

ENGINE - 10

580N
580SN WT
580SN
590SN
Tier 3
Tractor Loader Backhoe

SERVICE MANUAL

Part number 47878203

English
March 2015



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Battery - Basic instructions

⚠ 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.

W0005A

⚠ 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.

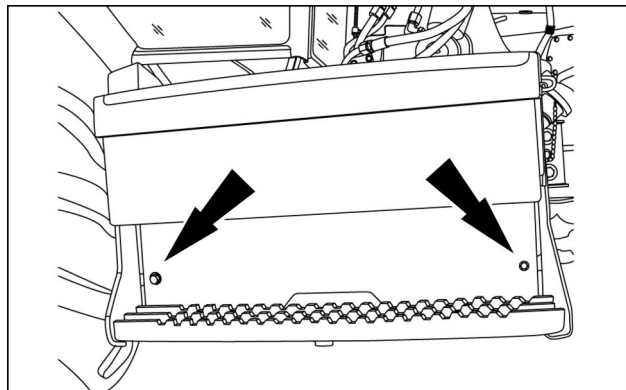
Failure to comply could result in death or serious injury.

W0006A

- Do not run the engine with the alternator wires disconnected.
- Before using an electric welder, disconnect the alternator wires, instrument cluster and batteries. Disconnect the Engine Control Unit (ECU) connectors.
- Do not use a steam cleaner or a cleaning solvent to clean the alternator.
- Keep the battery vents clean. Ensure the battery vents are not restricted.

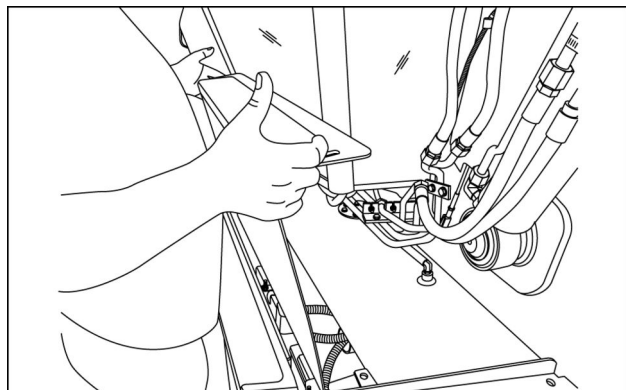
Disconnect battery

1. Remove the battery cover hardware.












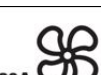





RCPH11TLB001AAM 1

2. Remove the battery cover.



RCPH11TLB002AAM 2

INTRODUCTION

Symbol	Function
	Rear wipers/washers
	Transmission differential lock
	Tail lights
	Pilot controls
	Cigarette lighter plugs
	4WD, Auto Ride Control
	Dome light
	Radio B+
	Horn
	Blower motor
	A/C
	TRAX B+
	Key switch
	Air seat
	2WD, Ride Control

Torque - Minimum tightening torques for normal assembly

METRIC NON-FLANGED HARDWARE

NOM. SIZE	CLASS 8.8 BOLT and CLASS 8 NUT		CLASS 10.9 BOLT and CLASS 10 NUT		LOCKNUT CL.8 W/CL8.8 BOLT	LOCKNUT CL.10 W/CL10.9 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr		
M4	2.2 N·m (19 lb in)	2.9 N·m (26 lb in)	3.2 N·m (28 lb in)	4.2 N·m (37 lb in)	2 N·m (18 lb in)	2.9 N·m (26 lb in)
M5	4.5 N·m (40 lb in)	5.9 N·m (52 lb in)	6.4 N·m (57 lb in)	8.5 N·m (75 lb in)	4 N·m (36 lb in)	5.8 N·m (51 lb in)
M6	7.5 N·m (66 lb in)	10 N·m (89 lb in)	11 N·m (96 lb in)	15 N·m (128 lb in)	6.8 N·m (60 lb in)	10 N·m (89 lb in)
M8	18 N·m (163 lb in)	25 N·m (217 lb in)	26 N·m (234 lb in)	35 N·m (311 lb in)	17 N·m (151 lb in)	24 N·m (212 lb in)
M10	37 N·m (27 lb ft)	49 N·m (36 lb ft)	52 N·m (38 lb ft)	70 N·m (51 lb ft)	33 N·m (25 lb ft)	48 N·m (35 lb ft)
M12	64 N·m (47 lb ft)	85 N·m (63 lb ft)	91 N·m (67 lb ft)	121 N·m (90 lb ft)	58 N·m (43 lb ft)	83 N·m (61 lb ft)
M16	158 N·m (116 lb ft)	210 N·m (155 lb ft)	225 N·m (166 lb ft)	301 N·m (222 lb ft)	143 N·m (106 lb ft)	205 N·m (151 lb ft)
M20	319 N·m (235 lb ft)	425 N·m (313 lb ft)	440 N·m (325 lb ft)	587 N·m (433 lb ft)	290 N·m (214 lb ft)	400 N·m (295 lb ft)
M24	551 N·m (410 lb ft)	735 N·m (500 lb ft)	762 N·m (560 lb ft)	1016 N·m (750 lb ft)	501 N·m (370 lb ft)	693 N·m (510 lb ft)

NOTE: M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.

