TECHNICAL PUBLICATIONS

Operator's Manual

HB4500 T4

CE

Issue 3.2

960-1122

Overview

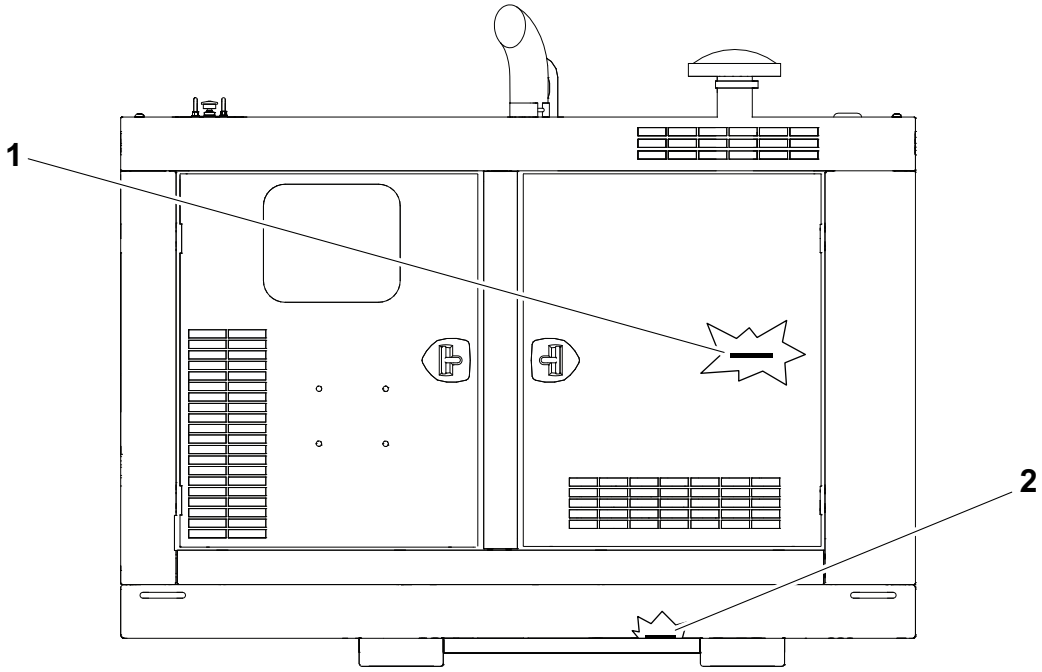
Chapter Contents

California Proposition 65

⚠ WARNING Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm. www.P65warnings.ca.gov.

Serial Number Location

Record serial numbers and date of purchase in spaces provided.



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date of manufacture	
date of purchase	
engine serial number (1)	
control unit serial number (2)	

Intended Use

HammerHead® control units are intended to provide power to run HammerHead underground construction equipment. The HB4500 T4 is a 74.3 hp (55.4 kW) control unit that provides hydraulic power to external equipment.

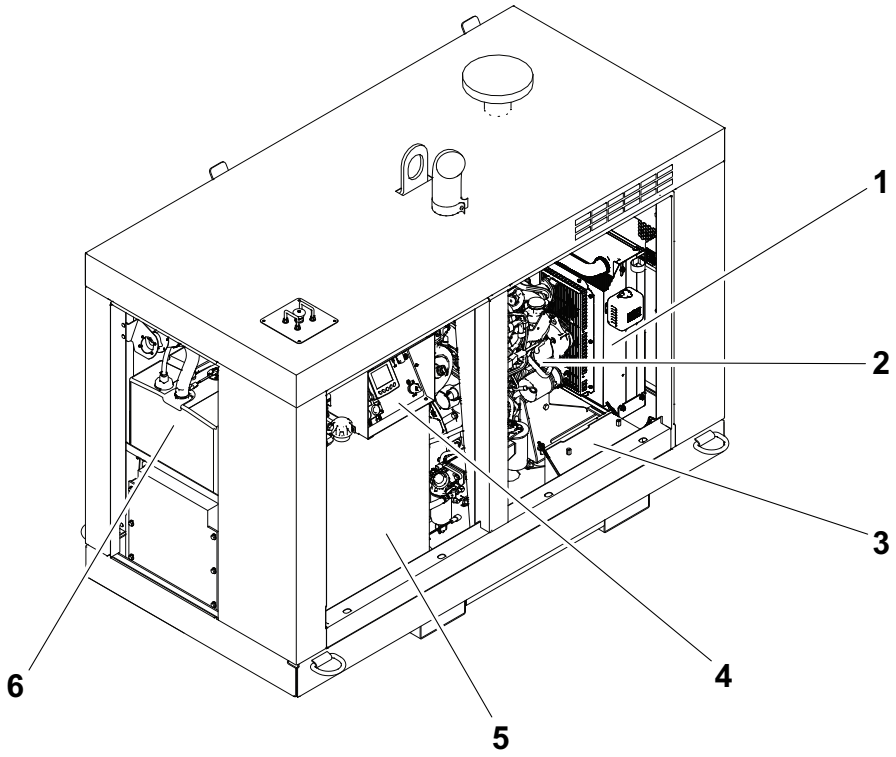
The unit is designed for operation in temperatures typically experienced in earth moving and construction work environments. Contact your HammerHead dealer for provisions required for operating in extreme temperatures. Use in any other way is considered contrary to the intended use.

HammerHead pipe bursters and control units should be operated, serviced, and repaired only by persons familiar with their particular characteristics and acquainted with the relevant safety procedures.

Equipment Modification

This equipment was designed and built in accordance with applicable standards and regulations. Modification of equipment could mean that it will no longer meet regulations and may not function properly or in accordance with the operating instructions. Modification of equipment should only be made by competent personnel possessing knowledge of applicable standards, regulations, equipment design functionality/requirements and any required specialized testing.

Unit Components



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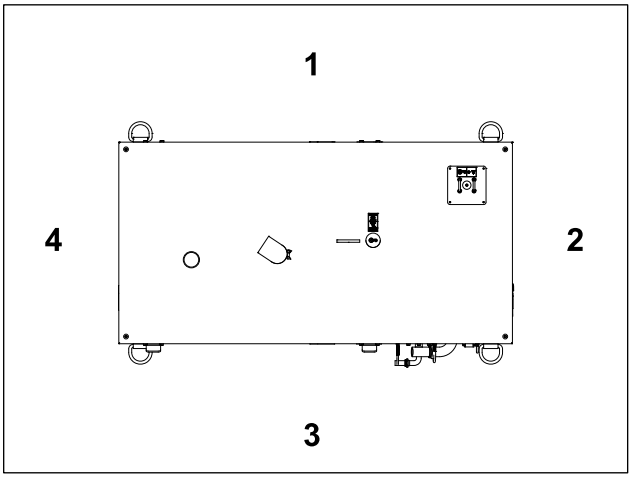
1. Radiator
2. Engine
3. Battery
4. Control panel
5. Hydraulic tank
6. Fuel tank

Operator Orientation

IMPORTANT: Top view of unit is shown.

1. Front of unit
2. Left side of unit
3. Rear of unit
4. Right side of unit



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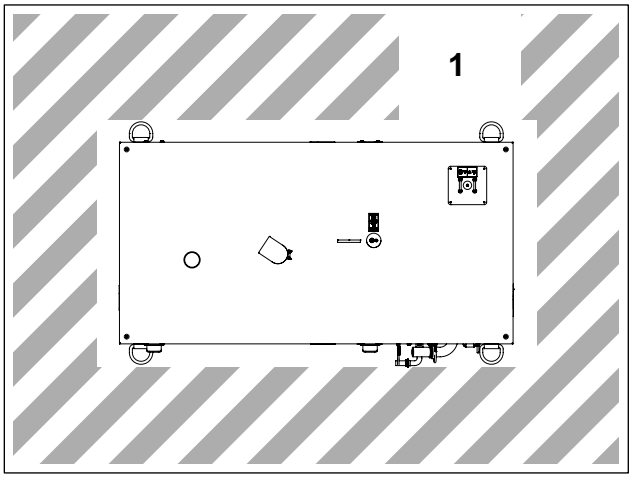
Operating Area

IMPORTANT: Top view of unit is shown.

Operator should stand only in the location marked by number 1.



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About This Manual

This manual contains information for the proper use of this machine.

Bulleted Lists

Bulleted lists provide helpful or important information or contain procedures that do not have to be performed in a specific order.

Numbered Lists

Numbered lists contain illustration callouts or list steps that must be performed in order.

Foreword

This manual is an important part of your equipment. It provides safety information and operation instructions to help you use and maintain your HammerHead® equipment.

Read this manual before using your equipment. Keep it with the equipment at all times for future reference. If you sell your equipment, be sure to give this manual to the new owner.

If you need a replacement copy, contact your HammerHead dealer. If you need assistance in locating a dealer, visit our website at **www.hammerheadtrenchless.com** or write to the following address:

HammerHead Trenchless Equipment
500 South C.P. Avenue
Lake Mills, WI 53551
USA

The descriptions and specifications in this manual are subject to change without notice. Earth Tool Company LLC reserves the right to improve equipment. Some product improvements may have taken place after this manual was published. For the latest information on HammerHead equipment, see your HammerHead dealer.

Thank you for buying and using HammerHead equipment.

HB4500 T4
Operator's Manual

Issue number 3.2/OM-10/22
Part number 960-1122

Contents

Safety

Chapter Contents

Safety Alert Classifications

These classifications and the icons defined on the following pages work together to alert you to situations which could be harmful to you, jobsite bystanders or your equipment. When you see these words and icons in the book or on the machine, carefully read and follow all instructions. YOUR SAFETY IS AT STAKE.

Watch for the three safety alert levels: **DANGER**, **WARNING** and **CAUTION**. Learn what each level means.

⚠ DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

⚠ WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

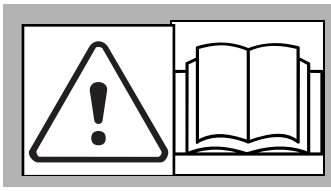
⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

Watch for two other words: ***NOTICE*** and **IMPORTANT**.

NOTICE indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

IMPORTANT can help you do a better job or make your job easier in some way.

Guidelines



⚠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.

When you see this safety alert sign, carefully read and follow all instructions.
YOUR SAFETY IS AT STAKE. Read this entire section before using your equipment.
SAVE THESE INSTRUCTIONS.

Follow these guidelines before operating any jobsite equipment.

- Complete proper training and read operator's manual before using equipment.
- Mark proposed path with white paint and have underground utilities located before working. In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service. In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.
- Classify jobsite based on its hazards and use correct tools and machinery, safety equipment, and work methods for jobsite.
- Mark jobsite clearly and keep spectators away.
- Wear personal protective equipment including long pants, hard hat, eye protection, hearing protection, and protective footwear.
- Do not wear jewelry or loose clothing.
- Review jobsite hazards, safety and emergency procedures, and individual responsibilities with all personnel before work begins. Safety Data Sheets (SDS) are available at www.hammerheadshop.com/resources/technical-sheets/.
- Fully inspect equipment before operating. Repair or replace any worn or damaged parts. Replace missing or damaged safety shields, safety signs, and decals. Contact your HammerHead dealer for assistance.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Do not operate unit where flammable gas, liquid, or dust may be present.
- Only operate equipment in well-ventilated areas.
- Contact your HammerHead dealer if you have any question about operation, maintenance, or equipment use.
-

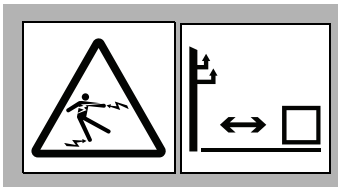
Emergency Procedures

⚠ WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

Before operating any equipment, review emergency procedures and check that all safety precautions have been taken.

EMERGENCY SHUTDOWN - Turn ignition switch to stop position or push remote engine stop button (if equipped).

Electric Strike Description



⚠ DANGER Electric shock. Contacting electric lines will cause death or serious injury. Know location of lines and stay away.

When working near electric cables, remember the following:

- Electricity follows all paths to ground, not just path of least resistance.
- Pipes, hoses, and cables will conduct electricity back to all equipment.
- Low voltage current can injure or kill. Many work-related electrocutions result from contact with less than 440 volts.

Most electric strikes are not noticeable, but indications of a strike include:

- power outage
- smoke
- explosion
- popping noises
- arcing electricity

If any of the occur, assume an electric strike has occurred.

If an Electric Line is Damaged

If you suspect an electric line has been damaged, DO NOT MOVE. Take the following actions. The order and degree of action will depend on the situation.

- If you are in pit:

  - DO NOT TOUCH ANYTHING.
  - Remain in pit.
  - Warn people nearby that an electric strike has occurred. Instruct them to leave the area and contact utility.
  - Contact utility company to shut off power.
  - Do not leave pit until given permission by utility company.
- If you are out of pit:
  - DO NOT TOUCH ANY EQUIPMENT.
  - LEAVE AREA. The ground surface may be electrified, so take small steps with feet close together to reduce the hazard of being shocked from one foot to the other.
  - Contact utility company to shut off power.
  - Do not return to jobsite or allow anyone into area until given permission by utility company.
- If you are on another piece of equipment:
  - Warn people nearby that an electric strike has occurred. Instruct them to leave the area and contact utility.
  - Contact utility company to shut off power.
  - Do not return to area or allow anyone into area until given permission by utility company.

If a Gas Line is Damaged

If you suspect a gas line has been damaged, take the following actions. The order and degree of action will depend on the situation.

- Immediately shut off engine(s), if this can be done safely and quickly.
- Remove any ignition source(s), if this can be done safely and quickly.
- Warn others that a gas line has been cut and that they should leave the area.
- After warning others to leave the area, leave jobsite as quickly as possible.
- Immediately call your local emergency phone number and utility company.
- If jobsite is along street, stop traffic from driving near jobsite.
- Do not return to jobsite until given permission by emergency personnel and utility company.

