

SERVICE MANUAL

SERVICE MANUAL SECTION

PRE-DELIVERY/QUALITY INSPECTION INSTRUCTION MANUAL FOR CF 500 and CF 600 MODELS

Model: CF 500

Model: CF 600

S10015

07/13/2007

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DESCRIPTION

GENERAL INFORMATION

IMPORTANT – Use these instructions along with the CF model form (S00102) when inspecting these models.

These instructions explain how to inspect the vehicle to be sure it is ready for delivery to the customer. Each inspection operation on the report has a corresponding procedure on the following pages.

Original should be retained at the PDI Facility.

NOTE – Fill in the information block on the report after the vehicle is driven into the inspection area.

The instructions described in this manual follow the order of operations listed in the Pre-Delivery/Quality Inspection Report. If, while performing an inspection a question comes up, use the form as a guide to help find the correct reference information inside this manual.

EXAMPLE: For a question about exterior lights, refer to the operation on the report : number 34. Go to Step 34.

1. CF 500 AND CF 600 MODEL INSPECTION INSTRUCTIONS (REPORT S00102)

1. Prepare vehicle for PDI inspection — wheel chocks



WARNING – To avoid property damage, personal injury or death, park the vehicle on a flat level surface, set the parking brake, chock the wheels and turn the engine off.

- A. PDI Inspection area should take place in a well-lit location with a level floor.
- B. Install wheel chocks.
- C. Turn OFF key.
- D. On air brake vehicles, release parking brake.
- E. Indicate on Inspection Report the vehicle Model, Plant, PDI Facility, VIN, Service Invoice No., and Customer.

2. Connect to Midtronics Smart Charger and begin charging — 2 hours minimum

For 12V Parallel Systems

- A. Open battery box.
- B. Connect battery charger to positive and negative terminals of battery pack in any convenient position.
- C. Turn charger ON at 12V automatic high rate of charge. Watch for Incorrect Hook-Up warning.

3. *Install loose components shipped with the vehicle*

- A. These include tailpipes, cargo nets, and any other mounted component not installed by the plant but shipped with the vehicle.
- B. This labor is not part of the PDI but is to be collected from the Sales Department.

4. *Routing and clipping under vehicle — secure, meets specifications*

- A. All cables, hoses, and wires should be:
 - 1. Well supported every 24" or less.
 - 2. Free from tension
 - 3. 5" from any heat source unless shielded
 - 4. 3" from any heat source if shielded
 - 5. Clear from any rub or pinch point
 - 6. Free from crimping
 - 7. Should NOT block access to any fluid fill point
 - 8. Compressor discharge line should be free from any low points, or "traps"
- B. Items included in this check:
 - 1. Electrical wiring harnesses
 - 2. Battery cables
 - 3. Fuel hoses
 - 4. Coolant / heater hoses
 - 5. Power steering hoses
 - 6. Transmission cooler lines
 - 7. Hydraulic brake hoses
 - 8. Add-on hydraulic hosing
- C. Listen for audible air leaks.

There should be no audible air leaks.

- D. If problems are found with routing and clipping or air leaks, correct as needed.

5. *Drive Axle Oil Level - full (ALL applicable drive axles)*

- A. Verify that oil level is filled level with fill port. Add fluid as needed.
- B. Verify that drain plug is snug and leak-free.

6. *Rearmost Drive Shaft U-Joints — phasing with next shaft, retorque*

- A. Verify that forward u-joint on rearmost shaft is phased like the forward joint on the second shaft from the rear.
- B. Retorque U-joint connections to assure proper reassembly after delivery.
- C. Correct as needed.

7. *Center Bearing Alignment - square and tight — all center bearings*

- A. Verify that center bearing isolator is not out of carrier alignment.
- B. Verify that center bearing assembly mounting bolts are tight.
- C. Correct as needed.

