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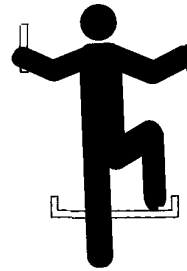
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Safety—Operating Precautions

Use Steps and Handholds Correctly

Prevent falls by facing the machine when getting on and off. Maintain 3-point contact with steps and handrails. Never use machine controls as handholds.

Use extra care when mud, snow, or moisture present slippery conditions. Keep steps clean and free of grease or oil. Never jump when exiting machine. Never mount or dismount a moving machine.



T133468 —UN—15APR13

TX03679,00016F2 -19-24APR13-1/1

Start Only From Operator's Seat

Avoid unexpected machine movement. Start engine only while sitting in operator's seat. Ensure all controls and working tools are in proper position for a parked machine.

Never attempt to start engine from the ground. Do not attempt to start engine by shorting across the starter solenoid terminals.



T133715 —UN—15APR13

TX03679,0001799 -19-22APR10-1/1

Use and Maintain Seat Belt

Use seat belt when operating machine. Remember to fasten seat belt when loading and unloading from trucks and during other uses.

Examine seat belt frequently. Be sure webbing is not cut or torn. Replace seat belt immediately if any part is damaged or does not function properly.

The complete seat belt assembly should be replaced every three years, regardless of appearance.



USE SEAT BELT

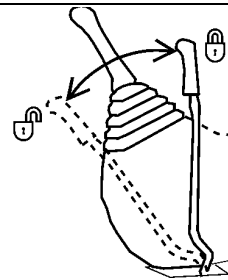
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DW90712,0000181 -19-29JUN06-1/1

Prevent Unintended Machine Movement

Be careful not to accidentally actuate control levers when co-workers are present. Pull pilot control shutoff lever to locked position during work interruptions. Pull pilot control shutoff lever to locked position and stop engine before allowing anyone to approach machine.

Always lower work equipment to the ground and pull pilot control shutoff lever to locked position before standing up or leaving the operator's seat. Stop engine before exiting.



T133863 —UN—20SEP00

TX03679,0001746 -19-24JAN07-1/1

Remove Paint Before Welding or Heating

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

Do not use a chlorinated solvent in areas where welding will take place.



Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.

DX,PAINT -19-24JUL02-1/1

TS220—UN—15APR13

Make Welding Repairs Safely

IMPORTANT: Disable electrical power before welding. Turn off main battery switch or disconnect positive battery cable. Separate harness connectors to engine and vehicle microprocessors.

Avoid welding or heating near pressurized fluid lines. Flammable spray may result and cause severe burns if pressurized lines fail as a result of heating. Do not let heat go beyond work area to nearby pressurized lines.

Remove paint properly. Do not inhale paint dust or fumes. Use a qualified welding technician for structural repairs.



Make sure there is good ventilation. Wear eye protection and protective equipment when welding.

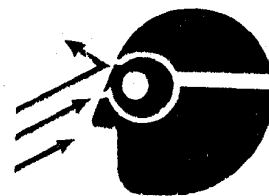
TX03679,00016D5 -19-25APR08-1/1

T133547—UN—15APR13

Drive Metal Pins Safely

Always wear protective goggles or safety glasses and other protective equipment before striking hardened parts. Hammering hardened metal parts such as pins and bucket teeth may dislodge chips at high velocity.

Use a soft hammer or a brass bar between hammer and object to prevent chipping.



TX03679,0001745 -19-03JAN07-1/1

T133738—UN—15APR13

Starting the Engine

1. Move engine rpm dial (1) to slow idle position.
2. Sound horn to alert persons nearby.

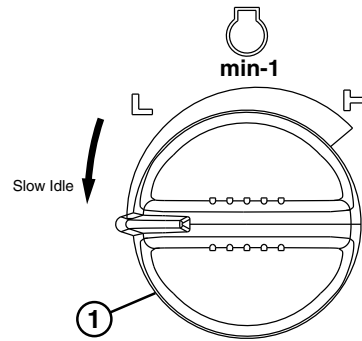
IMPORTANT: Prevent starter damage. Never operate starter for more than 20 seconds at a time. If engine fails to start, return key switch to OFF. Wait for about 2 minutes, then try again. After a false start, DO NOT turn key switch until engine stops.

3. Turn key switch to START. All indicator lights will stay on for approximately 3 seconds. Release key; switch will return to ON position.