If a Fiber Optic Cable is Damaged

Do not look into cut ends of fiber optic or unidentified cable. Vision damage can occur. Contact utility company.

If Machine Catches on Fire

Perform emergency shutdown procedure and then take the following actions. The order and degree of action will depend on the situation.

- Immediately move battery disconnect switch (if equipped and accessible) to disconnect position.

- If fire is small and fire extinguisher is available, attempt to extinguish fire.
- If fire cannot be extinguished, leave area as quickly as possible and contact emergency personnel.

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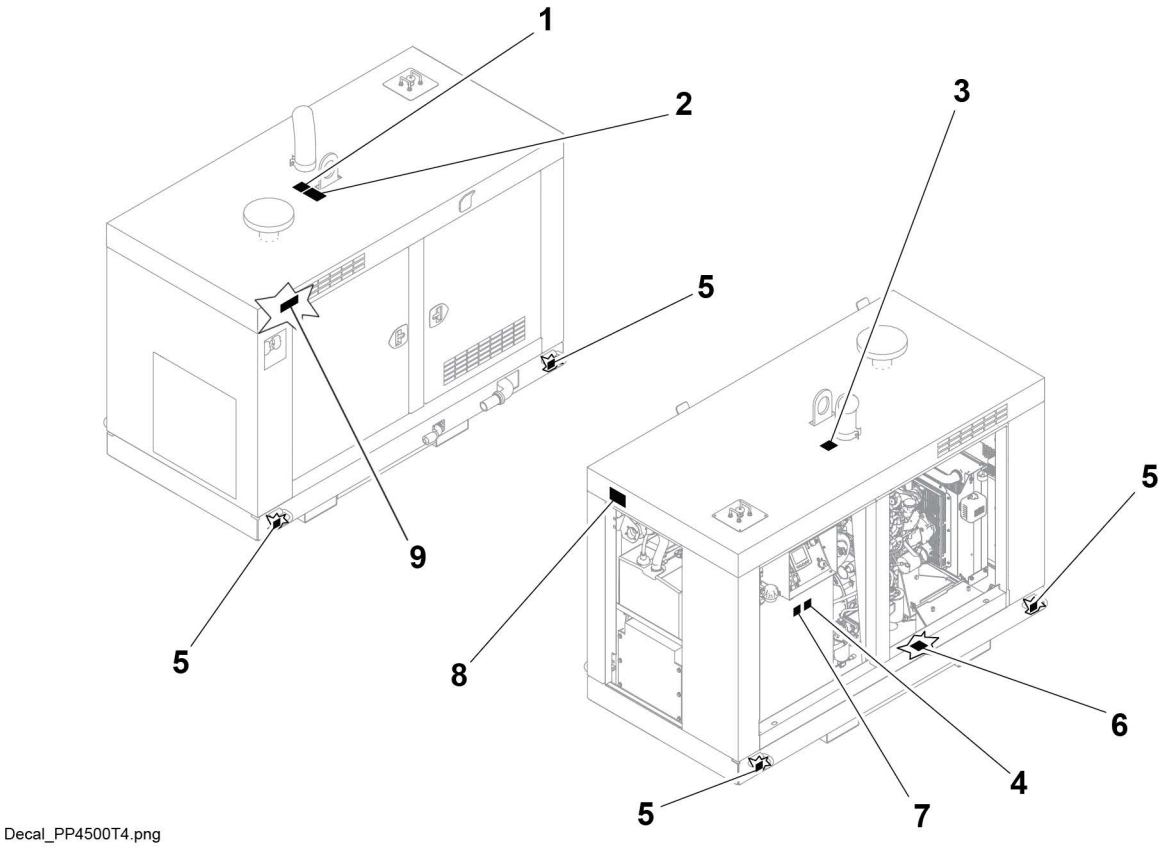
IMPORTANT can help you do a better job or make your job easier in some way.

Machine Safety Alerts



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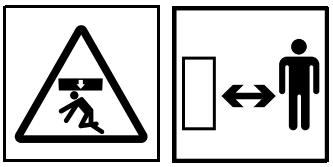
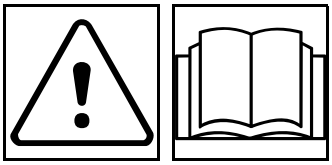
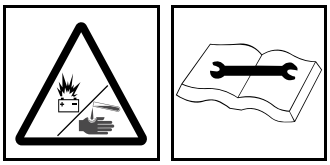
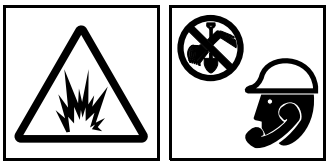
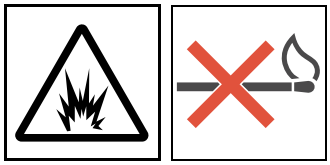
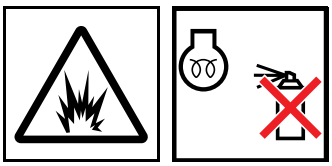
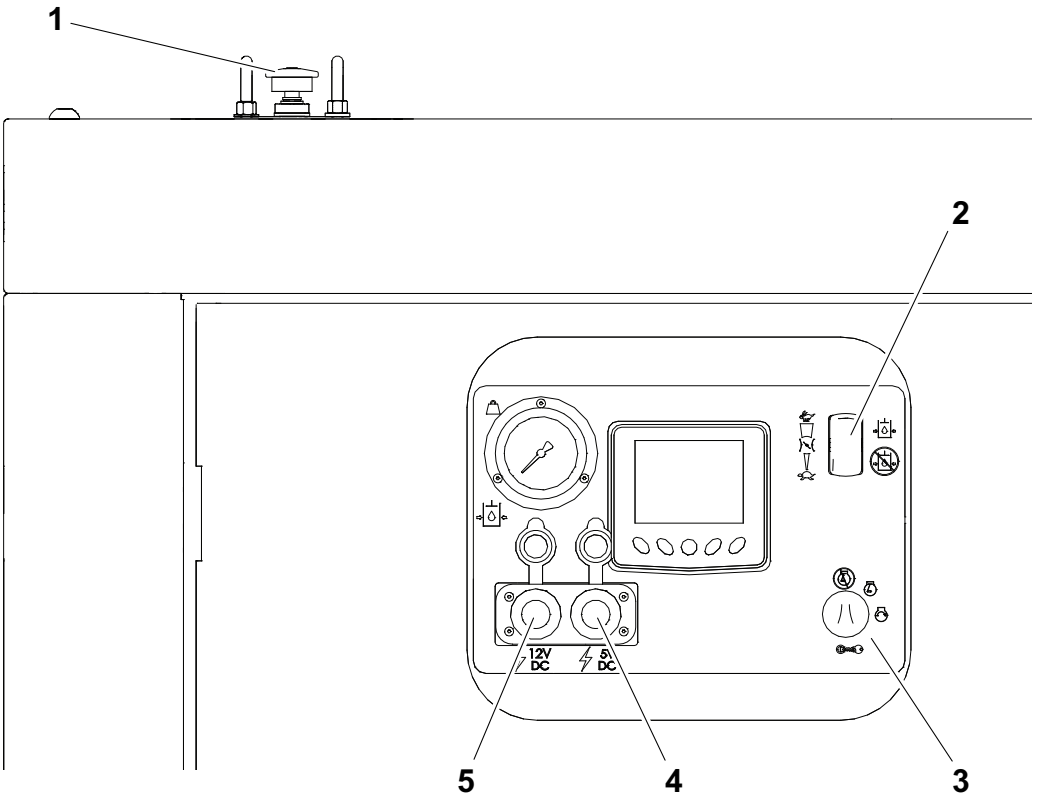
1		Lift point. See Transport chapter for more information.
2		**WARNING** Crushing weight could cause death or serious injury. Stay away.
3		**WARNING** Hot parts may cause burns. Do not touch until cool or wear gloves.

4		**WARNING** Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.
5		Tiedown location. See Transport chapter for more information.
6		**WARNING** Battery explosion can cause death or serious injury. Corrosive battery acid can cause burns. Keep heat, sparks, flames and other ignition sources away. Avoid contact with battery acid. Refer to manual before servicing.
7		**WARNING** Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.
8		**WARNING** Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark.
9		**WARNING** Fire or explosion possible. Do not use starter fluid. 273-459 (2P), 274-206 (2P), 700-206 (2P)

Controls

Chapter Contents

Controls



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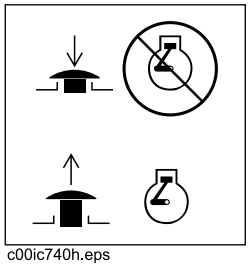
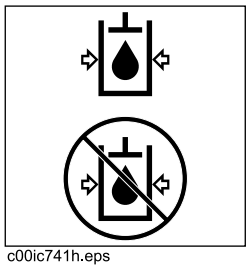
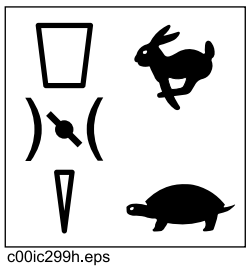
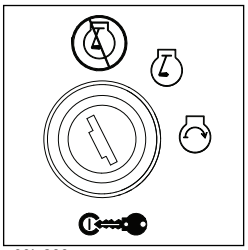
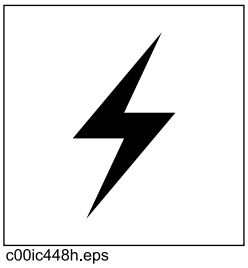
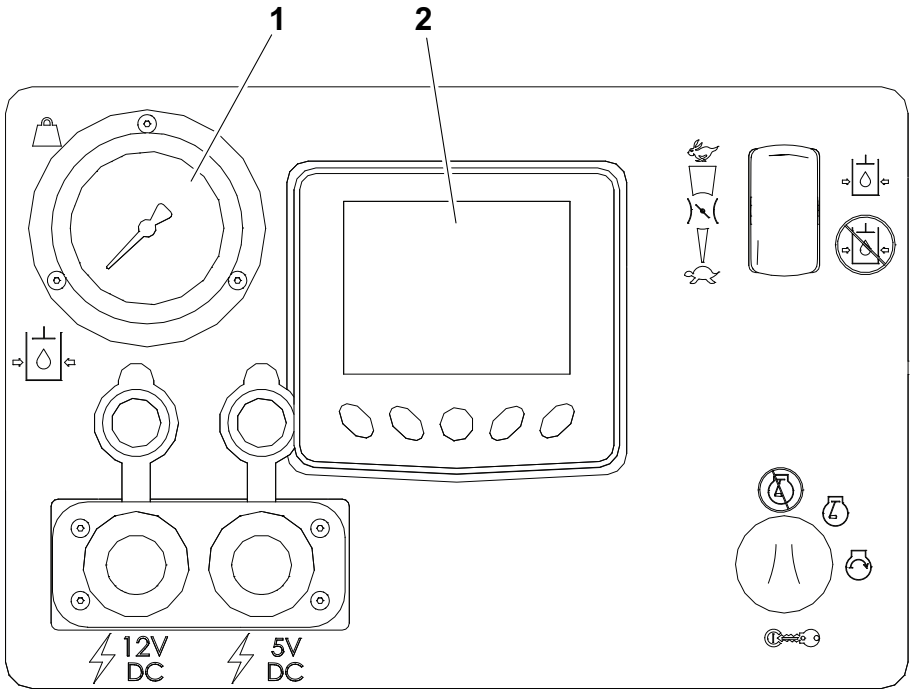
1. Remote engine stop button
2. Auxiliary mode switch
3. Ignition switch
4. USB port
5. Auxiliary outlet

Item	Description	Notes
1. Remote engine stop button  c00ic740h.eps	To shut down engine, press.	**IMPORTANT:** • Engine will not start until control is returned to neutral position. • Display indicates engine has been remotely shut down.

Item	Description	Notes
2. Auxiliary mode switch  c00ic741h.eps  c00ic299h.eps	To activate external hydraulic equipment and set throttle to 2200 rpm, press top. To deactivate external hydraulic equipment and set throttle to 1000 rpm, press bottom.	Auxiliary mode switch must be in OFF position to start engine.
3. Ignition switch  c00ic263w.eps	To turn on electrical system, turn ignition key one position clockwise (ON). To start engine, turn ignition key two positions clockwise (START) and hold until engine starts. To shut down engine, turn ignition key to center position (OFF).	See "Shut Down Unit" on page 39 for more information.
4. Auxiliary outlet  c00ic448h.eps	Provides power for other equipment.	Power output is 12VDC, 5A.
5. USB port	Provides power for mobile devices.	Power output is DC5V, 2A.

