580ST
590ST
695ST
Stage IV
Tractor Backhoe Loader

SERVICE MANUAL

Part number 48090752
English
February 2017

CASE
CONSTRUCTION

SERVICE MANUAL

580ST STAGE IV, SIDE-SHIFT (SS), FOUR-WHEEL DRIVE (4WD), MARBLE CUTTING, 580ST STAGE IV, STRAIGHT LOADER ARM (SLA), SIDE SHIFT (SS), FOUR-WHEEL DRIVE (4WD), 580ST STAGE IV, TOOL CARRIER (TC), SIDE SHIFT (SS), TWO-WHEEL DRIVE (2WD), 590ST STAGE IV, TOOL CARRIER (TC), SIDE SHIFT (SS), FOUR-WHEEL DRIVE (4WD), 695ST STAGE IV, SIDE-SHIFT (SS), FOUR-WHEEL DRIVE (4WD), MARBLE CUTTING, 695ST STAGE IV, TOOL CARRIER (TC), CENTER PIVOT (CP), 695ST STAGE IV, TOOL CARRIER (TC), SIDE SHIFT (SS)

48090752 24/02/2017

EN

Link Product / Engine

Product	Market Product	Engine
580ST STAGE IV, SIDE-SHIFT (SS), FOUR-WHEEL DRIVE (4WD), MARBLE CUTTING	Europe	F5BFL413B*C002
580ST STAGE IV, STRAIGHT LOADER ARM (SLA), SIDE SHIFT (SS), FOUR-WHEEL DRIVE (4WD)	Europe	F5BFL413B*C002
580ST STAGE IV, TOOL CARRIER (TC), SIDE SHIFT (SS), TWO-WHEEL DRIVE (2WD)	Europe	F5BFL413B*C002
590ST STAGE IV, TOOL CARRIER (TC), SIDE SHIFT (SS), FOUR-WHEEL DRIVE (4WD)	Europe	F5BFL413A*B001
695ST STAGE IV, TOOL CARRIER (TC), CENTER PIVOT (CP)	Europe	F5BFL413A*B001
695ST STAGE IV, SIDE-SHIFT (SS), FOUR-WHEEL DRIVE (4WD), MARBLE CUTTING	Europe	F5BFL413A*B001
695ST STAGE IV, TOOL CARRIER (TC), SIDE SHIFT (SS)	Europe	F5BFL413A*B001

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INTRODUCTION

Foreword - Important notice regarding equipment servicing

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All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

In case of questions, refer to your CASE CONSTRUCTION Sales and Service Networks.

Safety rules

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Personal safety

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

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.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation that, if not avoided, could result in machine or property damage.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information that clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Safety rules

⚠ General safety rules ⚠

Use caution when you operate the machine on slopes. Raised equipment, full tanks and other loads will change the center of gravity of the machine. The machine can tip or roll over when near ditches and embankments or uneven surfaces.

Never permit anyone other than the operator to ride on the machine.

Never operate the machine under the influence of alcohol or drugs, or while you are otherwise impaired.

When digging or using ground-engaging attachments, be aware of buried cables. Contact local utilities to determine the locations of services.

Pay attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety.

Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin, causing serious injury or infection.

- DO NOT use your hand to check for leaks. Use a piece of cardboard or paper.
- Stop the engine, remove the key, and relieve the pressure before you connect or disconnect fluid lines.
- Make sure that all components are in good condition. Tighten all connections before you start the engine or pressurize the system.
- If hydraulic fluid or diesel fuel penetrates the skin, seek medical attention immediately.
- Continuous long term contact with hydraulic fluid may cause skin cancer. Avoid long term contact and wash the skin promptly with soap and water.

Keep clear of moving parts. Loose clothing, jewelry, watches, long hair, and other loose or hanging items can become entangled in moving parts.

Wear protective equipment when appropriate.

DO NOT attempt to remove material from any part of the machine while it is being operated or while components are in motion.

Make sure that all guards and shields are in good condition and properly installed before you operate the machine. Never operate the machine with shields removed. Always close access doors or panels before you operate the machine.

Dirty or slippery steps, ladders, walkways, and platforms can cause falls. Make sure these surfaces remain clean and clear of debris.

A person or pet within the operating area of a machine can be struck or crushed by the machine or its equipment. DO NOT allow anyone to enter the work area.

Raised equipment and/or loads can fall unexpectedly and crush persons underneath. Never allow anyone to enter the area underneath raised equipment during operation.

Never operate the engine in enclosed spaces as harmful exhaust gases may build up.

Before you start the machine, be sure that all controls are in neutral or park lock position with the backhoe swing lock pin in the lock position. The backhoe swing lock pin must be in the lock position when you are not using the backhoe.

Start the engine only from the operator's seat. If you bypass the safety start switch, the engine can start with the transmission in gear. Do not connect or short across terminals on the starter solenoid. Attach jumper cables as described in the manual. Starting in gear may cause death or serious injury.

Always keep windows, mirrors, all lighting, and Slow-Moving Vehicle (SMV) emblem clean to provide the best possible visibility while you operate the machine.

Operate controls only when seated in the operator’s seat, except for those controls expressly intended for use from other locations.

From the operator's platform, install the backhoe swing lock pin when the backhoe is not in use and before all other operation.

Before you leave the machine:

1. Park the machine on a firm, level surface.
2. Put all controls in neutral or park lock position.
3. Engage the parking brake. Use wheel chocks if required.
4. Lower the loader bucket or other front attachment to the ground.
5. Move the operator’s seat to the backhoe operating position and choose one of the following backhoe positions:
   - Move the backhoe into the stowed position and from the operator's seat install the backhoe swing lock pin. See **Swing tower - Basic instructions ()** .
   - Lower the backhoe bucket or other attachment to the ground.
6. Turn off the engine and remove the key.
7. Move the operator’s seat into the driving position.

When, due to exceptional circumstances, you decide to keep the engine running after you leave the operator’s station, then you must follow these precautions:

1. Bring the engine to low idle speed.
2. Disengage all drive systems.

⚠ WARNING

Some components may continue to run down after you disengage drive systems.
Make sure all drive systems are fully disengaged.
Failure to comply could result in death or serious injury.

