Slope Guidelines

⚠ WARNING Tipover. Crushing can cause death or serious injury. Follow procedure in operator's manual. Drive cautiously.

To help avoid injury:

- Operate at slow speed when on rough terrain.
- Avoid driving across slopes.
- Never jerk control levers. Use a steady, even motion.
- Always operate with heavy end uphill.
- Always drive with attachment low to the ground.
- See page 80 for operating capacity.

Operating safely on a slope depends upon many factors including:

- distribution of machine weight, including front loading and absence of load
- height of load
- even or rough ground conditions
- potential for ground giving way causing unplanned tilt forward, reverse or sideways
- nearness of ditches, ruts, stumps or other obstructions and sudden changes in slope
- speed
- turning
- braking performance
- operator skill

These varying factors make it impractical to specify a maximum safe operating angle in this manual. It is therefore important for the operator to be aware of these conditions and adjust operation accordingly. Maximum engine angle and braking performance are two absolute limits which must never be exceeded. These maximums are stated below since they are design limits. **These design limits usually exceed the operating limits and must never be used alone to establish safe operating angle for variable conditions**.

Maximum engine lubrication angle: 20°

Maximum service brake retarding force: equal to traction of both tracks

Maximum parking brake holding force: equal to traction of one track

Reduce Track Wear

Rubber tracks are best suited at soil-based jobsites with minimal rocks and debris. To reduce track wear drive slowly and make wide turns. Avoid the following:

- spinning tracks under heavy load
- turning on sharp objects such as stones, broken concrete, or debris
- quick turns on asphalt or concrete
- driving over curbs or ledges
- driving with track edges pressed against hard walls or curbs
- operating on corrosive materials such as salt or fertilizer

Shut Down

1. When job is complete, move machine to level ground.
2. Stop machine movement.
3. Set parking brake.
4. Lower lift arms to ground.
5. Return all controls to neutral.
6. Run engine at low throttle with no load for at least five minutes to cool.
7. Shut off machine.
8. If leaving machine unattended, remove key.
9. For maintenance or long-term storage, disconnect battery using battery disconnect switch.

> ***NOTICE:*** Wait two minutes after shutting off machine before disconnecting battery.

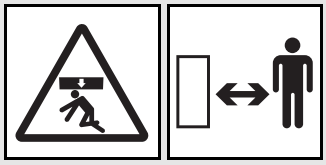
Transport

Chapter Contents

For additional precautions, see "Safety" and "Prepare" chapters.

IMPORTANT: For more information on how to operate controls, see "Controls" chapter.

Lift

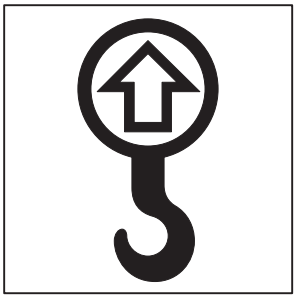


WARNING Lifted load. Crushing weight can cause death or serious injury. Stay away from lifted load and its range of movement.

To help avoid injury: Only lift unit without attachment installed.

Points

Lifting points are identified by lifting decals. Lifting at other points is unsafe and can damage machinery.