Transmission

Standard specification:	CASE AKCELA NEXPLORE™ FLUID	
SCWP specification:	CASE AKCELA HY-TRAN® ULTRACTION SSL	

Capacity:		
Manual (powershuttle)		
	Two wheel drive	Four wheel drive
Total system	17.0 l (18 US qt)	19.4 l (21 US qt)
Refill (with or without filter change)	10.5 l (11 US qt)	13.0 l (14 US qt)

Powershift S-type		
	Two wheel drive	Four wheel drive
Total system	21.7 l (22.9 US qt)	20.7 l (21.9 US qt)
Refill (with or without filter change)	15.3 l (16.2 US qt)	14.3 l (15.1 US qt)

Powershift H-type		
		Four wheel drive only
Total system		18.0 l (19.0 US qt)
Refill (with or without filter change)		11.4 l (12.0 US qt)

NOTE: The master brake cylinder receives fluid from the transmission.

Front drive axle - Four-Wheel drive (4WD)

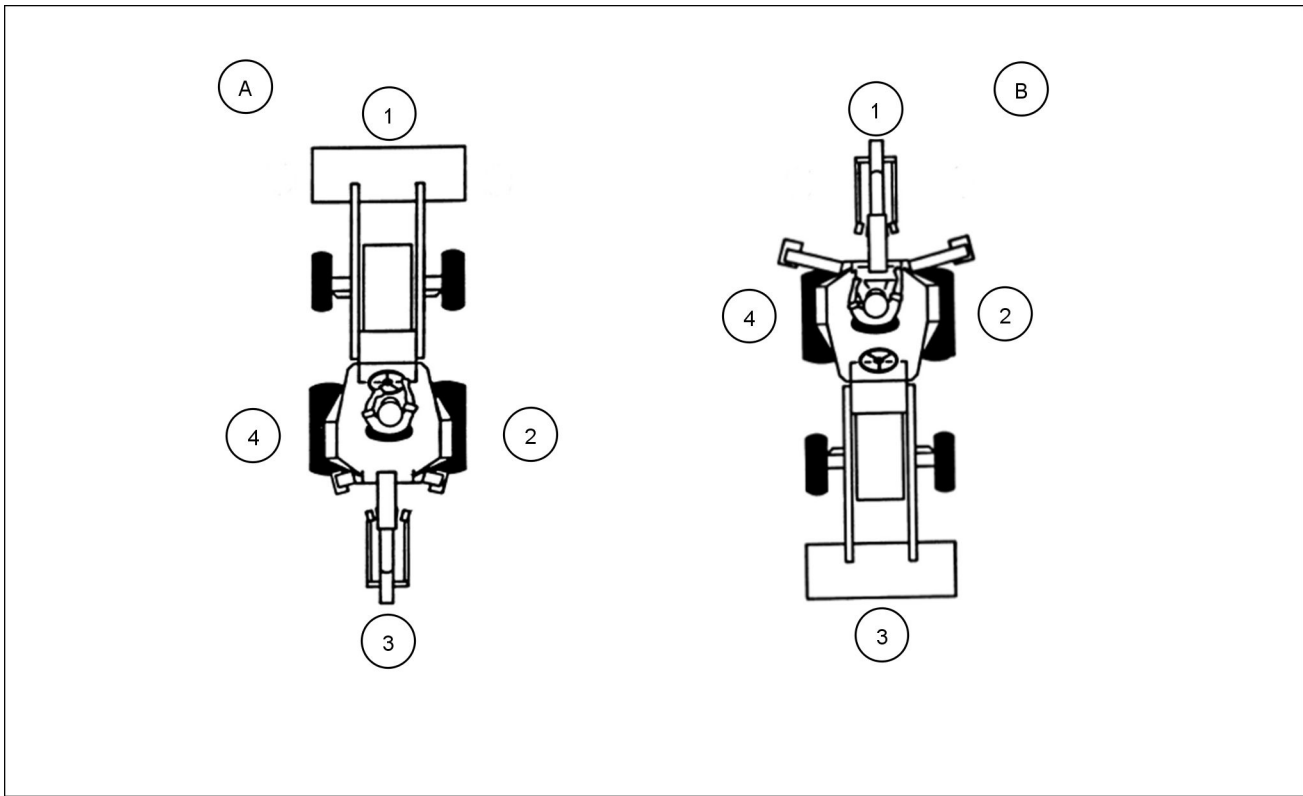
Standard and SCWP specification:	TUTELA TRANSAXLE FLUID SAE 80W-140	
Capacity:		
Differential	7.7 L (8.1 US qt)	
Each planetary hub	0.5 L (0.5 US qt)	

Rear axle (differential and hubs)

Standard and SCWP specification:	TUTELA TRANSAXLE FLUID SAE 80W-140	
Capacity:		
	13.6 L (14.4 US qt)	

Product overview - Machine orientation

The terms right-hand and left-hand, when used in this manual, indicate the right and left sides of the machine as seen from the operator's seat.



