

SERVICE MANUAL

SERVICE MANUAL SECTION

PRE-DELIVERY/QUALITY INSPECTION INSTRUCTION MANUAL FOR BE, CE, FE, and RE MODELS

Model: BE 200

Model: CE 200

Model: CE 300

Model: FE 300

Model: RE 200

Model: RE 300

S10014

07/12/2007

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DESCRIPTION

GENERAL INFORMATION

IMPORTANT – Use these instructions along with the Form (S00024) 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 engine coolant level, refer to the operation on the report : number 42. Go to Step 42.

Non-Reimbursement Addendum

Adjustments which are a part of the PDI (***not reimbursable as PTD warranty expense***) are as follows:

- Fluid level adjustments - Labor
- Wire harness route and clip - Tie Strapping
- Tire inflation
- Re-torque operations
- Installation of loose shipped items (except air deflector)
- Chassis Lubrication

Consumables such as windshield washer solvent, diesel fuel, coolant additives, etc. will not be reimbursed as warranty expense.

Damage due to shipping should be claimed with the shipping carrier. All other repair operations should be claimed to PTD 03 warranty.

1. BE, CE, FE, AND RE MODEL INSPECTION INSTRUCTIONS (REPORT S00024)

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 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 hour 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. 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. Air hoses
4. Fuel hoses
5. Coolant / heater hoses
6. Power steering hoses
7. Transmission cooler / retarder lines
8. Hydraulic brake hoses
9. 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.

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

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

5. *Rearmost Drive Shaft U-joints - phasing with next shaft, retorquer*

- 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.

6. *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.

7. *Air Tank Drain Valves — function properly*

- A. All air tank drain valves must function properly.

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

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

9. *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.

10. *Lubricate chassis — all grease zerks*

- A. Lubricate all grease zerks

11. *Axle Spring U-bolts - retorque*

- A. Refer to the Torque Chart for specifications.

Table 1 U-Bolt Nut Torque Chart

U-Bolt Dia. (Nominal)	Torque: Ft-lbs.	Torque: Nm
5/8 Inch Flanged Lock Nut	130-160	176-217
3/4 Inch Flanged Lock Nut	200-240	271-325
7/8 Inch Hex Head With Washer	260-300	350-380
1 Inch Hex Head With Washer	325-400	441-543

12. *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.

13. *Wheel Lug Nuts - retorque*

- A. Determine nut size, type, and torque specification.
- B. Re-torque all wheel rim nuts following the proper tightening sequence.
- C. Refer to the Wheels, Rims, and Tires section in GROUP 17 of the Master Service Manual for additional information.

14. *Axle Flange Nuts - retorque*

- A. Make sure new gaskets have been installed on each axle removed by the transport carrier.
- B. Tighten the nuts in a star pattern to the specified torque to ensure that axle flanges are properly seated. Refer to the Table below.

Table 2 Axle Flange Nut and Bolt Torque Chart

Size	Grade/Type	Torque: Ft-Lbs.	Torque: Nm
5/8-18	8/Washer	145-175	197-237
5/8-18	5/Nylok	106-125	143-170
9/16-18	8/Washer	105-125	143-170
9/16-18	5/Nylok	96-116	129-156
3/4-16	8/Washer	250-300	340-410
3/4-16	5/Nylok	219-240	294-325
3/4-10	8/Washer	250-300	340-410
3/4-10	5/Nylok	219-240	294-325

15. *Front Hub/Lift Axle Oil Level (if equipped) — between indicators*

- A. Oil level on oil filled front hubs should be between indicators.
- B. Add appropriate oil as needed to bring level to the indicator circle on the hub.

16. *Batteries/ Cables/ Cover — routing, tight, secure, 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 crimped 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.

17. *Storage Compartments — key function, latches, hinges, lights, condition*

- A. Check function of all latches.
- B. Check function of all hinges.
- C. Check function of all compartment lights.
- D. Check overall condition of hardware.
- E. Correct as needed.

18. *External Paint, Trim, Chrome, Mirrors, Grille — condition*

- A. External painted surfaces should be free from runs, scratches, scuffs, dents, orange peel, bumps, holes, excess glue, or other obvious defects.
- B. Trim pieces should be securely affixed and aligned, and in good condition.
- C. Chrome surfaces should be free from cracks, bubbles, scuffs, or other obvious defects.
- D. Mirrors and Grille should be securely mounted and in good condition.
- E. Correct as needed.