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Procedure

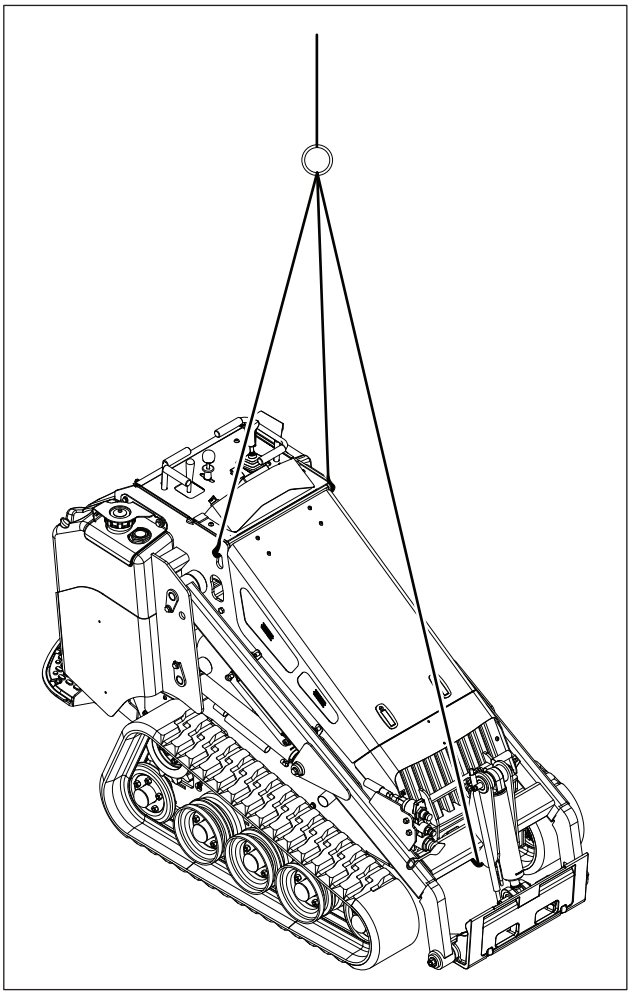
IMPORTANT: Do not lift machine with attachments installed.

IMPORTANT: Front of unit will be lower than rear.

Use a equipment capable of supporting the machine's size and weight. See "Specifications" on page 79 or measure and weigh equipment before lifting.

Use one of the methods below:

- Use two lift points nearest operator station.
- Use three lift points as shown.



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Haul

WARNING Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use. Know how to use all controls.

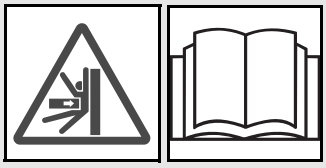
To help avoid injury:

- Read trailer operator's manual before loading or transporting machine.
- Ensure tow vehicle has proper tow capacity rating.
- Attach trailer to vehicle before loading or unloading.
- Load and unload trailer on level ground.
- To help prevent trailer sway, load trailer so that 10-15 percent of total vehicle weight (equipment plus trailer) is on tongue.
- If loading onto tilt-bed trailer, be prepared for trailer to tilt.

Inspect Trailer

- Check hitch for wear and cracks.
- Check battery for 12V charge.
- Inspect lights for cleanliness and correct operation.
- Inspect reflectors and replace if needed.
- Check tire pressure.
- Check lug nut torque.
- Ensure trailer brakes are adjusted to come on with tow vehicle brakes.
- Check trailer bed for cracks.

Load



WARNING Horizontal movement. Crushing can cause death or serious injury. Read and understand operator's manual and all safety instructions before use.

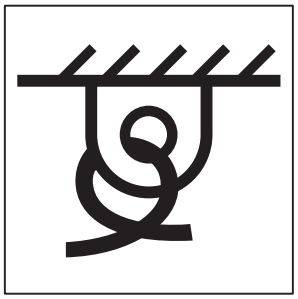
To help avoid injury: Start and operate only from platform.

1. Release parking brake.
2. Start engine.
3. Move throttle to low speed.
4. Raise attachment clear of trailer, but keep it low.
5. Move machine to rear of trailer and align with ramps.
6. Drive forward slowly to move machine onto trailer until tiedown position is reached.
7. Lower attachment to trailer bed.
8. Set parking brake.
9. Ensure all controls are in neutral position.
10. Shut off machine.
11. Tie down machine.

Tie Down

Points

Tiedown points are identified by tiedown decals. Securing to truck or trailer at other points is unsafe and can damage machinery.



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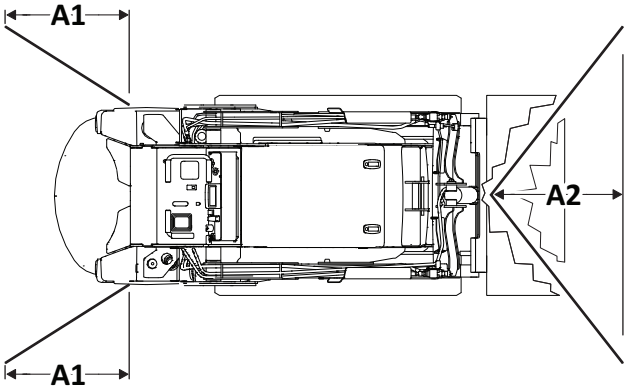
Procedure

Loop a transport chain around each tie down point. See chart below for correct distances between tiedown ends. Ensure tiedowns are tight before transporting.