RAIL14TLB0377FA 1

A – Driving and front loader operation

1. Front
2. Right-hand side
3. Rear
4. Left-hand side

B – Backhoe operation

1. Front
2. Right-hand side
3. Rear
4. Left-hand side

Engine - Engine and crankcase

ID	RPM	Results
1	Above 2335	Engine problem. Check engine speeds according to instructions in the engine service manual.
2	2190 to 2300	
3	Above 2290	
4	Above 2010	
1	Below 2240	Engine problem. Check engine speeds according to instructions in Refer to the engine service manual.
2	2190 to 2300	
3	Below 2125	
4	Below 1830	
1	Below 2240	Hydraulic system problem(s). Check the setting of the main relief valve. Check the output of the hydraulic pump.
2	2190 to 2300	
3	2125 to 2290	
4	Below 1830	
1	Above 2335	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.
2	2190 to 2300	
3	2125 to 2290	
4	Above 2010	
1	2240 to 2335	Hydraulic system problem(s). Check the setting of the main relief valve. Check the output of the hydraulic pump.
2	Below 2190	
3	2125 to 2290	
4	1830 to 2010	
1	2240 to 2335	Hydraulic system problem(s). Check the setting of the main relief valve. Check the output of the hydraulic pump.
2	Below 2190	
3	2125 to 2290	
4	1830 to 2010	
1	2240 to 2335	Torque converter or transmission problems. Refer to section NEED IU REFERENCE and check the transmission and torque converter.
2	2190 to 2300	
3	Above 2290	
4	Above 2010	
1	2240 to 2335	Torque converter or transmission problems.
2	2190 to 2300	
3	Below 2125	
4	Below 1830	

Engine - Speeds stall test check sheet (580SN WT only)

580SN WT Four-Wheel Drive (4WD) TIER 3

Results from stall test procedure (fill in values accordingly)

ID	RPM test valve	Stall test component (specified value)
1		Loader hydraulic stall speed (2330 - 2420 RPM)
2		Backhoe hydraulic stall speed (2330 - 2420 RPM)
3		Torque converter stall speed (2080 - 2260 RPM)
4		Combined - loader hydraulic and torque converter - stall speed (2090 - 2270 RPM)

Stall test reference chart

ID	RPM	Results
1	2330 to 2420	All systems operating within normal specified RPM values.
2	2330 to 2420	
3	2150 to 2295	
4	2090 to 2270	
1	Above 2420	Engine problem. Check engine speeds according to the engine service manual.
2	2330 to 2420	
3	Above 2295	
4	Above 2270	

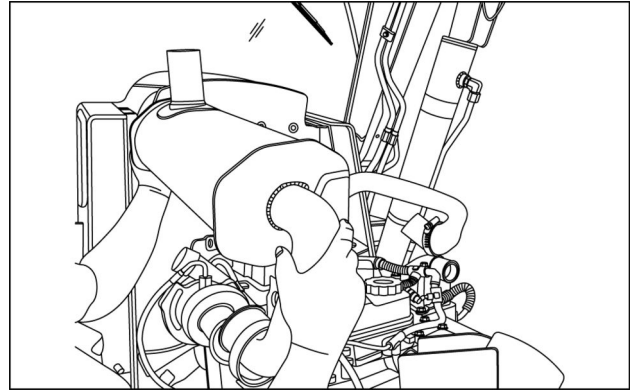
27. Move the engine forward and raise the engine. Remove the engine from the machine.

NOTICE: *Make sure that the flex plate/converter assembly stays in place on the transmission. If the engine will be separated from the transmission for an extended period of time fasten the flex plate/converter assembly in place on the transmission.*

Next operation:

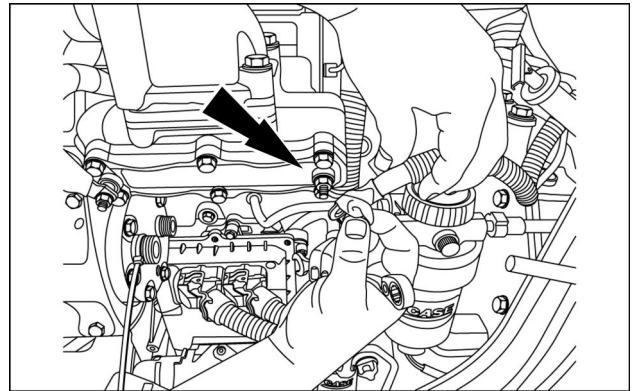
Engine - Install - 580SN, 580SN-WT, 590SN only (10.001).

