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**FARMALL® 105U EP
FARMALL® 115U EP**
With 16x16 Semi-Powershift Transmission
Tractor

*FARMALL® 105U EP PIN ZxJKxxxxx and above
FARMALL® 115U EP PIN ZEJK14976 and above*

SERVICE MANUAL

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CASE IH
AGRICULTURE



SERVICE MANUAL

Farmall® 105U EP with 16x16 Semi-Powershift transmission [ZxJKxxxxx -]
Farmall® 115U EP with 16x16 Semi-Powershift transmission [ZEJK14976 -]

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Capacities

Fluid capacities and lubricant specifications

	approximate	RECOMMENDED CASE IH PRODUCTS	SPECIFICATION CASE IH	INTERNATIONAL SPECIFICATION
Cooling system:	16 l (4.2 US gal)	Mixture of water and antifreeze CASE IH AKCELA PREMIUM ANTI-FREEZE at 50 % + 50 %	MS1710	-
Windscreen wash reservoir	2 l (0.5 US gal)	Water & cleaning liquid	-	-
Fuel tank:	165 l (43.6 US gal)	Decanted, filtered diesel fuel	-	-
Engine sump:				
Minimum	6.4 l (1.7 US gal)	CASE IH AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40 or CASE IH AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40	MAT3521	API CJ-4 ACEA E9
Maximum	8.1 l (2.1 US gal)			
Brake control circuit	0.7 l (0.18 US gal)	CASE IH AKCELA LHM FLUID	-	ISO 7308
Front axle:	4.5 l (1.2 US gal)	CASE IH AKCELA NEXPLORE™ FLUID	MAT3525	API GL4 ISO 32/46 SAE 10W-30
Final drives (each)	1.0 l (0.3 US gal)			
Transmission Ring/Pinion Gears final drives and brakes ECM No. hydraulic lift torque of engine at power steering	63 l (16.6 US gal)			
Front wheel hubs	-	CASE IH AKCELA 251H EP MULTI-PURPOSE GREASE	-	NLGI 2
Grease fittings	-			
Air-conditioning refrigerant	650 g (22.9 oz)	-	-	R134 A
Air-conditioning compressor oil	0.185 l (0.05 US gal)	-	-	SP10

NOTICE: Avoid using fuel with sulfur content higher than 50 mg/kg (50 ppm or 0.005%)

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Engine

Farmall® 105U EP with 16x16 Semi-Powershift transmission [ZxJKxxxxx -]
Farmall® 115U EP with 16x16 Semi-Powershift transmission [ZEJK14976 -]

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Engine - General specification

GENERAL SPECIFICATIONS	4 Cylinders
Engine, technical type: Farmall 105U Farmall 115U	F5DFL413B*A006 F5DFL413B*A002
Engine rpm - high - nominal - low	2400 - 2500 RPM 2300 RPM 700 - 800 RPM
Cycle	diesel, 4-stroke
Fuel injection	Direct
Number of cylinders in line	4
Bore - All models - Piston diameter - Piston stroke	99 mm (3.8976 in) 110 mm (4.3307 in)
Total displacement: - All models	3400 cm³
Compression ratio All models	17 ± 0.5 : 1
Maximum Power Output: - Farmall 105U - Farmall 115U Maximum power speed	79 kW (107 Hp) 84 kW (114 Hp) 2300 RPM
Peak torque - Farmall 105U - Farmall 115U Peak torque speed	444 N·m (327.48 lb ft) 461 N·m (340.02 lb ft) 1500 RPM
Torque increase - Farmall 105U - Farmall 115U	35 % 32 %
Power at the power take-off - Farmall 105U - Farmall 115U	68.6 kW (93.3 Hp) 73.9 kW (100.4 Hp)
Number of main bearings	5
Sump	structural, cast iron
Lubrication	forced, with lobe pump
Pump drive	from crankshaft
Oil filtration	mesh screen on oil intake and filter cartridge on delivery line
Engine oil pressure switch operating pressures: - contacts closing* with decreasing pressure. - contacts opening* with increasing pressure. * with the contacts closed the engine oil pressure warning light is on	0.2 bar (2.90 psi) 0.9 bar (13.05 psi)
Cooling	coolant circulation
closing	with five rows of vertical pipes
Capacity	16 l (4.23 US gal)
Fan with viscous joint, fixed to the specific pulley	∅ 520 mm (20.4724 in)
Coolant pump	intake, in plastic with 10 blades
Coolant thermometer	colored scale divided into three sections
Temperature ranges corresponding to each section: - initial dark blue sector - final red sector	normal temperature high temperature
dark blue area - Start of opening	via thermostat valve 80 °C (176.00 °F)
Timing	overhead valves operated by tappets, rods and rocker arms via the camshaft located in the engine block; the camshaft is driven by the crankshaft using straight-tooth gears

Engine - Engine and crankcase

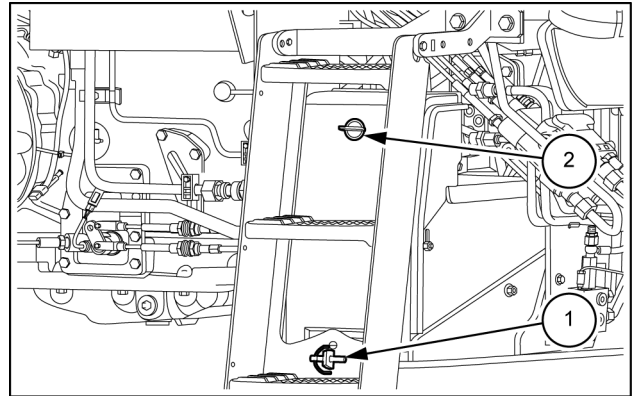
GENERAL SPECIFICATIONS	4 Cylinders
Intake: - start: before P.M.S. - end: after P.M.I.	19 ° 37 °
Exhaust: - start: before P.M.I. - end: after P.M.S.	61 ° 21 °
Clearance between valves and rocker arms with engine cold.	The valve clearance is hydraulically controlled. Therefore, manual adjustment is not necessary.
Turbocharging	Turbocharged with intercooler
Air cleaning	dual cartridge dry air cleaner, with clogged filter indicator with centrifugal pre-filter and automatic dust ejector
Fuel filtration	by mesh prefilter on the supply pipe, suction line filter with water - fuel separator, low pressure filter and sensor.
Priming pump Injection pump Type Nozzles type Injection pressure	Manual mounted on the suction line filter BOSCH High pressure Common Rail control unit HPCR - CP4.1 Electro-injectors 300 - 1400 bar (4350.00 - 20300.00 psi)
Filling: Engine sump Fuel tank	6.4 - 8.1 l (1.69 - 2.14 US gal) 140 l (36.98 US gal)
Anti-pollution system Type:	Exhaust gas recycling system EGR Particulate filter DPF*
Recommended frequency for renewing filter	every 3000 hours

NOTE: * - For filter maintenance please refer to: (*Diesel Particulate Filters (DPF) - Dynamic description manual regeneration of the diesel particulate filter (DPF) (55.408)*).

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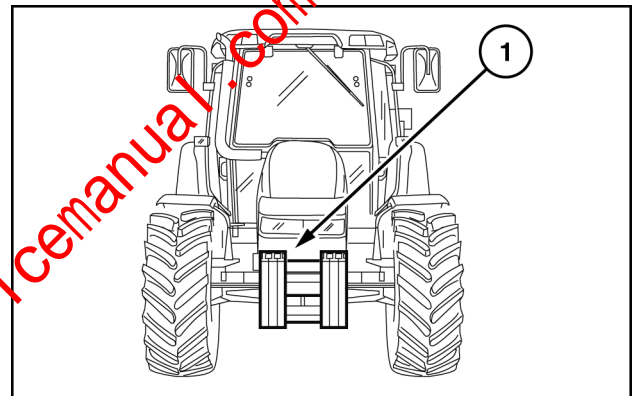
Engine - Remove

1. Remove the engine hood (1), as indicated in **Hood - Remove (90.100)**.
2. Open the lock (1) to release the lower steps of the ladder. Remove the battery cover (2). Disconnect the negative cable of the battery.