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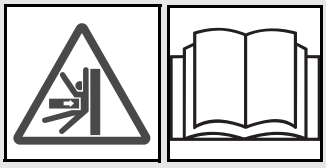
Distance	US	Metric
A1	8-30”	20-76cm
A2	12-40”	30-102cm

Unload



WARNING Horizontal movement. Crushing can cause death or serious injury. Read and understand operator's manual and all safety instructions before use.

To help avoid injury: Start and operate only from platform.

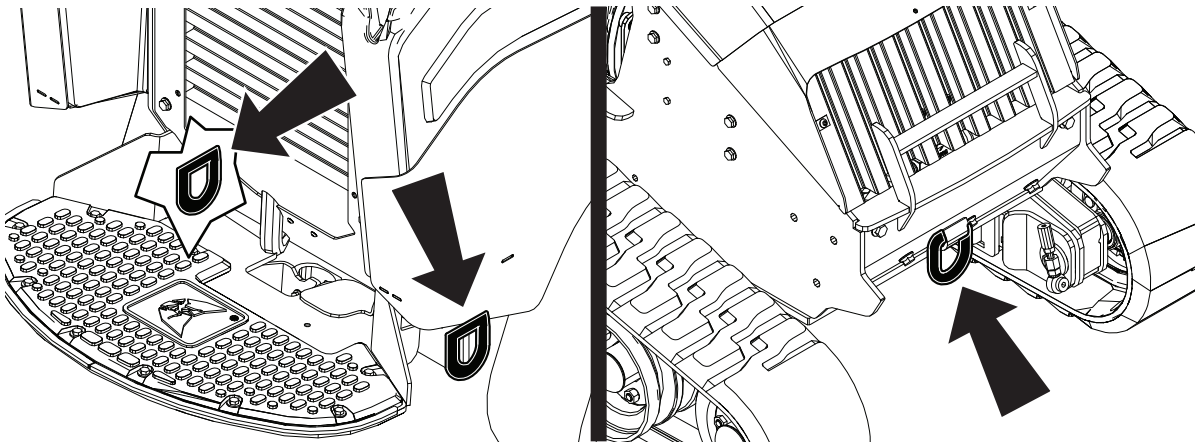
1. Prepare trailer and ramps for unloading.
2. Remove tiedowns.
3. Start engine.
4. Release parking brake.
5. Raise attachment off ground, but keep it low.
6. Move throttle to low speed and slowly back machine down trailer or ramps.

Retrieve

Under normal conditions, machine should not be towed. If machine breaks down and retrieval is necessary:

- Tow for no more than 100' (30m) at less than 1mph (1.6km/h).
- Use towing chains appropriately rated for maximum towing force.
- Use maximum force of 1.5 times machine weight.

1. Set parking brake if engine will start.
2. Block tracks to prevent machine from rolling.
3. Attach chain to tow points shown facing towing vehicle.



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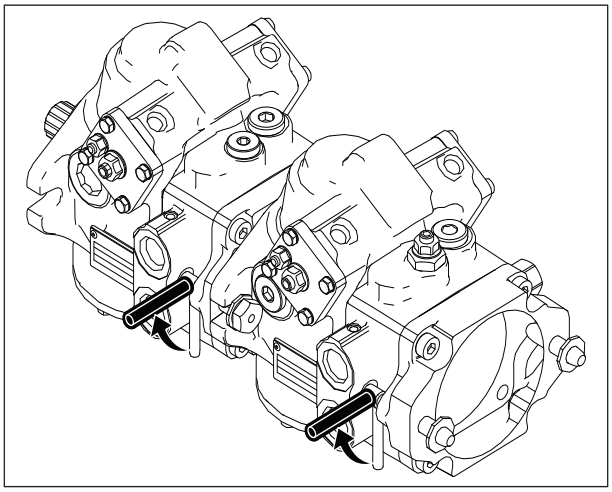
4. Activate tow valves on both front and rear pumps by turning levers into position shown.