19. *Windshield and glass — no damage*

- A. Windshield and other glass should be free from cracks, stars, chips, or other obvious defects.
- B. Correct as needed.

20. *Hood Fit — secure, good alignment*

- A. Hood should be properly aligned with cab, lower fender extensions, and bumper.
- B. Hood latches should be easily operated.
- C. Correct as needed.

21. *Steering Intermediate Shaft Pinch Bolts, Both Ends - torqued off*

- A. Pinch bolts should be twisted off at both ends of steering intermediate shaft.
- B. Correct as needed.

22. *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.

23. *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.
 - 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. 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.

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

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

25. *Engine compartment hose clamps - tightness, position*

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

26. *Engine Oil Level - between ADD and FULL marks*

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

27. *Washer Fluid Level*

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

28. Doors — *adjusted and work properly***A. Includes**

1. Entry Doors
2. Emergency Exits
3. Luggage Doors

B. Includes

1. Latches
2. Locks (Manual and Power)
3. Hinges
4. Stops
5. Air or Electrical Actuators

29. Windows — *open and close properly*

- A. Windows should open and close properly without binding, chattering, or excessive effort.
- B. Correct as needed.

30. Interior panels, trim, molding, and floor coverings — *neat, clean, secure*

- A. Interior components should be neat and square.
- B. Interior components should be clean.
- C. Interior components should be well secured.
- D. Correct as needed.

31. Passenger Area — *restraints, seat, controls, windows, visors*

- A. Verify proper installation, condition, and operation of Passenger area
- B. Included items:
 1. Restraints
 2. Seat (including air seat)
 3. Controls
 4. Windows
 5. Visors
- C. Correct as needed.

32. *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 (including air seat)
 - 3. Steering wheel
 - 4. Controls
 - 5. Windows
 - 6. Mirror adjustment
- C. Correct as needed.

33. *Auxiliary Heater — functions, secured*

- A. Auxiliary Heater should function.
- B. Auxiliary Heater should be well secured.
- C. Correct as needed.

34. *Engine Cover Fit — FE 300 only*

- A. Verify that engine cover fits well and does not move at all when tugged or rocked.

35. *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.

36. *Clear inactive fault codes*

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

37. *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.

38. *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.

39. 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.

40. Automatic Transmission Fluid Level full / cooler hose connectors fully engaged

- 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.
- B. Verify that all (up to four) Snap-To-Connect (STC) fittings on each end of the two Transmission Oil Cooler hose sections are fully latched by grasping the tubing on each side of the connections and forcefully pushing the connectors together. Then pull forcefully on each side of the connection and attempt to pull the connectors apart to assure that the connection will not detach during use.

CAUTION – Failure to fully latch the STC fittings can allow the fittings to come apart during use resulting in transmission failure due to oil loss.

41. 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.

42. 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.

43. Open all coolant valves before Road Test

- A. Open all coolant valves on vehicle prior to Road Test so that coolant circulates through all circuits.

44. Lights — exterior, instrument panel, interior

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

45. 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.

46. *Body Switches — function properly*

- A. Verify that all body switches operate accessories as labeled.
- B. Correct as needed.

47. *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.

48. *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.

49. *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.

50. *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.****51. *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.**52. *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.

53. *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.

54. *All Accessories as equipped — performance*

- A. All accessories should function properly.
- B. Includes Keyless Entry systems.
- C. Correct as needed.

55. *Hot Coolant Level — above half full in range or above lower view eye*

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

56. *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 Deliver 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.

57. *Fault Codes - check*

A. Check for fault codes.

B. Correct as needed.

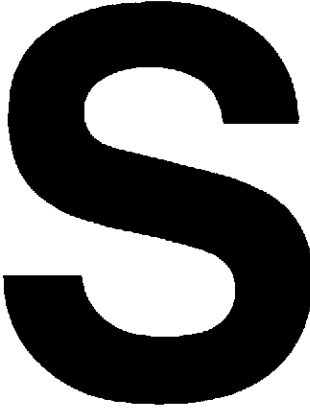
58. *PDI Location Code, Date - ADD to Vehicle Identification Label***59. *Vehicle Certification Label - ADD - See NEW VEHICLE PROCESSING MANUAL*****60. *Pre-Delivery Service Identity Sticker (CTS-1122) - affix to windshield***

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)

61. *COMMENTS - complete*

62. *Wash Vehicle — look for interior leaks*