Gauges and Indicators



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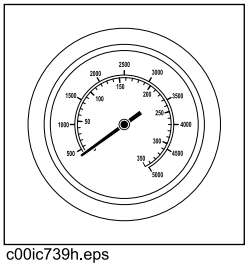
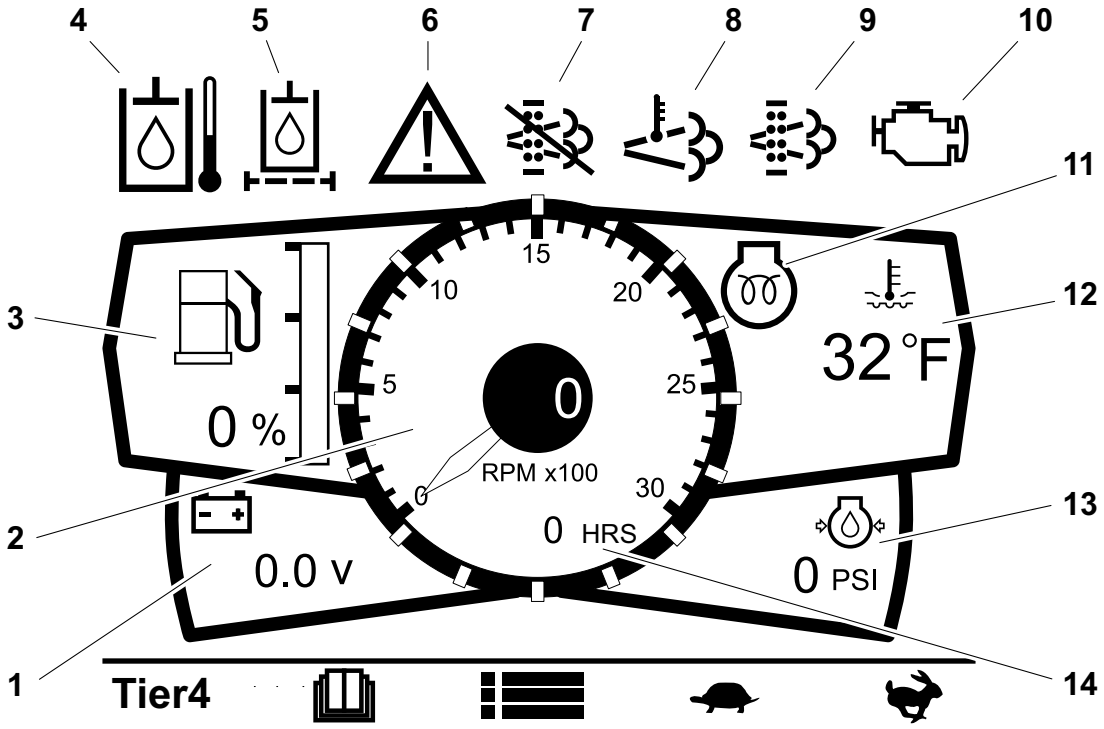
1. Hydraulic pressure gauge
2. Machine display

Item	Description	Notes
1. Hydraulic pressure gauge  c00ic739h.eps	Displays hydraulic pressure for unit.	Gauge should read 4500 psi (310 bar) at full throttle.
1. Machine display	Displays graphic symbols for indicators and conditions.	***NOTICE:*** For more information, see "Indicators" on page 25.

Machine Display

Indicators



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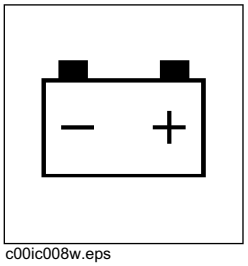
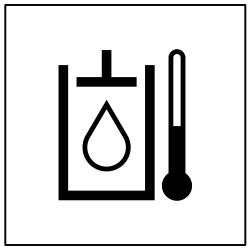
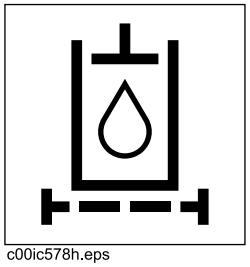
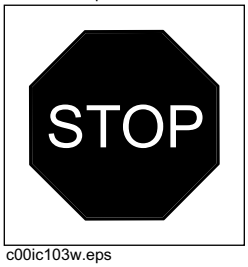
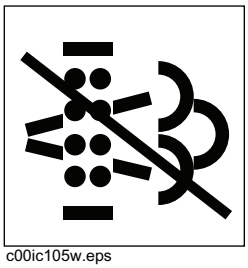
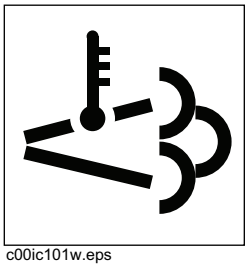
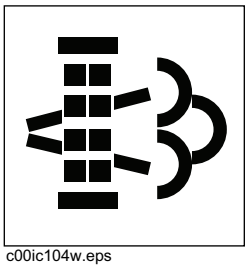
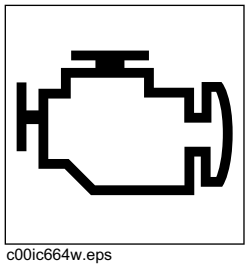
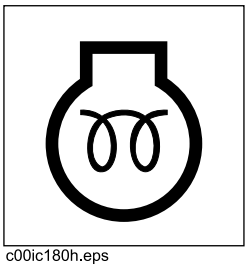
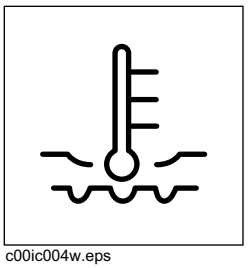
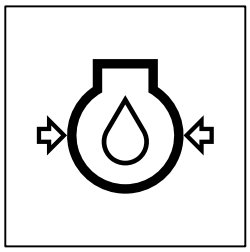
1. Voltmeter display
2. Tachometer
3. Fuel gauge
4. Hydraulic fluid temperature indicator
5. Hydraulic fluid filter indicator
6. Engine caution/stop indicator
7. Exhaust cleaning inhibited indicator
8. High exhaust temperature indicator
9. Exhaust cleaning indicator
10. Engine power indicator
11. Cold start indicator
12. Engine coolant temperature indicator
13. Engine oil pressure indicator
14. Hourmeter

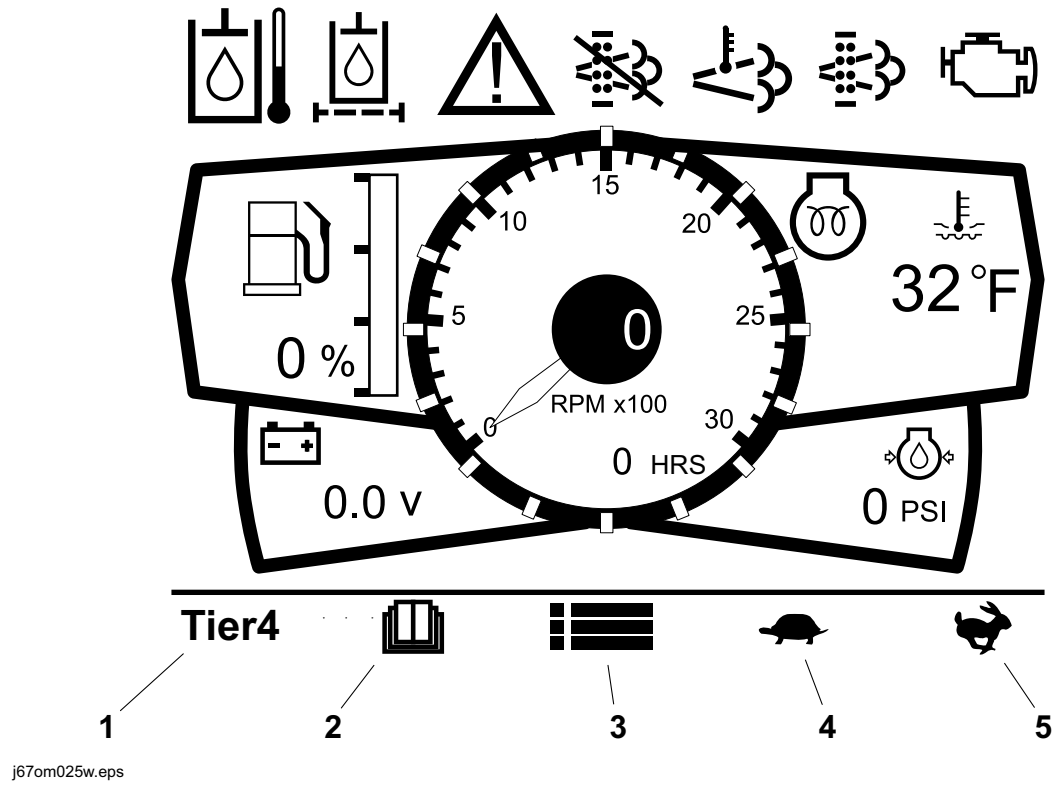
Item	Description	Notes
1. Voltmeter display  c00ic008w.eps	Displays system voltage.	
2. Tachometer	Displays engine speed in rpm.	
3. Fuel gauge  c00ic622w.eps	Displays amount of fuel remaining in tank.	Flashes when fuel level reaches 10% in fuel tank. See "Approved Fuel" on page 51.
4. Hydraulic fluid temperature indicator  c00ic098a.eps	Lights red when hydraulic fluid temperature is too high.	***NOTICE:*** Engine stop indicator will light when hydraulic fluid temperature is too high. See "Engine caution/stop indicator" on page 27.
5. Hydraulic fluid filter indicator  c00ic578h.eps	Lights when hydraulic fluid filter is restricted.	***NOTICE:*** Engine caution indicator will light when hydraulic filter needs attention. See "Engine caution/stop indicator" on page 27.

Item	Description	Notes
6. Engine caution/stop indicator  c00ic102w.eps  c00ic103w.eps	Lights yellow when engine needs attention. Lights red when operator needs to stop engine.	
7. Exhaust cleaning inhibited indicator  c00ic105w.eps	Lights when automatic exhaust cleaning has been inhibited.	
8. High exhaust temperature indicator  c00ic101w.eps	Lights when exhaust temperatures are high.	**IMPORTANT:** May light when exhaust cleaning is in process.

Item	Description	Notes
9. Exhaust cleaning indicator  c00ic104w.eps	Lights to indicate an automatic exhaust cleaning is in process. Blinks to indicate a manual exhaust cleaning is needed.	
10. Engine power indicator  c00ic664w.eps	Indicates engine power is derated.	Engine power is derated when exhaust cleaning prompts are disregarded for an extended period of time.
11. Cold start indicator  c00ic180h.eps	Lights yellow when engine preheater (glow plug) is on. Wait until light goes off before starting engine.	
12. Engine coolant temperature indicator  c00ic004w.eps	Flashes when engine coolant temperature is above 110°F (43°C).	**IMPORTANT:** Engine stop indicator will light when engine coolant needs attention.

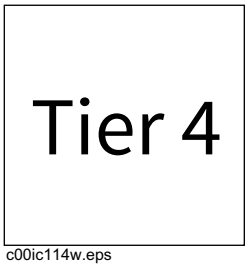
Item	Description	Notes
13. Engine oil pressure indicator  c00ic096a.eps	Flashes red on start-up and when engine oil pressure is below 9 psi (0.6 bar).	***NOTICE:*** Engine stop indicator will light when engine oil pressure is low. If engine oil pressure is too low the unit will shut down in 15 seconds.
14. Hourmeter	Displays engine operating time.	Use to schedule service.

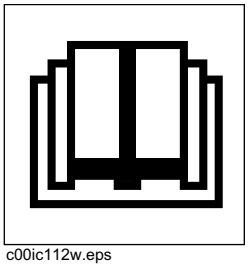
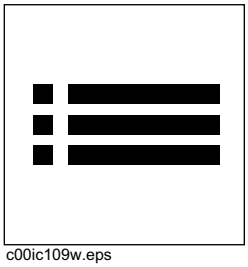
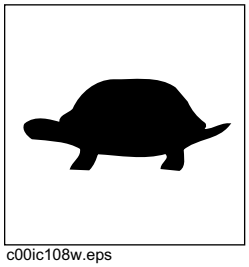
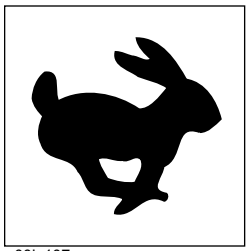
Buttons



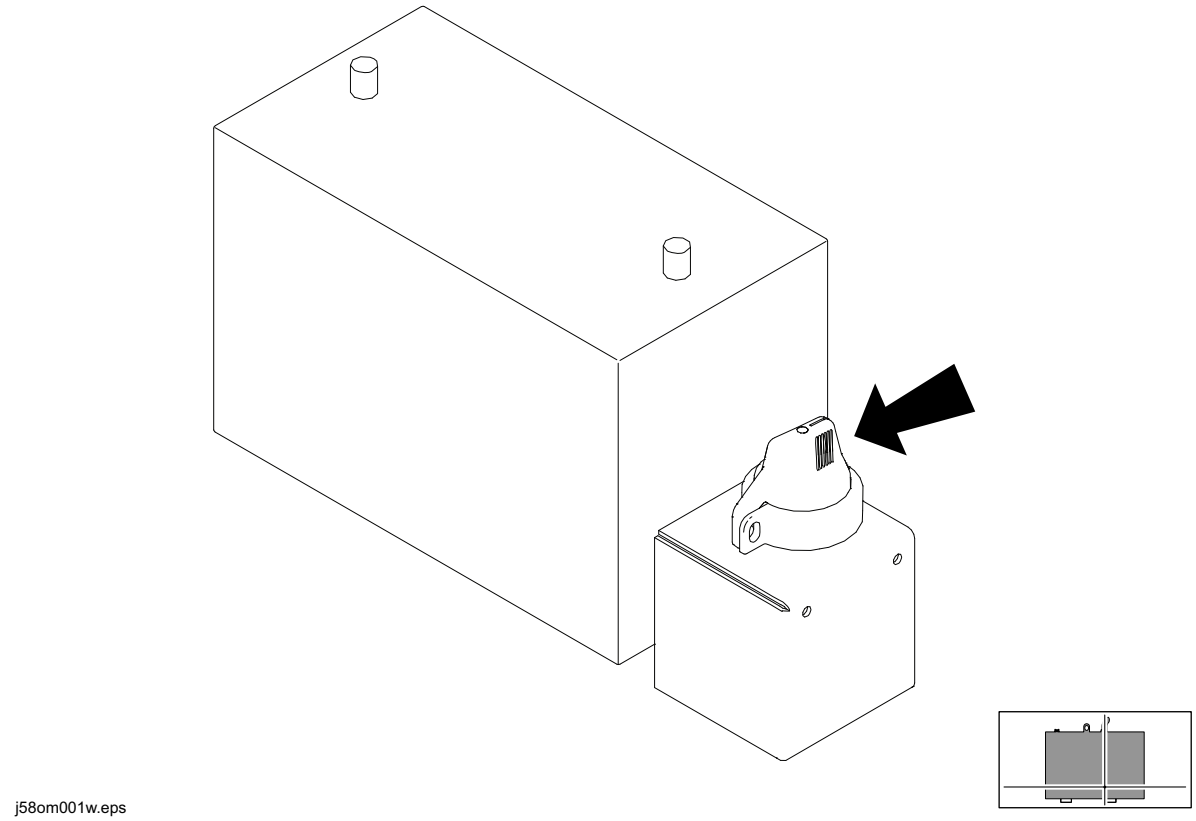
j67om025w.eps

1. Tier 4 menu button
2. Service reminders button
3. Settings menu button
4. Engine speed decrease button
5. Engine speed increase button

Item	Description	Notes
1. Tier 4 menu button  c00ic114w.eps	Press to go to the exhaust cleaning (REGEN) control menu.	Allows user to initiate exhaust cleaning.

