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## Fluids and lubricants

### Fuel tank

Capacity	<b>116.6 L (30.8 US gal)</b>
Specifications	<b>#2 Diesel ultra-low sulfur</b>

### Cooling system

Capacity	<b>12.0 L (3.2 US gal)</b>
Specifications	<b>EXTENDED LIFE OAT COOLANT/ANTIFREEZE</b>

### Hydraulic system

Reservoir capacity	<b>40.5 L (10.7 US gal)</b>
System capacity:	<b>50.2 L (13.3 US gal)</b>
Specifications	<b>PREMIUM HYDRAULIC OIL HV68 MULTI-GRADE AW</b>

### Grease fittings

Quantity	<b>As required</b>
Specifications	<b>MULTI-PURPOSE MOLY GREASE EP / AW / NLGI 2 (Molydisulfide)</b>

### Engine crank case oil

Capacity - with filter change	<b>8.5 L (9.0 US qt)</b>
Specifications	<b>No.1 ENGINE OIL™ SAE 10W-40 CK-4 SEMI-SYNTHETIC</b>

### Final track drive

Capacity - each side	<b>1.6 L (1.7 US qt) +/- 0.1 L (0.1 US qt)</b>
Specifications	<b>HYPOID GEAR OIL EP SAE 80W-90</b>

### Emissions fluid

Reservoir capacity	<b>12.4 L (3.3 US gal)</b>
<b>DEF/AdBLUE®</b> low volume indicator	<b>3.7 L (1.0 US gal)</b>
Specifications	<b>DEF/AdBLUE®</b>

## Engine oils

CASE CONSTRUCTION prefers the use of engine oils that meet CNH Industrial standard **MAT3571** in your engine.

You may also use engine oils that meet CNH Industrial standard **MAT3572** in your engine.

You may use other engine oils if the engine oils meet **API CJ-4** or **API CK-4** or **ACEA E6** or **ACEA E9** performance requirements.

CASE CONSTRUCTION engine oils exceed API and ACEA performance requirements.

**NOTE:** Do not put performance additives or other oil additive products in the engine crankcase. See your CASE CONSTRUCTION dealer for approved engine oil additives, engine oil analysis test package information.

RECOMMENDED VISCOSITY GRADES AT VARYING AMBIENT TEMPERATURE LIMITS												
	(H)	SAE 0W-40										
		(H)	SAE 10W-40									
			(H)	SAE 10W-30								
				(H)	SAE 15W-40							
-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C	30 °C	40 °C	50 °C			
-40 °F	-22 °F	-4 °F	14 °F	32 °F	50 °F	68 °F	86 °F	104 °F	122 °F			
(H) = Engine oil pan or coolant block heater recommended in this range												
<b>NOTICE:</b> See "Operating in extreme temperatures at low altitude" 4-4 or "Operating in extreme temperatures at high altitude" 4-6 for cold starting recommendations.												

## Engine oil and filter service intervals

CASE CONSTRUCTION develops the oil/filter change intervals given in this manual from tests with CASE CONSTRUCTION lubricants/filters.

Engine oil and filter service interval recommendations are based on type of engine oil, oil filter used, sulfur, bio-diesel content of diesel fuel. See diesel fuel recommendations for the approved Diesel fuel sulfur content, Bio-Diesel blends, and fuel specification information.

Always change engine oil and oil filter at the service intervals described in your maintenance chart. See **7-30**.

**NOTICE:** Service intervals must be reduced by **50%** (Maximum **300 h**) when using engine oils that do not meet CNH Industrial standards **MAT3571** or **MAT3572**. Service intervals must be reduced by **20%** (Maximum of **500 h**) when using engine oils that meet CNH Industrial standard **MAT3572**.

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## Hydraulic oil viscosity

Viscosity	Temperature range
<b>PREMIUM HYDRAULIC OIL HV68 MULTI-GRADE AW</b>	<b>-15 – 46 °C (5 – 115 °F)</b>
<b>No.1 ENGINE™ OIL FULL SYNTHETIC SAE 0W-40</b>	<b>-30 – 46 °C (-22 – 115 °F)</b>

**NOTE:** CASE CONSTRUCTION recommends **PREMIUM HYDRAULIC OIL HV68 MULTI-GRADE AW** for applications where continuous operations above **38 °C (100 °F)** ambient temperature or frequent roading applications (above **20 – 30 min**) are common.