   NOTICE: When bypass valves are open, only parking brake functions.

5. Remove blocks.
6. Release parking brake if engine will start. If engine will not start, remove rear panel and unbolt parking brake assembly.
7. After towing, turn levers to operating position.



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Complete the Job

Chapter Contents

For additional precautions, see "Safety" and "Prepare" chapters.

Rinse Equipment

NOTICE:

- Do not spray water onto operator's console or electrical center in engine compartment. Water can damage electrical components. Wipe down instead.
- Ensure all mud and debris is rinsed from tracks before parking unit overnight.

1. Spray water onto equipment to remove dirt and mud.
2. Remove mud from track sprockets.
3. Wash undercarriage.

Disconnect Attachment

1. Lower attachment to the ground.
2. Shut off machine.
3. Disengage lock pins by lifting handles upward.
4. Disconnect hydraulic hoses, if used.
5. Start engine.
6. Tilt mount plate forward and back machine away from attachment.

Stow Tools

Ensure all tools and accessories are loaded and properly secured on trailer.

Maintenance

Chapter Contents

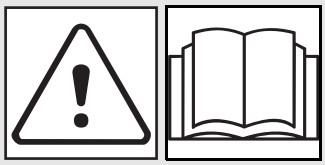
For additional precautions, see "Safety" and "Prepare" chapters.

Maintenance Precautions

WARNING Jobsite hazards. Exposure can cause death or serious injury. Use correct equipment and work methods. Use and maintain appropriate safety equipment.

To help avoid injury:

- Wear personal protective equipment including hard hat, safety eye wear, foot protection, hearing protection, and gloves (except when near rotating equipment).
- Remove jewelry.
- Wear close-fitting, high visibility clothing.
- Have other personal protective equipment, such as insulated boots and gloves, breathing protection, and face shield, etc. available for use depending on jobsite hazards or requirements.



WARNING Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use. Know how to use all controls.

To help avoid injury:

- Unless otherwise instructed, all service should be performed with the engine off and cool.
- Lower unsecured, raised components before servicing equipment.
- Unless otherwise instructed, all service should be performed with machine parked on level surface.
- Refer to US Occupational Safety and Health Administration (OSHA) guidelines for appropriate lockout-tagout procedures.

Washing Precaution

NOTICE: Do not spray water onto operator's console or electrical center in engine compartment. Water can damage electrical components. Wipe down instead.

Welding Precaution

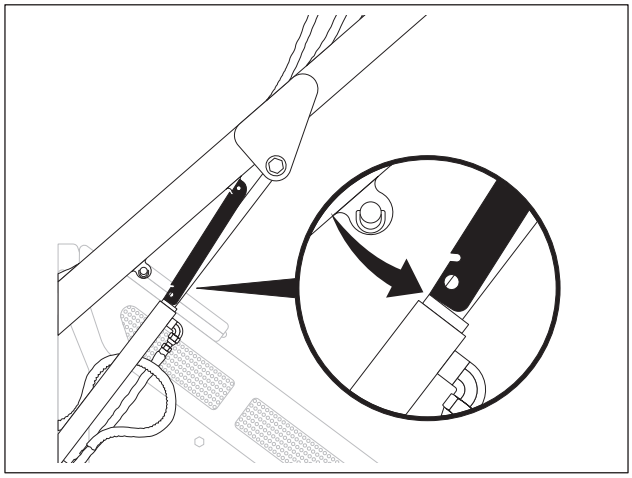
NOTICE: Welding can damage electronics.

- Welding currents can damage electronic components. Always disconnect the ECU ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments.
- Connect welder ground close to welding point and make sure no electronic components are in the ground path.
- Disconnect battery at battery disconnect switch before welding to prevent damage to battery.
- Never turn off battery disconnect switch with engine running, or alternator and other electronic equipment devices may be damaged.

Working under Raised Lift Arms

⚠WARNING Raised component. Crushing can cause death or serious injury. Stay away or secure raised component with locking device. Use correct equipment and procedures.