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Component identification

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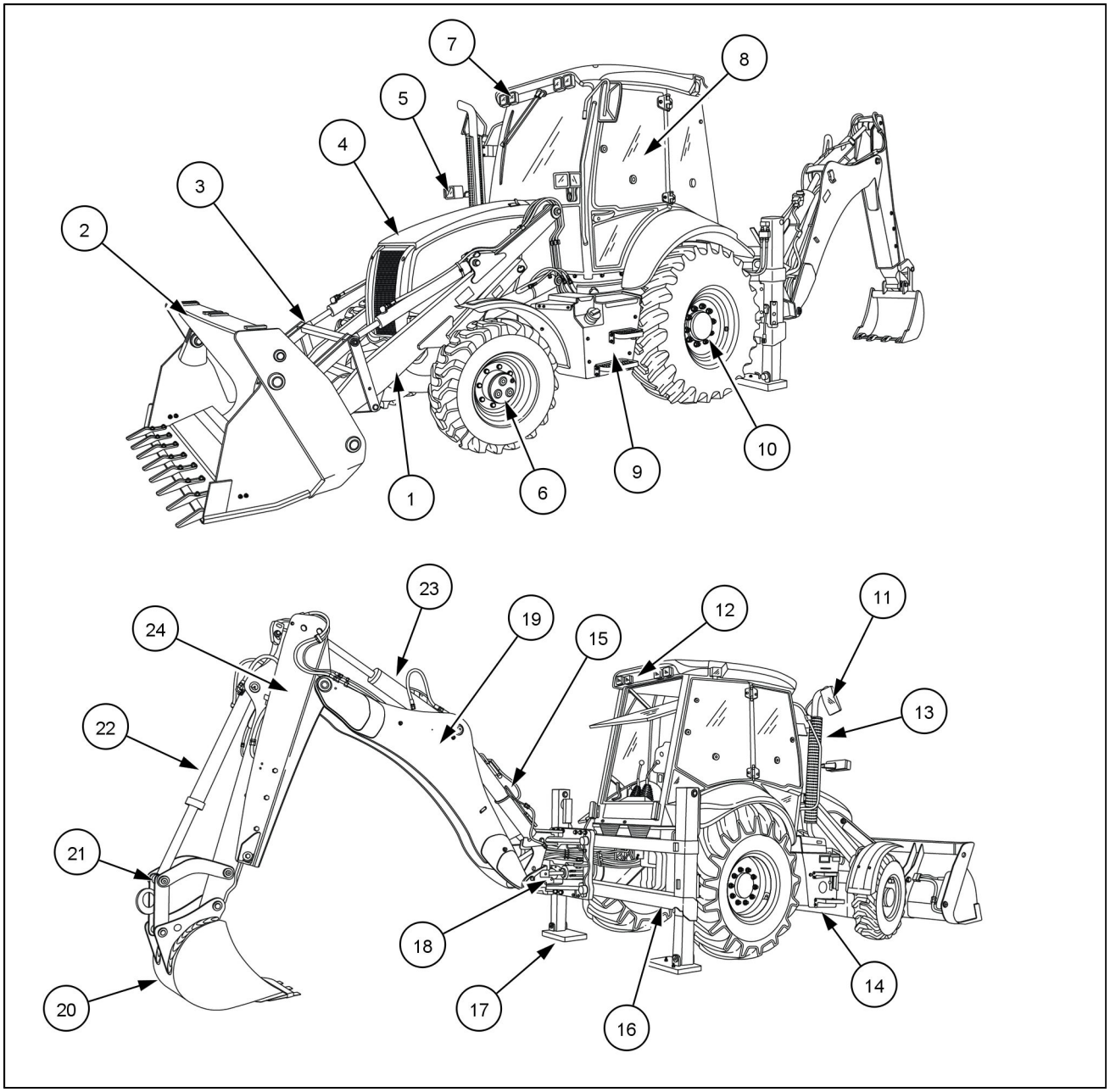
695ST	



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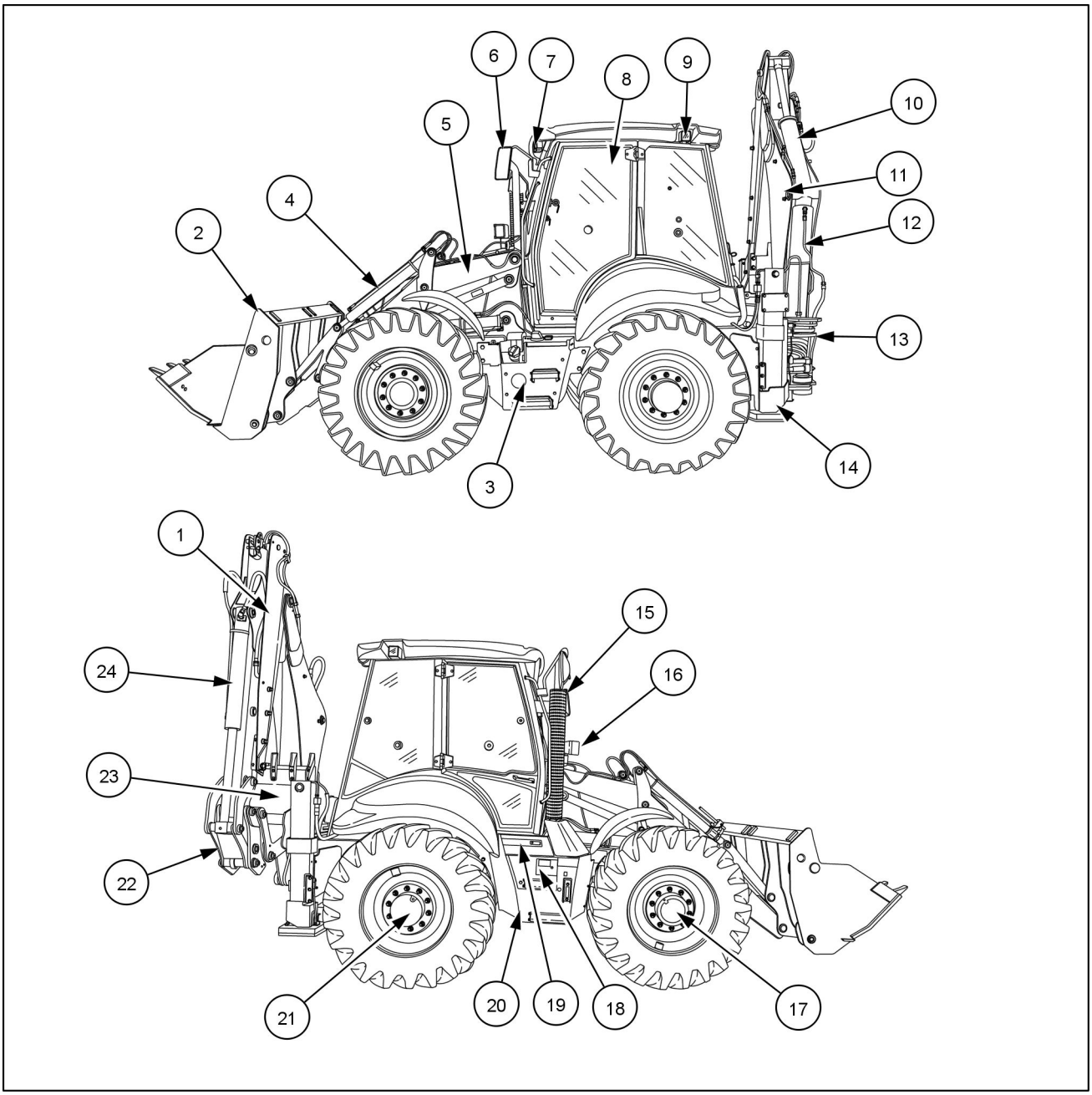
580ST and 590ST with in-line cylinder boom*

1. Loader arm
2. Loader arm bucket
3. Loader arm bucket cylinder
4. Engine hood
5. Front driving light
6. Front axle
7. Front work lights
8. Operator compartment
9. Fuel tank and **DIESEL EXHAUST FLUID (DEF)/ADBLUE®** tank
10. Rear Axle
13. Exhaust stack
14. Hydraulic oil tank, battery box, and optional tool box
15. Backhoe in-line cylinder boom* (shown)
16. Side shift carriage
17. Side shift stabilizer with pad
18. Backhoe swing tower
19. Backhoe boom
20. Backhoe bucket
21. Backhoe bucket links with optional lift hook
22. Backhoe bucket cylinder

11. Rearview side mirror
12. Rear work lights
23. Backhoe dipper arm cylinder
24. Backhoe standard dipper or **Extendahoe®** dipper

NOTE: *Boom with overlapping cylinder* available as a standard option on most model configurations.*



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695ST with in-line cylinder and side shift carriage