After Starting Check

IMPORTANT: Prevent possible damage to engine. If indicator lights do not go out after starting engine, IMMEDIATELY STOP THE ENGINE. Find and correct the problem.

After the engine is started, the indicator lights should go out except for the dig mode indicator which will remain on. If they do not, stop the engine immediately. Find and correct the problem.



1— Engine RPM Dial

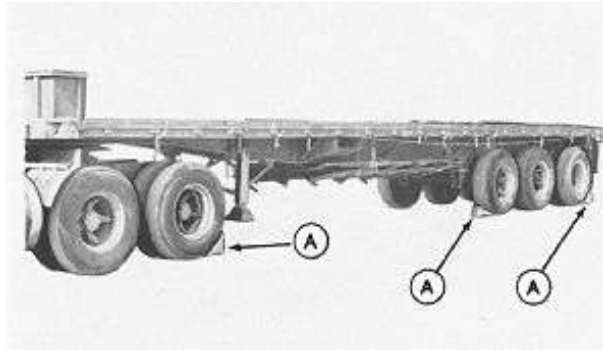
Warming the Engine

1. Run engine at 1/3 speed for 30 seconds. Do not run engine at fast or slow idle. Do not accelerate rapidly during warm-up.
2. Operate machine at less-than-normal loads and speeds until engine is at normal operating temperature.

DW90712,000016C -19-29JUN06-2/2

T136300—UN—24JAN01

Loading Machine On a Trailer



A—Chock Blocks

⚠ CAUTION: Prevent possible injury from unexpected machine movement. During loading operations with the track frames retracted, use care when swinging the upperstructure and travelling the machine. Avoid rapid movements, sharp turns, or counterrotating.

1. Keep the trailer bed clean.
2. Put chock blocks (A) against truck wheels.
3. Use ramp or loading dock. Ramps must be strong enough, have a low angle, and correct height.
4. Load and unload the machine on a level surface.
5. Turn auto-idle switch off.
6. Back the machine onto the ramp slowly.
7. The centerline of the machine should be over the centerline of the trailer.

8. Lower front-mounted equipment to the ground.
9. Stop engine. Remove key from switch.
10. Pull pilot control shut-off lever to locked position.
11. Cover exhaust opening to prevent entry of wind and water.

IMPORTANT: Fasten chains or cables to machine frame. Do not place chains or cables over or against hydraulic lines or hoses.

12. Fasten each corner of the machine to the trailer with a chain or cable with appropriate load binder
13. Place blocks in front of and behind tracks.

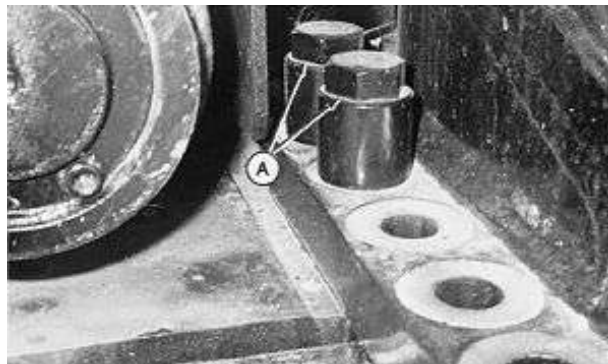
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T87155—UN—09NOV88

Track Gauge Work Position Adjustment

1. Remove the six cap screws (A) on the side frame to be extended (three cap screws each from the two track frame supports).
2. Swing upperstructure perpendicular to side frame.

A—Cap Screw



Continued on next page

DW90712,000017E -19-29JUN06-1/4

T6929BE—UN—06DEC88

Maintenance—Periodic Maintenance

Service Machine at Specified Intervals

Lubricate, make service checks, and make adjustments at intervals shown on the periodic maintenance chart and on the following pages.

Perform service on items at multiples of the original requirement. For example, at 500 hours also service those items (if applicable) listed under 250 hours, 100 hours, 50 hours, and 10 hours or daily.

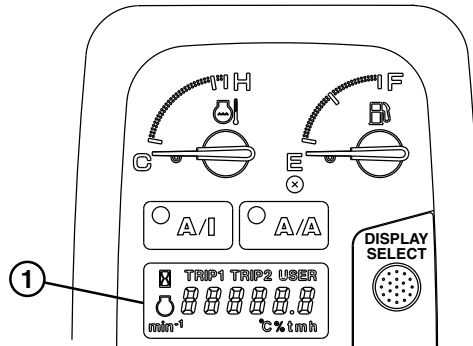
TX14740,0001C9F -19-17JUL07-1/1

Check the Hour Meter Regularly

Check the hour meter (1) to determine when your machine needs periodic maintenance.