Pin safety supports as shown when working under raised lift arms.



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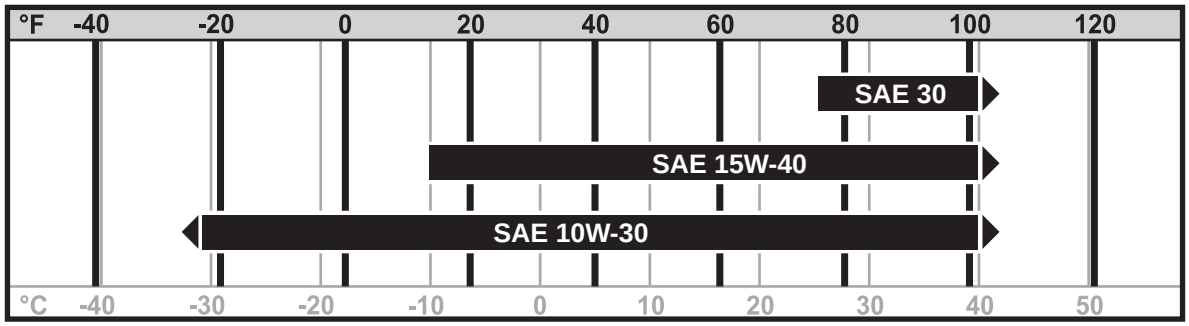
Recommended Lubricants

Item	Description
DEAC	Diesel engine antifreeze/coolant, low silicate, fully-formulated meeting CES 14603 See "Approved Coolant" on page 61.
DEO	**HRC:** Diesel engine oil meeting or exceeding API CH-4 (CH-4, CI-4, CJ-4) or ACEA E7 (E6, E7 or E9). See "Engine Oil Temperature Chart" on page 61. API American Petroleum Institute, ACEA European Automobile Manufacturer's Association
	LRC: Diesel engine oil compatible with the sulfur content of the fuel used. • If the fuel sulfur content exceeds 500ppm (500mg/kg), the oil's base number (TBN)) should exceed 10. • If the fuel sulfur content exceeds 5000ppm (5000mg/kg), reduce change interval to every 50 hours. • See viscosity chart.
MPG	Multipurpose grease, lithium based NLGI GC-LB Grade 2
THF	Tractor hydraulic fluid, Phillips 66® PowerTran Fuid, Mobilfluid® 423, Chevron® Tractor Hydraulic Fluid, Texaco® TDH Oil, or equivalent

Proper lubrication and maintenance protects Ditch Witch equipment from damage and failure. Service intervals listed are for minimum requirements. In extreme conditions, service machine more frequently. Use only genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty. Fill to capacities listed in "Specifications" on page 79.

For more information on engine lubrication and maintenance, see your engine manual.

Engine Oil Temperature Chart



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Temperature range anticipated before next oil change

Approved Coolant

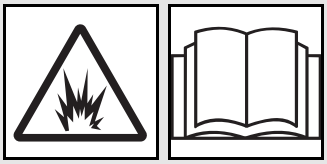
NOTICE:

- Use only pre-diluted coolant or concentrated coolant mixed with distilled water. Do not use tap water.
- Using water or high-silicate automotive-type coolant will lead to engine damage or premature engine failure.
- Mixing heavy-duty diesel engine coolant and automotive-type coolants will lead to coolant breakdown and engine damage.

This machine was filled with coolant meeting ASTM D6210 before shipment from factory. Add or replace only with low-silicate, fully-formulated diesel engine coolant meeting this specification. This coolant is available, pre-diluted, from your Ditch Witch dealer as part number 255-1055.

Approved Fuel

HRC (Highly Regulated Countries)



⚠ WARNING Ultra Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with higher sulfur content. Avoid death or serious injury from fire or explosion; consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices.

This engine is designed to run on diesel fuel. Use only high quality fuel meeting ASTM D975 No. 2D, EN590, or equivalent. At temperatures below 32°F (0°C) winter fuel blends are acceptable. See the engine manual for more information.

