Maintenance

Thomas Built Institute
Maintenance Schedule

C2 Chassis Information
Maintenance Schedule

C2 Chassis Information
Maintenance Schedule

Schedule I –
< 20,000 miles/year

Schedule II –
> 20,000 miles/year
Maintenance Schedule

Click on folder below and the Service Manuals you want to view or download:
- Parts Reference Manual
- Diagnosis-Retrieved Fault Codes, All Models and Years
- TFX Parts Reference Manual
- Electrical Manuals
- HDX Parts Reference Manual
- Operations Manuals
- Parts Manuals
- Parts Tech Tips
- Pre-Delivery Inspection Manual
- Service Manuals
- Standard Repair Time
- Supplemental Parts Information
### Maintenance Schedule

#### Preventive Maintenance Inspection #1

**4,000 Miles (6,400 Km) - 60 Days (whichever occurs first)**

<table>
<thead>
<tr>
<th>Unit Number</th>
<th>Mileage</th>
<th>Check = OK</th>
<th>X = Attention Required</th>
<th>R = Repair</th>
<th>N/A = Not Applicable</th>
</tr>
</thead>
</table>

1. Check driver’s reports for problems previously reported
2. Ignition switch “On” - air pressure warning signals
3. Start engine. Check operation of the following:
   a. Starter operation
   b. Check operation of Intake Air Heater
   c. All gauges: Oil pressure ____, Temp ____, Trans Temp ____, Tach ____, Voltmeter ____, Ammeter ____, Air pressure ____, Speedometer ____,
   d. Check interior lights ____, Dash lights ____, Ceiling lights ____,
   e. Check exterior lights ____, Headlights ____, High beam indicator ____, Tail ____, Stop ____, Stepwell ____, Clearance ____,
   f. Check turn signals ____, 4-way flashes ____,
   g. Check 4-light warning system ____, 6-light warning system ____,
   h. Check Windshield wiper operation ____, Washer ____,
   i. Check max air pressure (should be 110-120 psi)
   j. Check heater operation ____, Air conditioner ____,
   k. Check alternator output on voltmeter ____,
   l. Check operation of parking/spring brakes ____, Park brake warning light ____,
   m. Check hydraulic fluid level ____,
   n. Depress brake pedal - check for leaks in brake system ____,
   o. Inspect condition of windshield ____, Side glasses ____, Mirrors ____,
   p. Inspect condition of wiper blades ____, Fill washer container ____,
   q. Inspect front door assembly hinges ____, Controls ____, Adjustments ____,
   r. In-line Filter ____,
   s. Inspect seat back and cushion for damage ____, Check frame ____,
   t. Inspect condition of floor covering ____, Upholstery ____,
   u. Inspect and operate all emergency exits “opening/locking” ____,
   v. Check operation of all door and window warning buzzers ____,
   w. Check operation of all roof hats and warning buzzers ____,
   x. Inspect exterior sheet metal for damage: Corrosion ____, Paint Condition ____,
   y. Inspect lock condition, all external access doors ____,
   z. Check condition and adjust all Belts ____, Alternator ____, Air conditioner ____,
   {a. Inspect condition of throttle for proper operation ____,
   b. Inspect engine mounts - condition and security ____,
   c. Inspect air intake ducts, hoses for condition & for chafing ____, Loose clamps ____,
   d. Check air cleaner restriction indicator. Service filter if necessary ____,

<table>
<thead>
<tr>
<th>Preventive Maintenance Inspection #1 (continued)</th>
<th>OK</th>
<th>Not OK</th>
</tr>
</thead>
</table>
20. Inspect cooling system for leaks - Radiator ____, Hoses ____,
21. Inspect fan assembly - Mounting ____, Fan blades ____,
22. Check coolant level, Freeze protection ____, % and SCA levels ____, ppm or units ____,