1. Backhoe standard dipper or **Extendahoe®** dipper
2. Loader arm bucket
3. Fuel tank with **DIESEL EXHAUST FLUID (DEF)/ADBLUE®** tank
4. Loader arm bucket cylinder
5. Tool Carrier (TC) loader arm with safety support strut
6. Rearview side mirror
7. Front work lights
8. Operator's compartment
9. Side work light
10. Backhoe dipper arm cylinder
11. Backhoe boom
13. Backhoe swing tower
14. Side-shift** stabilizers with pad
15. Exhaust stack
16. Front driving light
17. Front axle – Four-Wheel Steer (4WS)
18. Battery box
19. Tool box (optional)
20. Hydraulic oil tank
21. Rear axle – Four-Wheel Steer (4WS)
22. Backhoe bucket links with optional lift hook
23. Backhoe bucket

SERVICE MANUAL

Engine

580ST STAGE IV, SIDE-SHIFT (SS), FOUR-WHEEL DRIVE (4WD), MARBLE CUTTING, 580ST STAGE IV, STRAIGHT LOADER ARM (SLA), SIDE SHIFT (SS), FOUR-WHEEL DRIVE (4WD), 580ST STAGE IV, TOOL CARRIER (TC), SIDE SHIFT (SS), TWO-WHEEL DRIVE (2WD), 590ST STAGE IV, TOOL CARRIER (TC), SIDE SHIFT (SS), FOUR-WHEEL DRIVE (4WD), 695ST STAGE IV, SIDE-SHIFT (SS), FOUR-WHEEL DRIVE (4WD), MARBLE CUTTING, 695ST STAGE IV, TOOL CARRIER (TC), CENTER PIVOT (CP), 695ST STAGE IV, TOOL CARRIER (TC), SIDE SHIFT (SS)

Engine - Speeds Stall test check sheet

NOTE: *The following specifications are for engines with more than 50 hours of operation.*

NOTE: *Engine RPM speed is based on the* ***ISO 14396*** *Cetane number of at least 51 and density between* ***820 – 845 kg/m³*** *(****1382 – 1424 lb/yd³****). Fuel inlet* ***36.0 – 40.0 °C*** *(****96.8 – 104.0 °F****).*

Results from stall test procedure (fill in values accordingly)

ID	RPM test valve	Stall test component (specified value)
1		Loader hydraulic stall speed (**2220 – 2330 RPM**)
2		Backhoe hydraulic stall speed (**2220 – 2330 RPM**)
3		Torque converter stall speed (**2150 – 2310 RPM**)
4		Combined - loader hydraulic and torque converter - stall speed (**1810 – 2090 RPM**)

Stall test reference chart

ID	RPM	Results
1 2 3 4	**2220 – 2330 RPM** **2220 – 2330 RPM** **2150 – 2310 RPM** **1810 – 2090 RPM**	All systems operating within normal specified RPM values.
1 2 3 4	Above **2330 RPM** **2220 – 2330 RPM** Above **2310 RPM** Above **2090 RPM**	Engine problem. Check engine speeds. Refer to the engine service manual.
1 2 3 4	Below **2220 RPM** **2220 – 2330 RPM** Below **2150 RPM** Below **1810 RPM**	Engine problem. Check engine speeds. Replace the fuel and air filters Refer to the engine service manual.
1 2 3 4	Below **2220 RPM** **2220 – 2330 RPM** **2150 – 2310 RPM** Below **1810 RPM**	Hydraulic system problem(s). Check the setting of the main relief valve. Check the output of the hydraulic pump.
1 2 3 4	Above **2330 RPM** **2220 – 2330 RPM** **2150 – 2310 RPM** Above **2090 RPM**	Hydraulic system problem(s). Check the setting of the main relief valve. Check the output of the hydraulic pump. Check for leakage in the loader control valve.
1 2 3 4	**2220 – 2330 RPM** Below **2200 RPM** **2150 – 2310 RPM** **1810 – 2090 RPM**	Hydraulic system problem(s). Check the setting of the main relief valve. Check the output of the hydraulic pump.
1 2 3 4	**2220 – 2330 RPM** Below **2220 RPM** **2150 – 2310 RPM** **1810 – 2090 RPM**	Hydraulic system problem(s). Check the setting of the main relief valve. Check the output of the hydraulic pump.
1 2 3 4	**2220 – 2330 RPM** **2220 – 2330 RPM** Above **2310 RPM** Above **2090 RPM**	Torque converter or transmission problems.
1 2 3 4	**2220 – 2330 RPM** **2220 – 2330 RPM** Below **2150 RPM** Below **1810 RPM**	Torque converter or transmission problems.

Engine - Drain fluid

⚠ WARNING

Avoid injury!
Avoid getting engine oil on your skin. In case of skin contact, wash with running water.
Failure to comply could result in death or serious injury.

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⚠ WARNING

Pressurized system!
Never attempt to drain fluids or remove filters when the engine is running. Turn off the engine and relieve all pressure from pressurized systems before servicing the machine.
Failure to comply could result in death or serious injury.

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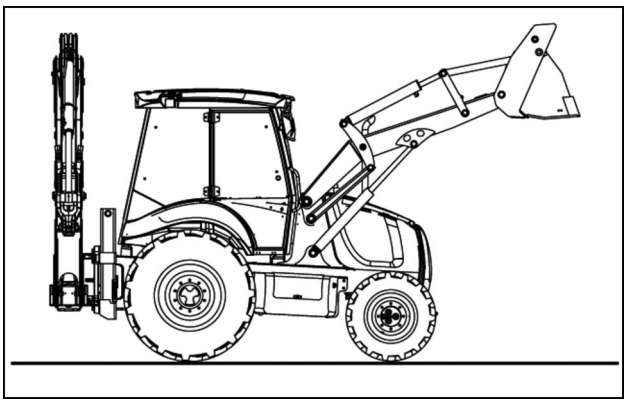
1. Move the machine to a level and firm ground.
2. Raise the loader attachment and install the safety support strut.
3. Place the backhoe attachment in the road travel position.
4. Place the direction-of-travel lever and gearshift lever in the NEUTRAL position.
5. Immobilize the machine with the parking brake.
6. Stop the engine and remove the starter switch key.
7. Open and raise the engine guard.
8. Remove the cap **(2)** of the filler neck.
9. Remove the protection cap from the engine crankcase drain valve.
10. Screw the connector of the extension drain hose (stored in the toolbox) on the crankcase drain valve.
11. Place the opposite end into a container with sufficient capacity.

NOTE: *Drain the engine when it is still warm. The oil will flow more easily.*

12. Wait for the oil to completely flow out of the engine.
13. Remove the extension drain hose and install the protection cap on the crankcase drain valve.
14. Place the extension drain hose in the toolbox.