**NOTE:** CASE CONSTRUCTION recommends **No.1 ENGINE™ OIL FULL SYNTHETIC SAE 0W-40** for improved cold weather operation. Standard factory fill oil **PREMIUM HYDRAULIC OIL HV68 MULTI-GRADE AW** is acceptable for cold weather operation when sufficient warm up time is provided.

## Organic Acid Technology (OAT) coolant

CASE CONSTRUCTION requires the use of a fully formulated Organic Acid Technology (OAT) based coolant. The coolant must meet the specifications outlined in the CNH Industrial material specification MAT3724. Use of coolant not meeting this specification is not allowed. Mixing of different coolant brands is not recommended.

**NOTICE:** OAT coolant is mandatory for all FPT engines compliant to Tier 4B (final) or Stage V emissions using Selective Catalytic Reduction (SCR). NEVER mix OAT coolant with IAT coolant. Under no circumstances should you top off a cooling system with only water.

Use distilled or demineralized water for diluting when using OAT coolant concentrate. The optimum OAT coolant to water concentration is 50/50. This concentration will protect the cooling system to **-37 °C (-35 °F)**. Do not exceed **60%** by volume ethylene glycol-based coolant. The heat dissipation and antifreeze properties may otherwise be negatively affected. You can use a refractometer to check the concentration level. If distilled or demineralized water is not available, use water for dilution with the following properties:

Property	Limit Maximum
Total Solids	<b>340 ppm</b>
Total Hardness	<b>170 ppm</b>
Chloride (Cl)	<b>40 ppm</b>
Sulfate (SO <sub>4</sub> )	<b>100 ppm</b>
Acidity pH	5.5 to 9.0

You should not use Supplemental Coolant Additives (SCA). Do not add rust inhibitors or other additives to your vehicle's cooling system. Contact your CASE CONSTRUCTION dealer for approved additives and coolant analysis test package information.

### Service intervals

See **7-30** for the proper service intervals. Drain and flush the cooling system at the recommended drain interval, then fill with fresh coolant.

### Definitions

Inorganic Acid Technology (IAT) coolant:

A coolant that relies on inorganic inhibitors such as silicates, nitrites, and phosphates for corrosion and cavitation protection

Organic Acid Technology (OAT) coolant:

A coolant that relies on inhibitors such as organic acid salts for corrosion and cavitation protection.

## General specification - Diesel fuel

Only use diesel fuel that conforms to North American standard **ASTM D975** Grade No. 2-D S15 or equivalent in your engine. Do not use any other low grade diesel fuel.

**NOTICE:** Use of other low grade diesel fuels will result in loss of engine power, high fuel consumption, and damage to the exhaust aftertreatment system (if equipped).

**NOTE:** When operating the machine in very cold climates, the use of winter blended fuel is permitted for a short period of time. See your fuel supplier for winter fuel requirements in your area.

## Fuel conditioner

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Diesel fuel conditioner is available from your CASE CONSTRUCTION dealer. Instructions for the use of the fuel conditioner is on the container.

The use of diesel fuel conditioner will:

- Clean fuel injectors, valves, and manifolds for increased service life
- Disperse insoluble gummy deposits that form in the fuel system

- Separate moisture from the fuel
- Stabilize fuel in storage

**NOTICE:** Use only CASE CONSTRUCTION approved biocide additives to prevent damage to the exhaust aftertreatment system (if equipped).

## General specification - Biodiesel fuels

### Biodiesel usage in CASE CONSTRUCTION products

#### Introduction to Fatty Acid Methyl Ester (FAME) biodiesel

FAME biodiesel, called biodiesel fuel in the following section, consists of a family of fuels derived from vegetable oils treated with methyl esters.

There are two main biodiesel fuel types: Rapeseed Methyl Ester (RME) and Soybean Methyl Ester (SME). RME is a blend of rapeseed and sunflower methyl ester, and is the preferred crop in Europe. SME is the preferred crop in the United States.

Biodiesel fuel is a renewable alternative fuel source. Its use and development is promoted worldwide, especially in Europe and in the United States.

**NOTICE:** *Your emissions control system is compatible with up to 5% biodiesel fuel (B5). Be aware that the use of biodiesel fuel that does not comply with the standards mentioned in this section could lead to severe damage to the engine, fuel system or aftertreatment system of your machine. The use of non-approved fuels may void CASE CONSTRUCTION Warranty coverage.*

Biodiesel can be used to run Tier 4B (final) and Stage IV diesel engines only when blended with standard diesel fuel:

- B5: indicates the blend of **5%** biodiesel and **95%** diesel fuels.
- B20: indicates the blend of **20%** biodiesel and **80%** diesel fuels. Do not use.