**IMPORTANT:** Check with Engine Manufacturer for their SCA recommendations and maintenance schedule.

23. Check Hydraulic fluid level ____,
24. Grease rear suspension ____, Drive shaft ____, Brake mechanism ____,
25. Check tube level - Rear axle ____, Trans. (std.) ____,
26. Adjust rear brakes ____, Inspect lining wear ____,
27. Clean rear axle vent ____,
28. Inspect rear springs, broken leaves ____, Loose U-bolts ____,
29. Inspect air suspension for cracks ____, Wear ____, Hangers ____, Leaks ____,
30. Bleed air tanks ____, Check moisture ejector ____, Heat operation ____,
31. Inspect battery installation, hold-down clamps security, clean as required ____,
32. Inspect battery cables for corrosion, chafing ____,
33. Check state of charge in batteries, Fill if applicable. Battery voltage ____,
34. Inspect fuel tank mounting brackets for cracks, security ____,
35. Clean fuel tank vents ____, Inspect filler cap seals ____,
36. Jack front axle. Check tires for toe-in wear ____,
   a. Grease suspension, king pin, steering linkage ____,
   b. Check tube level of front wheels ____, Bearing adjustment ____,
   c. Check steering linkage for lost motion ____, Check king pin ____,
   d. Inspect front springs for broken leaves ____, Loose U-Bolts ____, Snatchers ____,
   e. Adjust front brakes ____, Grease brake mechanism ____, Check lining wear ____,
37. Inspect steering gear box mounting for security ____,
38. Inspect wheel rim lug nuts for security ____,
39. Inspect wheel caps for cracks, slipping ____,
40. Inspect tires for cuts, tread depth, wear ____,
41. Initiate tires to recommended pressure ____,
42. Inspect body mounting bolts and clips for security ____,
43. Consult repair order for following ____,
   a. Change engine oil ____, Replace oil filters ____,
   b. Replace fuel filters ____, Water filter ____,
44. Start engine. Check filters for leaks ____,
45. Engines idling & at operating temperature - check automatic transmission fluid level ____,
46. Road test: Check brake operation, unusual noises, etc. ____,
47. Wipe grease off steering wheel and driver's seat ____,
48. Fill out all required work orders, forms, etc. ____,

**Mechanic’s Signature** __________________________

**Comments:**
**Preventive Maintenance Inspection #2**

*45,000 Miles, 75,000 Km - Annual*

<table>
<thead>
<tr>
<th>Unit Number</th>
<th>Check = OK</th>
<th>N/A = Not Applicable</th>
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</thead>
<tbody>
<tr>
<td>Mileage</td>
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<tr>
<td>Repair Order #</td>
<td></td>
<td></td>
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<tr>
<td>Date/Time</td>
<td></td>
<td></td>
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<tr>
<td>Location</td>
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</table>

1. Steam clean engine compartment, if necessary
2. Perform #1 Inspection
3. Inspect hoses for deterioration - replace as required
4. Check condition of antifreeze - replace as required - set for -30°F (-34°C)

**IMPORTANT:** Check with Engine Manufacturer for their SCA recommendations and maintenance schedule.

5. Check shutters for opening and closing fully, if so equipped
6. Service shutter system filter, if so equipped
7. Clean front of radiator module (mud, dirt, debris)
8. Remove covers, all heaters - clean cores, clean filters
9. Check operation of all heater motors, defrosters
10. Replace power steering filter in reservoir
11. Replace water filter, if not done previously
12. Check operation - block/dial/heat, if applicable
13. Check operation of other start device
14. Tighten all hose clamps - air intake system
15. Air cleaner element: Replace every 2 years, 45,000 miles, or 25⁰F of restriction, which ever occurs first.
16. Check operation of restriction indicator, remove and test operation
17. Service crankcase breathers
18. Check EPA07 Exhaust System for:
   a. Leaks at clamps attaching exhaust pipe to turbocharger exhaust outlet
   b. Wear, cracks, damage in exhaust pipe, bellows, seal clamps
   c. If present, the condition of the insulation material around pipe between turbocharger and the ATD
   d. ATD mounting bolts for tightness (30 ft-lbs, 41 N-m)
   e. Leaks around clamps retaining the After-Treatment Device in the After-Treatment System
   f. Leaks around the clamps that retain the Diesel Particulate Filter in the After-Treatment Device
   g. Sensors attached to the ATD for leaks or damaged wires
   h. DPF exterior surface for dents or other damage
   i. Heat discoloration on surface of the ATD
   j. Any wires, lines, or hoses within 4" (10 cm) of the exhaust system for heat damage