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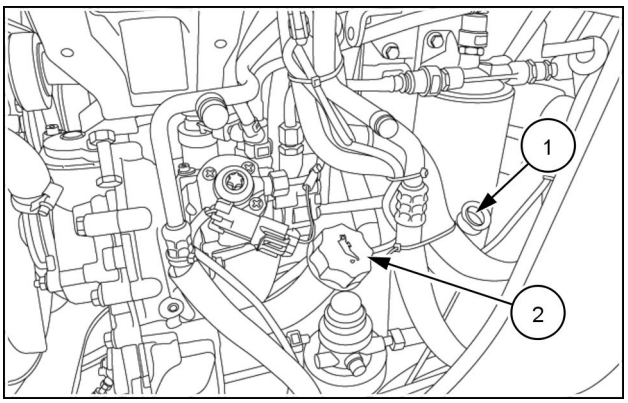

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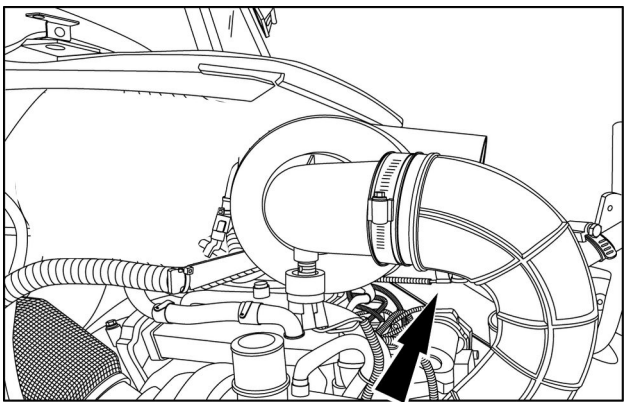
Engine - Remove

Prior operation:
Disconnect the battery, refer to **Battery - Remove (55.302)**.
Prior operation:
Drain the engine oil, refer to **Engine - Drain fluid (10.001)**.
Prior operation:
Remove engine hood, refer to **Engine hood - Remove (90.105)**.
Prior operation:
Drain the hydraulic fluid, refer to **Oil reservoir - Drain fluid (35.300)**
Prior operation:
Drain the transmission fluid, refer to **Power shuttle transmission - Drain fluid (21.112)** (Power shuttle) or **Powershift transmission - Drain fluid (21.113)** (Powershift).
Prior operation:
Remove the cooling package, refer to **Engine cooling system - Remove (10.400)**.
Prior operation:
If applicable discharge the Air Conditioning A/C system, refer to **Air conditioning - Discharging (50.200)**.

1. Disconnect the air temperature sensor X-474.



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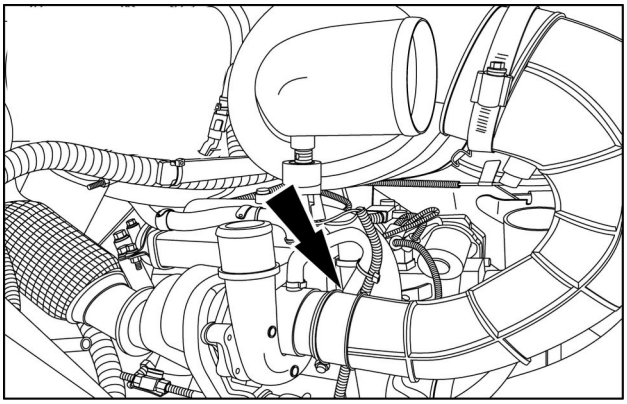
2. Remove the connector X-4 from 2-way air cleaner connector.



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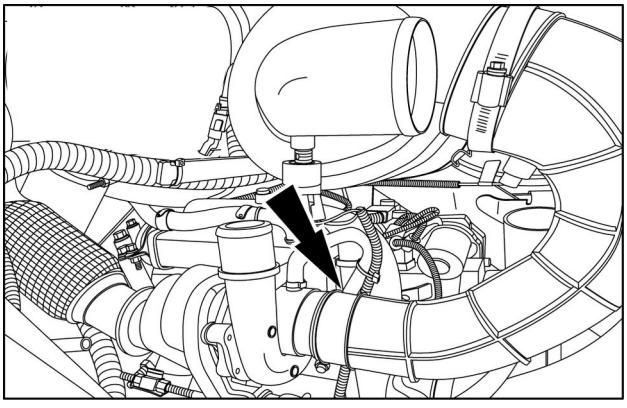
3. Remove the pipe connecting the air cleaner with turbocharger.



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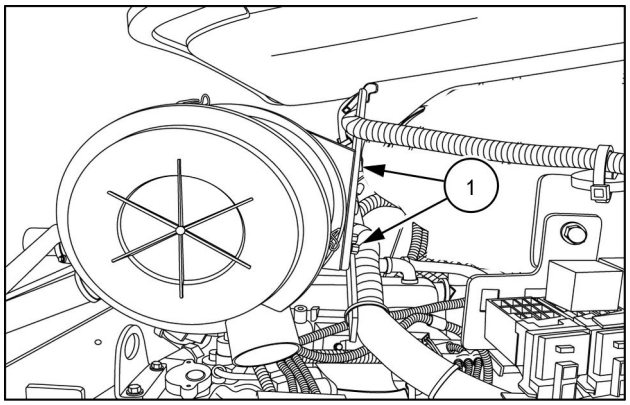
4. Remove the aspirator tube. Remove the four mounting bolts **(1)** securing the air cleaner. Remove the air cleaner.



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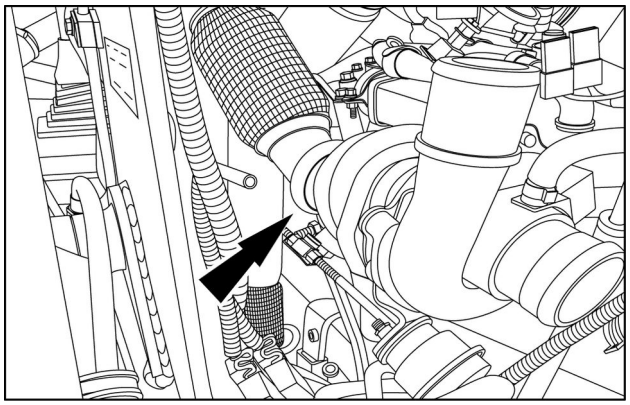
5. Disconnect the connecting exhaust pipe from the turbocharger



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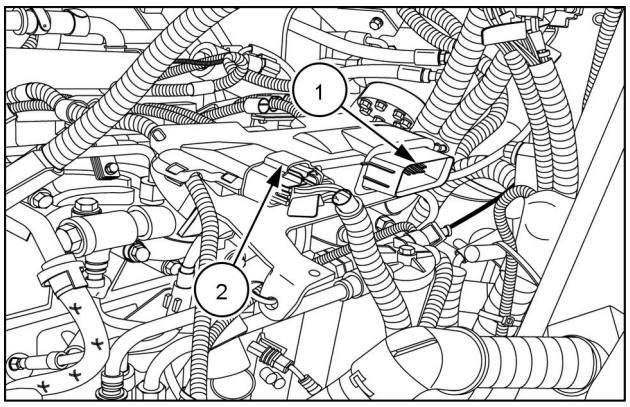
6. Remove the connectors X-470 **(1)** and X-471 **(2)** from the engine electronic control unit.



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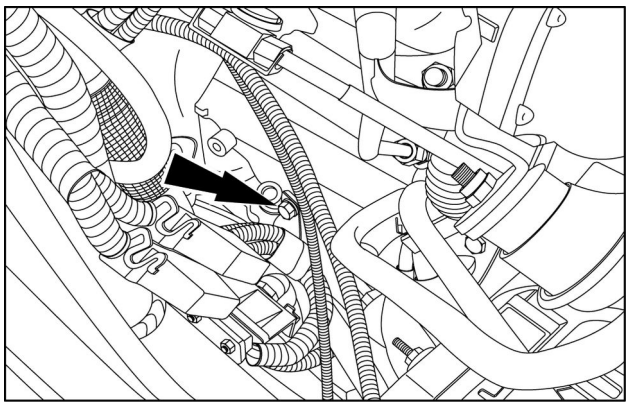
7. Remove the ground strap.