Biodiesel fuel has several positive features in comparison with diesel fuel:

- Biodiesel fuel adds lubricity to the fuel, which is beneficial in many circumstances, particularly as sulfur and aromatics are removed from the fuel.
- Biodiesel has a greater cetane number and burns cleaner.
- Biodiesel produces less particulate matter and reduces smoke emissions.
- Biodiesel is fully biodegradable and non-toxic.

#### Diesel and biodiesel fuel specifications

Tier 4B (final) and Stage IV diesel fuel specifications are covered by the following:

- **ASTM D975**, Standard Specification for Diesel Fuel Oils. (15 ppm sulfur maximum.)

Biodiesel blends are covered by:

- United States Diesel Fuel Specification **ASTM D975** allows up to **5%** biodiesel since 2009. United States fuel

suppliers are allowed to use up to **5%** biodiesel fuel (B5) to supply the network.

- United States Biodiesel Fuel Specification **ASTM D7467** provides specifications for diesel and biodiesel blends from B5 to B20.

Pure biodiesel blend stock (B100) specification is covered by the following requirements:

- **ASTM D6751** - Standard specification for biodiesel fuel blend stock (B100) for middle distillate fuels.

**NOTE:** *ASTM D6751 specification has been updated to improve the quality of biodiesel in the market place.*

Before raw oil can be converted into usable biodiesel fuel, it must undergo transesterification to remove glycerides. During the transesterification process, the oil reacts with an alcohol to separate the glycerine from the fat or vegetable oil. This process leaves behind two products: methyl ester (the chemical name for biodiesel) and glycerine (a byproduct usually sold for use in soaps or other products).

**NOTICE:** *Biodiesel fuels approved for use in the CASE CONSTRUCTION equipment must be transesterified and comply with the latest North America Standard **ASTM D6751**.*

**NOTICE:** *Cold Pressed Biodiesel, Cold Pressed Oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel, are fuels that are normally made from Rapeseed oil or similar high oil content crops. These kinds of fuel are not transesterified, so they do not fulfil the **ASTM D6751** requirements. There is no recognized quality standard available for these types of fuel. Therefore the use of Cold Pressed Biodiesel, Cold Pressed Oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel are NOT APPROVED at any blend in any CASE CONSTRUCTION product.*

**NOTICE:** *Any engine and fuel injection equipment fitted to a CASE CONSTRUCTION vehicle found to have run with any blend of NON-APPROVED fuel (fuel not fulfilling the specification described in the requirement **ASTM D6751**) will no longer be covered for Warranty by CASE CONSTRUCTION.*

#### Biodiesel fuel usage conditions

You must stringently follow the biodiesel fuel usage conditions. Incorrect application of the biodiesel fuel usage conditions could lead to severe damage to the engine, fuel injection equipment and aftertreatment system.

The main concerns related to operation with biodiesel fuels are:

- Filters and injector blockage caused by poor fuel quality.

- Wear and corrosion of internal components due to water content, which affects lubricity.
- Deterioration of some rubber sealing compounds in the fuel system.
- Biodiesel oxidation, which can lead to the formation of deposits that can harm the fuel injection system.

**NOTICE:** Any problem in the engine fuel injection equipment associated with non-compliance to the following conditions for biodiesel fuel handling and maintenance will not be covered for Warranty by CASE CONSTRUCTION.

Purchase biodiesel fuel from a trusted supplier who understands the product and maintains acceptable fuel quality. The National Biodiesel Board awards **BQ-9000®** accreditation to biodiesel marketers and producers that meet strict quality and consistency standards. Biodiesel users in North America are strongly encouraged to purchase biodiesel blends from the **BQ-9000®** Certified Marketers and sourced from the **BQ-9000®** Accredited Producers found on the **BQ-9000®** website.

The use of biodiesel blends up to B5 will not void the CASE CONSTRUCTION warranty as long as the following conditions for biodiesel fuel handling and maintenance are stringently followed:

Biodiesel fuel must be pre-blended by the supplier. Mixing biodiesel fuels on-site can result in an incorrect mixture that could damage the engine and/or fuel system.