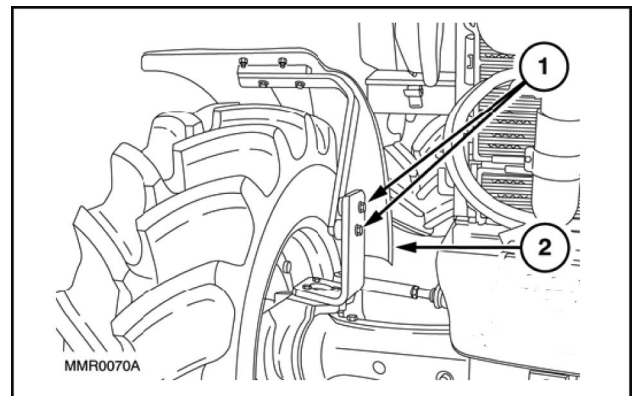
MOIL12TR00670AA 1

3. Remove the cotter pins, retaining pin, and the complete front ballasts (1) from the relative support.



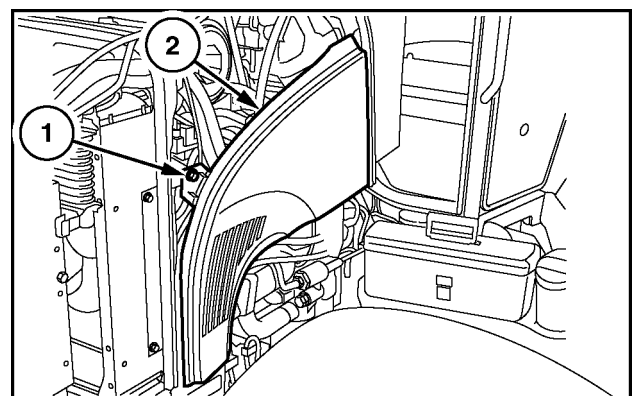
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4. Loosen the retaining screws (1). Remove the front fenders (2) from both sides (if present).



WLAPL4S10C104A 3

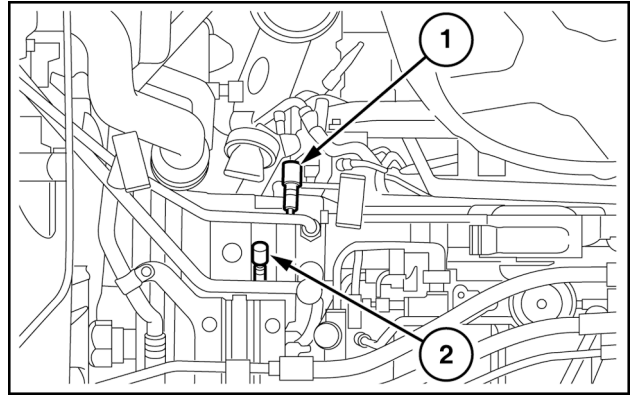
5. Remove the retaining screws (1). Remove the left-hand engine side panel (2). Perform the same operation for the right-hand side panel. Remove the storage compartment.



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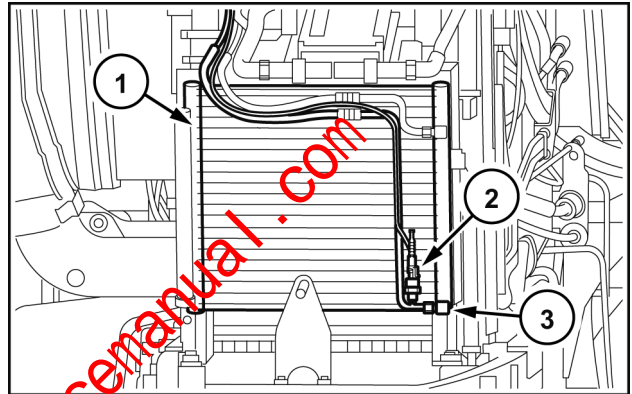
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6. Use the special tool **380000315** to recover the refrigerant liquid from the system via the fittings **(1)** and **(2)**. Remove the tube **(1)**. Clear the section of brackets and clamps. Move the tube onto the capacitor (**(1)**, **(6)**). Remove the tube **(2)**. Clear the section. Move the tube onto the cab.



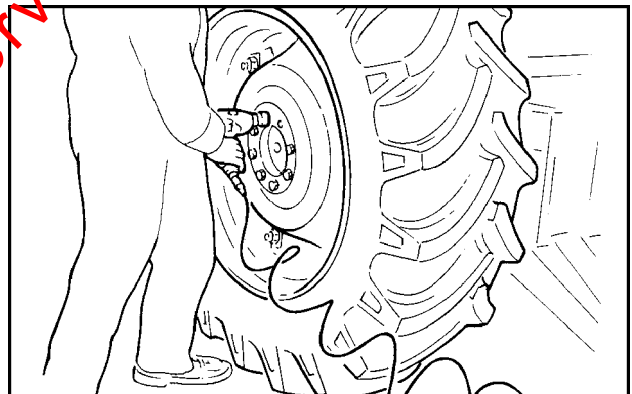
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7. At the front of the engine, remove the lower tube **(3)** on the capacitor **(1)**. Free the tube from any straps or clamps. Disconnect the sensor **(2)**. Move the tube onto the cab.



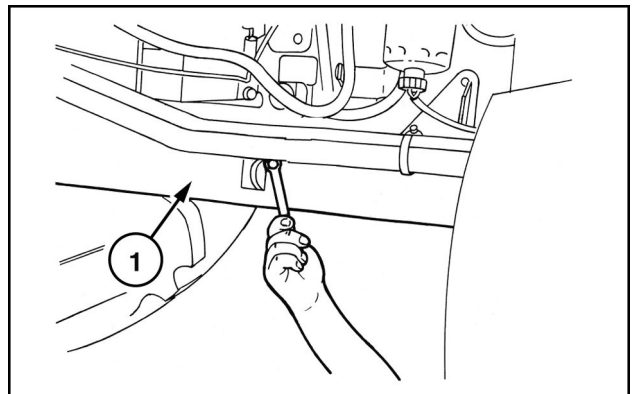
WLAPL4S10C107A 6

8. Raise the rear of the tractor with a hydraulic jack. Place a mechanical jack stand under the reduction gear box. Use a pneumatic gun to remove the retaining nuts of the left-hand rear wheel. Then remove the wheel.



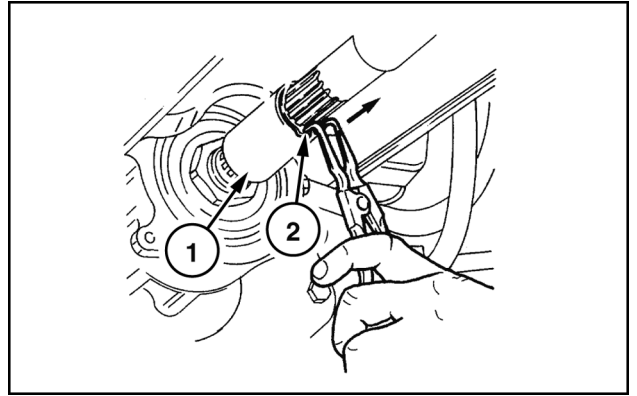
WLAPL4S10C110A 7

9. Loosen the front, central, and rear retaining screws of the curtain **(1)** of the front axle control shaft. Remove the curtain.