Item	Description	Notes
2. Service reminders button  c00ic112w.eps	Press to go to the service reminders screen.	Allows user to set reminders for service intervals.
3. Settings menu button  c00ic109w.eps	Press to go to the setting menu.	Allows user to change language, screen brightness and contrast, units of measurement, and access the diagnostics menu screen.
4. Engine speed decrease button  c00ic108w.eps	To decrease engine speed, push once. To decrease to lowest speed, push twice.	**IMPORTANT:** Each button press decreases engine by 50 rpm.
5. Engine speed increase button  c00ic107w.eps	To increase engine speed, push once. To increase to full speed, push twice.	**IMPORTANT:** Each button press increases engine by 50 rpm.

Battery Disconnect



j58om001w.eps

Item	Description	Notes
Battery disconnect switch	To connect, move right. To disconnect, move left.	***NOTICE:*** • Do not operate battery disconnect switch with engine running. • To avoid equipment damage, wait two minutes after turning engine off before disconnecting battery.

Prepare

Chapter Contents

Gather Information

A successful job begins before the excavation. The first step in planning is reviewing information already available about the job and jobsite.

Arrange for Traffic Control

If working near a road or other traffic area, contact local authorities about safety procedures and regulations.

Prepare for Working Near Existing Utilities

If jobsite may contain electrical lines, wear protective boots and gloves meeting the following standards:

- Boots must have high tops and meet the electric hazard protection requirements of ASTM F2413 or ASTM F1117, when tested at 18,000 volts. Tuck legs of pants completely inside boots.
- Gloves must have 17,000 AC maximum use voltage, according to ASTM specification D120.

If working around higher voltage, use gloves and boots with appropriately higher ratings.

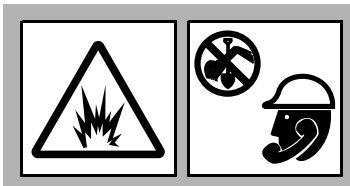
Plan for Emergency Services

Have the telephone numbers for local emergency and medical facilities on hand. Check that you will have access to a telephone.

Inspect Site

- Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.
- Mark proposed path with white paint and have underground utilities located before working. In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service. In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.
- Inspect jobsite and perimeter for evidence of underground hazards, such as:
  - "Buried utility" notices
  - Utility facilities without overhead lines
  - Gas or water meters
  - Junction boxes
  - Drop boxes
  - Light poles
  - Manhole covers
  - Sunken ground
- Mark location of all buried utilities and obstructions.

Prepare Jobsite



WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury:

- Expose lines by hand before digging.Cutting high voltage cable can cause electrocution.
- All vegetation near operator's station must be removed. Contact with trees, shrubs, or weeds during electrical strike could result in electrocution.

- Ensure area where control unit will be operated is on level and firm ground.
- Clear selected area.

Check Supplies and Prepare Equipment

Check Supplies

- personal protective equipment, such as hard hat and safety glasses
- fuel
- keys

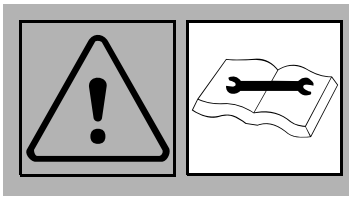
Prepare Equipment

Fluid Levels

- fuel
- hydraulic fluid
- engine oil
- engine coolant

Condition and Function

- all controls



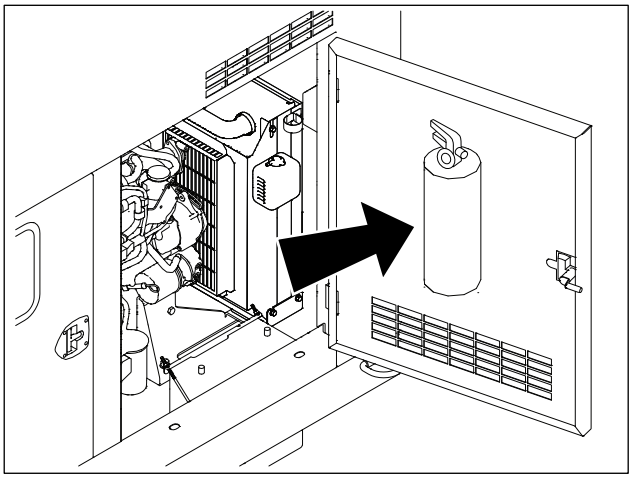
WARNING Improper control function could cause death or serious injury. If control does not work as described in instructions, stop machine and have it serviced.

- couplers and fittings
- hoses and valves
- filters

Assemble Accessories

Fire Extinguisher

If required, mount a fire extinguisher near the control unit but away from possible points of ignition where shown. The fire extinguisher should always be classified for both oil and electric fires. It should meet legal and regulatory requirements.

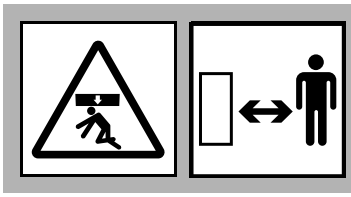


j67om026w.eps

Transport

Chapter Contents

Lift

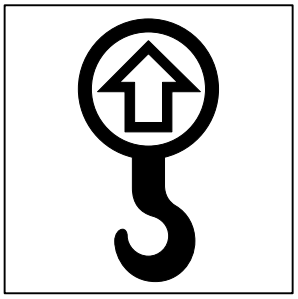


WARNING Crushing weight could cause death or serious injury.

To help avoid injury: Use proper procedures and equipment or stay away.

Points

The lifting point is identified by a lifting decal. Lifting at other points is unsafe and can damage machinery.

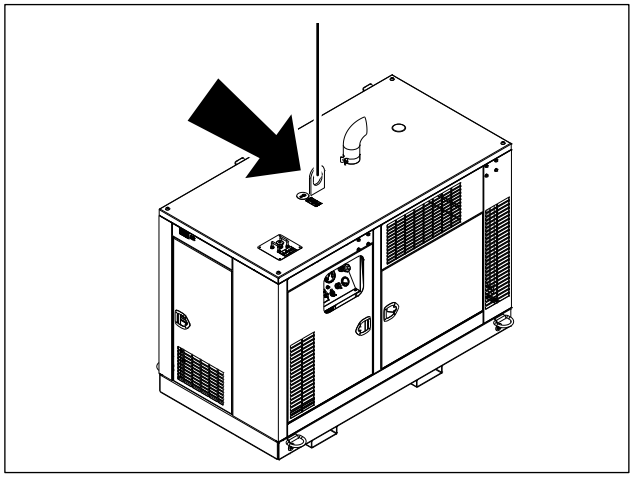


ic1319a.eps

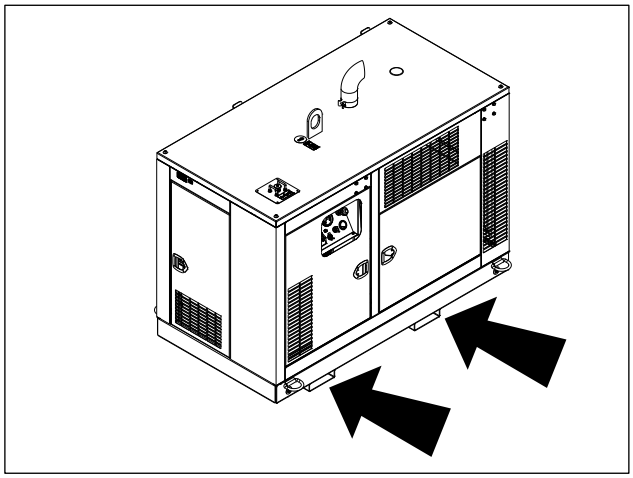
Procedure

NOTICE: Ensure hoses are secure. See "Secure Hydraulic Hoses" on page 47.

Use equipment capable of supporting the unit's size and weight. See "Specifications" on page 61. Lift as shown.



j58om005h.eps

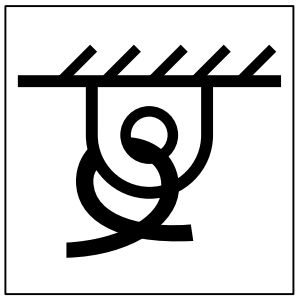


j58om006h.eps

Tie Down

Points

Tie down points are identified by tie down decals. Tying down at other points is unsafe and can damage machinery.

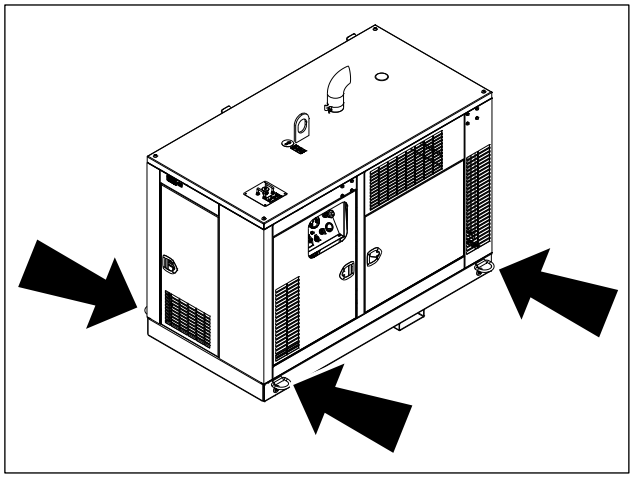


ic1320a.eps

Procedure

NOTICE: Ensure hoses are secure. See "Secure Hydraulic Hoses" on page 47.

To tie-down unit, use d-rings as shown.



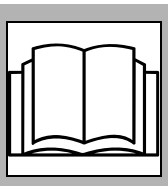
j58om007h.eps

Operate

Chapter Contents

Set Up Unit

IMPORTANT: Follow external equipment operator's manual instructions.

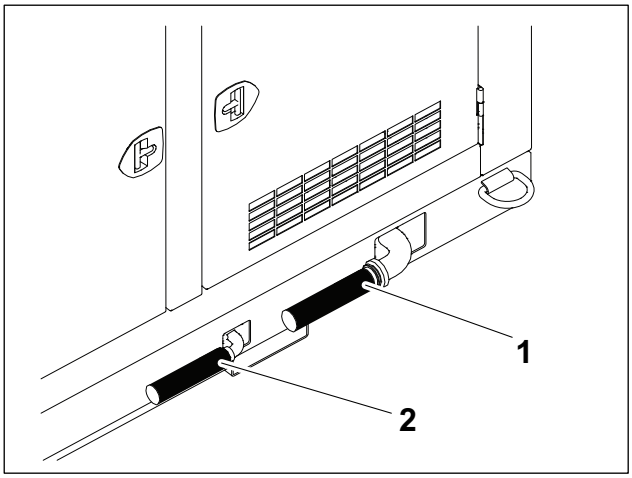



WARNING Pressurized fluid or air could pierce skin and cause severe injury.

To help avoid injury: Ensure all hydraulic connections are tight and all lines are undamaged.

Connect Hydraulic Hoses

1. Ensure engine is off.
2. Remove vacuum hoses from storage.
3. Connect hydraulic hoses, return line first.
   - return line (1)
   - high pressure line (2)



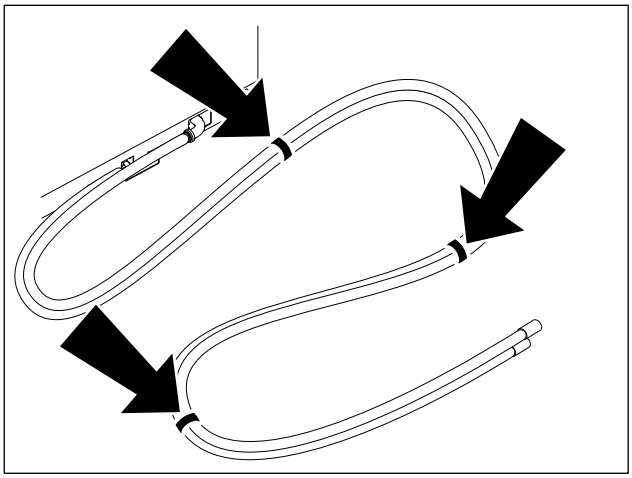
j67om018w.eps

Secure Hydraulic Hoses

1. Ensure engine is off.
2. Secure hydraulic hoses together using straps provided as shown.

NOTICE: Straps should be secured as tightly as possible.