Intervals on the periodic maintenance chart are for operating in normal conditions. If you operate your machine in difficult conditions, you should service it at **SHORTER INTERVALS**.

1—Hour Meter



T140186—UN—21MAR01

TX14740,0001CEE -19-29JUN06-1/1

Prepare Machine for Maintenance

1. Park machine on a level surface as shown.
2. Stop engine.



T6811A1—UN—18OCT88

TX14740,0001C3D -19-06MAY08-1/1

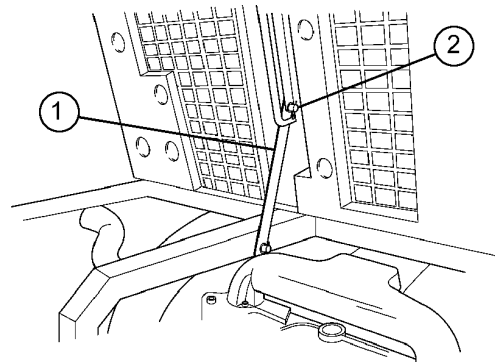
Open Engine Hood for Service

CAUTION: Prevent possible injury. Unlock latch. Pull open latches to unlock hood. Raise the hood until lock stay completely engages with lock groove inside the cover.

Raise hood using handle on hood until lock stay (1) completely engages lock groove (2) inside the cover.

1—Lock Stay

2—Lock Groove



T140175—UN—27MAR01

TX14740,0001CEF -19-29JUN06-1/1

Maintenance—Every 10 Hours or Daily

Check Recovery Tank Coolant Level

IMPORTANT: Avoid mixing different brands or types of coolant. Coolant manufacturers engineer their coolants to meet certain specifications and performance requirements. Mixing different coolant types can degrade coolant and machine performance.

With the engine cold, coolant level must be at the FULL mark on the recovery tank (1).

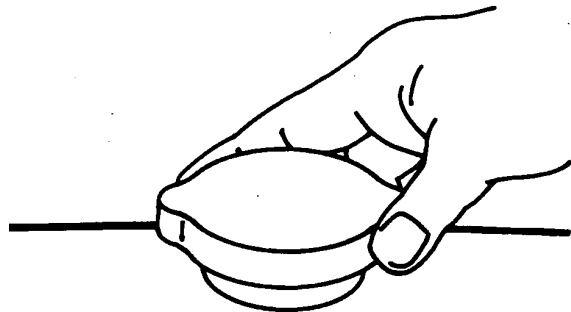
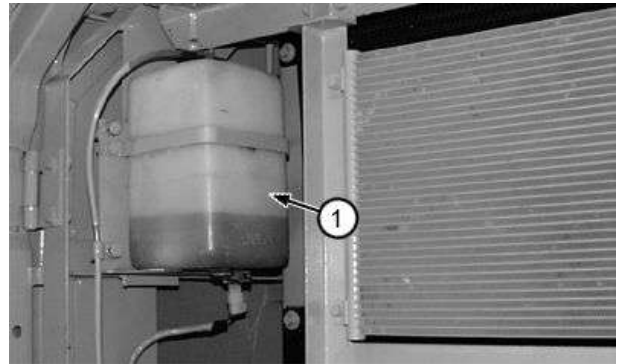
If coolant is below the FULL mark, add coolant to the recovery tank.

CAUTION: Prevent possible injury from hot spraying water. **DO NOT** remove radiator filler cap unless engine is cool. Then turn cap slowly to the stop. Release all pressure before you remove cap.

If recovery tank is empty, check for leaks. Repair as required. Add coolant to the radiator and the recovery tank.

NOTE: If recovery tank is full and radiator is low, check for leaks in radiator cap and hose connections between radiator and coolant recovery tank.

Coolant level must be at bottom of the filler neck.



1— Recovery Tank

VD76477,0000107 -19-22JUL05-1/1

T140548B —UN—26MAR01

T6274AQ —UN—18OCT88

Check Engine Oil Level

IMPORTANT: Prevent engine damage. Do not run engine when oil level is below the ADD mark.

The most accurate oil level reading is obtained when the engine is cold before starting the engine for the day's operation.