8. *Exhaust System - secure, positioned, tailpipe extends beyond body*

- A. Exhaust system should be securely mounted to frame.
- B. Exhaust system joints should be tight and leak free. Look for evidence of leakage such as soot or slobber around the joints.
- C. Exhaust system sensors, cables, tubes, and hoses should be tension free and should not rub any object.
- D. Exhaust tailpipe must extend beyond any coachwork.
- E. Exhaust tailpipe must not contact mudflaps or other non-exhaust components.
- F. Exhaust tailpipe must not exit within 12" laterally from any fuel fill point.
- G. Correct as needed.

9. *Cotter keys / lock tabs present, properly spread - steering / brakes/clutch*

- A. Replace missing or damaged cotter keys or lock tabs.

10. *Starter / Ground Connections - tight, secure, greased*

- A. Inspect cable end tightness. Connections should be tight and coated with dielectric grease.
- B. Cable ends make no contact with other vehicle hardware.
- C. Correct as needed.

11. *Lubricate chassis — all grease zerks*

- A. Lubricate all grease zerks

12. *Axle Spring U-bolts - retorque*

- A. Re-torque all spring u-bolts to 260 — 300 lbf-ft (353 — 407 Nm).

13. *Tires - proper inflation, valve stem caps are tight*

- A. Tire pressure should be checked with a pressure gauge.
- B. Tires may come from the vendor inflated above the maximum pressure indicated on the sidewall.
- C. If tires are inflated beyond the maximum pressure indicated on the sidewall, they should be left at that pressure.
- D. Rear tires should be inflated to 90 +/- 5 psi, at minimum.
- E. Front tires should be inflated to the maximum pressure indicated on the sidewall, at minimum.
- F. Tire pressure should be equal for all tires on an axle.
- G. Correct as needed.
- H. Re-install valve stem caps properly.

14. *Wheel Lug Nuts - retorque*

- A. Re-torque all wheel nuts following the proper tightening sequence to 140 — 160 lbf-ft (190 — 217 Nm).

15. *Axle Flange Bolts - retorque*

- A. Make sure new gaskets have been installed on each axle removed by the transport carrier.
- B. Tighten the bolts in a star pattern to 96 — 116 lbf-ft (130 — 157 Nm) to ensure that axle flanges are properly seated.

16. *Cab Tilt / Assist / Latch/ Lockout Mechanisms — work properly*

- A. Cab should tilt smoothly, easily, quietly.
- B. Cab lock-out should work properly.
- C. First latch works properly — catch and release.
- D. Third latch works properly — catch and release.
- E. Mechanism latches cab firmly.
- F. Correct as needed.

17. *Batteries/ Cables/ Cover — routing, tight, secured, greased, view eyes*

- A. Battery cable end connections should be tight and secure.
- B. Battery cable end connections should be protected by a dielectric grease.
- C. Cables are not kinked, crimped, pinched or rubbing when box moves.
- D. Batteries should be securely fastened in box.
- E. Battery view eyes should not be obscured by cables or mounting hardware.
- F. Correct as needed.

18. *Steering Intermediate Shaft Pinch Bolts, Both ends - torqued off*

- A. Pinch bolts should be twisted off at steering gear box end of steering intermediate shaft.
- B. Correct as needed.

19. *Turbo downpipe - secured, no contact with other hardware*

- A. Verify turbo to downpipe connection is secure and well positioned.
- B. Downpipe makes no contact with other vehicle hardware.
- C. Correct as needed.

20. *Engine compartment routing / clipping - secure, meets specifications*

- A. All cables, hoses, and wires should be:
 - 1. Well supported every 24" or less.
 - 2. Free from tension.
 - 3. 5" from any heat source unless shielded.
 - 4. 3" from any heat source if shielded.
 - 5. Clear from any rub or pinch point.
 - 6. Free from crimping.
 - 7. Should NOT block access to any fluid fill point.
- B. Items included in this check:
 - 1. Electrical wiring harnesses.
 - 2. Battery cables.
 - 3. Air hoses.
 - 4. Fuel hoses.
 - 5. Coolant / heater hoses.
 - 6. Power steering hoses.
 - 7. Transmission cooler lines.
 - 8. Hydraulic brake hoses.
 - 9. Add-on hydraulic hosing.
- C. Listen for audible air leaks.
 - 1. There should be no audible air leaks.
- D. If problems are found with routing and clipping or air leaks, correct as needed.