12. Remove the muffler.



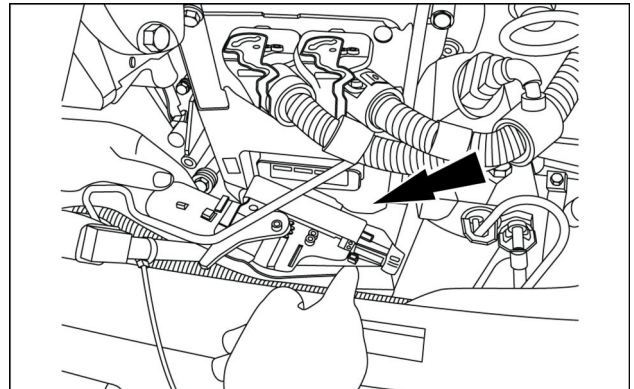
RCPH11TLB044AAM 12

13. Disconnect the grid heater connection.



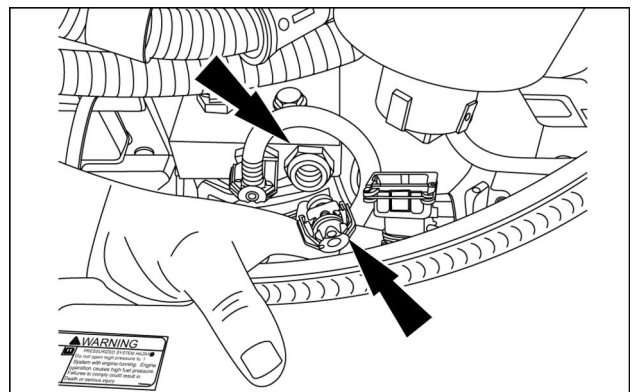
RCPH11TLB045AAM 13

14. Disconnect the Electronic Control Unit.



RCPH11TLB046AAM 14

15. Disconnect the return fuel line.



RCPH11TLB047AAM 15

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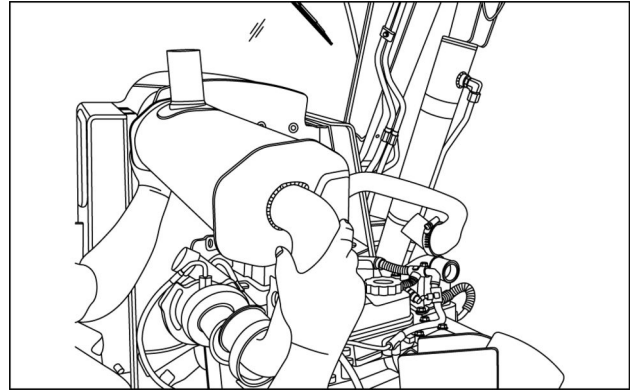
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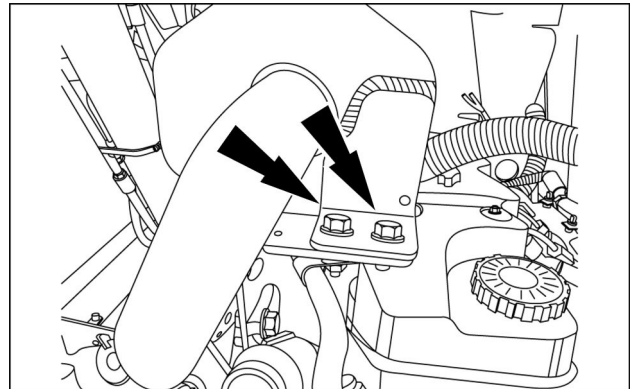
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20. Install the muffler.