19. Check operation of air dryer - renew filter or desiccant, if so equipped
20. Inspect rubber seals on emergency exits
21. Lubricate all access and emergency door hinges
22. Replace entrance door inline filter
23. Inspect all windows for proper latching
24. Check fuel tank (by a trained inspector), every third year (CNG units)
25. Check fuel sender unit connections and renew dielectric grease, if necessary
26. Check fuel fill hose for tightness

**Mechanic's Signature**

**Comments:**

<table>
<thead>
<tr>
<th>OK</th>
<th>Not OK</th>
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<tbody>
<tr>
<td></td>
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</tr>
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</table>
Maintenance - Initial

- Lubrication and Fluid Level Check
- Frame Fastener Torque Checking
- Suspension U-Bolt Torque Check
- Draw Key Nut Inspection
- Axle Breather - free and clear
- Air Brake System Valve Inspection
- Haldex & Gunite Slack Adjuster Lubrication
- Meritor Slack Adjuster Lubrication
- Power Steering Fluid Level Inspection
- Power Steering Gear Lubrication
- Drag Link Lubrication
- Fuel Tank Band Nut Tightening
- Door Seal Lubrication
- Air filter, check clamps and associated piping.
Service Access

- 15 lbs of force to open hood
- Always use hand hold to open
- Removable 4 bolt grill
INSPECT

- Integrated intake
- Sealing gasket to air cleaner
- Integrated drains
Maintenance – LH-side Access

- Power steering reservoir
- Steering gear linkages
- Fuel filters
- Centrifugal oil filter

- Fuel/water separator
- Oil dipsticks
- Windshield wiper motor and linkage
Maintenance – RH-side Access

- Radiator surge tank
- Air cleaner / restriction indicator
- Oil filter
- Windshield washer reservoir
- Heater cutoff valves
- Crossing control arm
Maintenance – Air Cleaner

Replace the element at the service interval or when the restriction indicator signals red (see Section 09 in Workshop)

Always place a cover over the air cleaner when the hood is open to keep from exposing the element to contamination
Type D Access

- Filters, Air, fuel Oil
- Dip stick
- Coolant Tank
- Engine Belts
- A/C Connections
- Hydraulic Reservoir
CHECK ALL LEVELS DAILY

Lube Oil & Lube, Fuel, Coolant Filters
Coalescing Filter (Cummins Engine)
Air Filter (Paved Roads)
Coolant Test
Overhead Adj.
DEF & DPF Filters

15K Miles / 6 Months
60K Miles / 24 Months
12 Months
250 Hours / 3 or 4 Months
150K Miles / 48 Months
200K Miles

Install Fuel Filters “DRY”
Maintenance – Cooling

2013 HDX Fan Drive Gearbox

- Initial oil change @ 6000 miles for “break in” period.

- Change oil every 24M/30K miles.

- Flush with nontoxic, nonflammable solvent.
  - Lubriplate Syn Flush
  - Lubriplate Pure Flush
  - Whitmore’s Flushing Oil
  - Medallion Flushing Oil Kosher

- Use Mobile Delvac 75W-90 synthetic lubricant.

- Make sure breather is clear.