1. Make sure dipstick (1) is fully seated.
2. Remove dipstick to check oil level.

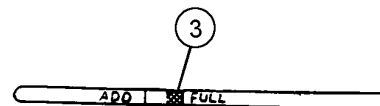
BEFORE THE ENGINE IS STARTED: The engine is full when oil level is in the cross-hatch area (3). It is acceptable to run the engine when the oil level is above the ADD mark.

AFTER THE ENGINE HAS BEEN RUN: Allow the oil to drain into the oil pan for 10 minutes before checking the oil level. Ten minutes after shutdown the engine oil level must be above the ADD mark.

3. If necessary, remove filler cap (2) to add oil. (See Section 3-1.)

1— Dipstick
2— Filler Cap

3— Cross-Hatch Area



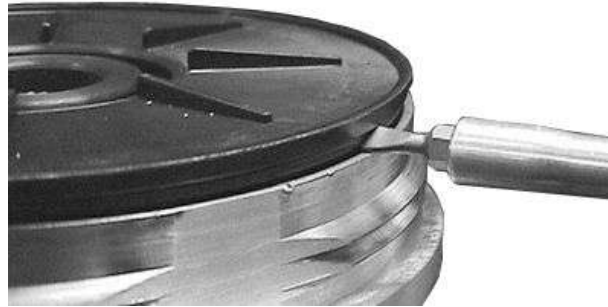
TX14740,0001D02 -19-27MAR01-1/1

T141907B —UN—02MAY01

T144208 —UN—27JUL01

2. Remove cap (1) from fuel filter housing.

NOTE: Relieve vacuum in filter housing by operating hand primer until fuel filter “pops up”. If filter does not “pop up” after about 30 strokes of primer, insert a small screwdriver as shown to carefully pry under filter flange to relieve vacuum in the housing.



RG10303 —UN—27MAY04

TX14740,0001D3A -19-03JUL01-2/4

3. Remove filter element as shown. Hold filter suspended straight up in top of housing to drain fuel from filter.
4. Dispose of used filter properly.
5. Drain fuel from water separator bowl. (See Section 3-3.)

NOTE: If sediment in bowl cannot be flushed out by pumping primer, remove bowl to clean.

6. Clean sediment from water separator bowl. (See Section 4-1.)

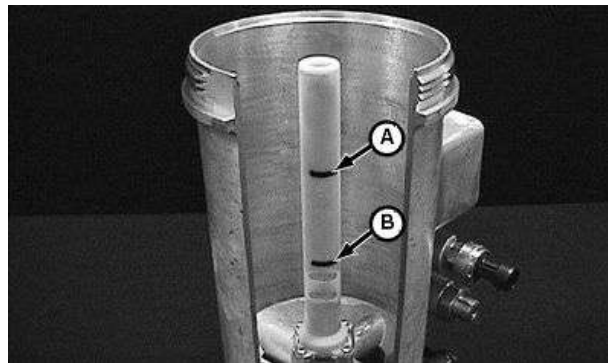


RG10304 —UN—02SEP99

TX14740,0001D3A -19-03JUL01-3/4

IMPORTANT: Fuel level below the MIN indication may result in trapped air in the filter causing the engine to stall and not restart without additional system purging. Fuel level above the MAX indication may cause fuel to overflow from the filter housing during insertion of filter element.

7. Pump primer until fuel reaches the MAX (A) level.
8. Insert **new** (dry) fuel filter into filter housing.
9. Install fuel filter cap and hand tighten.
10. Pump primer 20 strokes.
11. Start engine. Run engine at slow idle for 5 minutes.



RG10305 —UN—02SEP99

A—Maximum Level 63 mm (2-1/2 in.) From Top of Housing (New Filter)

B—Minimum Level 127 mm (5 in.) From Top of Housing

TX14740,0001D3A -19-03JUL01-4/4

Drain Cooling System

IMPORTANT: Avoid mixing different brands or types of coolant. Coolant manufacturers engineer their coolants to meet certain specifications and performance requirements. Mixing different coolant types can degrade coolant and machine performance.

Drain and flush cooling system using commercial products, replace radiator cap, and refill with new coolant.

1. Check coolant hoses for cracks and leaks. Replace if necessary.
2. Check radiator and oil cooler for dirt, grease, leaks, and loose or broken mountings. Clean radiator and oil cooler fins.