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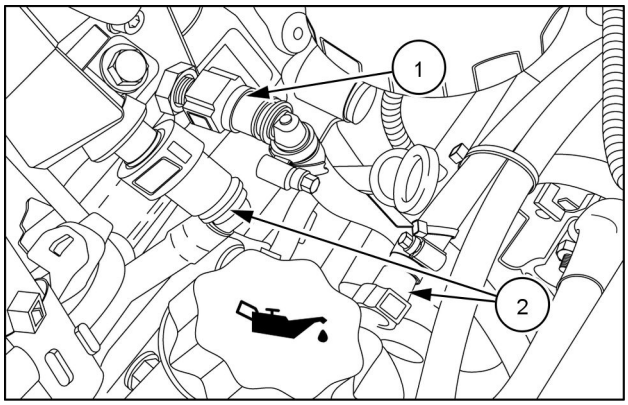
8. Disconnect the fuel line **(1)** from the cylinder head. Disconnect the fuel lines from the fuel filter **(2)**.



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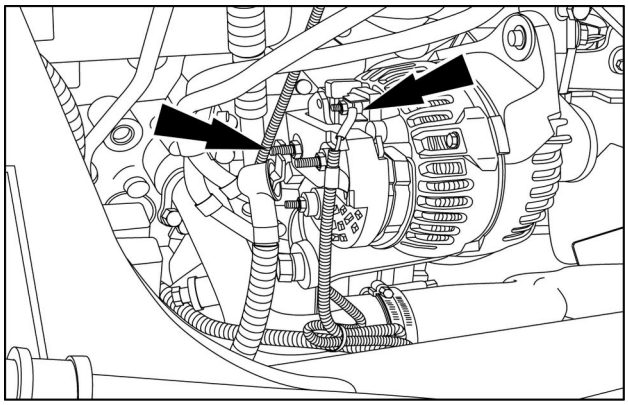
9. Remove the alternator connector X-67 and connector X-10.



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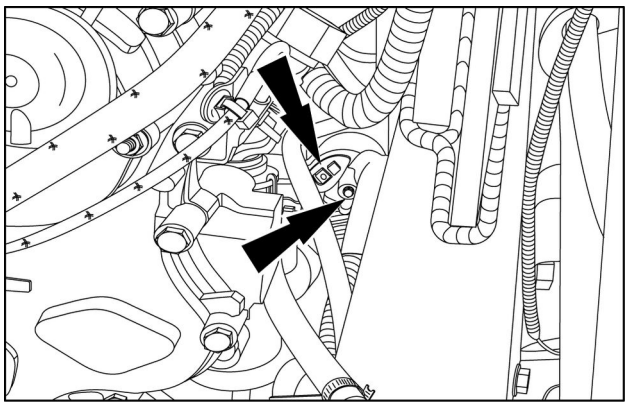
10. Disconnect the connector X-508 from the starter motor and the ignition connector.



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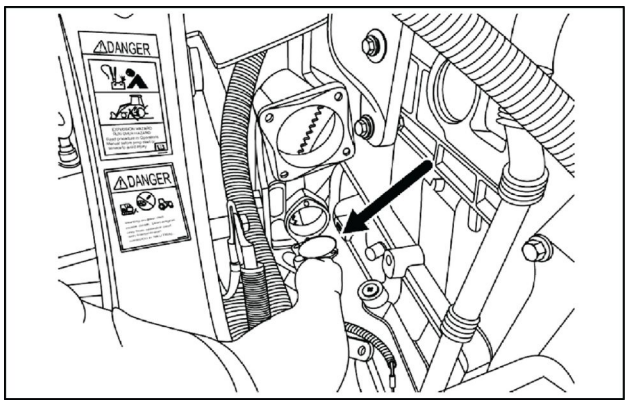
11. Remove the flywheel access cover.



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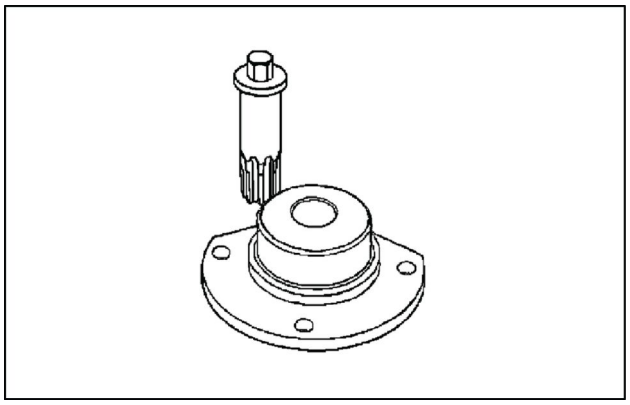
12. Use tool **380000988** to rotate the engine to access flywheel flex plate hardware.



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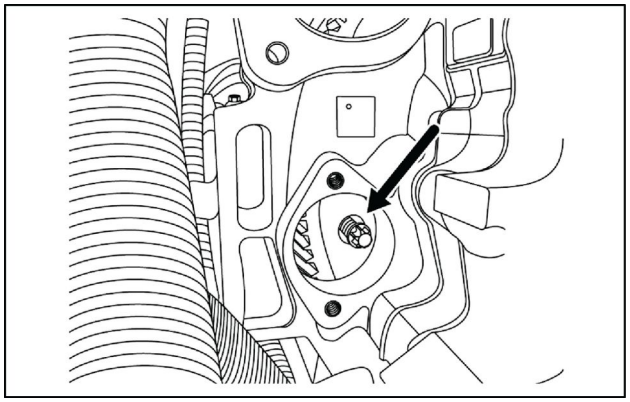
13. Remove the flywheel and flex plate hardware.



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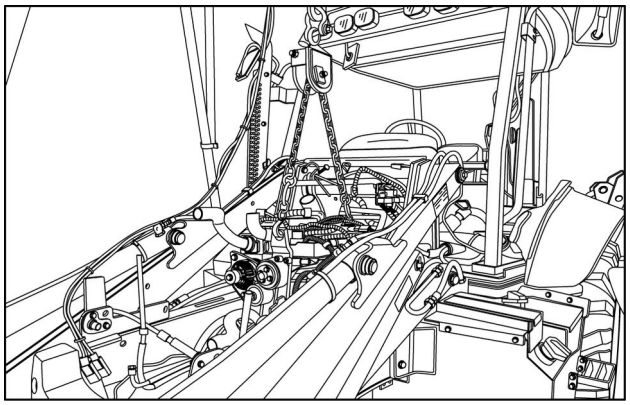
14. Attach a suitable lifting device.



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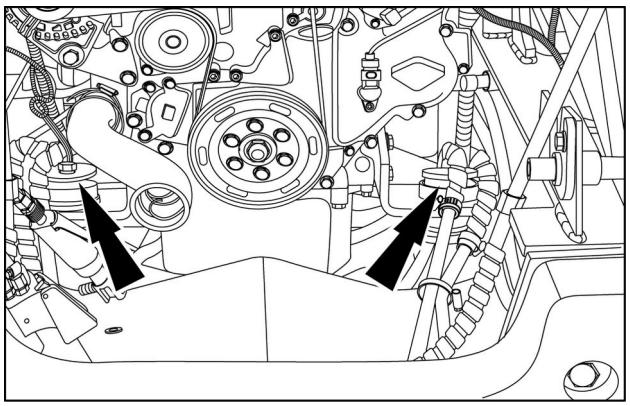
15. Remove engine mounting hardware.