- Do not overfill !!!!
OUTPUT SHAFT SEAL REPLACEMENT

- Drain unit.
- Use extreme care to not damage seal bore or shaft surface.
- Drill two holes 180 deg. apart.
- Install sheet metals screws leaving about 3/16” exposed.
- Using prybar, lift seal out.
2013 HDX Fan Drive Gearbox

SEAL INSTALLATION

• Inspect output shaft for grooving, scratches, score marks.
• Try removing imperfections with emery cloth (no.240)
• Cover keyway with tape to prevent cutting new seal.
• Use RTV sealant on O.D. of seal.
• Coat inner seal lip with oil or grease to facilitate installation.
Maintenance – Engine

Fuel Priming System

(J-47912QC – Fitting 4 Only)
(For Cust. Supplied Pumps over 30 PSI)

Kit 23535927
Maintenance – Engine

Cummins ISB

Fuel Filters

Oil Filter

Coalescing Filter
EGR valve ISB

Refer to Cummins cleaning Procedure 155-011-022
Clean care kit part # 4919498
Maintenance – Engine

Davenport Seat Access Panel

CURRENT PRODUCTION
Maintenance – Engine

Current configuration

Prototype – to be in production soon.
Maintenance – Alternator

- Maintenance
  - Check for corrosion and loose connections
  - Remove buildup of dirt and grease
  - Check airflow vents
  - Check belt condition and tension.
Maintenance – Alternator

Corrosion -

-Excessive dirt/debris (heat)

Oil soaked due to engine/hydraulic failure -

CHECK FLUID LEVELS DAILY

Oil / filter change as recommended, or as indicated by prognostic controller.

- w/ TES295 Fluid:
  - 2K 60K/48M
  - 3K 90K/48M
- Filters:
  - 2K 40K/48M
  - 3K 40K/48M
- Both – Initial 5K

- w/ Dexron Fluid:
  - 2K 50K/24M
  - 3K 25K/12M
- Filters:
  - 2K 40K/24M
  - 3K 25K/12M
- Both – Initial 5K

Revised 10/11
Maintenance – Transmissions

**Fluid:**

TES-295

**Approved Allison Transmission Lubricants**

<table>
<thead>
<tr>
<th>APPROVED ALLISON TRANSMISSION LUBRICANTS*</th>
</tr>
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<tr>
<td><strong>T E S - 2 9 5</strong></td>
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<tr>
<td><strong>APPROVAL</strong></td>
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<td><strong>C O M P A N Y</strong></td>
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<td><strong>P R O D U C T B R A N D N A M E</strong></td>
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<td>EXXONMOBIL LUBRICANTS AND PETROLEUM</td>
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<td>AN-071006</td>
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<td>JOHN DEERE &amp; COMPANY</td>
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<tr>
<td>HD SYNTRAN</td>
</tr>
</tbody>
</table>

**Approved Allison Transmission Lubricants**

**Filters:**

- **2K:**
  - Spin-On 29539579
  - Filter Magnet 29535617
  - Deep In-Pan 29537966
- **3K:**
  - Filter Kit (2) 29537067

**NSBU Switches:**

- 29540479 – 2 plug
- 29541852 – 1 plug
- J-41364-A Adj. Tool
Maintenance – Transmissions

Allison ’09 Prognostics

• Oil Life Monitor
  • Indicator or Lamp remains illuminated for 2 minutes after Drive is selected
  • Change transmission fluid.

• Filter Life Monitor
  • Indicator or Lamp remains flashing for 2 minutes after Drive is selected.
  • Change transmission filter(s)

• Transmission Health Monitor
  • Indicator or Lamp remains illuminated at all times during vehicle operation.
  • Clutch system may have exceeded specified limits.
Allison ’09 Prognostics

**3000 Series**

### Up/Down Arrow Buttons | Mode ID | Readout
---|---|---
1st Press | Oil Level Sensor | OL | OL OK, OL LO xx, OL HI xx
2nd Press | Oil Life Monitor | OM | 99 down to 0 Oil Life Remaining
3rd Press | Filter Life Monitor | FM | OK, LO
4th Press | Trans Health Monitor | TM | OK, LO, NA
5th Press | Diagnostic Codes | d# | d1 P xx xx

Resetting procedures vary with model.
For earlier Allison 2000 PTS Transmission
Check linkage and NSBU switch adjustment

D07-19453
Batteries
• Inspect cables and connections
• Load test

Grounds
• Inspect, test and repair
Dash HVAC Filter

Current Filter is ABP N10G 36000006
• Passenger & Stepwell heaters have aluminum filters
• Inspect and / or clean filters every 30 days
• Inspect / tighten hose clamps after 30 days and routinely thereafter
Head Light Aiming

