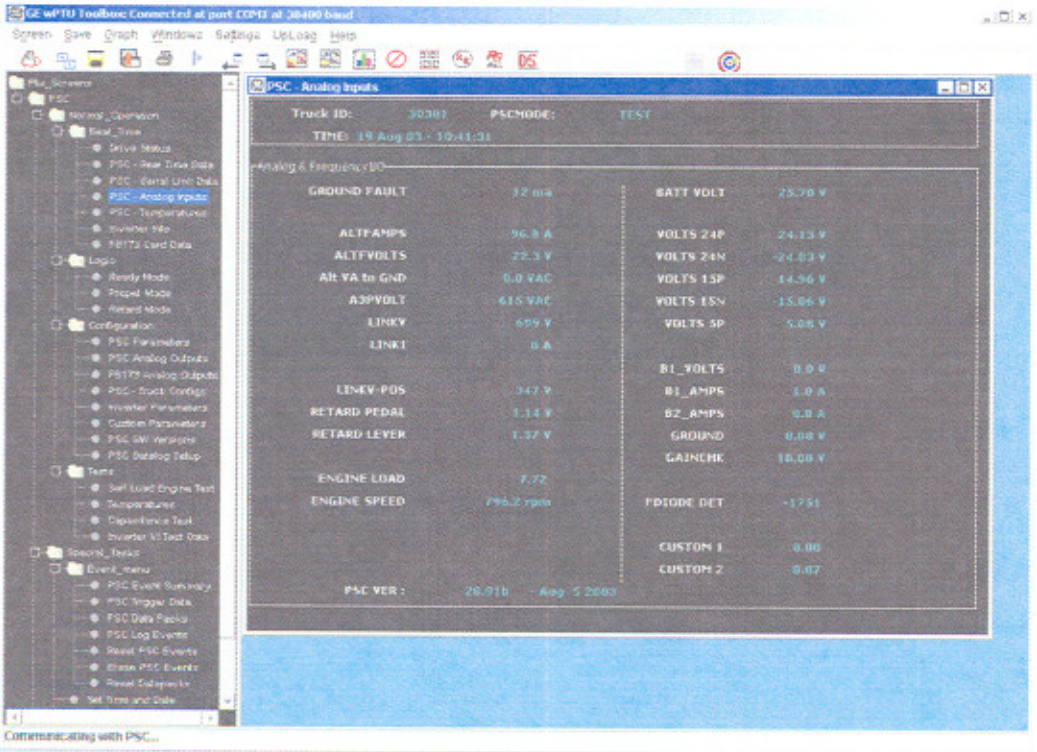
Komatsu America Corp.

Electrical Checkout Procedure EF9650-10

9/30/2005	Truck Checkout Procedure	EF9650-10



12. Real_Time > PSC Analog Inputs



24. Remove jumper that locked engine fan on per part XVII.E.15.

XVIII. Body-up limit/ body over center circuit check

A. Without Body installed on truck

1. On the right top rear of the frame rail there is a proximity sensor mounted At the auxilary control box circuit "53H" is located on TB28 Measure the circuit "53H" to ground It should be 0VDC.
2. Put a washer on the rear proximity switch and verify that the circuit "53H" changes to 24VDC. Remove the washer.

B. With Body installed on truck .

1. Start the engine **(Always activate the horn to warn of impending engine start).**
2. Measure the circuit "53H" to ground It should be 0VDC.
3. Verify that the body up limit proximity sensor is mounted on the right top rear frame rail and the metal detection bracket is mounted on the body as show on the Body Ship Loose Group Drawing.
4. Raise the body until the third stage of the hoist cylinders is approximately six inches of the unused hoist cylinder stroke, as show on the Body Ship Loose Group Drawing The circuit "53H" should change from 0VDC to 24VDC and the body is prevented from hoisting further.
5. Lower body and shut down truck.

XIV. Lincoln and Lube Circuit Check

A. Lincoln and Lube System with the PB0337 timer module.

1. With Lincoln and Lube System not filled and serviced

Note: Engine is turned off and not running.

a. Disconnect the Lube Pump Solenoid connector & circuit 71 from Lincoln Lube Timer module.

b. Jumper circuit 22FO to ground and verify that the voltage on 72E to 72R changes to 7.0VDC.

c. If the 72E to 72R value is 0VDC, verify the connections to the PVM are correct and circuit "439" and "11SL" connected to CN P382 positions 5 and 40 are 24VDC.

2. With the engine running and under load , the keyswitch turned on and the control power switch turned on, check the voltage value at 72E (+) lead to 72R (-) lead. The value should be 5.0VDC.

a. Check the PVM diagnotic connector P381

1. Verify that the voltage between position A to B is 8 – 11VDC. A voltage of 0VDC indicates that the 1939 transmittion line failed. Check out the 1939 wiring.
2. Verify that the voltage between position C to B is 8 – 11VDC. A voltage of 0VDC indicates that the PVM has failed only if the value of position A to B is correct from step1 and the filtering circuit is correct. Check out the filtering circuit resistors and capacitors connected to P383 positions 12 and 20 and P382 position 33 that are mounted on diode board 1 (DB1).
3. If both step 1 and 2 are 0VDC then the circuit "439" or "11SL" or both are incorrect.

b. A voltage of 5.0VDC can be substituted for this 72E to 72R to determine if the load problem is from the engine or the GE Drive System. This voltage can be varied above and below 5VDC to determine if the GE Drive System follows this signal, dropping load when the signal is below 5VDC and adding load if the signal is above 5VDC. If the GE Drive system follows the signal and with 5VDC the system can produce full power, but can not function normally, investigate engine boost or fuel injection system.

c. The PWM Cummins/GE Load Curve interface Check.