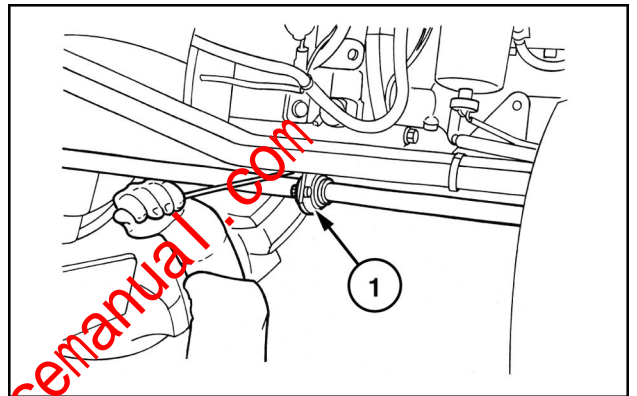
WLAPL4S10C112AA 8

10. Remove the circlip (2). Move the front sleeve (1) in the direction indicated by the arrow in order to release the sleeve from the groove on the front axle.



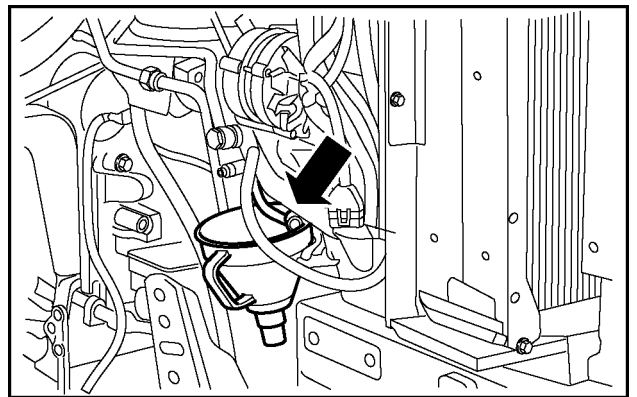
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11. Remove the screws that secure the central support (1) from the drive shaft. Retrieve the shaft together with the support. Retrieve the shim that adjusts the clearance of the shaft on the back.



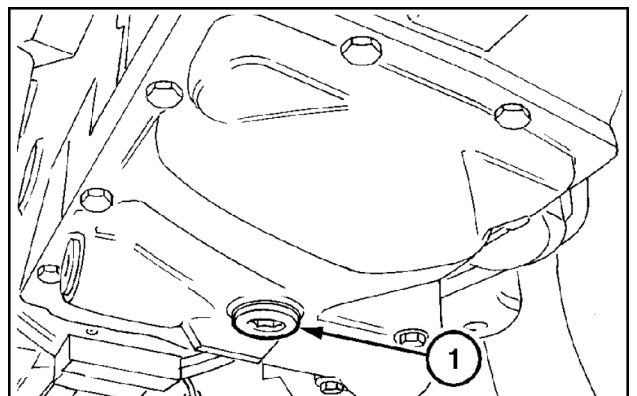
WLAPL4S10C115AA 10

12. Loosen the inlet of the water return line from the cab heater radiator. Drain and retrieve the engine coolant.



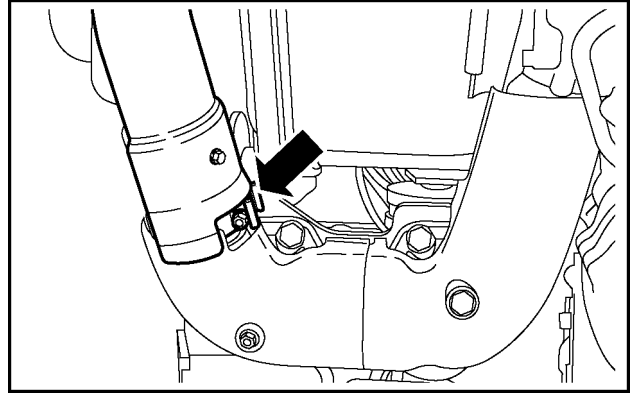
WLAPL4S10C116A 11

13. Remove the cap (1). Drain the oil from the transmission box.



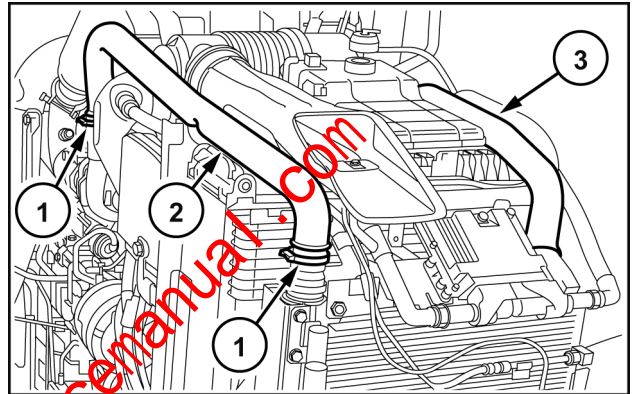
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14. Loosen the device that fastens the muffler to the exhaust pipe. Free the exhaust pipe from any cab support fastening brackets. Loosen the connection to the DPF filter. Then remove the exhaust pipe.



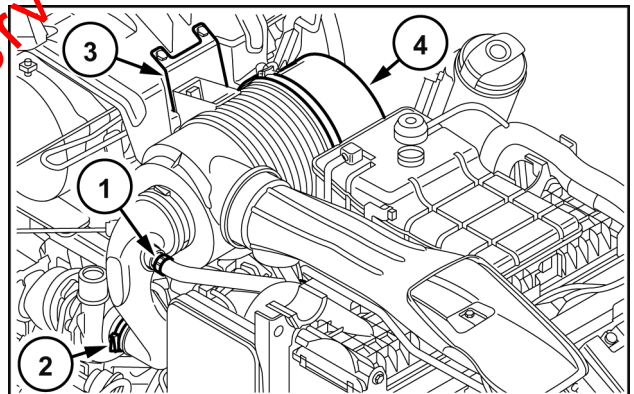
WLAPL4S10C118A 13

15. Loosen the fixing clamps (1). Extract the tubing from the turbine to the radiator intercooler (2). Perform the same operation for the tubing from the radiator intercooler to the engine (3).



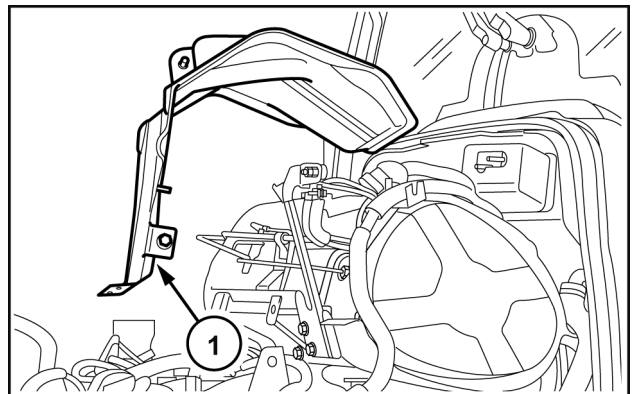
WLAPL4S10C119A 14

16. Loosen the clamp (2) that joins the air inlet duct to the turbine. Release the air filter (4), together with the bracket (3), from the retaining screws. On the left-hand side of the engine, disconnect the oil vapor duct (1) from the fuel pump.



WLAPL4S10C120A 15

17. Release the air filter support (1) from the retaining screws. Remove the air filter support.

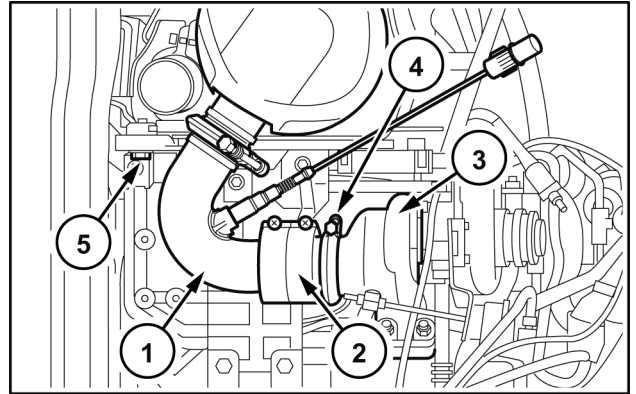


WLAPL4S10C121A 16

ATTENTION: The DPF (1) filter outlet union has a decoupler at the end (2). The decoupler only responds to temperature variations longitudinally.