NOTICE: Use only Ultra Low Sulfur Diesel (less than 15ppm sulfur content in the US and Canada or 10mg/kg in EU and Japan) in this unit. Operating with higher sulfur content will damage the engine and aftertreatment device.

Biodiesel blends up to 5% (B5) are approved for use in this unit. The fuel must meet the specifications for diesel fuel shown above. In certain markets, higher blends may be used if certain steps are taken. Extra attention is needed when using biodiesel, especially when operating in cold weather or storing fuel. Contact your Ditch Witch® dealer or the engine manufacturer for more information.

LRC (Less Regulated Countries)

This engine is designed to run on diesel fuel. Use only high quality fuel meeting ASTM D975 No. 2D, EN590, or equivalent. At temperatures below 32°F (0°C) winter fuel blends are acceptable. See the engine manual for more information.

NOTICE: Worldwide, fuel sulfur regulations vary widely. Fuel used should always comply with local regulations. Prior to shipping, LRC units were filled with CJ-4 DEO. If using fuel with sulfur content above 15ppm (15mg/kg), change oil initially at 250 hours.

Biodiesel blends up to 5% (B5) are approved for use in this unit. The fuel must meet the specifications for diesel fuel shown above. In certain markets, higher blends may be used if certain steps are taken. Extra attention is needed when using biodiesel, especially when operating in cold weather or storing fuel. Contact your Ditch Witch® dealer or the engine manufacturer for more information.

Maintenance Interval Chart

IMPORTANT: Chart indicates first instance of repeated maintenance procedures. See detailed information below.

▽	Adjust, service, or test	□	Change, initial	○	Lube, initial
▲	Check	■	Change	●	Lube

Service	Startup	10 Hours	50 Hours	150 Hours	300 Hours	600 Hours	1000 Hours	As Needed
Battery		▲						▽
Coolant	▲	▲					■	
Dust ejector valve	▲	▲						
Engine compartment		▲						
Filter, air	▲	▲						■
Filter, engine oil (see Oil, engine)								
Filter, fuel						■		
Filter, hydraulic fluid			□		■			
Fluid, hydraulic	▲	▲				■		
Fuse box	▲							
Fuel hose			▲					
Hydraulic hoses	▲	▲						
Idler roller bearings			▲		▲			▽
Intake air line					▲			
Lug nuts		▲	▲		▲			
Oil, engine	▲	▲	□	■				
Parking brake	▲	▲						

Service	Startup	10 Hours	50 Hours	150 Hours	300 Hours	600 Hours	1000 Hours	As Needed
Radiator/Hydraulic fluid cooler			▲					▽
Track tension	▲	▲						▽

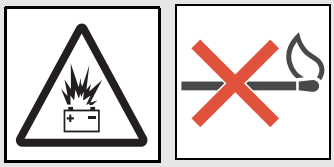
Procedures

Battery

CAUTION Corrosive fluid. Contact can cause death or serious injury. Avoid contact. Wear appropriate gloves. See Safety Data Sheet (SDS) for more information.

To help avoid injury:

- Never attempt to charge a battery that is leaking, bulging, heavily corroded, frozen, or otherwise damaged.
- Refer to Safety Data Sheet (SDS) for additional information regarding battery.



CAUTION Explosive hydrogen gas. Fire or explosion can cause death or serious injury. Keep heat flames, sparks, and other sources of ignition away.

To help avoid injury:

- Use a single 12V maximum source for charging. Never connect to rapid chargers or dual batteries.
- Never lean over battery when making connections.
- Never allow vehicles to touch when charging.
- Never short-circuit battery terminals for any reason or strike battery posts or cable terminals.
- Refer to Safety Data Sheet (SDS) for additional information regarding battery.

NOTICE:

- Electronic components can be easily damaged by electrical surges. Jump starting can damage electronics and electrical systems, and is not recommended. Try to charge the battery instead. Use quality large diameter jumper cables capable of carrying high currents (400 amps or more). Low quality cables may not allow enough current flow to charge a dead/discharged battery.
- Read all steps thoroughly and review illustration before performing procedure.

Check every 10 hours. Charge as needed.