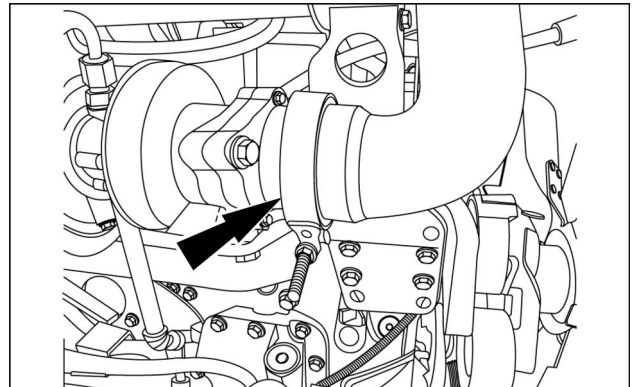
RCPH11TLB044AAM 20

21. Install the muffler front and rear mounting hardware.



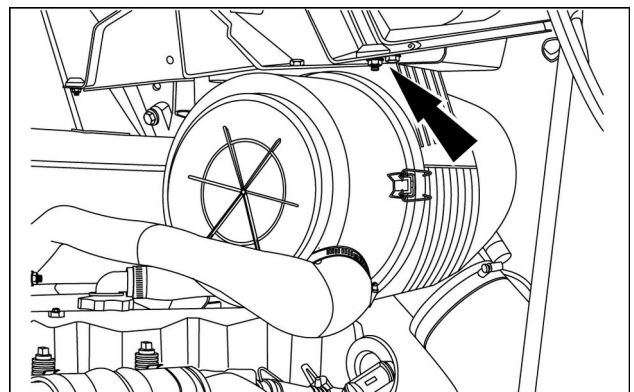
RCPH11TLB043AAM 21

22. Install the muffler to turbo clamp.



RCPH11TLB042AAM 22

23. Install the fixed hood with the air cleaner.



RCPH10TLB031AAL 23

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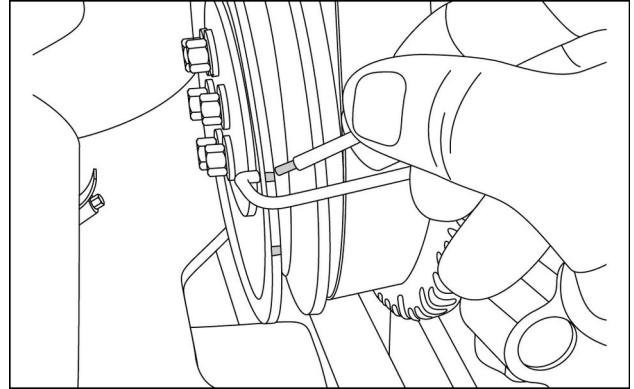
SERVICE

Fuel tank	
Remove	3
Install	5

8. Continue to turn the engine in a clockwise direction, approximately 1/5 turn, until the piston is on a down cycle.
9. Install tool 380001435 to open the No. 1 cylinder intake valve.
10. Turn the engine in a counter-clockwise direction until the piston makes contact with the valve.

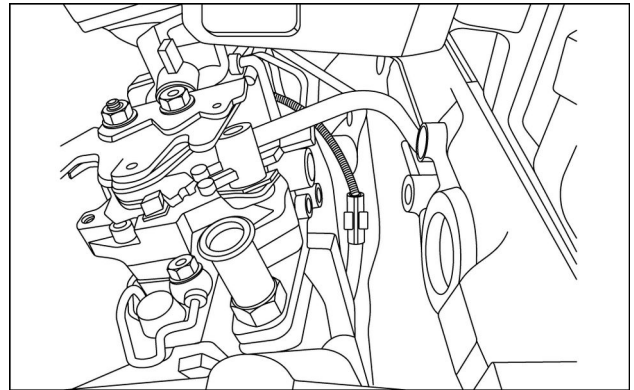
NOTICE: Do not use excessive force with the tuning tool, otherwise damage to the intake valve will occur.

11. Mark the AC belt pulley (1) using the rod as a reference.



RCPH10TLB745ABL 4

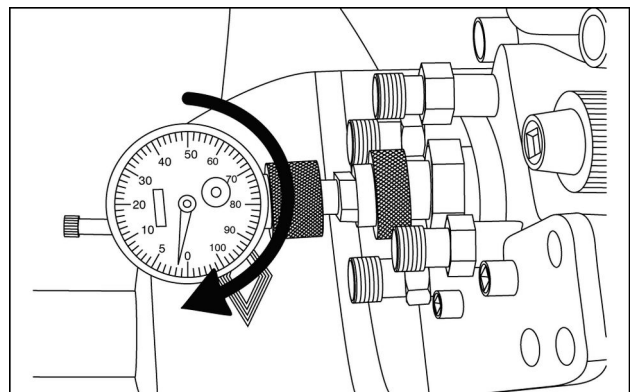
12. Measure between the marks and make a third mark at the midpoint (1). When aligned with the reference rod, this mark indicates TDC. Use it to time the pump with the engine.



RCPH10TLB746ABL 5

Checking Static Timing

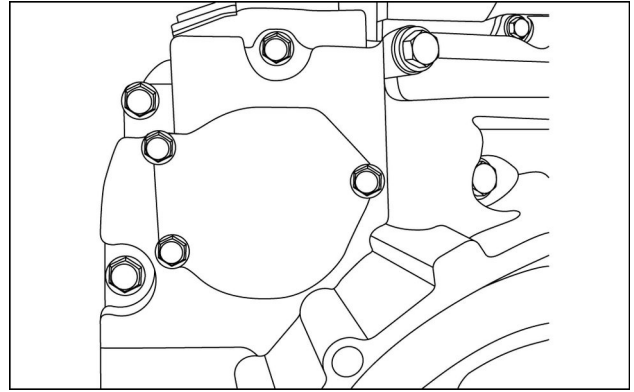
1. Remove tool 380001435 closing the intake valve.
2. Locate the timing plug at the center of the four injection lines and remove it with a **12 mm** socket.
3. Install adapter (1) CAS 2458 and insert the indicator gauge (2) CAS 1745-1 into the pump.