**NOTICE:** CASE CONSTRUCTION may void your warranty if the problem is associated with poor fuel quality due to improper blending. It is the responsibility of the fuel supplier and/or yourself to ensure the right type of fuel and blend is delivered and used.

## Storage

The machine should not be stored for more than 6 months with biodiesel in the fuel system. For longer storage time, it is strongly suggested that only regular #2 diesel fuel is used.

**NOTE:** If storage for longer than 6 months is necessary, the engine must be run on regular #2 diesel for a minimum of 20 hours to flush the biodiesel fuel out of the fuel system prior to storage.

Biodiesel is highly hygroscopic and tends to collect water more than diesel fuel. This increases the risk of algae and bacteria growth which can cause severe damage to the fuel injection system. Keep the machine fuel tanks and on-site storage tanks as full as possible to limit the amount of air and water vapors inside the tank. Drain water from the tanks at least once a week.

**NOTICE:** Use only CASE CONSTRUCTION approved biocide additives on Tier 4B (final) and Stage IV engines with an exhaust aftertreatment system.

## Limited B10 biodiesel approval

CASE CONSTRUCTION approves the use of up to B10 on Tier 4B (final) and Stage IV engines only in Minnesota (or other States & Provinces) where the state legislation mandates its usage during the months of April to September only and the state legislation mandates strict compliance of the B10 to specification **ASTM D7467**. The B10 must consist of a blend of S15 #2D Diesel Fuel per **ASTM D975** and B100 blend stock per **ASTM D6751** only.

## Selective Catalytic Reduction (SCR) exhaust treatment - Basic instructions

### Requirements

The operator must maintain appropriate Diesel Exhaust Fluid (DEF)/AdBlue® levels at all times. No additional maintenance is required.

**NOTICE:** Prolonged idling of the machine with no load for more than **6 h** will cause damage to the SCR catalyst.

**NOTE:** See your CASE CONSTRUCTION dealer for replacement components and cleaning agents.

CASE CONSTRUCTION recommends using **No.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**. See 7-14 for other recommended engine oils, their operating temperature ranges and their required oil change interval.

See “General specification - Biodiesel fuels” for details on biodiesel fuel usage in your CASE CONSTRUCTION machine.

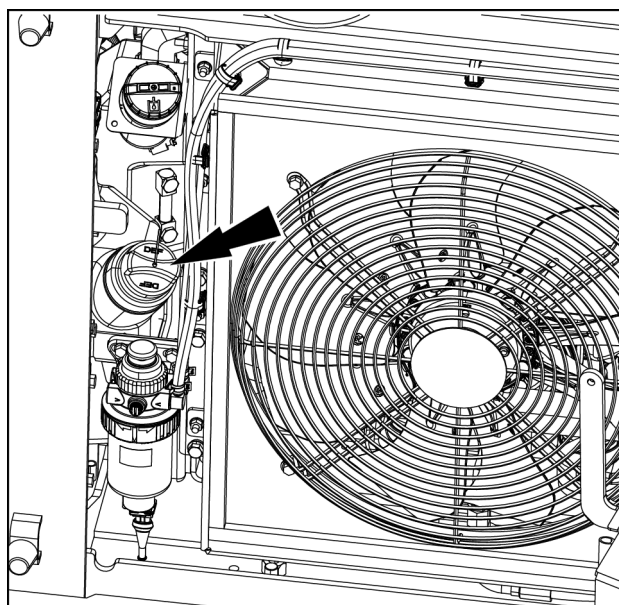
**NOTICE:** While any company can perform necessary maintenance or repairs on your equipment, CASE CONSTRUCTION strongly recommends that you use only authorized CASE CONSTRUCTION dealers and products that meet the given specifications. Improperly or incorrectly performed maintenance and repair voids the equipment warranty and may affect service intervals.

### Diesel Exhaust Fluid (DEF)/AdBlue® refilling

The DEF/AdBlue® tank is located on the left-hand side of the machine, next to the hydraulic filling port.

The DEF/AdBlue® tank cap can be identified by the “blue” color of the cap. A fitting under the cap prevents the insertion of a diesel fill nozzle.

**NOTICE:** If any DEF/AdBlue® spills or contacts any surface other than the storage tanks, immediately clean the affected surface with clear water. DEF/AdBlue® will cause corrosion on painted and unpainted metallic surfaces, and may distort some plastic and rubber components.



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It is recommended that DEF/AdBlue® filling equipment should be used having a fill nozzle/pump with the correct length and diameter, triggered by the magnet in the tank filler neck, and with overfill flow cut out.