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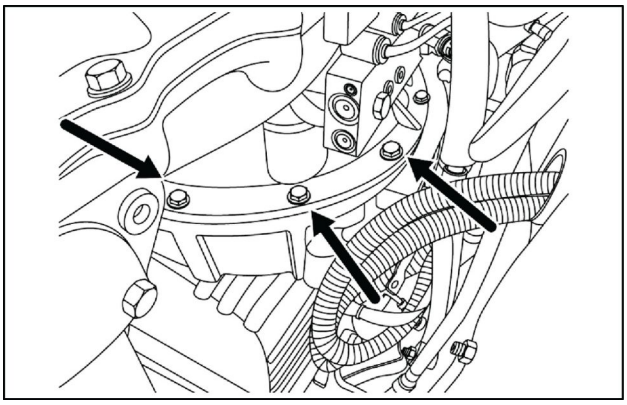
16. Remove hardware which attaches the engine to the transmission.



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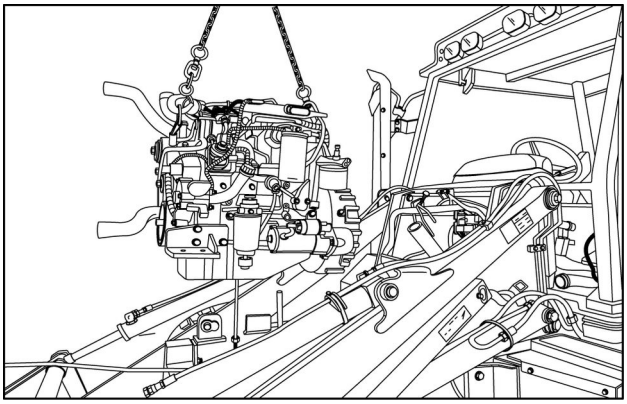
17. Make sure that all the harness connectors and hoses have been disconnected and are clear of the engine. Slowly raise the engine from the frame and remove the engine from the machine.



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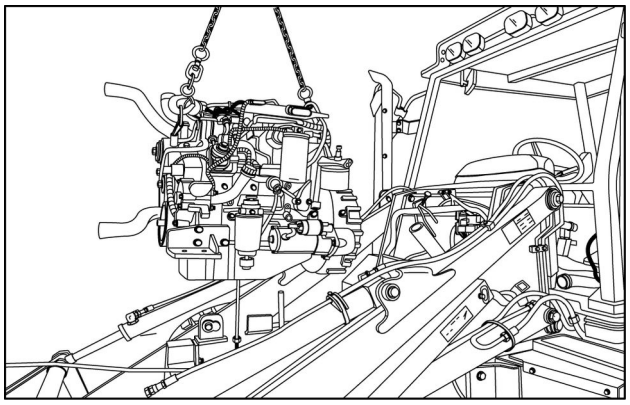
18. If necessary, see the engine service manual for more specific details.

Engine - Install

1. Carefully lower the engine on the frame.



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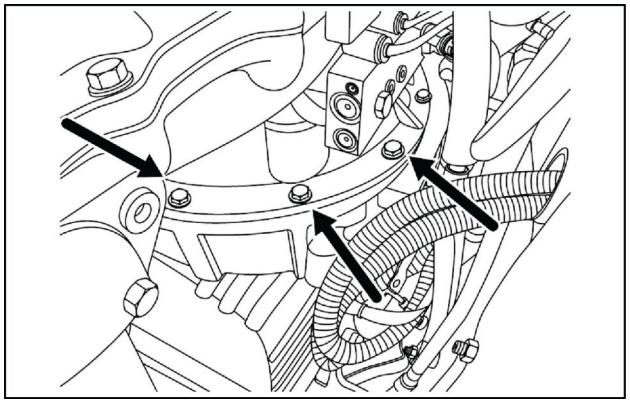
2. Attach the engine to the transmission with the hardware removed earlier. Torque the hardware to **52 – 57 N·m** (**38 – 42 lb ft**).



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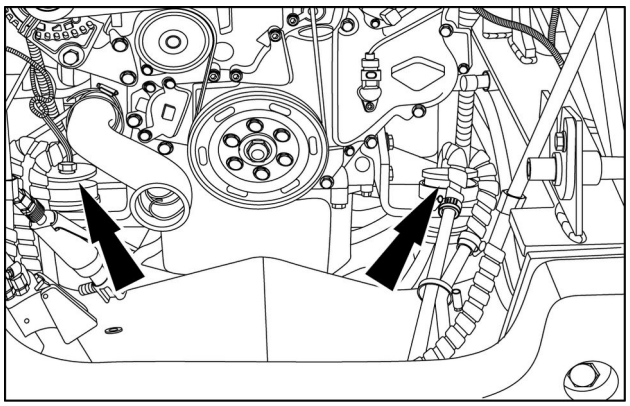
3. Install the engine mounting hardware to the engine. Torque the hardware to **89 – 107 N·m** (**66 – 79 lb ft**).



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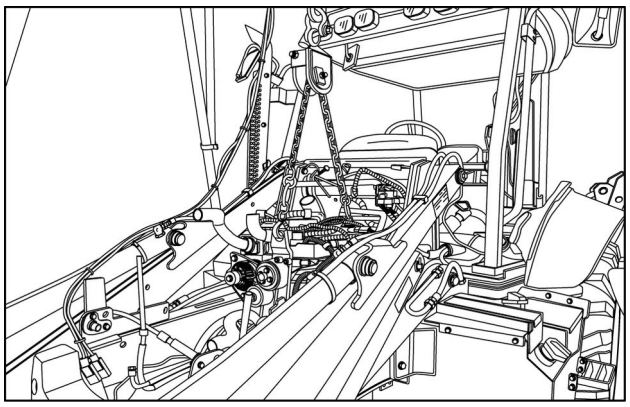
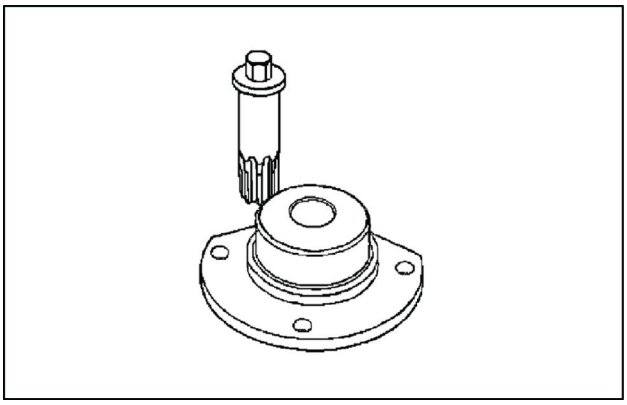
4. Secure engine mounts to the frame. Torque the hardware to **178 – 240 N·m** (**131 – 177 lb ft**).
5. Remove the lifting device.