21. *Engine compartment wire harness connections - seated / latched / tight*

- A. Verify all wire harness electrical connections are securely latched.
- B. Correct as needed.

22. Engine compartment hose clamps - tightness, position

- A. Verify clamp orientation allows good access.
- B. For hose clamps:
 - 1. Aluminum pipe, re-tighten to 50 - 60 in-lb.
 - 2. Steel pipe, re-tighten to 70 - 75 in-lb.

23. Engine Oil Level - between ADD and FULL marks

- A. Vehicle should be parked on a level surface.
- B. Engine oil level should register between half-full and full on dipstick. Add proper oil as needed to correct fluid level.

24. Washer Fluid Level

- A. Washer fluid level should be half-full or higher. Add fluid as required.

25. Driver's Area - restraints, seat, controls, windows, mirrors, visors

- A. Verify proper installation, condition, and operation of Driver's Area.
- B. Included Items:
 - 1. Restraints
 - 2. Seat
 - 3. Steering wheel
 - 4. Controls
 - 5. Windows
 - 6. Mirror adjustment
- C. Correct as needed.

26. Gauges and Dash Warning Lights - function properly**Multiplexed Systems**

- A. With engine off and key in RUN position, gauges will self test with a full clockwise sweep.
- B. With engine off and key in RUN position, warning lights will illuminate.
- C. If any gauge points to 6:00 position, data is out of range or no data is available. Correct as needed.

Non-Multiplexed Systems

- A. With engine off and key in RUN position, warning lights will illuminate.
- B. With engine off and key in RUN position, gauges will self test.

27. *Clear inactive fault codes*

- A. Hook up Electronic Service Tool (EST). Clear inactive fault codes.

28. *Neutral Start - Cranks in Neutral, Park, or with clutch depressed only*

Automatic Transmission

- A. Select all gear ranges and turn key to START position. Starter MUST NOT ACTIVATE except in NEUTRAL or PARK position.
- B. Start vehicle.

Manual Transmission

- A. Starter MUST NOT ACTIVATE except when clutch pedal is depressed.
- B. Start vehicle.

29. *Brake warning light, buzzer, motor, air system — function properly*

Full Power Systems

- A. With the key switch in the OFF position the park brake and brake pressure lights should be off. The system may have enough stored fluid pressure to apply the brakes without starting the motor. With the key switch in OFF position the motor should operate when the brake pedal is pressed. If it does not, apply and release the brakes until the motor starts, up to a maximum of 10 times. (If the motors do not start when pedal is pressed and key off there is most likely a problem with the brake light switch in the master cylinder, or there may be a communication problem with the ESC.)
- B. Engage the park brake if it is not already set, and turn the key switch to ON. The park brake light must go ON.
- C. The motor will operate until hydraulic pressure has been built in the accumulators. Brake pressure buzzer should sound and brake pressure light should stay on until approximately 1500 psi is built in accumulators.
- D. Start the engine and let it run. The motors must turn off once cut-out pressure is reached. The park brake light will remain on since the park brake is still set.
- E. Press the brake pedal and disengage the park brake. The park brake light must go off.
- F. Correct as needed.

Hydromax Systems

- A. With the key switch in OFF position the park brake light should be off. The motor will operate when the brake pedal is pressed.
- B. Engage the park brake and turn the key switch to ON. The light must go on. The motor should operate continuously.
- C. Start the engine and let it run. The motor must turn off. The light will remain on since the park brake is still set.
- D. Press the brake pedal and disengage the park brake. The light must go off.
- E. Correct as needed.