This will ensure that:

- The screen in the filler neck will not be damaged.
- Impurities are not entering the DEF/AdBlue® tank. The standardized DEF/AdBlue® nozzle matches the filler neck diameter.
- The DEF/AdBlue® tank is not overfilled, as the DEF/AdBlue® pump will stop when the DEF/AdBlue® tank is full.
- DEF/AdBlue® is not pumped in the fuel tank, as the DEF/AdBlue® nozzle cannot pump when the magnet is not sensed.

**NOTICE:** If a warning light has been triggered for low or empty DEF/AdBlue®, the system must be reset by cycling the ignition knob OFF then ON after refilling the DEF/AdBlue® tank.

**NOTICE:** Refilling with a funnel is not recommended, as this may lead to damage of the screen in the filler neck.



**NOTE:** The information above has been provided by the International Organization for Standardization (ISO), Document number **ISO 22241-4** Diesel engines - NOx reduction agent AUS 32 - Part 4: Refilling interface.

### **Diesel Exhaust Fluid (DEF)/AdBlue® consumption**

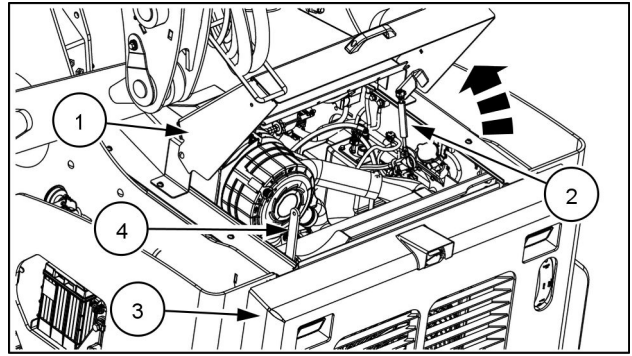
**DEF/AdBLUE®** consumption is figured against the amount of fuel consumed. Typical **DEF/AdBLUE®** consumption is approximately **6%** of fuel consumption when you operate the machine at rated engine speed. **DEF/AdBLUE®** consumption can be as high as **15%** when NOx output increases. The consumption rate of **DEF/AdBLUE®** and fuel also depends on:

- Engine load
- Ambient humidity
- **DEF/AdBLUE®** fluid concentration
- Gear selection
- Ground drive slip
- Engine RPM during operation

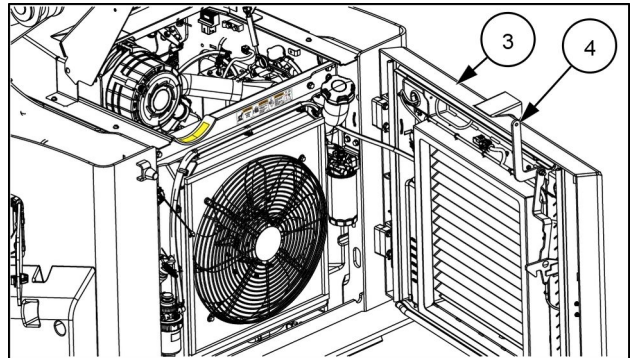
## Lubrication and maintenance access

1. Lift open the engine hood (1). Make sure that the hood pivots to a fully open position so that the strut (2) will hold the hood in an open position.
2. Pull rearward on the rear door latch (4) to open the rear service door (3).