A small misalignment of the axis of the decoupler with respect to the axis of the turbine outlet (3) would produce an adjustment that would no longer be longitudinal, in line with the direction of the tractor. This small misalignment would produce an abnormal transversal adjustment, which would affect its durability.

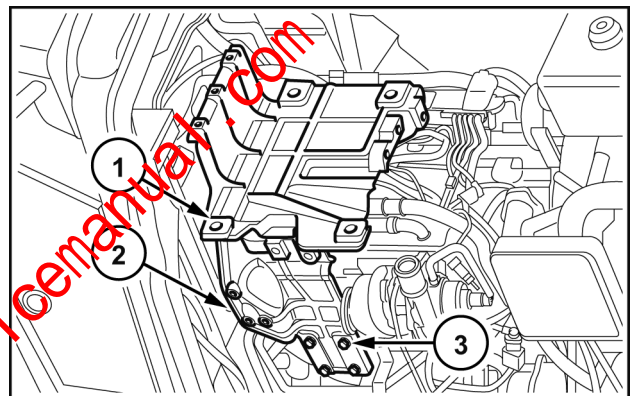
18. Disconnect all of the filter sensors. Loosen the clamp (4). Loosen the four screws (5) that secure the filter to the bottom support to remove the filter together with the sensors and heat shields.



WLAPL4S10C122A 17

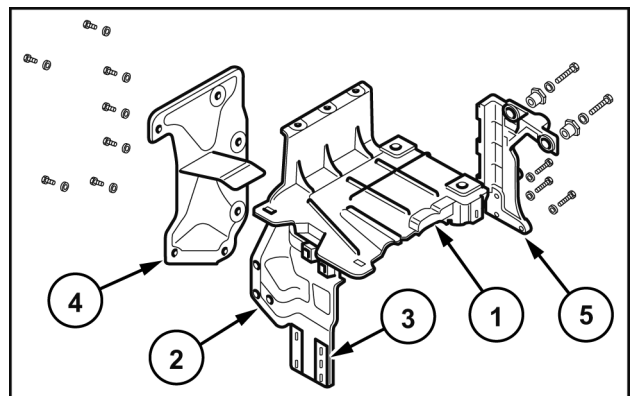
ATTENTION: Only if you have to work on the parts underneath the DPF filter support, it is advisable to remove the support.

When possible, you should remove the upper part (1) and the right-hand part (2) as a block. To do this, remove the retaining screws (3) on the right-hand side of the engine. (These screws work on a vertical slot, so that the support (2) can have various height positions.) Before disassembly, it is necessary to take some references of the position on the engine, so that you can return the block to the original position during reassembly.



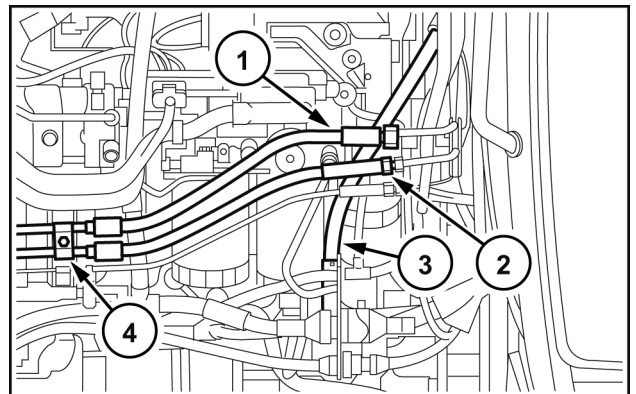
WLAPL4S10C123A 18

19. To remove the rear shield, loosen the two screws that fix the support (4) to the support (1). To remove the left-hand support (5), loosen the two retaining screws on the left-hand bracket (1). Retrieve the respective centering bushings.



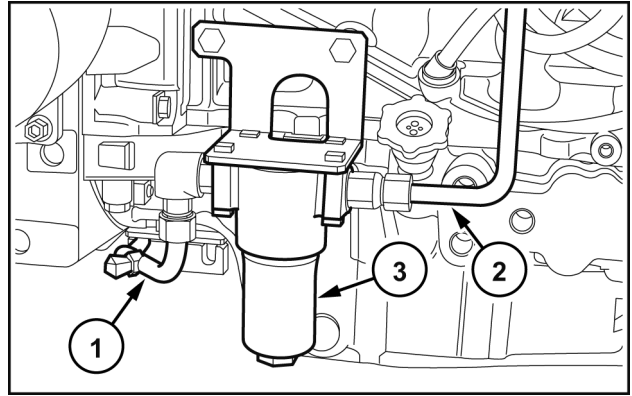
WLAPL4S10C124A 19

20. Disconnect the steering control lines (1) and (2). Disconnect the oil supply line to the distributor (3). Remove the fastening (4) of the engine lines.



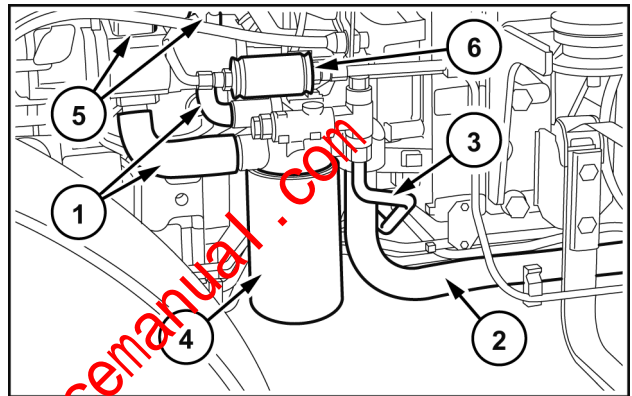
WLAPL4S10C125A 20

21. Disconnect the exhaust pipe (2) of the power-steering control valve. Disconnect the power supply line (1) of the transmission control valve. Then remove the filter (3) together with the support.



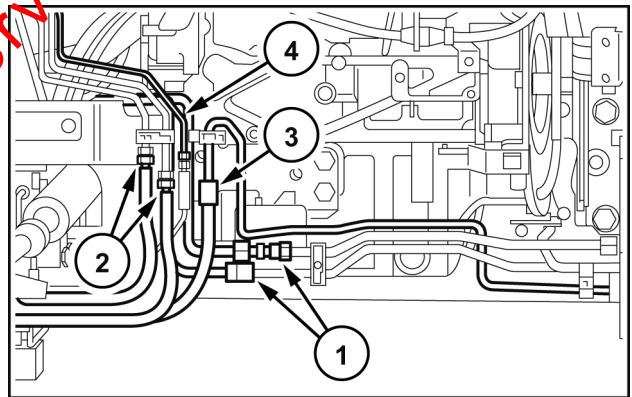
WLAPL4S10C126A 21

22. Disconnect the inlet pipes from the pump (1). Disconnect the inlet pipe (2) from the transmission oil filter, at the height of the cab support. Disconnect the supply line to the lift (3). Disconnect the supply lines (5) to the lift and to the power-steering anti-cavitation tank (6).
23. Remove the filter assembly (4) together with the tank (6), support, and parts of the tubing that were previously disconnected.
24. Remove the power-steering pump assembly from the high-pressure circuit.