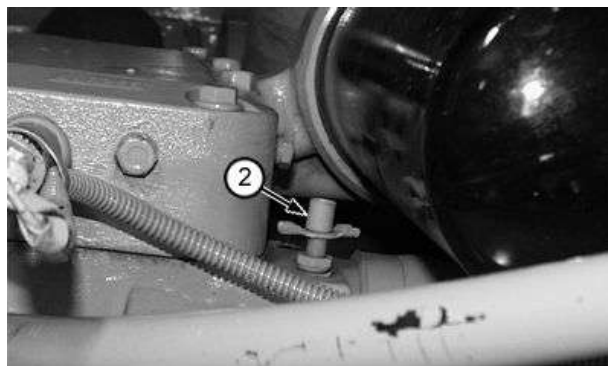
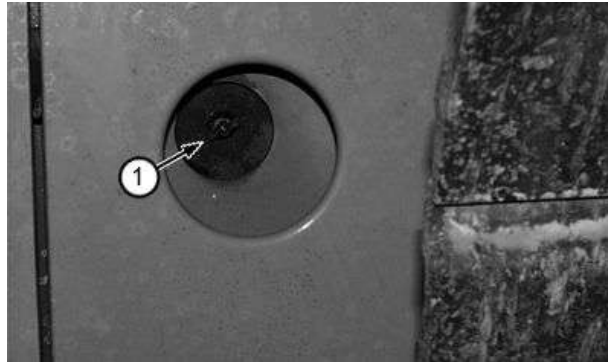
CAUTION: Prevent possible injury from hot spraying water. **DO NOT** remove radiator filler cap unless engine is cool. Then turn cap slowly to the stop.

3. Release air to relieve pressure. Remove filler cap.

Specification

Cooling System—Capacity..... 50 L (13.2 gal)

4. From under machine, turn radiator drain valve (1) counterclockwise to open valve. Allow coolant to drain into a container. Dispose of waste coolant properly. Close drain valve.
5. Turn engine block drain valve (2) counterclockwise to open valve. Drain coolant into a container. Dispose of waste coolant properly. Close drain valve.



1—Radiator Drain Valve

2—Engine Block Drain Valve

T140550B —UN—26MAR01

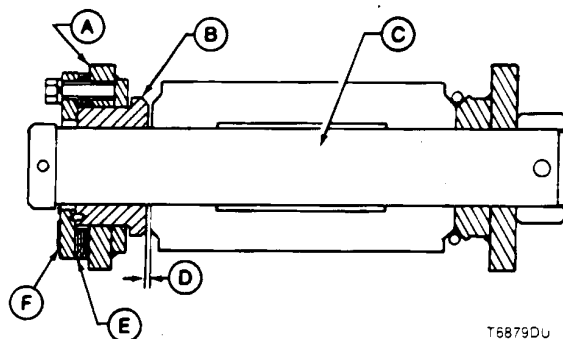
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2. Measure distance (D) between the bushing (B) and the arm. This distance should not be adjusted below 0.5 mm (0.020 in.).
3. Remove plate (F).

A—Bucket
B—Bushing
C—Pin

D—Clearance
E—Shim
F—Plate



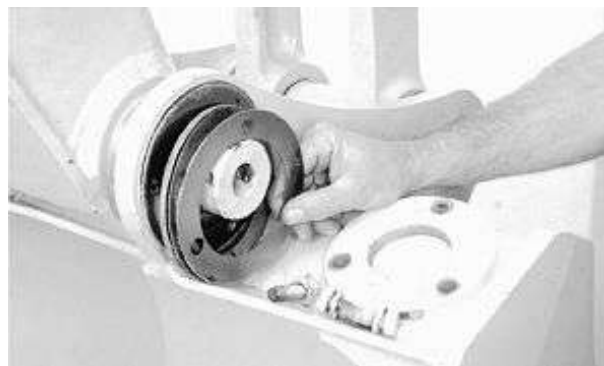
T6879DU

T6879DU—UN—06DEC88

04T,90,M210 -19-29JUN06-2/3

NOTE: Alternate buckets may have different adjustment procedures.

4. Remove shim(s) according to distance measured. This will allow the bushing to move to the right and take up the excessive play.
5. Install plate and tighten cap screws.
6. Slide O-ring back into position.



T95788—UN—10NOV88

04T,90,M210 -19-29JUN06-3/3

Removing the Bucket

1. Lower bucket to the ground.
2. Remove snap rings and locking pins.

3. Slide O-ring seals out of way. Remove bucket pins.
4. Install and adjust bucket. See Adjust Bucket To Arm Joint in this section.