1. Park bus 25 feet from wall to front bumper
2. Measure up to center of headlight
3. Measure up from floor and mark wall with same dimension
4. Turn on headlights and adjust to focus on line
Maintenance – Fasteners

• Check spring tension after 30 days and every 6 months thereafter

• Check torque after 30 days and every 6 months thereafter

• Check torque on body clips after 30 days and every 6 months thereafter
• Torque 35-50 ft/lbs
Seat Bolts

Check mounting bolts after 30 days and every 90 days thereafter.
Maintenance – Doors & Floors

- Open and close all exits - confirm buzzer operation

- Use silicone spray on all door seals.
- Lube / grease door hinges.
  - Use grease gun needle adapter.

Recommend using a “Dry” lube on rear exit for the HDX.

- Keep flooring clean and free of abrasive debris
- During first 30 days, mop/rinse often with clean water
- Apply wax after 30 days, Using non-skid type floor wax.
Does the entrance door “slam” shut when setting release switch to “normal”?

Adjust flow control valve for “soft” close. Make this adjustment first, before any other adjustments to door are made.

To retrofit this valve on older Units use part# TBB 170172
Adjust flow control’s for approx.
3-5 sec “OPEN”
3-5 sec “CLOSE”

Door close flow control  Door open flow control
Door adjustment

Open the doors fully and check the measurement across the opening. It should be 28 1/2" or 90 deg.
Door adjustment

- Inspect for worn/loose components
- Disconnect rear door leaf control rod.
- Adjust FWD leaf for 90 deg. opening via air ram clevis. (check for proper close position)
- Reconnect control rod and adjust rear leaf for proper timing. (lead/lag)
- Use blue loctite on jam nuts when final adjustments have been made.
Adjust flow control’s for approx.
3-5 sec “OPEN”
3-5 sec “CLOSE”
Adjust door using same procedure as HDX/EFX
After final adjustments, test 8-light operation.
Adjust reed switch as necessary.
Synthetic axle oil

- Standard fill for all C and D buses
- Extends drain interval to 3 years from the original 1 year. Front/rear axle fluid level checks quarterly.
- Helps lower TCO
Maintenance – Suspension

Maintain proper torque of front shackle bolts. Check torque every 60 days, Or at quarterly service.

320 ft/lbs

Worn/Grooved shackle bolts
Maintenance – Auto chains

Keep your Onspots in tune
General Guidelines

<table>
<thead>
<tr>
<th>Torque Chart</th>
<th>Standard</th>
<th>Extreme Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter nuts installed under OEM U-bolt nuts</td>
<td>150 ft.lbs.</td>
<td>250 ft.lbs.</td>
</tr>
<tr>
<td>Adapter nuts replacing OEM U-bolt nuts</td>
<td>OEM Spec</td>
<td>OEM Spec</td>
</tr>
<tr>
<td>Adapter nut Capscrews</td>
<td>150 ft.lbs.</td>
<td>250 ft.lbs.</td>
</tr>
<tr>
<td>Chain Unit Capscrews</td>
<td>125 ft.lbs.</td>
<td>150 ft.lbs.</td>
</tr>
<tr>
<td>Adjustable Chainwheel Retainer Capscrews</td>
<td>35 ft.lbs.</td>
<td>35 ft.lbs.</td>
</tr>
<tr>
<td>Chainwheel Bolt Nut</td>
<td>125 ft.lbs.</td>
<td>125 ft.lbs.</td>
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</tbody>
</table>

Grease Arm Bearings
Check Play In:
  - Ball Joint
  - Chainwheel Bearings
  - Arm Bearings

Check Tire Sidewall Pressure
  (minimum 20 Lbs)

Check Chainwheel Contact
  - Operating Angle
  - Pitch
  - Contact Height

Adjustable Chainwheel Bolt

Standard Chainwheel Bolt

Red Chainwheel Driver Side
Blue Chainwheel Passenger Side

2 3/4” contact on loaded vehicle with 16” wheels and 170mm chainwheel

1-800-224-2467

Additional information available on our website at:
www.onspot.com
Type D Maintenance