Air Brake Systems

- A. With the key switch in the OFF position, the light must be off. The pressure should be below 55 psi. If necessary, apply and release the brakes until the system pressure drops below 55 psi.
- B. Turn the key switch to the ON position. The light and buzzer must be on when the air pressure is below 55 psi.
- C. Start the engine and let it run. The light and buzzer must go off once the air pressure in both systems reaches 76 psi.
- D. Pressure Build
 - 1. Pressure should build from 85 - 100 psi in 45 seconds.
 - 2. Governor should cut out at 125 psi.
- E. Pressure Bleed
 - 1. Turn off engine, switch key to Accessory position, release service brake.
 - 2. Air pressure should drop no more than 2 psi in one minute.
 - 3. Apply and hold service brake.
 - 4. Pressure should drop no more than 3 psi in one minute.
- F. Low Pressure Alarm
 - 1. Cycle service brake pedal to deplete air pressure.
 - 2. Alarm must sound at 55 psi or higher.
- G. Park Brake Application
 - 1. Continue cycling service brake pedal to deplete air pressure
 - 2. Park brake must apply at 20 psi or higher.
- H. Correct as needed.

30. Hydraulic Brake Fluid Level - proper level**Full Power System:**

- A. Turn key ON if engine is not already running. Pump brake pedal quickly five times. Wait until pump motors stop running.
- B. Hydraulic brake fluid level should register between midpoint of MIN-MAX indicators and MAX indicator on transparent reservoir.
- C. DO NOT OVERFILL. Reservoir can appear to be overfilled when key is in OFF position. Add appropriate fluid as needed to correct fluid level.

HydroMax System:

- A. The fluid level must be up to the bottom edge of the ring on each reservoir fill port.
- B. DO NOT fill to the top of the reservoir.
- C. Add appropriate fluid as needed to correct fluid level.

31. Automatic Transmission Fluid Level - between ADD and FULL marks

- A. With vehicle running and in neutral or park position, check transmission fluid level. Fluid level should register between midpoint and Full mark in Cold range. Add appropriate fluid as needed to correct fluid level.

32. Power Steering Fluid Level - between ADD and FULL marks

- A. Power steering fluid level should register between half-full and full range. Add appropriate fluid as needed to correct fluid level.

33. Engine Coolant Level - above half full in range, or above lower view eye

- A. Coolant level should register between the midpoint of MIN-MAX indicators and MAX indicator on transparent surge tank.
- B. Coolant freeze protection should be good to -40F/-40C.
- C. Add proper coolant as needed.

34. Lights — exterior, instrument panel, interior

- A. Check exterior lights and flashers.
- B. Check interior lights.
- C. Check dome lights.
- D. Correct as needed.

35. Horn and Windshield Wiper / Washer — function and adjustment

- A. Verify operation of electric horn.
- B. Verify operation of air horn.
- C. Verify wipers work in all positions and do not contact each other or window frames.
- D. Verify all washer nozzles' spray.

36. Park Brake Function - holds and rolls when it should

- A. With Park Brake set and vehicle in drive gear, release service brake. Vehicle must not move. Park Brake indicator must be lit.
- B. With Park Brake released, Park Brake light must not be visible.
- C. Correct as needed.

37. Gear Selector Function - each position selects correct gear

Automatic Transmission / Automatic Manual Transmission

- A. Apply service brakes.
- B. Verify that every gear is selected as indicated.
- C. Correct as needed.

Manual Transmission

- A. Depress the clutch and apply the service brakes.
- B. Verify that every gear is selected as indicated.
- C. Correct as needed.

38. Driver Controls - function properly

- A. Check for proper function of systems:
 - 1. Service brake
 - 2. Accelerator
 - 3. Steering
 - 4. Retarder (Use caution when engaging retarder on slick road surfaces)
 - 5. Cruise Control / Hand Throttle
 - 6. Self-Canceling Turn Signal
 - 7. Power Divider Lock
 - 8. Differential Locks
 - 9. Air Suspension Dump
 - 10. Two Speed Axle
- B. Correct as needed.

39. Gauges and Warning Lamps - function properly

- A. Check for proper function of gauges:
 - 1. Speedometer
 - 2. Tachometer
 - 3. Oil Pressure
 - 4. Water Temperature
 - 5. Voltmeter
 - 6. Air Pressure
 - 7. Fuel Level
- B. Verify operation of all warning lamps
- C. Correct as needed.