RCPH10TLB747ABL 6

4. Preload the gauge approximately **2.5 mm (0.1 in)**.

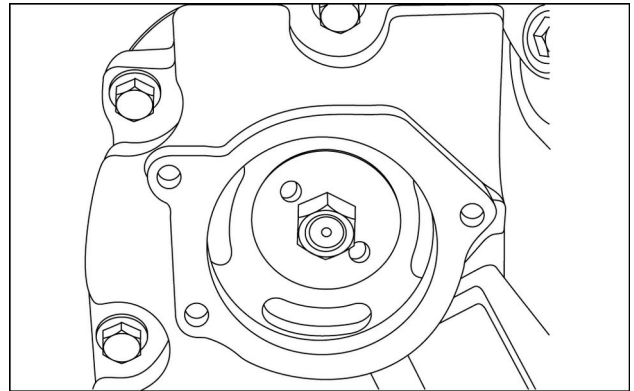
22. Reaching through the inlet hole in the frame, remove the three plate retaining bolts, remove the plate.



RCPH10TLB733ABL 19

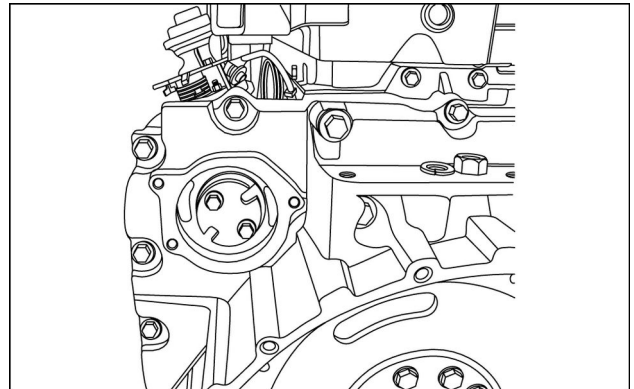
23. Loosen and remove nut and washer.

NOTICE: Use caution when removing nut and washer they can be dropped inside of the engine, requiring the engine to be disassembled in order to remove the hardware. Failure to comply will result in engine damage.



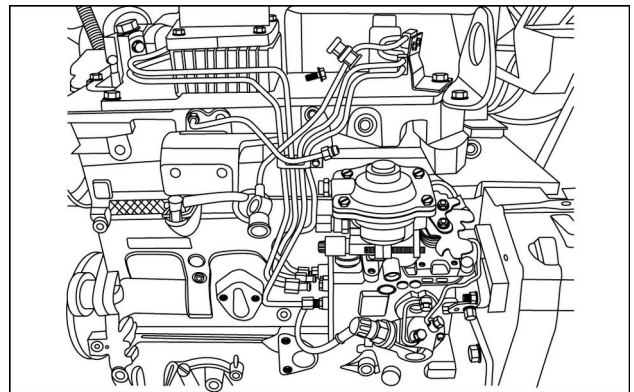
RCPH10TLB734ABL 20

24. Install gear puller and tighten bolts until gear is loose.



RCPH10TLB735ABL 21

25. Remove the three mounting nuts from the studs, two are located at arrows, one is located at the bottom of the pump. Remove the pump from the engine.



RCPH10TLB728ABL 22

Next operation:
Injection pump - Install (10.218)

Exhaust manifold - Exploded view - 580N only

580N Four-Wheel Drive (4WD) TIER 3	
580N Two-Wheel Drive (2WD) TIER 3	---

1. Muffler	4. Bolts (2), nuts (2), and washers (4)	7. Bolt (1), spacer (1), and washer (1)
2. Bolts (2) and washers (2)	5. Bolts (2), nuts (2), and washers (4)	8. Bolt (1), nut (1), and washers (2)
3. Clamp T bolt	6. Bolt (1), nut (1), and washers (2)	9. Aspiration hose

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Intake and exhaust manifolds and muffler - 254

Exhaust manifold - Exploded view - 580N only (*)	4
Exhaust manifold - Exploded view - 580SN, 580SN-WT, 590SN only (*)	6
Exhaust manifold - Install - 580N only (*)	10
Exhaust manifold - Install - 580SN, 580SN-WT, 590SN only (*)	13
Exhaust manifold - Remove - 580 only (*)	8
Exhaust manifold - Remove - 580SN, 580SN-WT, 590SN only (*)	11