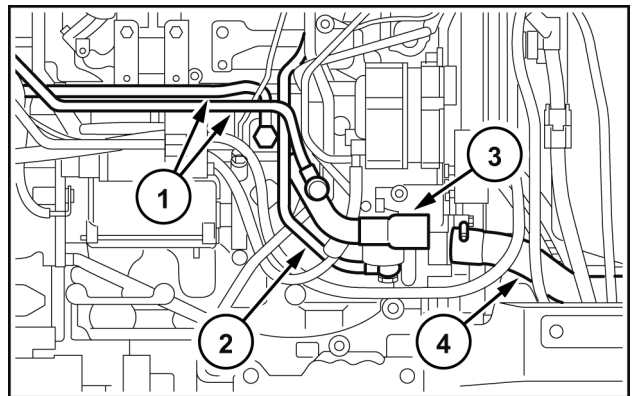
WLAPL4S10C127A 22

25. Remove the tubes of the heat exchanger (1), differential lock (3), and (if applicable) front braking assembly (4).
26. Release the lines that were previously disconnected from the supports, brackets, and clamps secured to the engine. Do the same for the lines directed to the steering cylinder (2).



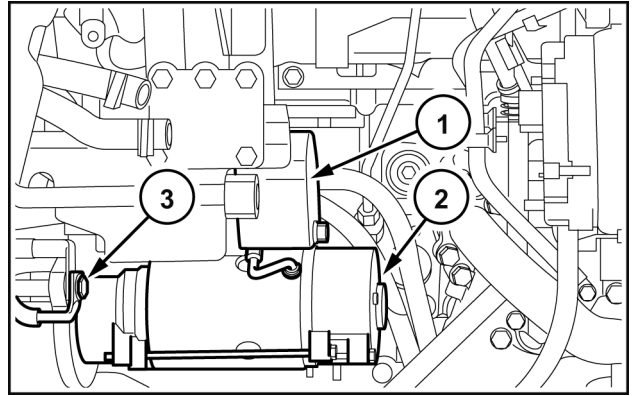
WLAPL4S10C128A 23

27. On the right-hand side of the engine, disconnect the cab heating lines (1). Disconnect the tubing from the expansion tank that is inserted on the engine sleeve (3). Loosen the clamps. On the engine, disconnect the connecting rubber sleeves (4) of the radiator.



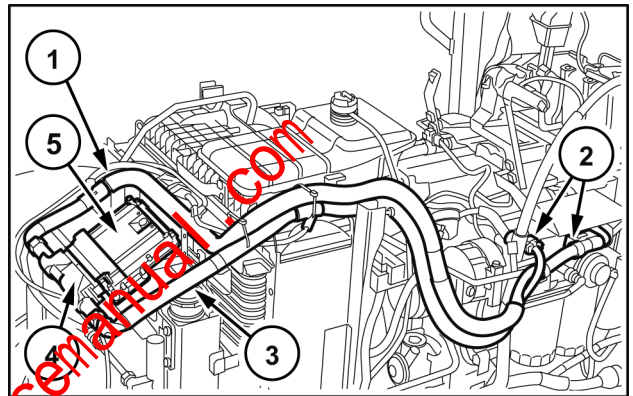
WLAPL4S10C134A 24

28. On the right-hand side, remove the guard (1) on the starter motor (2). Disconnect the starter cable and battery isolator. Disconnect the alternator and the respective connecting cable. Release all of the wiring from the fixing clamps.
29. Loosen the fastening (3). Remove the ground connection cable. Remove starter



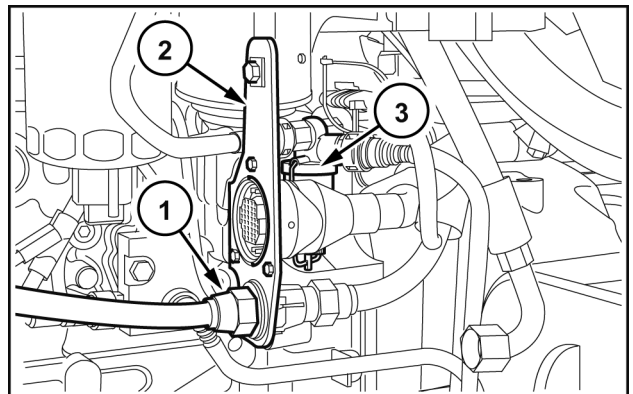
WLAPL4S10C135A 25

30. On the FTP interface cable (1) with the motor, disconnect all of the connections (2), except for the connections on the maxi fuse compartment and on the glow plug controller. After you cut the fixing clamps, reconnect the cable on the front near the controller (5).
31. On the main engine cable (3), disconnect the connectors from the controller (4) including the maxi fuse compartment, switches, and sensors positioned on the engine. After you cut the fixing clamps, move the cable onto the rear of the engine at the height of the right-hand ladder.



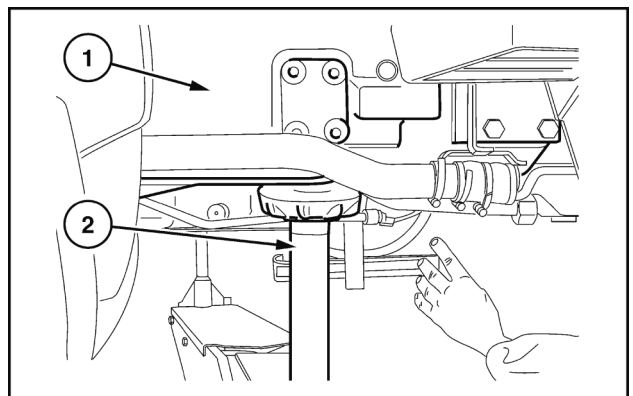
WLAPL4S10C137A 26

32. On the left-hand side, disconnect the cab power cable connector (1). Release the connector from the clamps. Move the connector onto the maxi fuse compartment.
33. Remove the bracket (2) of the cab electrical connectors, cab electrical supply, and cup filter (3). Disconnect the tubing that joins the cup filter to the mechanical priming pump on the sediment filter.



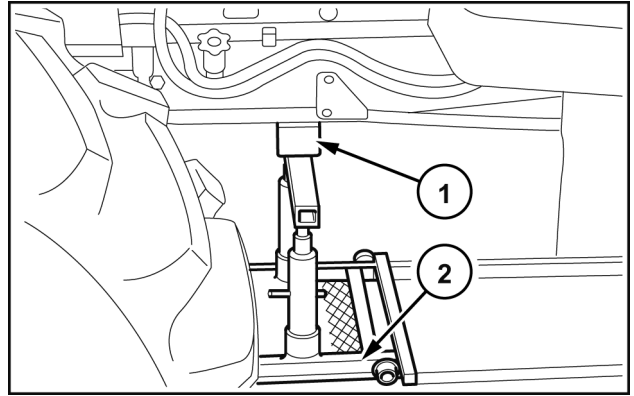
WLAPL4S10C139A 27

34. Hook the rear part of the engine to a hoist using chains or ropes for lifting. (Apply two eyebolts, one to the right-hand side and one to the left-hand side, on the upper part of the flange containing the flywheel.) Position a fixed jack stand (2) under the clutch case (1) near the engine attachment flanging.



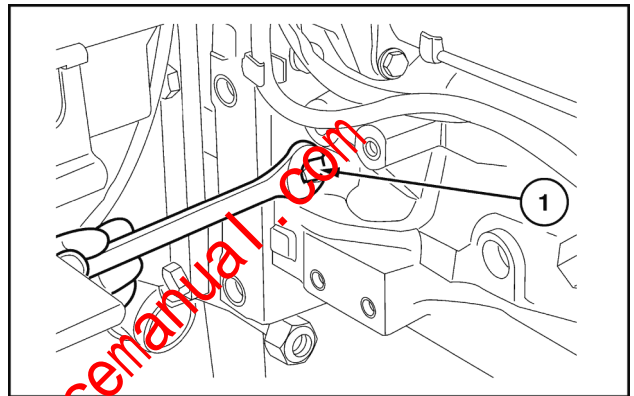
WLAPL4S10C129A 28

35. Position the movable tractor splitting tool **380003114** **(2)** with the support bracket and adapter plate under the engine. Place a wooden block **(1)** at the points of contact between the tool and the engine. Wedge the axle to prevent swinging.