04T,90,M35 -19-29JUN06-1/1

Track Sag General Information

To maximize undercarriage life, keep track sag within specification. Tracks may require adjustment several times during a working day due to changing soil type and moisture content.

Adjust tracks in the actual operating conditions.

TIGHT TRACK: Packing causes a tight track. If material packs in the undercarriage, adjust tracks with the material packed in the components.

While the track spring will recoil and the machine can continue to operate with a tight track, continued operation

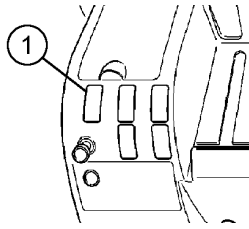
will result in excessive pin and bushing wear, sprocket popping, tooth tip wear, and excessive loads on the entire undercarriage and travel drive system.

Machine productivity and fuel consumption are also adversely affected because increased horsepower is needed to move the machine.

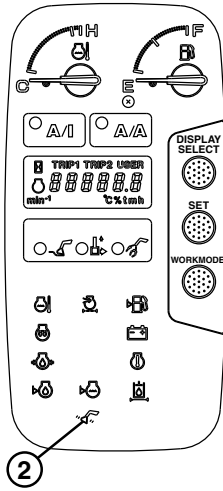
LOOSE TRACK: A loose track has more side to side motion, increasing side wear on the links, rollers and front idler. An excessively loose track will slap at high ground speeds, resulting in high impact loads on the sprocket teeth, bushings, and carrier rollers.

04T,90,M197 -19-11MAY06-1/1

Precision Mode Circuit Check



T141363 —UN—27JUN01



T141365 —UN—20APR01

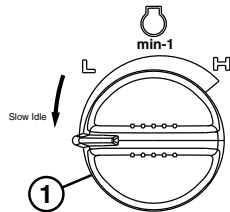
- 1— Precision Mode Switch
- 2— Precision Mode Indicator

Push precision mode switch (1) to ON.
Does precision mode indicator (2) light?

YES: Go to next check.
NO: Check fuses 2, 4, and 6 in fuse box. Go to your authorized dealer.

VD76477,0000057 -19-12SEP12-7/27

Engine RPM Dial Checks



T137611 —UN—05FEB01

- 1— Engine RPM Dial

Auto-idle/auto-acceleration switch OFF.
Move engine RPM dial (1) clockwise.
Does engine speed increase?
Move engine RPM dial counterclockwise.
Does engine speed decrease?

YES: Go to next check.
NO: Go to your authorized dealer.

Continued on next page

VD76477,0000057 -19-12SEP12-8/27

Electrical System

Symptom	Problem	Solution
Nothing Works	Battery	Recharge or replace.
Batteries Undercharged	Loose or corroded connections	Clean and tighten or replace batteries.
Batteries Will Not Take A Charge	Loose or corroded connections	Clean and tighten.
	Low battery power	Replace both batteries.
Battery Uses Too Much Water	Cracked battery case	Replace batteries.
	High ambient temperature	Refill with water.
Cracked Battery Case	No battery hold down clamp	Replace both batteries, and install hold down clamp.
	Loose battery hold down clamp	Replace both batteries, and install hold down clamp.
	Frozen battery	Replace both batteries. Keep batteries fully charged in cold weather.
Low Battery Output	Low water level	Add water.
	Dirty or wet battery top, causing discharge	Clean and wipe battery top dry.
	Corroded or loose battery cables	Clean and tighten battery cables.
	Broken battery post	Wiggle battery post by hand. If post wiggles or turns, replace both batteries.
Starter Will Not Turn	Battery undercharged or dead	Recharge or replace both batteries.
	Battery cables making poor connections	Clean connections.
	Starter	Repair or replace starter.
	Starter pinion jammed in flywheel gear	Repair or replace starter, or ring gear.
Starter Turns But Will Not Crank Engine	Starter	Repair or replace starter.
Engine Cranks Slowly	Battery cables damaged or broken internally	Inspect and replace cables.
	Battery or starter cable connections loose or corroded	Clean and tighten connections.
	Battery discharged or will not hold a charge	Recharge or replace both batteries.
	Starter	Repair or replace starter.
	Low battery voltage	Recharge or replace both batteries.

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TX14740.0001D0B -19-24JAN07-1/2

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