**NOTE:** Close both doors and use a padlock on the door latch to lock unauthorized access.



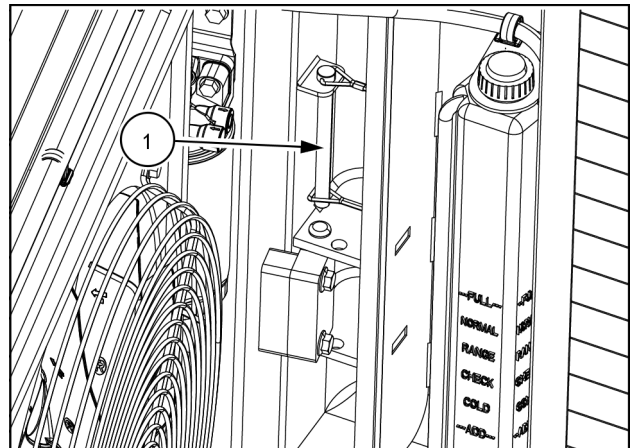
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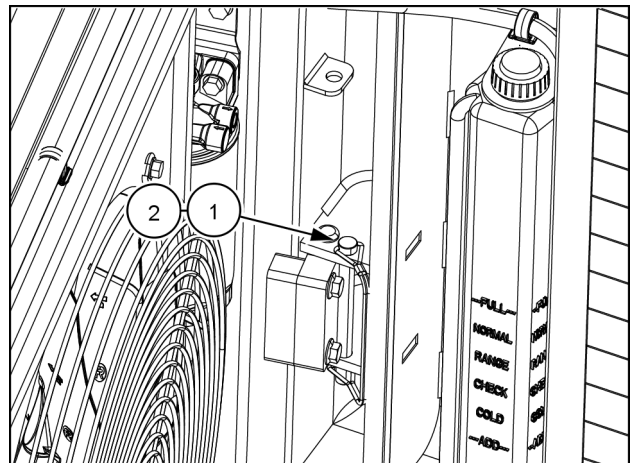
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Always lock the rear service door open when you service or monitor the components.

3. Remove the rear service door lock pin (1) from the storage location.
4. Insert and secure the lock pin (1) in the rear service door pivot lock bracket (2).



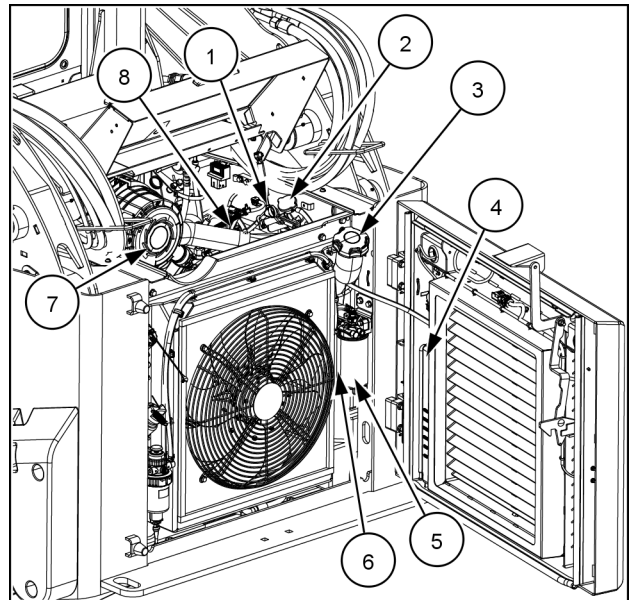
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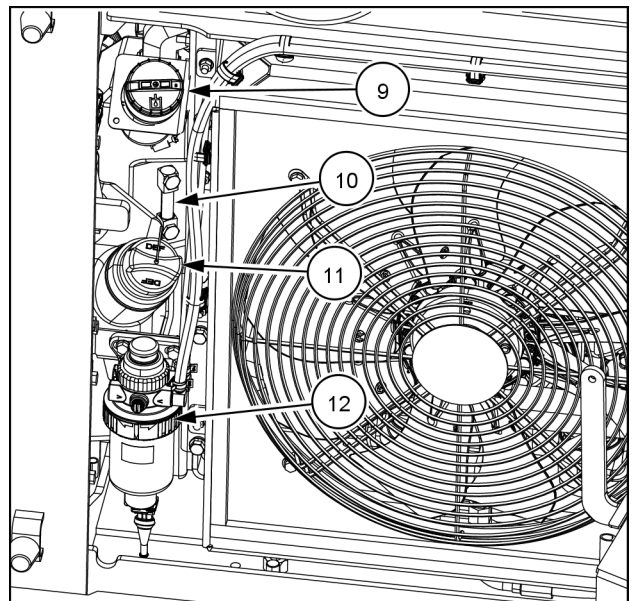
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With the engine hood and the rear service door open the operator or technician will be able to:

- Check the engine oil (1).
- Add engine oil (8).
- Add diesel fuel (3).
- Check radiator and hydraulic oil coolers (fill, drain and clean debris). Radiator cap (2) and radiator drain cock (6).
- Check and clean the coolant reservoir (4).
- Service both spin-on fuel filters (main fuel filter (5) and water separator filter (12)).
- Service the air filters (7).
- Add hydraulic oil (9).
- Access hydraulic oil level sight indicator (10).
- Add **DIESEL EXHAUST FLUID (DEF)/ADBLUE®** (11).
- The drive belts (not shown).
- The alternator (not shown).