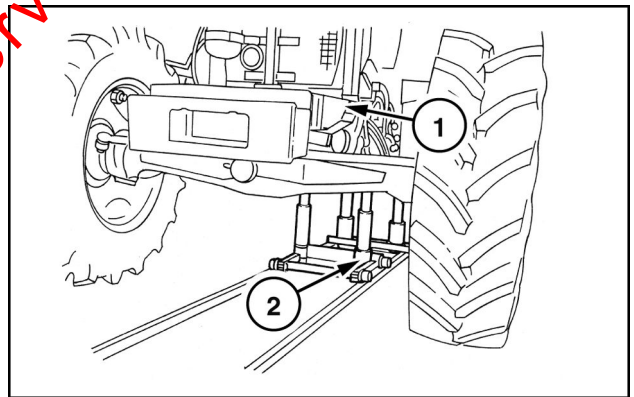
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36. Remove the retaining bolts **(1)** between the engine and the transmission.



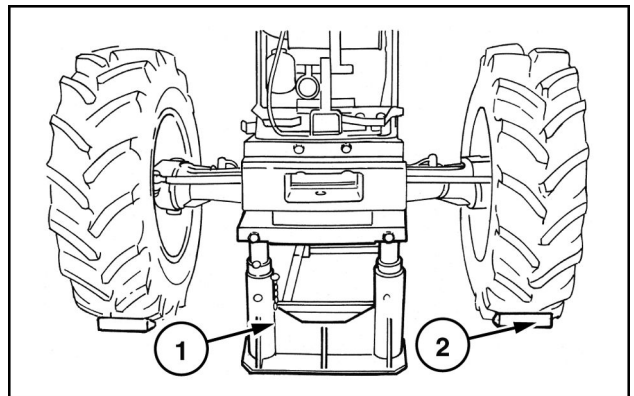
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37. Separate the engine **(1)** from the transmission with the tool **380003114** **(2)**.



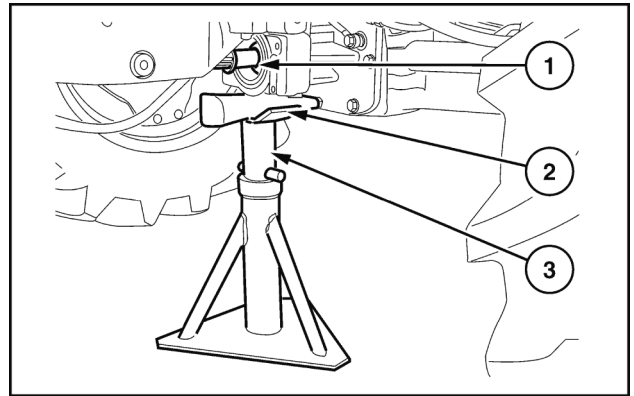
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38. Insert the fixed jack stand **(1)** under the ballast support. Chock the front wheels with wooden blocks **(2)**.



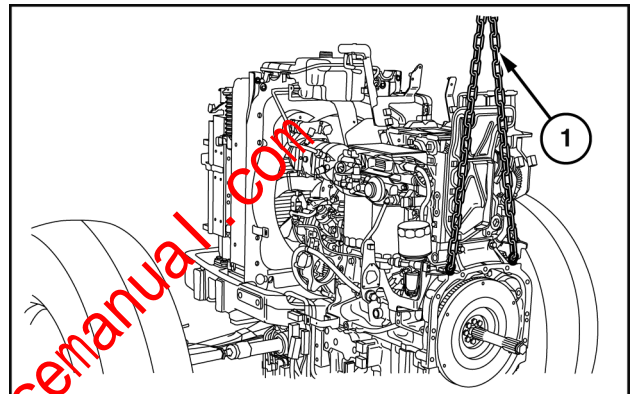
WLAPL4S10C132AA 32

39. Position a fixed jack stand **(3)** under the support of the groove **(1)** of the power take-off of the front axle. Insert a wooden plug between parts **(3)** and **(1)**.



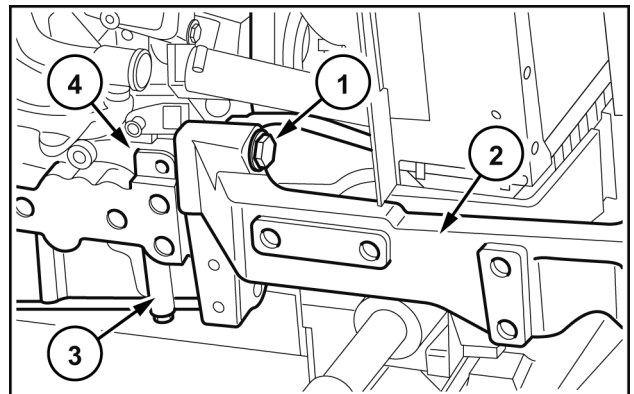
WLAPL4S10C133A 33

40. Position a jack stand under the rear of the engine in order to be able to safely release the hoist with the coupling device. Add a rope or chain also on the front of the engine. Take up the slack with the lifting device. Keep the engine balanced.



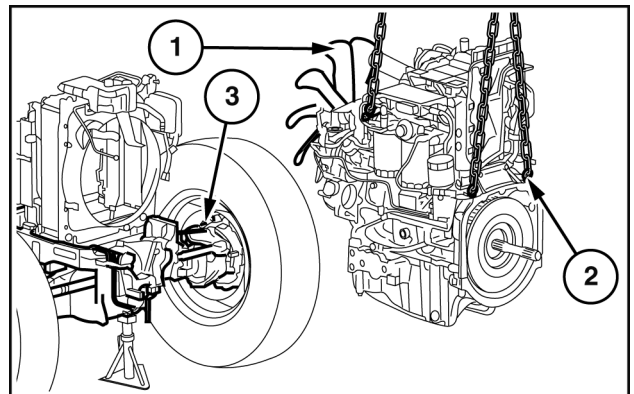
WLAPL4S10C136A 34

41. Remove the screws **(1)** that secure the front axle support **(2)** to the engine. Retrieve the adjuster spacers of the engine block **(4)** or sump **(3)**.



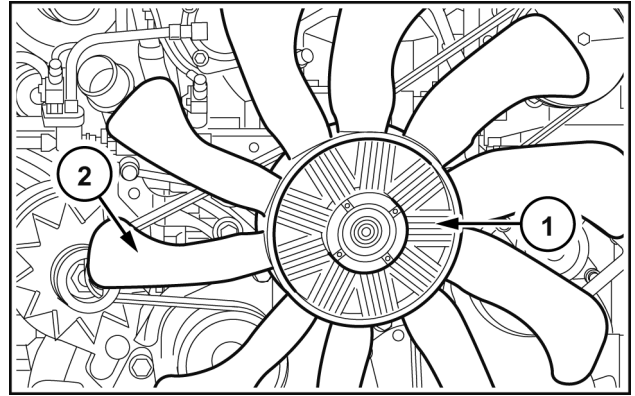
WLAPL4S10C141A 35

42. Check that there are no brackets between the engine and the cooling assembly. Remove the engine **(2)** from the front axle **(3)**. Try to avoid incorrect engine maneuvers in order to not damage the fins or the radiator **(1)** on the axle. Then rest the engine **(2)** on a suitable support.