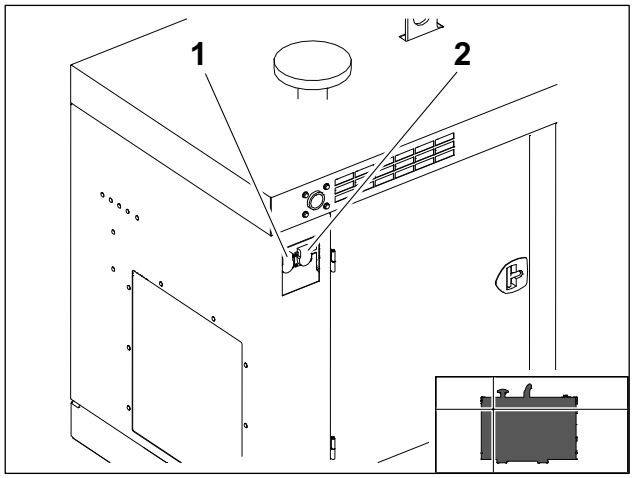
   - Secure first strap at approximately 10' (3.05 m) from control unit.
   - Secure second strap near the connectors at the ends of the hoses near the bursting pit.
   - Evenly space and secure remaining straps along the hoses.


j67om027w.eps

Connect Control Unit

Connect external equipment to control unit where shown.

Ref.	Description	External Equipment
1	7-pin	HB125/HB175
2	9-pin	100XT



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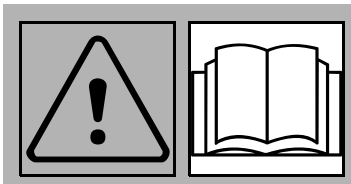
Start Unit

Before operating machine, read engine manufacturer's starting and operating instructions.

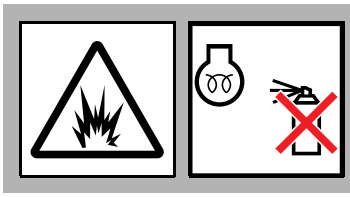


WARNING Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.

To help avoid injury:

- Wear hard hat, safety glasses, and other protective equipment required by job. Do not wear jewelry or loose clothing that can catch on controls.
- Clear the area around the machine of all bystanders.

1. Ensure controls are in neutral.
2. Turn ignition switch to the run position (key on, engine off). Cold start indicator will light if necessary.



WARNING Fire or explosion possible.

To help avoid injury: Do not use starter fluid.

3. When cold start wait indicator turns off, turn ignition switch clockwise to start machine.

IMPORTANT: If engine turns but does not start within 15 seconds, allow starter to cool one minute before trying to start again.

4. Run engine at half throttle or less for five minutes before operating machine. Ensure all controls function properly.

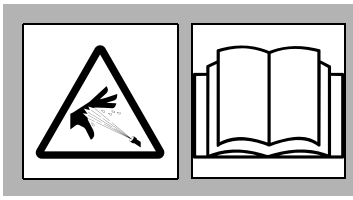
Shut Down Unit

Shut Down Engine

1. Ensure all controls are in neutral.
2. Reduce engine speed to low throttle.
3. Turn ignition switch to the off position.
4. Remove ignition key.
5. For maintenance or long-term storage, turn battery disconnect switch to the off position.

NOTICE: To avoid equipment damage, wait two minutes after turning engine off before disconnecting battery.

Disconnect Hydraulic Hoses



WARNING Pressurized fluid or air could pierce skin and cause severe injury.

To help avoid injury: Cycle control valve to release hydraulic pressure.

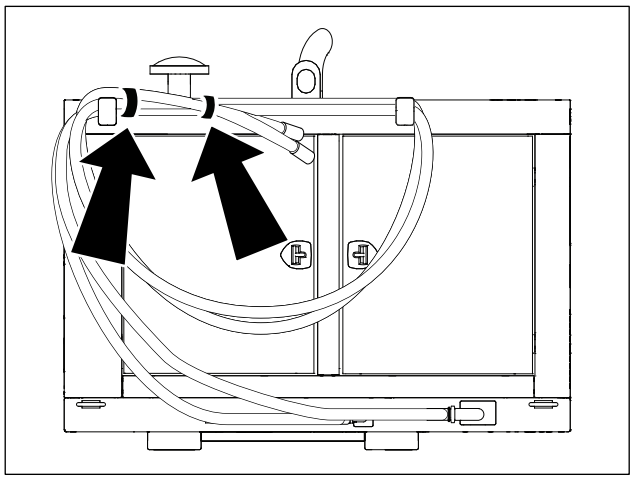
IMPORTANT: Follow external equipment operator's manual instructions.

1. Disconnect hydraulic hoses, pressure line first.
2. Attach hydraulic hoses to hooks on control unit frame.

Secure Hydraulic Hoses

After hoses are attached to hooks on control unit frame, secure hydraulic hoses together for storage using straps provided as shown.

NOTICE: Straps should be secured as tightly as possible.



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Disconnect Control Unit

Disconnect external equipment from control unit.

Decommission Machine

Before decommissioning machine, follow local regulations for disposing of hazardous substances. For more information on draining fluids, see "Service" on page 49.

Service

Chapter Contents

Service Precautions

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

To help avoid injury:

- Unless otherwise instructed, all service should be performed with engine off and engine cool.
- Refer to engine manufacturer's manual for engine maintenance instructions.
- Wear personal protective equipment.

Recommended Fluids/Service Key

Item	Description		
ULSD	Ultra Low Sulfur Diesel (ULSD) No. 2-D (S15) meeting ASTM D975 or EN 590 . If <15 ppm sulfur fuel is not available in your area, contact your Hammerhead® dealer.		
DEAC	Diesel engine coolant Ethylene Glycol long-life coolant meeting SAE J814C		
DEO	Diesel engine oil meeting or exceeding API CJ-4, ACEA E9		
HF	Hydraulic fluid, similar to Phillips 66® PowerTran or equivalent meeting or exceeding ISO 46		
	Check level of fluid or lubricant		
	Filter		Check condition
	Adjust, service or test		Change, replace, adjust, service or test

Proper lubrication and maintenance protects HammerHead equipment from damage and failure. Service intervals listed are minimum requirements. In extreme conditions, service machine more frequently. Use only recommended lubricants. Use only genuine HammerHead parts and approved lubricants to maintain warranty.

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

IMPORTANT: Use the "Service Record" on page 75 to record all required service to your machine.

Approved Fuel

WARNING Ultra Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations. Fire or explosion can cause death or serious injury.

To help avoid injury:

- Avoid static electricity when fueling.
- Consult with your 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.

NOTICE: Incorrect sulfur content will damage the engine and after-treatment device.

- Only use Ultra Low Sulfur Diesel with less than 15ppm (10 mg/kg) sulfur content.

For more information, see engine manual.

Approved Coolant

NOTICE: Incorrect coolant will damage the engine.

- Only use fully formulated, low silicate, ethylene glycol coolant for diesel engines meeting SAE J814C. Use only pre-diluted coolant or concentrated coolant mixed with clean, soft water.

Only use the mixture proportions in the table that follow:

Mixture freezing temperature	Mixture proportions	
	Clean, soft water	Coolant
-34°F (-37°C)	50%	50%
-58°F (-50°C)	40%	60%

For more information, see engine manual.

Exhaust Cleaning

This engine has a Diesel Particulate Filter (DPF) that purifies NOx emissions in the exhaust into nitrogen and water. The DPF system uses a small amount of engine lubricating oil to during the high-temperature combustion. The system cleans itself automatically, unless it is manually inhibited by the operator.

Automatic exhaust cleaning (REGEN) happens during normal machine operation when sensors in the engine determine the need. During an engine exhaust cleaning cycle, engine exhaust can reach high temperatures. When this happens, the high exhaust temperature icon will light.

If the jobsite is in an area where high exhaust temperature might cause a problem, inhibit exhaust cleaning through the Tier 4 menu (see "Tier 4 menu button" on page 30) for the duration of the job and return to automatic cleaning when the job is finished. The exhaust cleaning inhibited icon will light and remain on until the system is returned to automatic exhaust cleaning mode.

The exhaust cleaning icon will light when the system is inhibited and an exhaust cleaning cycle is needed.

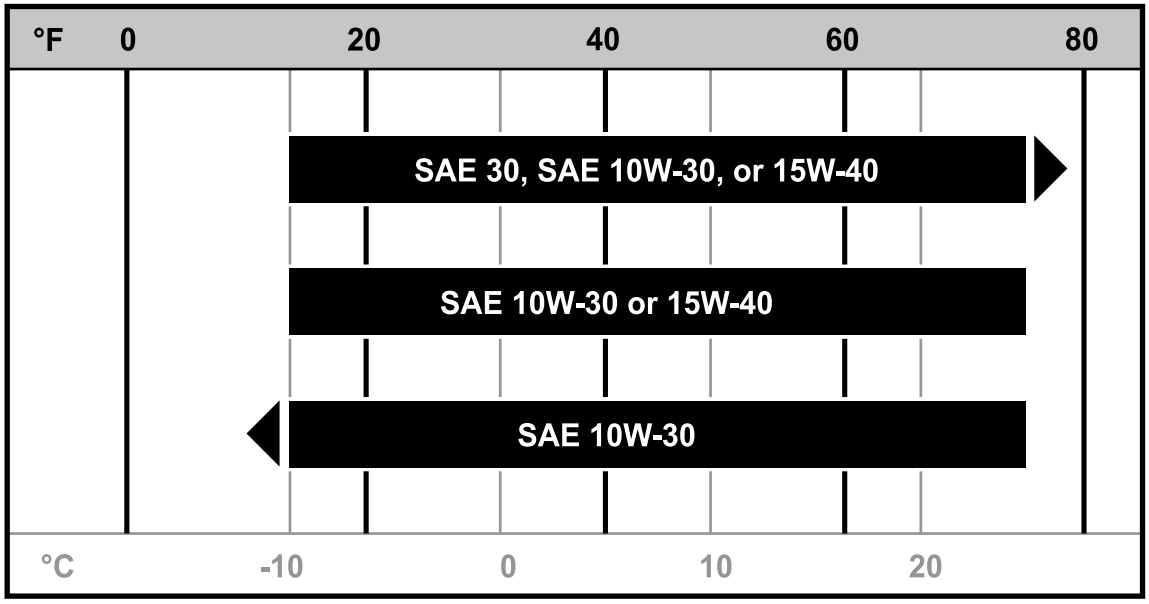
- The icon will flash when exhaust cleaning is needed. If the area will allow it, return the unit to automatic cleaning mode in the Tier 4 menu and let it run automatically.
- A manual exhaust cleaning cycle (DPF REGEN) is required after automatic exhaust cleaning has been inhibited multiple times. Take system out of inhibited mode through the Tier 4 menu, set the engine to low throttle with no load and initiate the DPF REGEN exhaust cleaning cycle. The light will remain on steady until the manual exhaust cleaning cycle is finished (approximately 30 minutes). If manual cleaning is not done when indicated, the engine will derate.
- Ash buildup in soot filter part of DPF will have adverse effects on engine performance. The soot filter must be serviced every 3000 hours of operation or more often if high-ash oil and/or fuel is used. See your Yanmar engine distributor for this service.

Engine Oil Temperature Chart

NOTICE: Incorrect engine oil will damage the engine.

- Only use diesel engine oil compatible with Ultra Low Sulfur Diesel meeting API service classification CJ-4.

Use chart below to select engine oil with SAE viscosity adapted to operating ambient temperatures:



j46om045h.eps

Temperature range anticipated before next oil change

For more information, see engine manual.

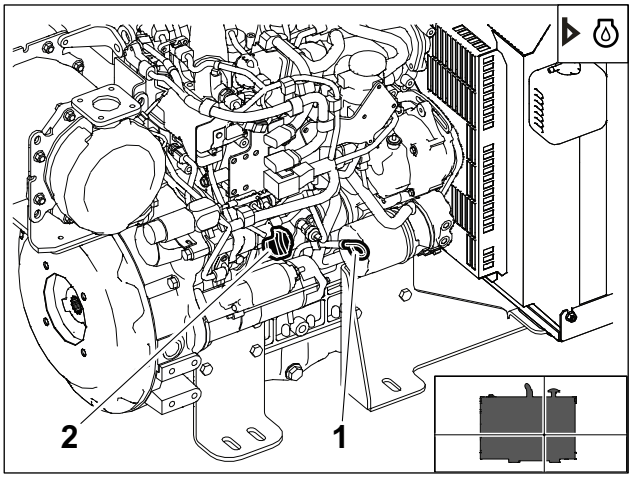
Startup/10 Hour

Tasks	Notes
Check engine oil level	DEO
Check fan belt	
Check hydraulic fluid level	HF
Clean dust ejector valve	
Check engine coolant level	

Check Engine Oil Level

IMPORTANT: See "Recommended Fluids/ Service Key" on page 50.

With engine on level surface, check engine oil at dipstick (1) before startup and every 10 hours of operation. Add DEO at fill (2) as necessary to keep oil at highest line on dipstick.

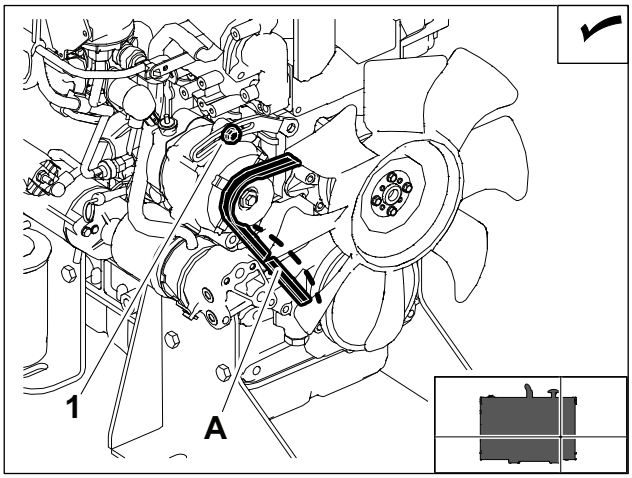


j67om006w.eps

Check Fan Belt

Check fan belt before startup and every 10 hours of service.