ICON
Auxiliary Screens

- Maintenance

MAINTENANCE SCREEN are next.
Maintenance Screens

There are a minimum of two maintenance screens. In select cases depending on the vehicles transmission type, you may see four maintenance screens. In this case the cluster S/W receives a message from the engine ECU and the transmission maintenance screen are then activated. Otherwise only the two default maintenance screens are available.
To set the interval for engine oil changes, use the down button to scroll to ENGINE OIL in the maintenance menu. To select ENGINE OIL, press the Right button.
To change the interval to 6000 miles, continue to press the **Down button** until 6000 Miles is selected.

• Engine oil change intervals range from 1000 miles to 15,000 miles. If desired, you may choose to disable the oil change reminder by selecting the “REMEMDER IS DISABLED” choice from the menu.
Auxiliary Screens

- Maintenance…..Engine Oil

To change the interval to 6000 miles, continue to press the **Down button** until 6000 Miles is selected.
Auxiliary Screens

- Maintenance.....Engine Oil

ENGINE OIL CHANGE
INTERVAL: 3000 Miles
PRESS ↓ TO CHANGE

To change the interval to 6000 miles, continue to press the Down button until 6000 Miles is selected.
Auxiliary Screens

- Maintenance.....Engine Oil

ENGINE OIL CHANGE
INTERVAL:  4000 Miles
PRESS ↓ TO CHANGE

To change the interval to 6000 miles, continue to press the Down button until 6000 Miles is selected.
Auxiliary Screens

- Maintenance.....Engine Oil

ENGINE OIL CHANGE
INTERVAL:  5000 Miles
PRESS ↓ TO CHANGE

To change the interval to 6000 miles, continue to press the **Down button** until 6000 Miles is selected.
Auxiliary Screens

- Maintenance.....Engine Oil

To confirm and select 6000 miles, press the Right button.
Auxiliary Screens

- Maintenance.....Engine Oil

6000 Miles TO NEXT
ENGINE OIL CHANGE
HOLD → TO RESET

To go back to the MAINTENANCE menu, press the Right button.
To set the interval for engine air filter, use the down button to scroll to ENGINE AIR FILTER in the maintenance menu. To select ENGINE AIR FILTER, press the Right button.
Auxiliary Screens
- Maintenance…..Engine Air Filter

Air filter change intervals range from 16,000 miles to 30,000 miles. If desired, you may choose to disable the air filter change reminder by selecting the “REMINDER IS DISABLED” choice at the end of the interval choices.

EXAMPLE - To change the interval to 19000 miles, continue to press the Down button until 19000 Miles is selected. Pressing the Right button will select the interval value on that screen.
Auxiliary Screens

- Maintenance…..Engine Air Filter

AIR FILTER CHANGE
INTERVAL:  17000 Miles
PRESS ↓ TO CHANGE

Continue to press the Down button until 19000 Miles is selected.
Auxiliary Screens

- Maintenance.....Engine Air Filter

AIR FILTER CHANGE
INTERVAL: 18000 Miles
PRESS ↓ TO CHANGE

Continue to press the Down button until 19000 Miles is selected.
Auxiliary Screens

- Maintenance.....Engine Air Filter

AIR FILTER CHANGE
INTERVAL: 19000 Miles
PRESS ↓ TO CHANGE

Continue to press the Down button until 19000 Miles is selected. To confirm and select 19000 miles, press the Right button.
Auxiliary Screens

- Maintenance…..Engine Air Filter

19000 Miles TO NEXT
AIR FILTER CHANGE
HOLD → TO RESET

To go back to the MAINTENANCE menu, press the Right button.
Transmission maintenance screens work the same as the Engine maintenance screens.

Using the **Down button** scroll to highlight Exit.
Auxiliary Screens

- Maintenance

To return to Auxiliary menu, select EXIT by pressing the Right button.