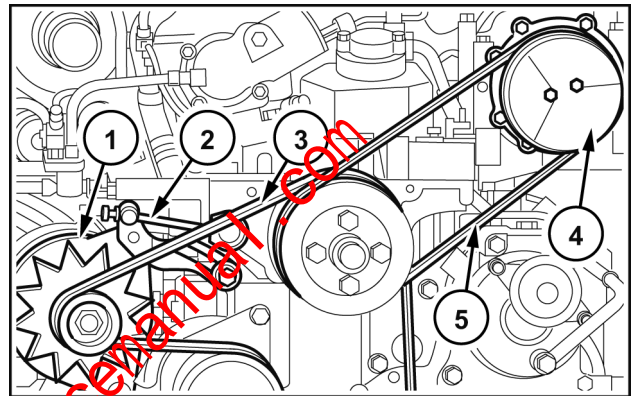
WLAPL4S10C138A 36

43. Remove the viscous coupling (1), if applicable, together with the fan (2).



WLAPL4S10C144A 37

44. Loosen the supercharger retaining screws (4). Remove the belt (5). Then remove the supercharger.
45. Completely loosen the belt tensioner (2). Remove the elastic belt (3). Then remove the alternator (1).

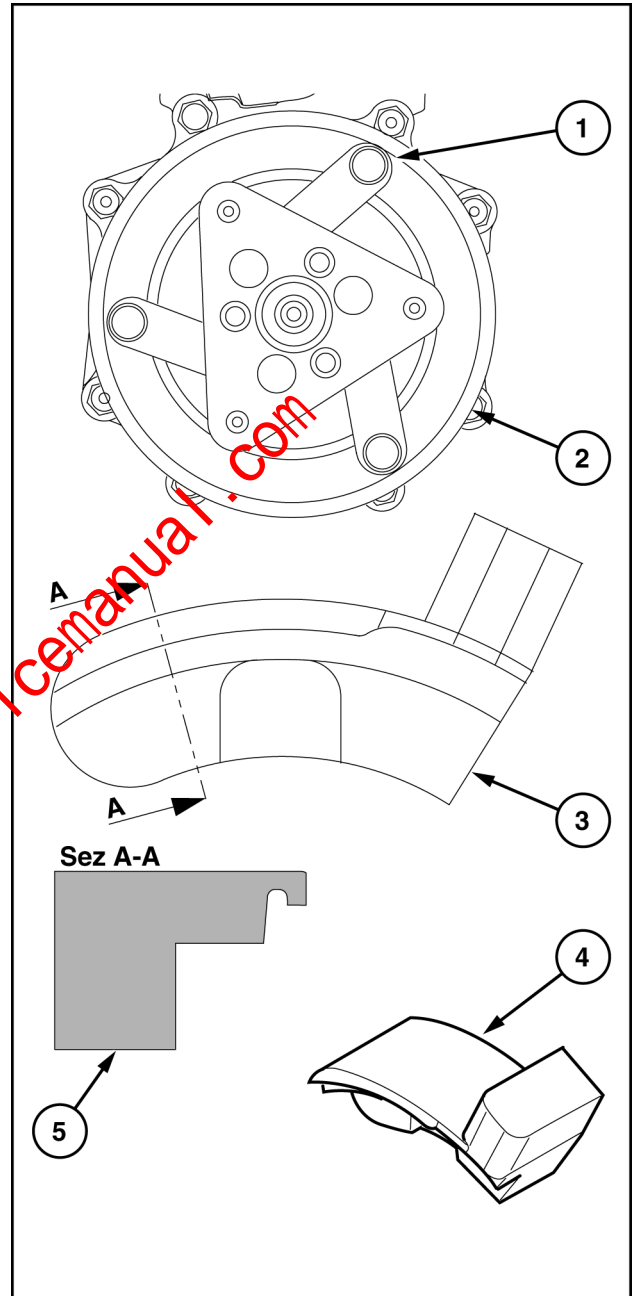


WLAPL4S10C145A 38

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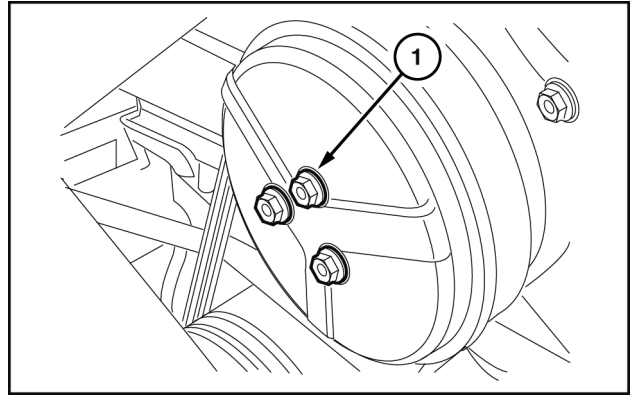
Engine - Install

1. - Refit the flexible belt on the alternator and take up the slack according to the procedure in **Accessory belt - Tension adjust (10.414)**.
2. - Reposition the compressor and the relevant belt following this procedure:
 - Put the compressor back on the support and with the related pipe support. Secure with the bolts
 - To fit the polyv belt, use tool **380200011**.
 - (1). Compressor clutch actuator drive bracket.
 - (2). Outer edge of polyv belt pulley.
 - (3). Tool recess. Used to drive the tool. This recess houses the bracket (1).
 - (4). Tail. Used to drive the polyv belt in the pulley seat.
 - (5). Hitching. Thanks to this recess, where the outer edge (2) is housed, the tool remains hitched to the compressor.



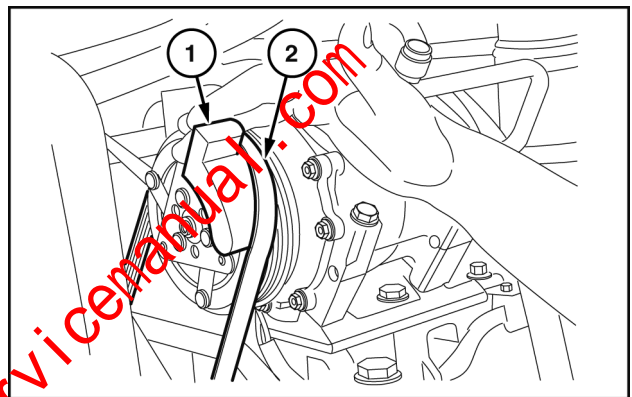
WLAPL4S10C101C 1

3. - Remove the three bolts (1) and the related dust cover for the compressor clutch.



WLAPL4S10C142A 2

4. - Make sure that the polyv belt (2) is perfectly housed on the fan pulley.
5. - Move the belt (2) near to the compressor pulley. Keeping the tool 380200011 under the belt, hook the tool onto the compressor clutch at the innermost part in order to slightly force the belt.

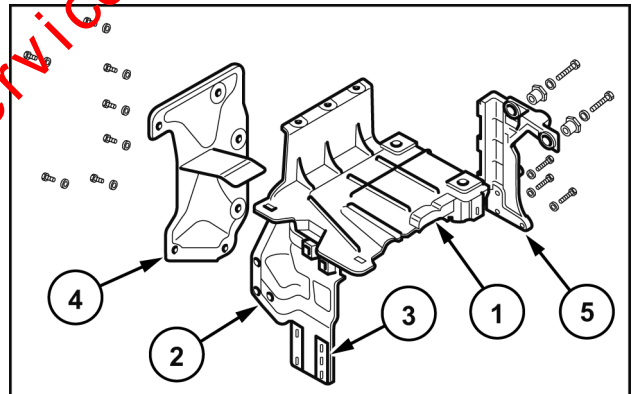


WLAPL4S10C143A 3

6. - With your left hand on the fan and right hand on the tool, move both clockwise in order to take the belt onto the compressor pulley.
 - Put the dust cup back onto the compressor clutch. Tighten the three screws, ensuring that you spread a film of thread lock on the ends so that they do not come loose.
7. - If present, reposition the viscous coupling and reposition the cooling fan.
8. - Apply the required torque settings (see engine section).
9. - Insert the three hooks of the chain in the eyelets on the engine. Using a hoist, lift the assembly off the platform support.
10. - Position the engine on the front axle. Try to avoid incorrect operations with the hoist so as not to let the engine fan damage the fins of the radiator. Then use the four retaining screws and the necessary adjuster spacers of the engine block/sump to join the two assemblies together.
11. - Reposition the movable tractor splitting tool 380003114 under the engine. Place a wooden block in the point of contact between the tool and the engine.