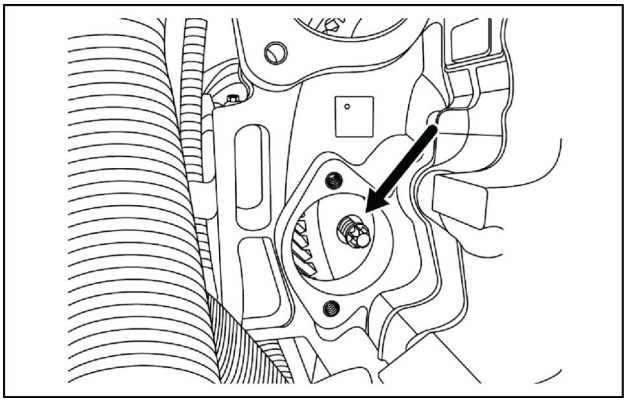
RAIL15TLB0244AA 4

6. Rotate the engine to access flywheel. Use tool **380000988**.



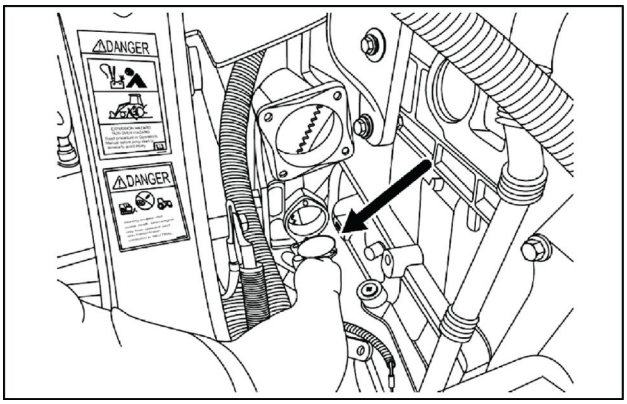
LELI12TLB0081AA 5

7. Reinstall the flywheel and flex plate hardware. Torque to **62 – 57 N·m** (**46 – 42 lb ft**).



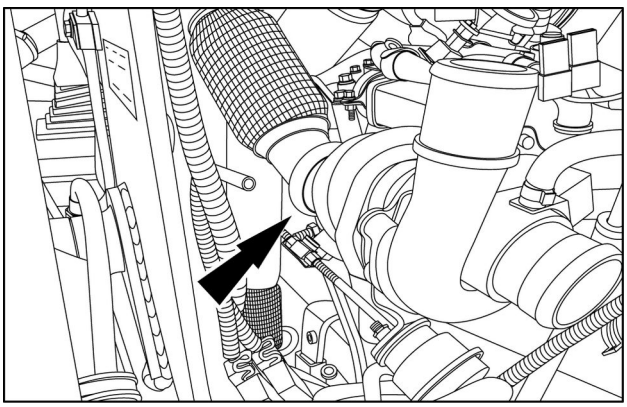
LELI12TLB0082AA 6

8. Install the flywheel access cover.



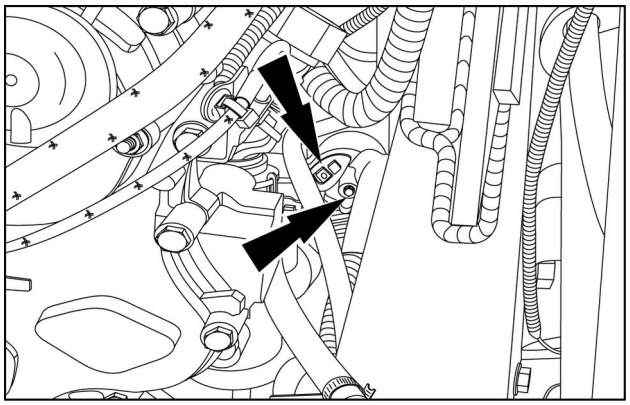
LELI12TLB0080AA 7

9. Connect the exhaust pipe to the turbocharger with the clamp. Torque the hardware to **21 – 29 N·m** (**15 – 21 lb ft**).