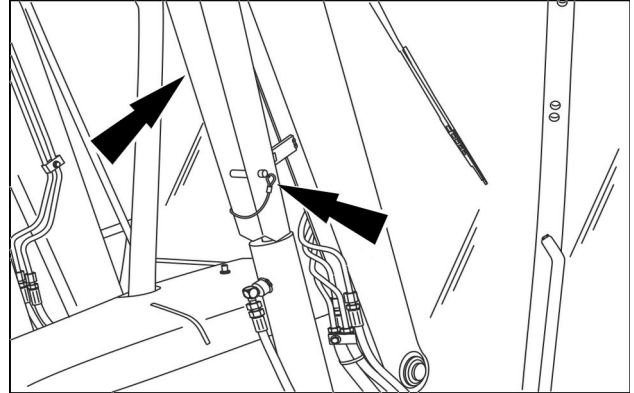
(*) See content for specific models

Radiator - Remove - 580N only

580N Four-Wheel Drive (4WD) TIER 3	
580N Two-Wheel Drive (2WD) TIER 3	---

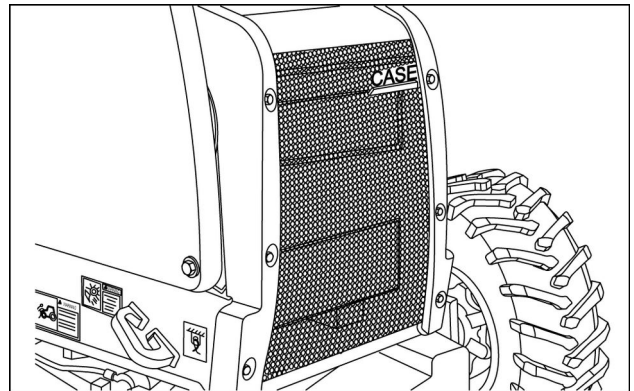
NOTE: The photos in this procedure may be different from your machine and are for reference only.

1. Put identification tags on all disconnected hoses and wires. Close disconnected hoses and fittings with caps and plugs.
2. Park the machine on a level surface. Raise the loader and lock the support strut **(1)** to hold the loader. Stop the engine and apply the parking brake.



RCPH10TLB227AAF 1

3. Remove the cap screws, bumpers and the grill from the front of the machine.



RCPH10TLB051AAL 2

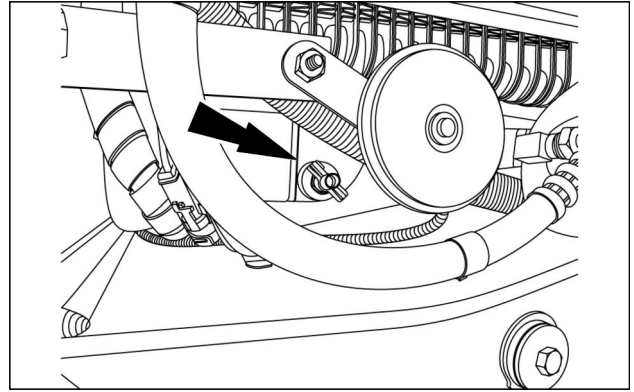
4. Open the hood. Connect acceptable lifting equipment to the hood.



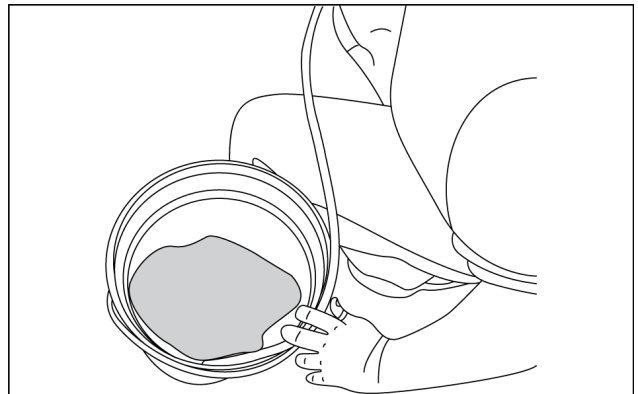
RCPH10TLB356AAF 3

5. Do the following procedure to remove the hood:
 - A. Remove the retainers from the hood struts and disconnect the hood struts from the stud.
 - B. Disconnect the hood cable from the radiator shroud.
 - C. Carefully lower the hood back to the closed position.

4. Drain the coolant.

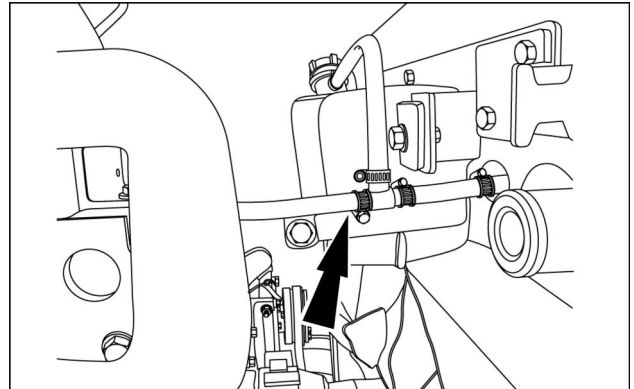


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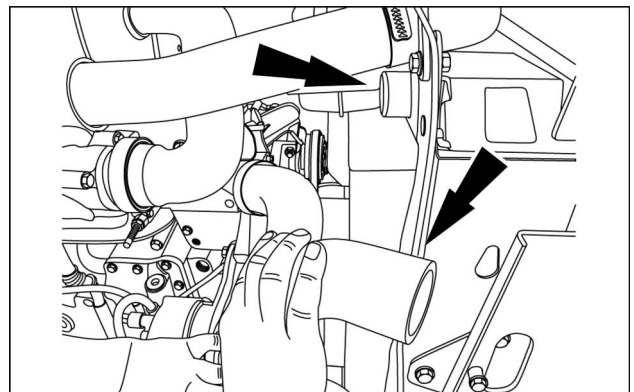
RCPH11TLB012AAM 5