40. *Climate controls - function properly*

A. Check for proper operation of:

1. Heater
2. Defroster
3. A/C
4. Blower Fan
5. Adjustable Vents
6. Auxiliary Heaters
7. Auxiliary A/C

B. Correct as needed.

41. *Engine, Transmission, Brakes, Steering - performance*

A. The following characteristics should be considered:

1. Idle quality - smooth
2. Acceleration - smooth and powerful
3. Shifts - crisp but not harsh
4. NVH (Noise, Vibration, and Harshness) - smooth and quiet, no shuddering, squeaking, buzzing, hissing, whining
5. Braking / Retarder - smooth and powerful
6. Steering - Tight and straight, no pull or vibration
7. Oil Pressure - 25 - 40 psi, engine warm
8. Water Temperature - 235 F max, engine hot
9. Volts - 12.5 - 15.5V with engine at idle and low electrical accessory load.

B. Each parameter should be within an acceptable range per vehicle type and class.

C. Road test course should be nominally 4 miles and should include reverse operation and full-lock turns in right and left directions. Road test should include road speed of 50 mph or higher.

42. *Steering Wheel Alignment*

72 Tooth Spline

- A. The 72 tooth spline steering wheel can be adjusted by +/- 5 degrees.
- B. 20 inch wheel — each tooth = 7/8 inch at the outside of the wheel.
- C. 18 inch wheel — each tooth = 3/4 inch at the outside of the wheel.
- D. Correct as needed.

36 Tooth Spline

- A. The 36 tooth spline steering wheel can be adjusted by +/- 10 degrees.
- B. 20 inch wheel — each tooth = 1.75 inch at the outside of the wheel.
- C. 18 inch wheel — each tooth = 1.5 inch at the outside of the wheel.
- D. Correct as needed.

43. *Hot Coolant Level - above half full in range, or above lower view eye*

- A. Coolant level should register between the midpoint of MIN-MAX indicators and MAX indicator on transparent surge tank.
- B. Add proper coolant as needed.

44. *Fluid or Air Leaks - Cab/Engine Compartment/Chassis - none*

- A. Check gaskets, seals, hoses, connections, and low points on housings on components that contain fluids.
- B. Included components:
 - 1. Engine
 - 2. Transmission
 - 3. Radiator
 - 4. Transmission Cooler
 - 5. Transmission Retarder
 - 6. Drive Axle
 - 7. Fuel Tank/ Fuel Delivery System
 - 8. Chassis Power Steering lines
 - 9. Hydraulic Brake tubing
 - 10. Add-on Hydraulic equipment
 - 11. Exhaust connections
- C. Verify manual operation of drain valves if equipped with air tank(s).
- D. Correct if needed.

45. *Fault Codes - check*

- A. Check for fault codes.
- B. Correct as needed.

46. *Operator's Manual and other required documents are in vehicle***47. *Install Instruction stickers on vehicle, found in Operator's Manual*****48. *PDI Location Code, Date - ADD to Vehicle Identification Label***

49. *Vehicle Certification Label - ADD - See NEW VEHICLE PROCESSING MANUAL*

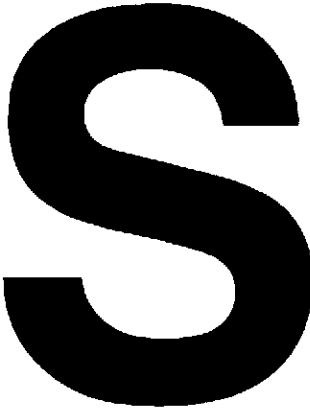
50. *Pre-Delivery Service Identity Sticker (CTS-1122) - affix to windshield*

PRE-DELIVERY SERVICE	
MODEL	VEHICLE IDENTIFICATION NO.
SERVICING LOCATION	INVOICE NO.

Pre-delivery Service Performed By: _____ Date _____

CTS-1122D

(Front Side)



MOISTEN THIS SIDE — APPLY TO WINDSHIELD

(Back Side)

Figure 1 Pre-Delivery Service Identity Sticker (CTS-1122)

51. *COMMENTS - complete*

52. *Wash Vehicle — look for interior leaks*