1. Apply pressure to fan belt (A) between pulleys. Belt should move between 0.39-0.47" (10-12 mm) when pressed.
2. If the belt is outside of normal tension, adjust alternator arm (1) until belt is within normal limits.
3. Replace fan belt if damaged.



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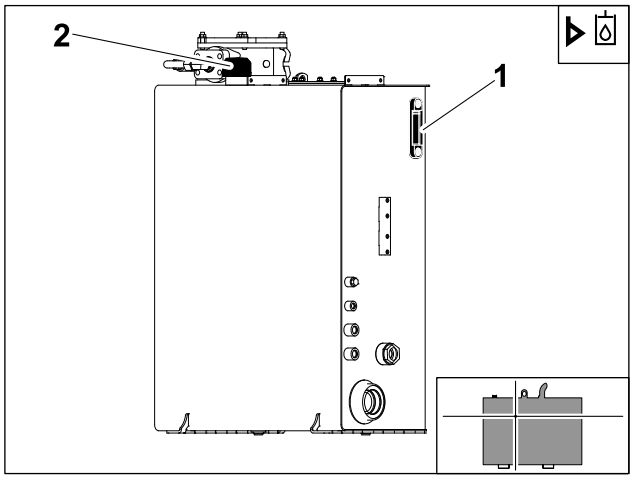
Check Hydraulic Fluid Level

With unit on level surface, check hydraulic fluid level before startup and every 10 hours of operation. Add HF at fill (2) to maintain fluid at halfway point on sightglass (1).



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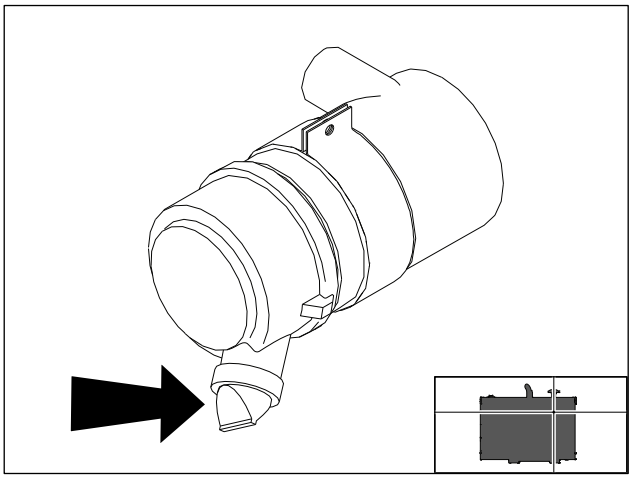
Clean Dust Ejector Valve

Check dust ejector valve (shown) before startup and every 10 hours of operation. Ensure that valve is not inverted, damaged, plugged, or cracked.



j67om022w.eps

Check Engine Coolant Level

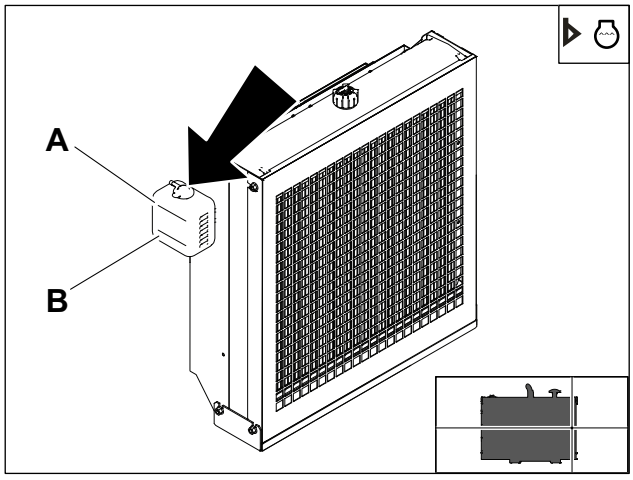
IMPORTANT: See "Approved Coolant" on page 51.

WARNING Contents under pressure. Relieve pressure before opening. Death or injury could occur.

To help avoid injury:

- Do not remove pressure cap from hot engine.
- Wear gloves.

With unit on level surface, check coolant level at fill (shown) before startup and every 10 hours of operation. Add DEAC to maintain coolant level between LOW mark (B) and FULL mark (A).



j67om007w.eps

50 Hour

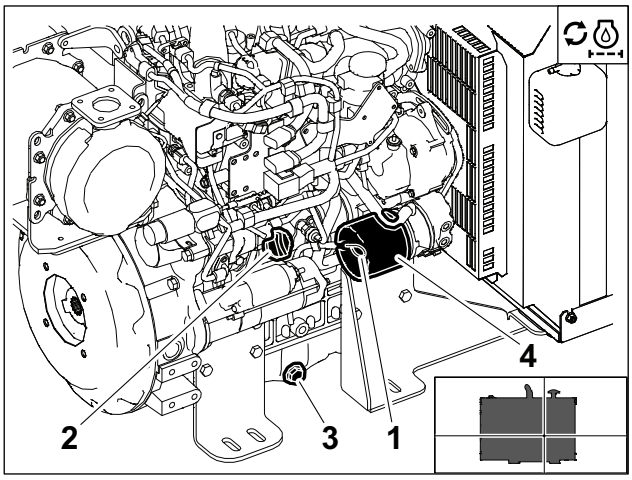
Tasks	Notes
Change engine oil and filter	Initial service, DEO
Check fuel lines	
Check hydraulic hoses	
Drain fuel/water separator	

Change Engine Oil and Filter (Initial Service)

Change engine oil and filter after 50 hours of operation and every 500 hours thereafter.

To change:

1. While oil is warm, remove drain plug (3). Drain oil and replace plug.
2. Remove filter (4) and replace each time oil is changed.
3. Add DEO at fill (2) until oil level is at highest line on dipstick (1).



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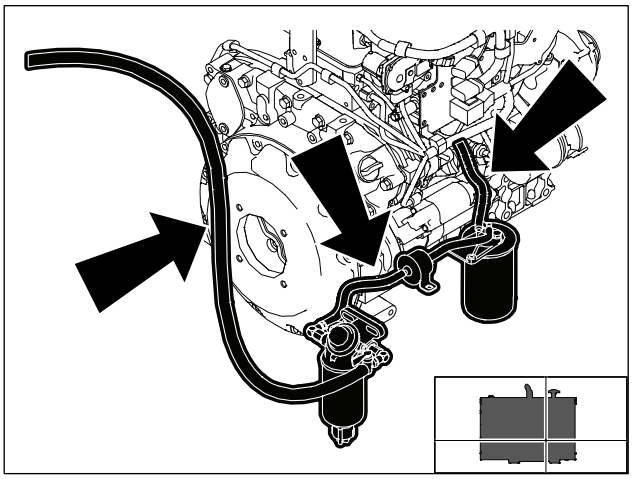
Check Fuel Lines

Check fuel lines after 50 hours for wear or cracks. Check fuel line for loose or broken clamp bands.



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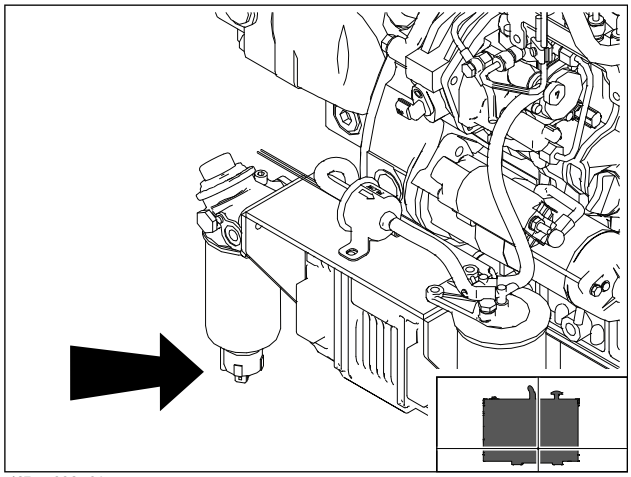
Drain Fuel/Water Separator

Drain fuel/water separator every 50 hours.

1. Unscrew cap (shown).
2. Drain water into appropriate container.
3. Tighten cap.



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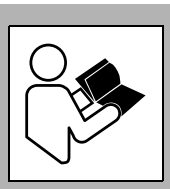
Check Hydraulic Hoses

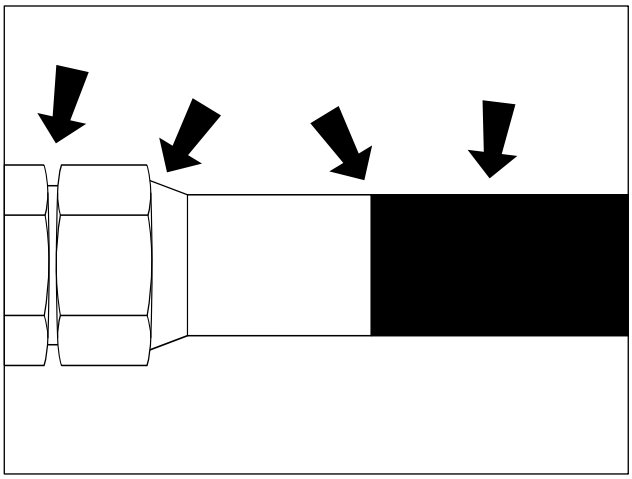


⚠WARNING Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use.

To help avoid injury:

- Use a piece of cardboard or wood, rather than hands, to search for leaks.
- Wear protective clothing, including gloves and eye protection.
- Before disconnecting a hydraulic line, turn engine off and operate all controls to relieve pressure.
- Lower, block, or support any raised component with a hoist.
- Cover connection with heavy cloth and loosen connector nut slightly to relieve residual pressure. Catch all fluid in a container.
- Before using system, check that all connections are tight and lines are undamaged.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.

Check all hydraulic hoses every 50 hours.



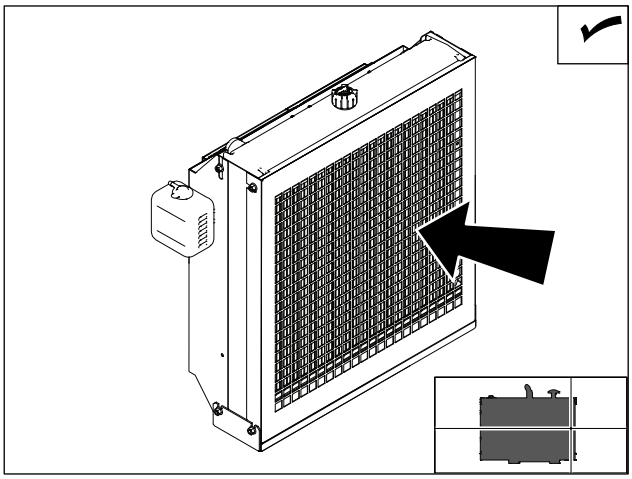
CheckHoses.eps

100 Hour

Tasks	Notes
Check radiator	
Change hydraulic fluid filter	

Check Radiator

Check radiator for dirt and debris every 100 hours. Clean with compressed air or spray wash as needed. See "Clean Radiator" on page 67.



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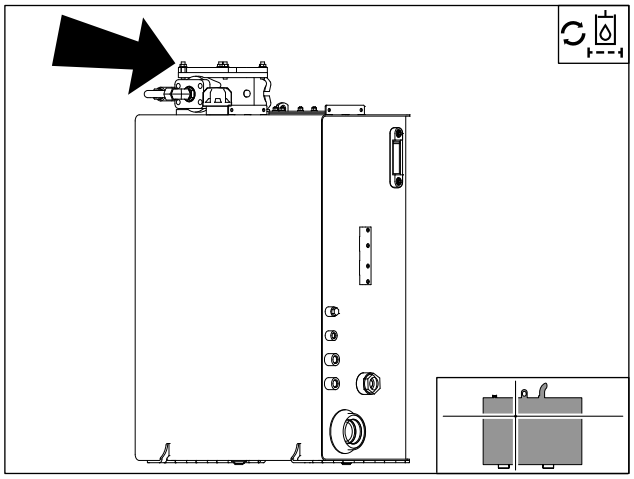
Change Hydraulic Fluid Filter

Change hydraulic fluid filter after the first 100 hours of operation and every 500 hours thereafter.

To change:

1. Remove filter cover screws (shown) to remove filter.
2. Clean filter head surface.
3. Apply thin film of oil to gasket of new filter.
4. Install filter and secure with filter cover screws.



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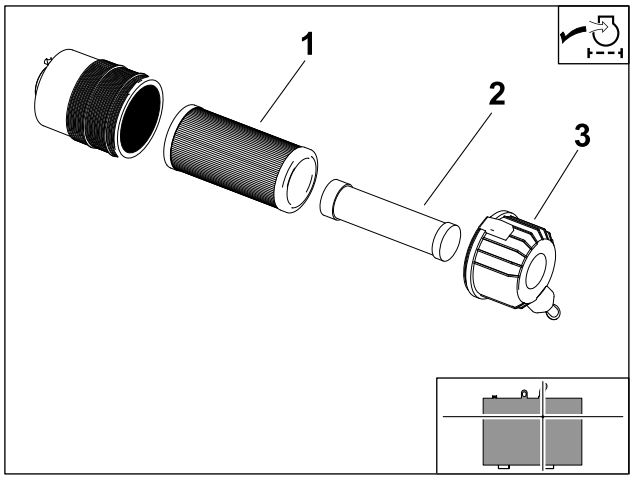
250 Hour

Tasks	Notes
Clean air filter	

Clean Air Filter

Clean air filter every 250 hours.