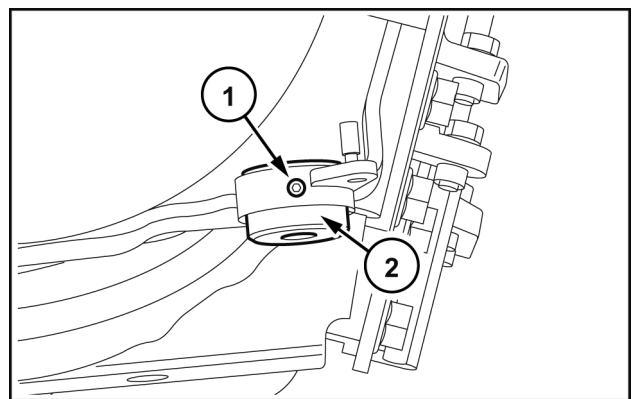
12. - Use the hoist to rest the engine on the tool **380003114**. Remove the lifting eyebolts previously fitted on the rear of the engine.
13. - Remove the fixed jack stand previously positioned under the support of the groove of the front axle drive and the wooden plug.
14. - Remove the fixed jack stand previously installed under the ballast support. Remove the two wooden wedges for locking the front wheels.
15. - Remove the old sealing paste from the two surfaces between the engine and clutch case.
16. - Apply **LOCTITE® 518™** sealing compound on the mating surfaces of the engine and clutch case.
17. - Put a wooden wedge under the right-hand rear wheel. Make sure that the hand brake is fully applied and that all fixed and mobile stands are safely positioned.
18. - The installation phase described below requires the presence of two or three workers to use the movable tractor splitting tool **380003114** to accurately bring the engine/front axle assembly towards the gearbox case.
19. - In the phase of installing the engine/front axle assembly to the gearbox case, it is necessary to push on the front wheels, taking great care in the end phase of coupling over both the pipes and the cables/electrical connections to prevent crushing between the two bodies. Moreover, during this phase it is necessary to turn the crankshaft with the aid of the radiator cooling fan to aid coupling between the sleeve and the drive shaft.
20. - Tighten all of the screws that lock the engine to the gearbox case to secure both of the assemblies.
21. - Disconnect the hoist chains. Remove the jack stand previously placed under the clutch case. Retrieve the movable tractor splitting tool **380003114**.
22. - Refit the bracket for the cab connectors, cab power and cup filter. Connect the pipe that joins the cup filter to the mechanical priming pump on the sediment filter.
23. - On the left-hand side, connect the cab power cable connector. Bring the cab power cable connector to the maxi fuse compartment. Lock the cab power cable connector with clamps.
24. - Return the main engine cable back into position. Connect the connectors to the sensors and the switches located on the engine, on the control unit and on the maxi fuse compartment. Secure the wiring with clamps.
25. - Lay out the FTP interface - engine cable on the machine. Reconnect the various connections. Secure the wiring harnesses with clamps.
26. - Refit the starter motor. Then connect the two ground wires on the engine and battery system.

27. - On the right-hand side, reconnect the positive battery cable and reconnect the wiring harnesses to the starter motor, battery isolator switch and alternator. Refit the shield on the starter motor.
28. - Refit the supply and return lines to the cab heater and the pipe inserted on the lower sleeve coming from the expansion tank. Refit the upper and lower sleeves of the engine radiator connection. Secure the straps and clamps tightening the pipes.
29. - Reconnect the oil filter of the power steering control valve, together with the support. Reconnect the oil drain line from the power steering and reconnect the supply line to the gearbox control valve.
30. - Refit the two oil delivery and return pipes to the heat exchanger and secure the pipes with the relevant clamp.
31. - Refit the power steering pump. Refit the transmission oil filter assembly and secure the screws. Reconnect the supply line to the lift and to the power steering anti-cavitation assembly on the pump. Reconnect the oil filter inlet from the transmission. Reconnect the two suction lines from the filter to the pump.
32. - Connect the lines to the power steering cylinder and the control valve supply.
33. - If it is necessary to remove the support DPF, proceed as follows:
 1 – Mount the upper support (1) on the right-hand one (2) with the three Allen screws.
 2 – Mount the left-hand support (5) securing it to the engine with the three lower screws.
 3 – Mount the assembly of the supports (1) and (2) to the engine with the four screws in position (3) respecting the reference marks made when dismantling.
 4 – Secure the support (5) to the support (1) with the two upper screws with the two adjustment bushings.
 5 – Mount the support (4) on the engine with the two lower screws. Secure the three left-hand screws to the support (5). Secure the two upper screws to the support (1) .



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34. - Refit the entire DPF filter. Return the entire unit into position. Secure the four retaining bolts of the assembly itself to the cradle.
 Observation:
 If, after refitting the DPF filter, you find a slight misalignment with the axis of the turbine, it is possible to make a correction. On the two bolts that secure the filter to the cradle there are two threaded bushings (2), which are held in position by a grub screw (1). Loosen the grub screw with an Allen key. Tighten or loosen the bushing by the amount necessary to correct the misalignment. Retighten the grub screw. Secure the support.



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35. - Refit the upper bracket that supports the hood. Secure the upper bracket with the relevant screws.

36. - Refit the air cleaner assembly and the relevant support. Secure the screws on the filter bracket and on the inlet duct on the radiator. Refit the sleeves connected to the turbine, to the engine and to the cooling fan assembly. Tighten the relevant clamps. Reconnect the piston pin of the filter clog sensor.
37. - Refit the two lines to the intercooler radiator. Tighten the relevant clamps.
38. - Refit the drain tube. Tighten the relevant retaining clamps.
39. - Refit the transmission oil drain plug. Refill with oil using a pump.
40. - Refit the drive shaft together with the central support and the retaining bolts. Insert the shim and adjust the shaft end play.
41. - Refit the guard of the front axle control shaft. Tighten the front retaining bolts, the central retaining bolts, and the rear retaining bolts.
42. - Reposition the fuel drain plug on the tank.
43. - Refit the lower guard for the tank, if present. Put the fuel tank in position. Tighten the relevant retaining straps to secure the fuel tank. Reconnect the lines as marked during disassembly.
44. - Using a hydraulic jack, raise the rear of the tractor. Remove the mechanical jack stand under the left-hand reduction gear. Put the wheel back into position and fit the retaining nuts with a pneumatic gun.
45. - Reconnect the air conditioning lines and the sensor to the condenser. Secure the air conditioning lines and the sensor with clamps and brackets.
46. - Reconnect the air conditioning lines on the compressor. Secure the air conditioning lines with clamps and clamping brackets.
47. - Use the control unit **380000-15** to recharge the refrigerant of the air conditioning system.
48. - Refit the two engine side panels. Secure with the relevant screws.
49. - Refit the fenders of the front wheels, if present. Tighten the relevant fasteners.
50. - Reposition the ballast pack on the relevant support. Fit the cotter pins and fit the retaining pin.
51. - Refit the left-hand ladder. Secure the ladder to the cab.
52. - Connect the negative battery cable.
53. - Refit the battery cover.
54. - Lower the right-hand ladder for cab access.
55. - Refill the radiator with engine coolant.
56. - Refit the engine hood, as indicated in **Hood - Install (90.100)**.