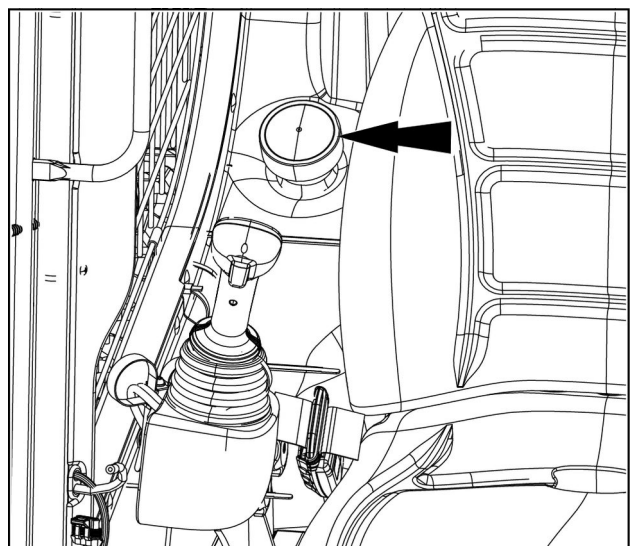
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The rear inside cab.

- The windshield washer reservoir is inside the cab between the side window of the cab and the right-hand side of the seat.

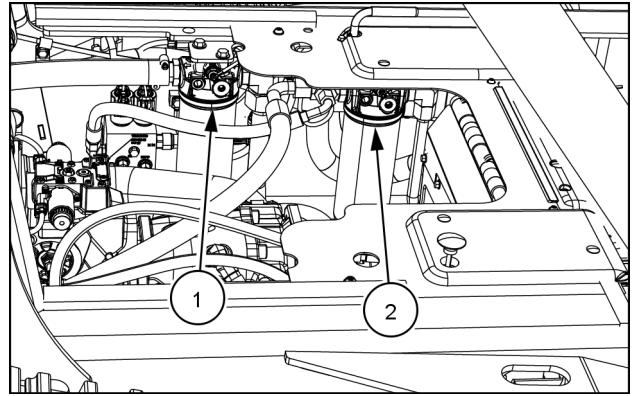


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## 7 - MAINTENANCE

Tilt the cab forward to access the hydraulic implement oil filter (1) and hydraulic charge filter (2).

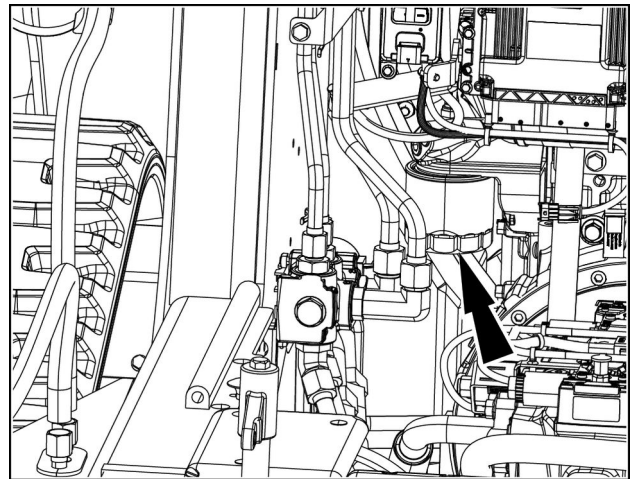
**NOTE:** See the "Loader arm lock and cab tilt procedure" 2-19 for the procedure.



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The engine oil filter is located on the right-hand side of the engine.

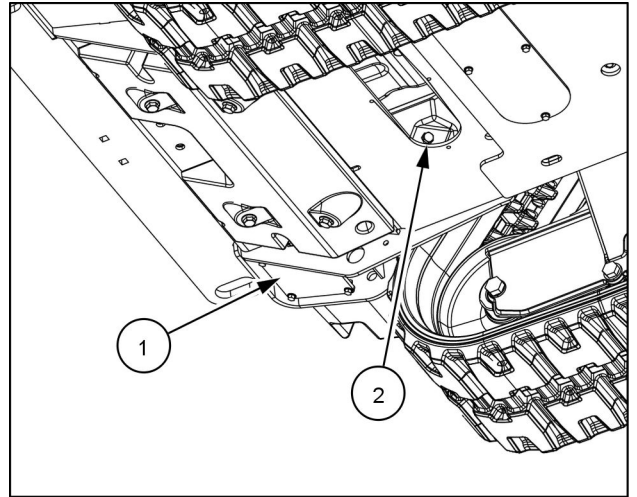
**NOTE:** Some components hidden for clarity.