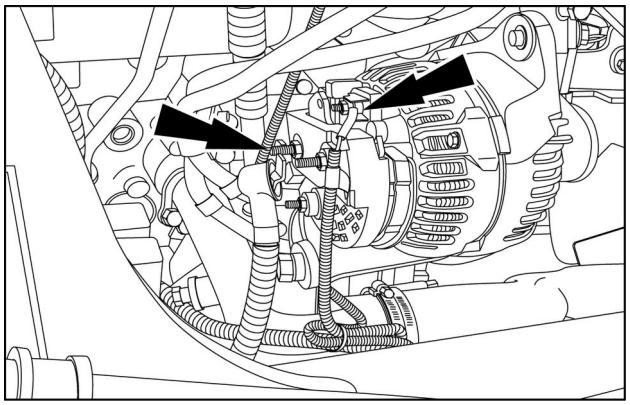
RAIL15TLB0230AA 8

10. Connect the connector X-508 on the starter motor and the ignition connector.



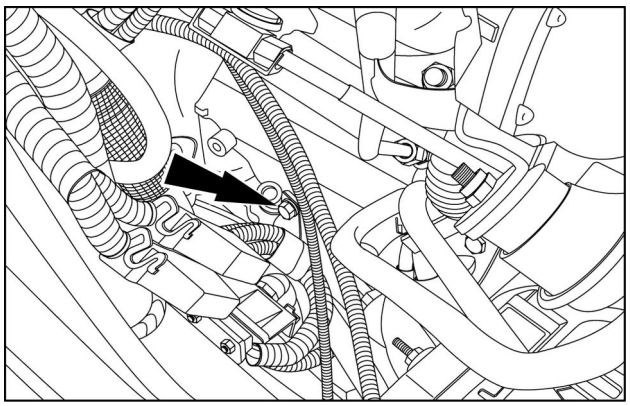
RAIL15TLB0241AA 9

11. Connect the connectors X-67 and X-10 to the alternator.



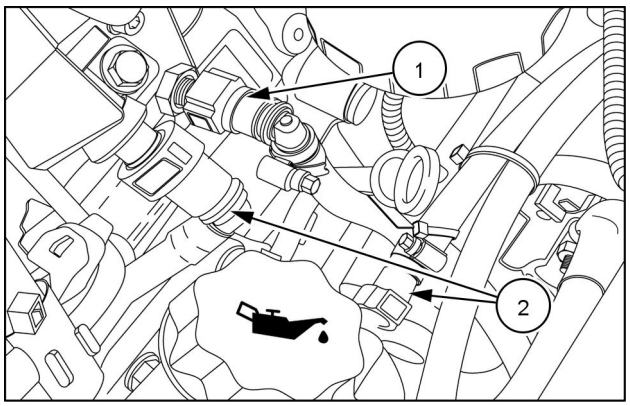
RAIL15TLB0233AA 10

12. Connect the ground strap.



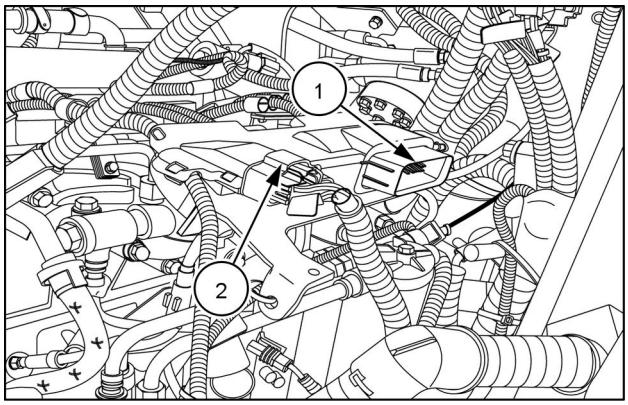
RAIL15TLB0235AA 11

13. Connect the fuel line **(1)** to the cylinder head. Connect the fuel lines **(2)** to the fuel filter .



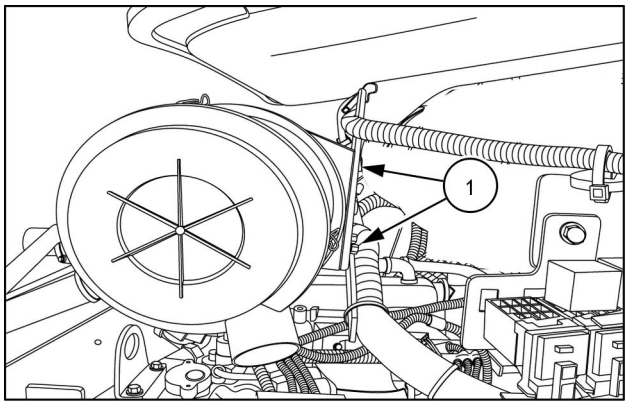
RAIL15TLB0240AA 12

14. Connect the connectors X-470 **(1)** and X-471 **(2)** to the electronic control unit.



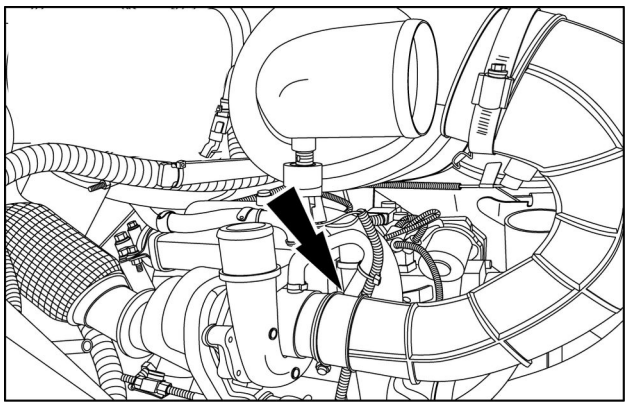
RAIL15TLB0237AA 13

15. Install the air cleaner and secure with the bolts **(1)** removed earlier. Connect the aspirator tube.



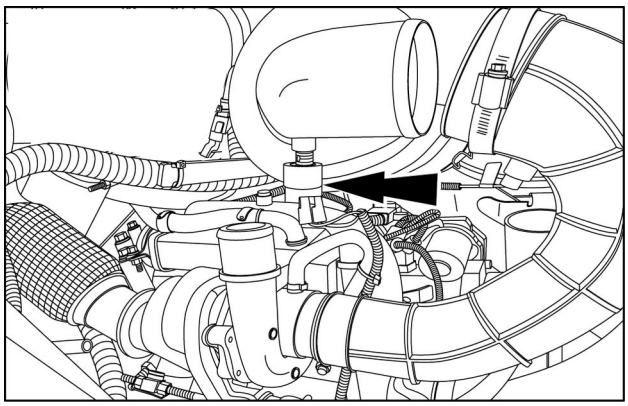
RAIL15TLB0218AA 14

16. Connect the hose to the turbocharger. Torque the hardware to **3.4 – 4.5 N·m** (**30.1 – 39.8 lb in**).



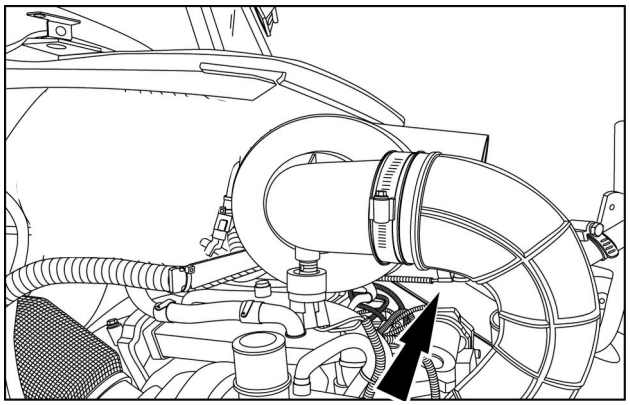
RAIL15TLB0217AA 15

17. Connect the connector X-4 to 2-way air cleaner connector.



RAIL15TLB0217AA 16

18. Connect the air temperature sensor connector.



RAIL15TLB0216AA 17

19. Top up the engine oil. Refer to **Engine - Filling (10.001)**.
20. Top up the hydraulic oil. Refer to **Oil reservoir - Filling (35.300)**.
21. Top up the transmission oil. Refer to **Power shuttle transmission - Filling (21.112)** (Power Shuttle) or **Powershift transmission - Filling (21.113)** (Powershift).
22. Install the cooling system. Refer to **Engine cooling system - Install (10.400)**.
23. Charge the Air Conditioning system. Refer to **Air conditioning - Charging (50.200)**
24. Install the engine hood. Refer to **Engine hood - Install (90.105)**.
25. Connect the battery. Refer to **Battery - Install (55.302)**.

Suggest:

If the above button click is invalid.

Please download this document

first, and then click the above link

to download the complete manual.

Thank you so much for reading

Engine - Filling

⚠ WARNING

Avoid injury!
Avoid getting engine oil on your skin. In case of skin contact, wash with running water.
Failure to comply could result in death or serious injury.

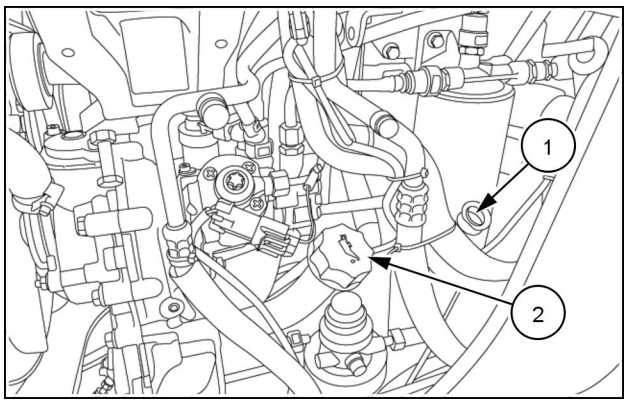
W1336B

⚠ WARNING

Pressurized system!
Never attempt to drain fluids or remove filters when the engine is running. Turn off the engine and relieve all pressure from pressurized systems before servicing the machine.
Failure to comply could result in death or serious injury.

W0905A

1. Open and raise the engine guard.
2. Remove the cap **(2)** of the filler neck.

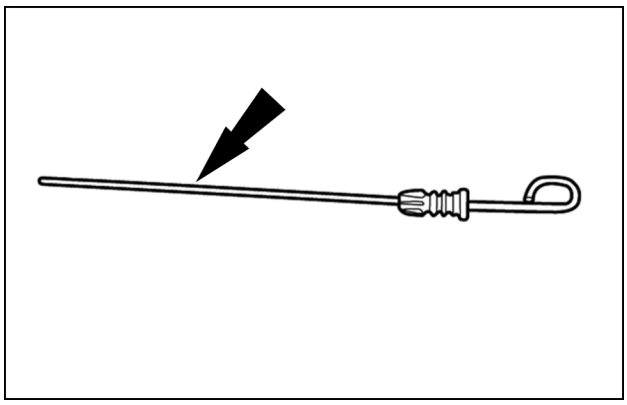


LEEN11T0356AA 1

3. Fill the engine with new oil.
4. Run the engine for a few minutes and check for leaks.
5. Check the engine oil level by means of the dipstick **(1)**.

NOTE: *Always wait **15 min** to allow the oil to return to the engine sump before checking the oil level.*

6. Reinstall the cap **(2)** on the filler neck.
7. Lower and lock the engine guard.
8. Remove the safety support strut and lower the loader attachment.



LEEN11T0361AA 2

Oil specification and capacity

Use **CASE AKCELA UNITEK 10W-40 MAT3521**, engine oil or an oil meeting the following specification:

- **API CJ-4**
- **ACEA E9**

NOTE: *A higher quality oil is acceptable.*

NOTICE: *For machines operating in cold regions, see **Recommended engine oil for operating temperature ranges (10.304)**.*

Engine oil capacity (with filter): **8.0 L** (**7.0 UK qt**)