1. Remove air filter cover (3).
2. Remove and clean primary (1) and secondary (2) elements. Replace if needed. See "Change Air Filter" on page 67.
3. Wipe inside of housing and wash cover.
4. Insert secondary element and ensure it is seated correctly.
5. Insert primary element.
6. Replace cover. If cover does not fit, element is not properly locked into housing. Remove cover and primary element and repeat step 4.



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NOTICE: Only open the air filter canister when service is needed.

- Improperly installed primary element can lead to premature engine failure.
- Compressed air or water may damage filter elements.
- Tapping filter elements to loosen dirt may damage the elements.

500 Hour

Tasks	Notes
Change engine oil and filter	DEO
Change hydraulic fluid filter	
Change fuel filter	
Check battery	

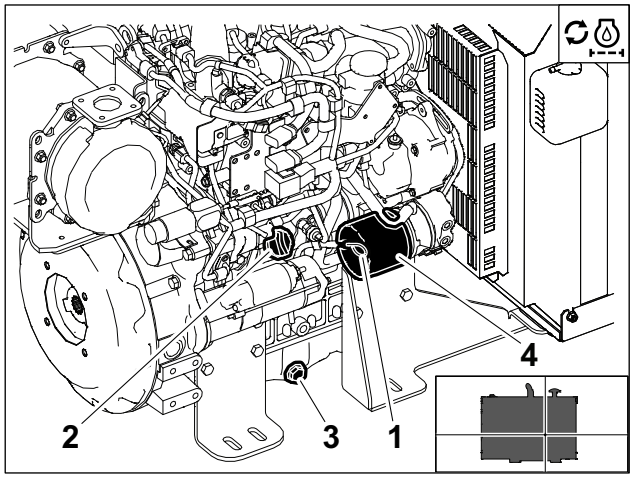
Change Engine Oil and Oil Filter

IMPORTANT: See "Recommended Fluids/ Service Key" on page 50.

Change engine oil and filter every 100 hours.

To change:

1. While oil is warm, remove drain plug (3). Drain oil and replace plug.
2. Remove filter (4) and replace each time oil is changed.
3. Add DEO at fill (2) until oil level is at highest line on dipstick (1).



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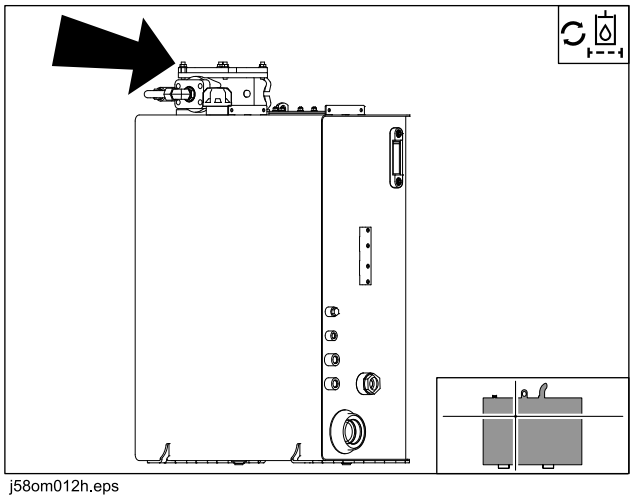
Change Hydraulic Fluid Filter

Change hydraulic fluid filter every 500 hours.

To change:

1. Remove filter cover screws (shown) to remove filter.
2. Clean filter head surface.
3. Apply thin film of oil to gasket of new filter.
4. Install filter and secure with filter cover screws.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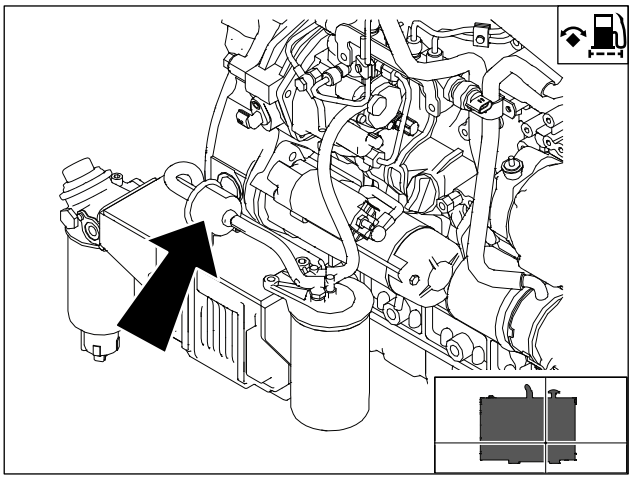
Change Fuel Filter

Change fuel filter every 250 hours.

1. Close fuel shutoff valve (shown, top).
2. Replace fuel filter (shown, bottom).
3. Open fuel shutoff valve.



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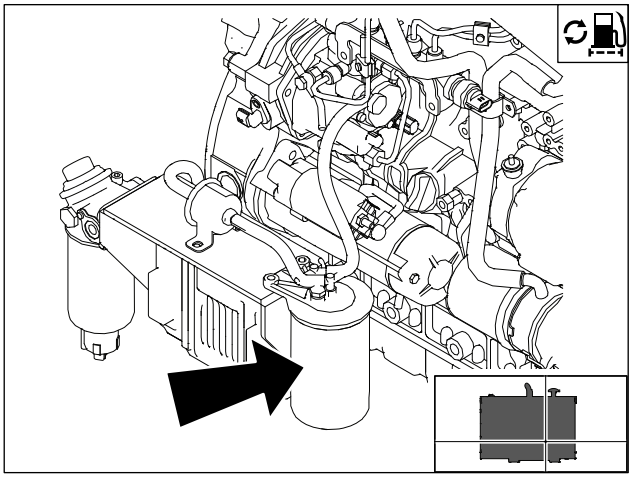

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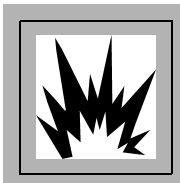
Check Battery

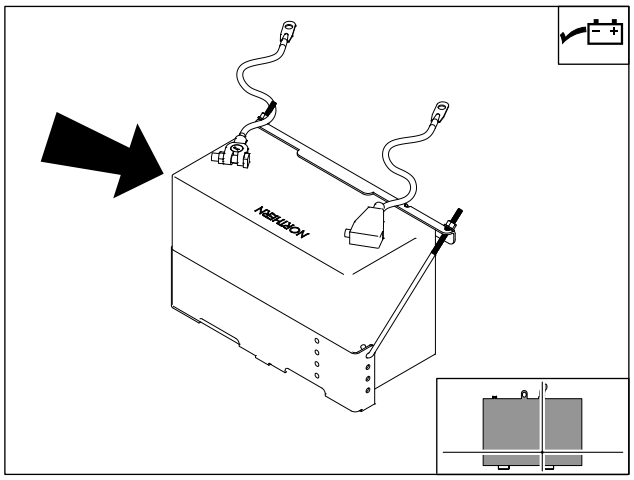


⚠WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

To help avoid injury:

- Use caution and wear personal protective equipment such as safety eyewear when charging or cleaning battery.
- Keep sparks, flames, and any ignition source away from batteries at all times. Internal contents are extremely hazardous. Leaking fluid is corrosive. Battery may be explosive at higher temperatures.
- Use flashlight to check electrolyte level.
- Work in a well-ventilated area.
- Avoid breathing fumes from battery, and avoid contact with skin, eyes, or clothing.
- Do not attempt to charge a battery that is leaking, bulging, heavily corroded, frozen, or otherwise damaged.
- NEVER short-circuit battery terminals for any reason or strike battery posts or cable terminals.
- Refer to SDS for additional information regarding this battery.

Check battery electrolyte level and clean terminals every 500 hours.



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1. Turn battery disconnect to the OFF position.
2. Loosen and remove battery cable clamps carefully, **negative (-)** cable first.
3. Clean cable clamps and terminals to remove dull glaze.
4. Check for signs of internal corrosion in cables.
5. Remove cell caps.
6. Fill each cell with distilled water. Replace cell caps.

IMPORTANT: In freezing weather, run engine immediately after filling battery to allow water and electrolyte to mix.

7. Connect battery cable clamps, **positive (+)** cable first.
8. Tighten any loose connections.
9. Ensure that battery tiedowns are secure.
10. Turn battery disconnect to the ON position.

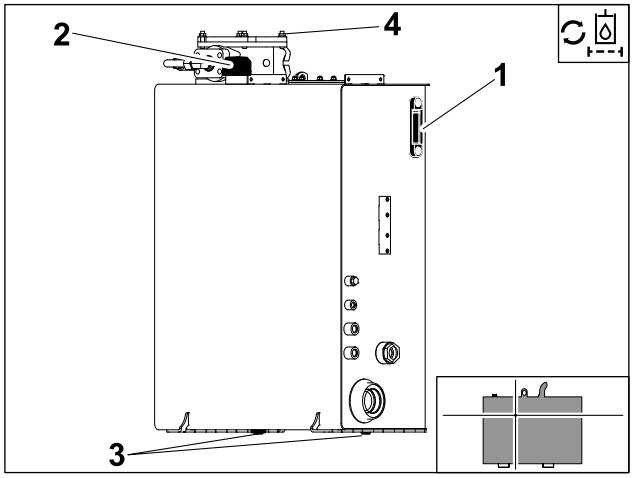
1000 Hour

Tasks	Notes
Change hydraulic fluid	HF

Change Hydraulic Fluid

Change hydraulic fluid every 1000 hours.

1. Remove filter cover screws (4) to remove filter cap (2).
2. Remove drain plug (3) while fluid is warm and drain.
3. Clean, inspect, and install drain plug. Replace if needed.
4. Change hydraulic filter. See "Change Hydraulic Fluid Filter" on page 60.
5. Add HF at fill (2) until fluid at halfway point on sightglass (1).



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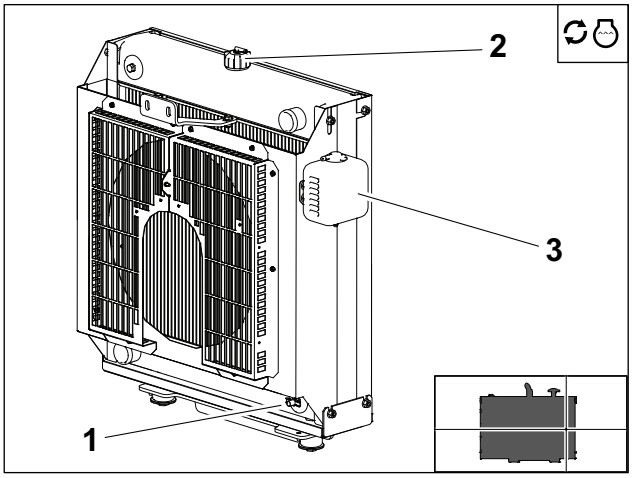
2000 Hour

Tasks	Notes
Change engine coolant	

Change Engine Coolant



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Drain and clean cooling system every 2000 hours or two years.

To drain and clean:

1. Remove drain plug (1) and radiator cap (2) and drain old coolant.
2. Replace drain plug.
3. Fill radiator with clean water at fill.
4. Check for signs of rust and add cooling system cleaner to the water if necessary.
5. Run engine long enough to ensure thermostat has opened.
6. Let system cool.
7. Drain water.
8. Add approved coolant to FULL mark of recovery tank (3).

IMPORTANT: See "Approved Coolant" on page 51.

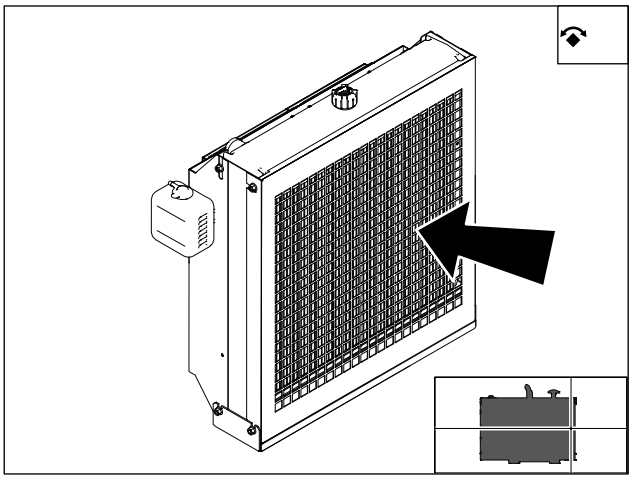
9. Let engine cool and check coolant level. Add coolant if necessary.

As Needed

Tasks	Notes
Clean radiator	
Change air filter	
Charge battery	
Change battery	

Clean Radiator

Clean radiator fins with compressed air or spray wash as needed. Be careful not to damage fins with high-pressure air or water.



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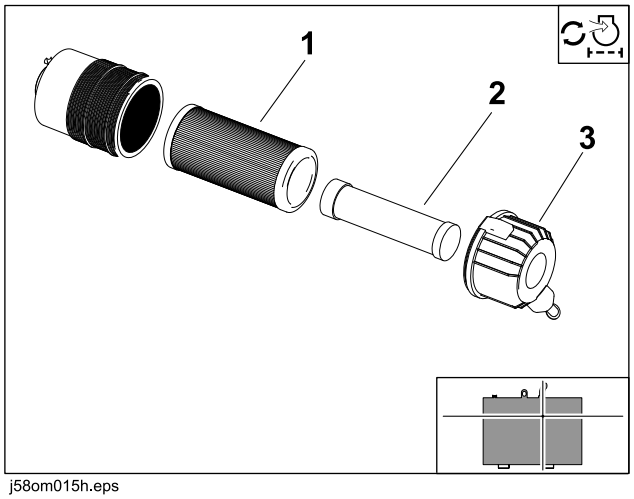
Change Air Filter

Change air filter as needed.