5. Remove the radiator purge hose.



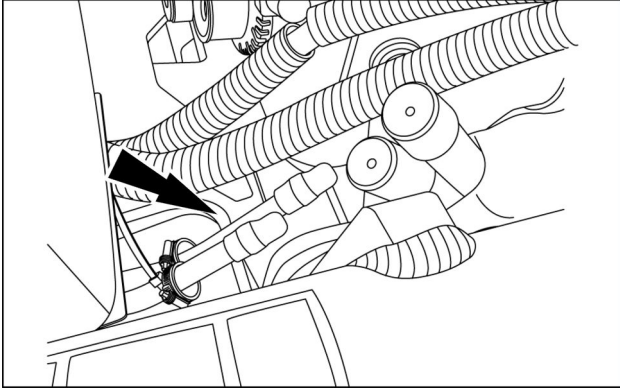
RCPH11TLB013AAM 6

6. Remove the upper radiator hose.



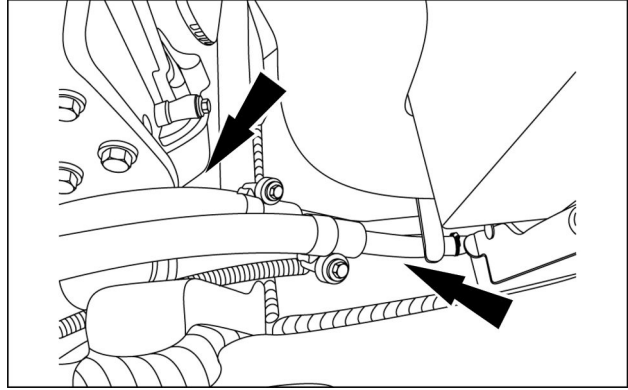
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Left hand oil cooler lines



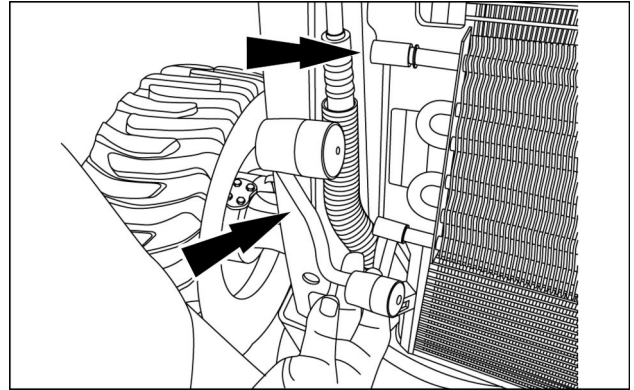
RCPH11TLB026AAM 8

Right hand oil cooler lines



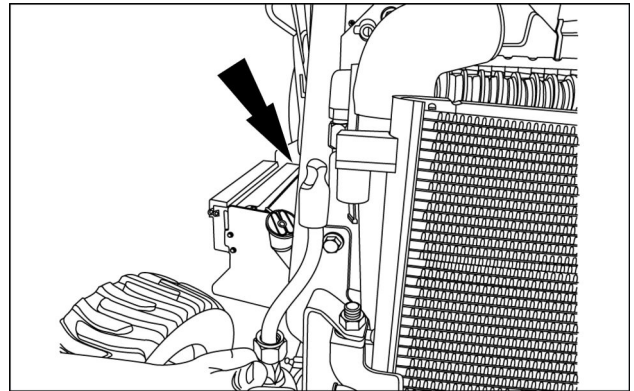
RCPH11TLB025AAM 9

9. Connect fuel cooler lines and remove the caps from the open ports.



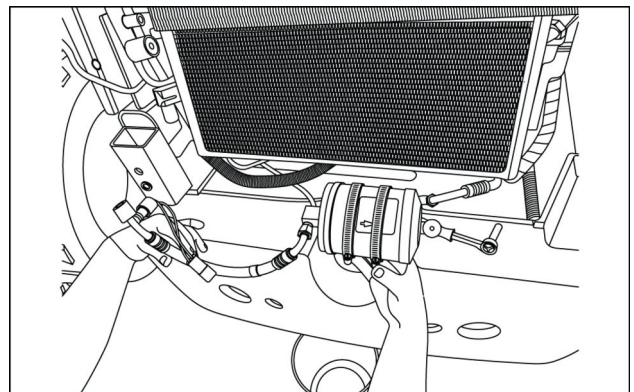
RCPH11TLB024AAM 10

10. Remove the cap and install the upper condenser line.



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11. Move the dryer into place and secure to the frame.



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