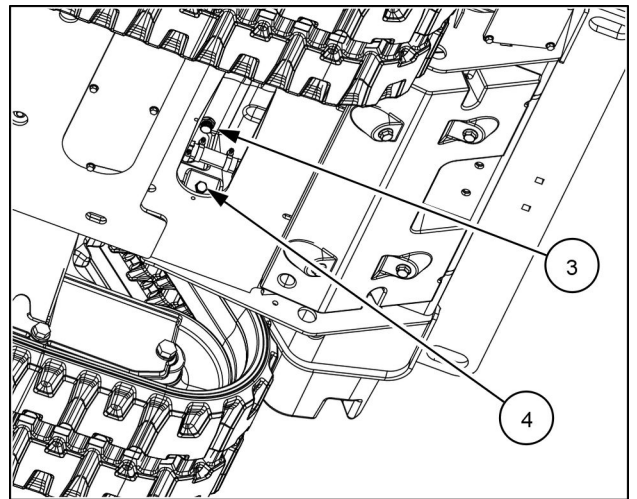
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Drain plugs:

- **DIESEL EXHAUST FLUID (DEF)/AdBLUE® drain plug (1).**  
Behind the access panel.
- Hydraulic fluid reservoir drain plug (2)
- Engine oil drain plug (3)
- Fuel tank drain plug (4)



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## Master disconnect switch

### ⚠ WARNING

#### Explosive gas!

Batteries emit explosive hydrogen gas and other fumes while charging. Ventilate the charging area. Keep the battery away from sparks, open flames, and other ignition sources. Never charge a frozen battery.

Failure to comply could result in death or serious injury.

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### ⚠ WARNING

#### Hazardous chemicals!

Battery electrolyte contains sulfuric acid. Contact with skin and eyes could result in severe irritation and burns. Always wear splash-proof goggles and protective clothing (gloves and aprons). Wash hands after handling.

Failure to comply could result in death or serious injury.

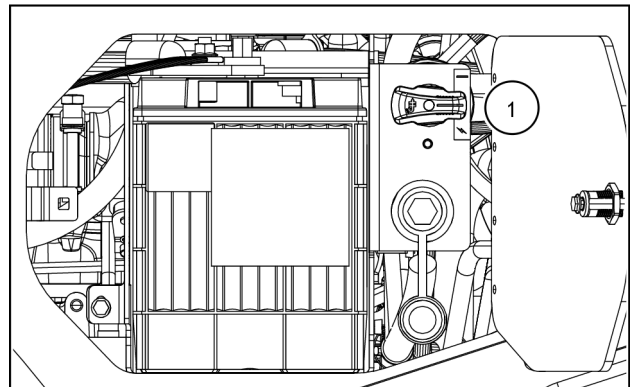
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Use the master disconnect switch to enable or disable electrical power from the machine batteries to the electrical components. The master disconnect switch is on the left-hand side of the machine in the battery access compartment.

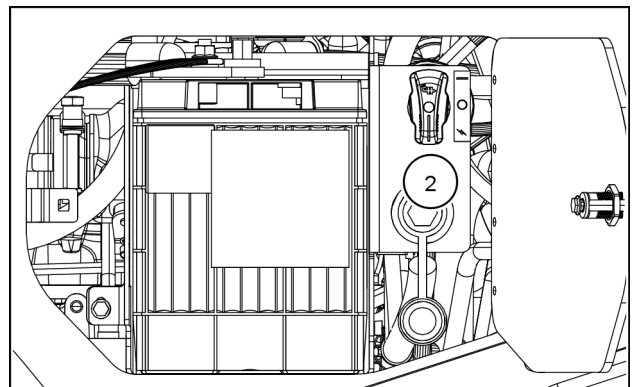
- Horizontal position (1) – disconnect machine from battery power.
- Vertical position (2) – connect machine to battery power.

**NOTICE:** Wait at least **60 s** after you place the ignition key in the **OFF** position before turning master disconnect switch to **OFF**. This allows the machine controllers to shut down properly.

**NOTICE:** Some machine service procedures require an actual terminal disconnect of the batteries. Do not use the master disconnect switch for those types of procedures, such as welding on the machine.



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