1. Remove air filter cover (3).
2. Remove primary (1) and secondary (2) elements.
3. Wipe inside of housing and wash cover.
4. Insert new secondary element and ensure it is seated correctly.
5. Insert new primary element.
6. Replace cover. If cover does not fit, element is not properly locked into housing. Remove cover and primary element and repeat step 4.



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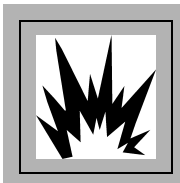
NOTICE: Only open the air filter canister when service is needed.

- Improperly installed primary element can lead to premature engine failure.
- Compressed air or water may damage filter elements.
- Tapping filter elements to loosen dirt may damage elements.

Charge Battery



⚠ WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

To help avoid injury:

- Use a single 12V maximum source for charging. Do not connect to rapid chargers or dual batteries.
- Use caution and wear personal protective equipment such as safety eyewear when charging or cleaning battery.
- Keep sparks, flames, and any ignition source away from batteries at all times. Internal contents are extremely hazardous. Leaking fluid is corrosive. Battery may be explosive at higher temperatures.
- NEVER lean over battery when making connections.
- Do not allow vehicles to touch when charging.
- Do not attempt to charge a battery that is leaking, bulging, heavily corroded, frozen, or otherwise damaged.
- NEVER short-circuit battery terminals for any reason or strike battery posts or cable terminals.
- Refer to MSDS for additional information regarding this battery.

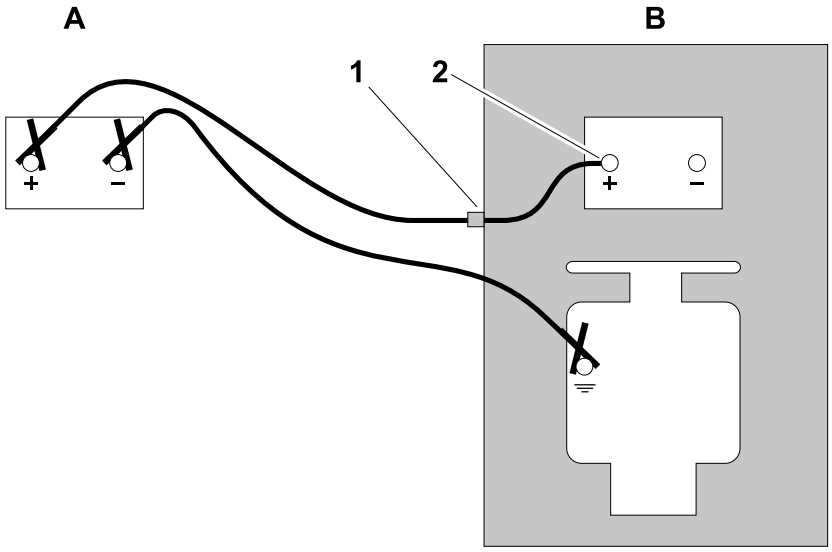
Before You Start

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). Cheap cables may not allow enough current flow to charge a dead/discharged battery.

Read all steps thoroughly and review illustration before performing procedure.

Charging Procedure (Engine Off)

1. Park service vehicle close to disabled equipment but do not allow vehicles to touch. Engage parking brake in both vehicles.
2. Turn the ignition switch to the OFF position in both vehicles, and turn off all electrical loads. Disconnect the machine controller.



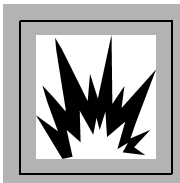
3. Inspect battery in disabled vehicle (B) for signs of cracking, bulging, leaking, or other damage. Connect red positive (+) jumper cable clamp to positive (+) post (2) of battery in disabled vehicle first.

IMPORTANT: Some equipment may have a positive jumper cable terminal (1) located externally. If so equipped, connect red positive (+) jumper cable clamp to terminal.

4. Connect the other red positive (+) jumper cable clamp to positive (+) post of battery (A) in the service vehicle.
5. Connect black negative (-) cable clamp to negative (-) post of battery (A) in service vehicle.
6. Connect the other black negative (-) cable clamp to the engine or frame ground on the disabled vehicle, at least 12" (305 mm) from the failed battery, as shown.
7. Operate service vehicle engine at 1500-2000 rpm for a few minutes to build an electrical charge in the failed battery.
8. Stop engine in service vehicle.
9. Remove jumper cables from the service vehicle, black negative (-) clamp first. Do not allow clamps to touch.
10. Remove black negative (-) cable clamp from the disabled engine or frame ground first.
11. Remove red positive (+) cable clamp from the disabled vehicle positive (+) battery post last.
12. Reconnect machine controller and try to start disabled vehicle.

If the disabled vehicle did not start, check for loose or corroded battery cable connections. Poor connections will prevent current from charging the failed battery. Clean terminals and posts if necessary and repeat steps above.

Change Battery



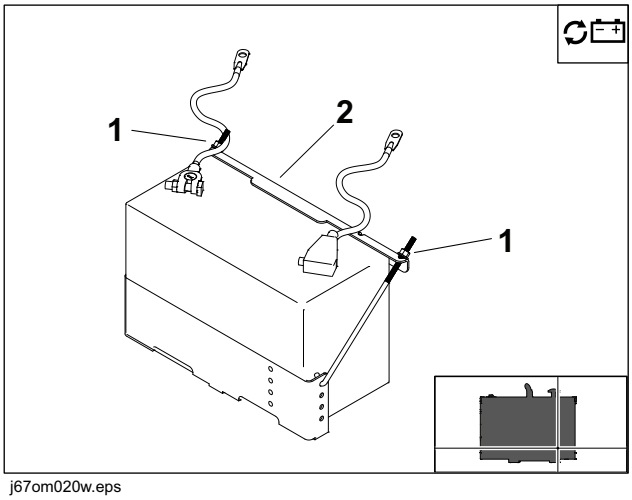
WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

To help avoid injury:

- Use a single 12V maximum source for charging. Do not connect to rapid chargers or dual batteries.
- Use caution and wear personal protective equipment such as safety eyewear, when charging or cleaning battery.
- Keep sparks, flames, and any ignition source away from batteries at all times. Internal contents are extremely hazardous. Leaking fluid is corrosive. Battery may be explosive at higher temperatures.
- NEVER lean over battery when making connections.
- Do not allow vehicles to touch when charging.
- Do not attempt to charge a battery that is leaking, bulging, heavily corroded, frozen, or otherwise damaged.
- NEVER short-circuit battery terminals for any reason or strike battery posts or cable terminals.
- Refer to SDS for additional information regarding this battery.

Change battery as needed.

1. Loosen and remove battery cable clamps carefully, **negative (-)** cable first.
2. Remove nuts (1) and bracket (2) to remove battery.
3. Install new battery.
4. Connect battery cable clamps, **positive (+)** cable first.
5. Tighten any loose connections.
6. Ensure battery tiedowns are secure.



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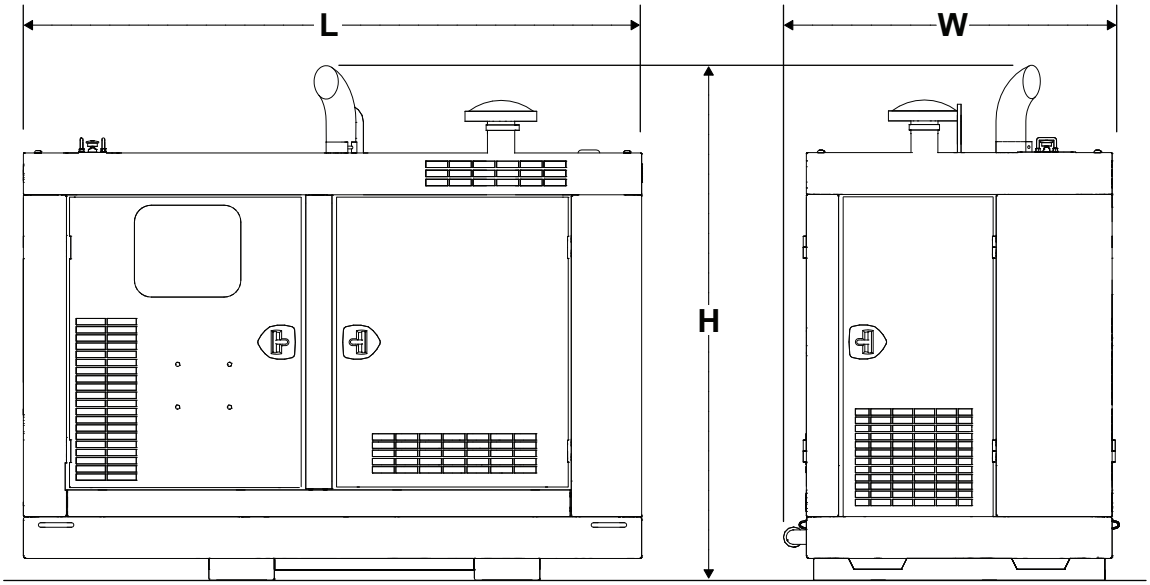
Specifications



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Dimensions	U.S.	Metric
L, length	85 in	208.3 cm
W, width	47 in	119.4 cm
H, height	70.75 in	177.8 cm

Operational	U.S.	Metric
Maximum operating weight	3,300 lb	1497 kg
Maximum hydraulic flow	45.6 gpm	172.6 L/min

Fluid Capacities	U.S.	Metric
Hydraulic tank	55 gal	208.2 L
Fuel tank	25 gal	94.6 L
Engine oil	2.95 gal	11.2 L
Engine coolant	1.69 gal	6.3 L

Noise Levels
Operator ear 77 dB (A) sound pressure per ISO 6394
Exterior 100 dB (A) sound power per ISO 6393

Power	**U.S.**	**Metric**
Engine: Kubota V3307-CR-T4, vertical, direct-injection, 4-cycle Diesel engine		
Fuel: Diesel No.2-D		
Cooling: water		
Number of cylinders: 4		
Dry weight	672 lbs	305 kg
Displacement	203.27 in^3	3331 cm^3
Bore	3.70 in	94 mm
Stroke	4.72 in	120 mm
Manufacturer's gross intermittent power rating (per SAE J1349) @ 2600 rpm	74.3 hp	55.4 kW
Maximum speed	2800 rpm	2800 rpm

Support

Procedure

Notify your dealer immediately of any malfunction or failure of HammerHead® equipment.

Always give model, serial number, and approximate date of your equipment purchase. This information should be recorded and placed on file by the owner at the time of purchase.

Return damaged parts to dealer for inspection and warranty consideration if in warranty time frame.

Order genuine HammerHead replacement or repair parts from your authorized HammerHead dealer. Use of another manufacturer's parts may void warranty consideration.

Resources

Publications

Contact your HammerHead dealer for publications and videos covering safety, operation, service, and repair of your equipment.

HammerHead Training

For information about on-site, individualized training, contact your HammerHead dealer.

Warranty

Limited Warranty Policy

Earth Tool Company LLC, hereinafter sometimes referred to as ETC warrants each new industrial product of its own manufacture to be free from defects in material and workmanship, under normal use and service for one full year after delivery to the owner or 1000 operating hours, whichever occurs first. During the warranty period, the authorized selling HammerHead® Dealer shall furnish parts without charge for any HammerHead product that fails because of defects in material and workmanship. Warranty is void unless warranty registration card is returned within ten days from the date of purchase. This warranty and any possible liability of Earth Tool Company LLC here under is in lieu of all other warranties, express, implied, or statutory, including, but not limited to any warranties of merchantability or fitness for a particular purpose.

The parties agree that the Buyer's SOLE AND EXCLUSIVE REMEDY against ETC, whether in contract or arising out of warranties, representations, or defects shall be for the replacement or repair of defective parts as provided herein. In no event shall ETC's liability exceed the purchase price of the product. The Buyer agrees that no other remedy (including, but not limited to, incidental or consequential loss) shall be available to him. If, during the warranty period, any product becomes defective by reason of material or workmanship and Buyer immediately notifies ETC of such defect, ETC shall, at its option, supply a replacement part or request the return of the product to its plant in Lake Mills, Wisconsin. No part shall be returned without prior written authorization from ETC, and this warranty does not obligate ETC to bear any transpiration charges in connection with the repair or replacement of defective parts. Earth Tool Company LLC will not accept any charges for labor and/or parts incidental to the removal or remounting of parts repaired or replaced under this Warranty.

This Warranty shall not apply to any part or product which shall have been installed or operated in a manner not recommended by ETC nor to any part or product which shall have been neglected, or used in any way which, in ETC's opinion, adversely affects its performance; nor negligence of proper maintenance or other negligence, fire or other accident; nor with respect to wear items; nor if the unit has been repaired or altered outside of an ETC authorized dealership in a manner of which, in the sole judgment of ETC affects its performance, stability or reliability; nor with respect to batteries which are covered under a separate adjustment warranty; nor to any product in which parts not manufactured or approved by ETC have been used, nor to normal maintenance services or replacement of normal service items. Equipment and accessories not of our manufacture are warranted only to the extent of the original Manufacturer's Warranty and subject to their allowance to us, if found defective by them. ETC reserves the right to modify, alter, and improve any product or parts without incurring any obligation to replace any product or parts previously sold with such modified, altered, or improved product or part. No person is authorized to give any other Warranty, or to assume any additional obligation on ETC's behalf unless made in writing, and signed by an officer of ETC.

EARTH TOOL COMPANY LLC

Lake Mills, Wisconsin

Service Record

Service Performed	Date	Hours

Service Performed	Date	Hours