

SECTION 440-01

Gearbox

Application to Models: **Light Line - A650 - A750 - A850 - A950 - A990**


Table of Contents

Subject
REMOVAL AND INSTALLATION
Gearbox
Gearbox Oil Filter
Gearbox Cooling System Oil Cooler
DISASSEMBLY AND ASSEMBLY
Differential
Front Drive Axle
Pinion Shaft
Side Shaft
Main Shaft
Gearbox
DRAINING AND FILLING
Gearbox Oil

REMOVAL AND INSTALLATION

Gearbox

Removal

 **CAUTION:** for the accomplishment of the following operations all required personal protective equipment should be used at work, for instance: safety gloves, safety glasses, safety shoes, ear plugs, etc.

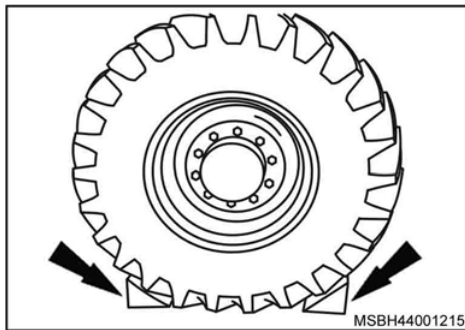
 **CAUTION:** when handling heavy and bulky parts, TAKE the required safety precautions.

NOTE: for the operations of removal and installation of gearbox, it is required the removal of the safety structure (cabin). Thus, before removing the safety structure, WASH the tractor carefully so as to avoid wetting the electrical components of the instrument panel and the seat.

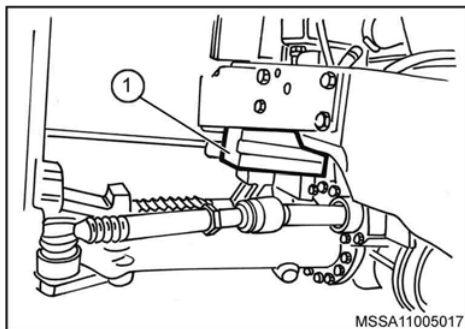
NOTE: all used lubricant oil shall be properly recollected and stored for later recycling.

NOTE: DO the disconnections at the most proper point for each case and IDENTIFY the hoses and tubes so as to avoid difficulties during the assembly.

NOTE: all loose hoses and fittings in general shall be plugged in so as to avoid contaminations and leakages.

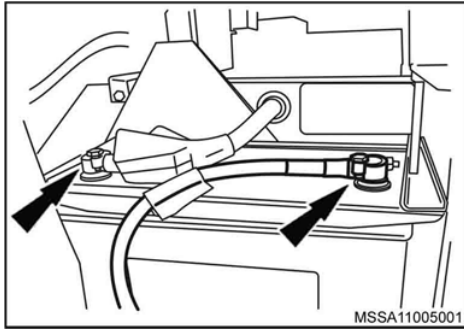


1. ACTUATE the parking brake and SHIM the front wheels with wooden wedges (arrows).

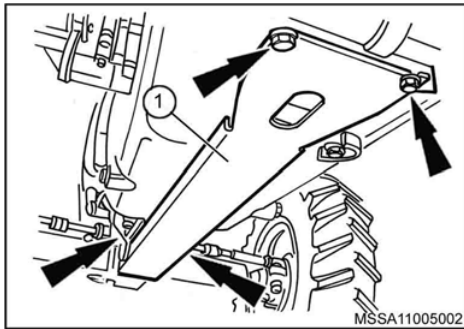


2. SHIM the front axle beam with wooden shims (1) in both sides, so as to ensure the side balance of the front assembly that will be assembled.
3. REMOVE the side lids and the engine hood. For more information, REFER to the item [“Engine Hood and Side Lids – Removal and Installation”](#), in [Section 881-01](#).

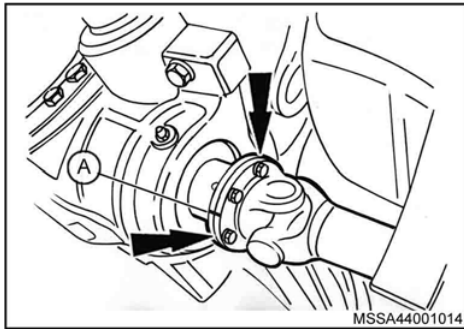
(Light Line - A650 - A750 - A850 - A950 - A990) – 09/2011



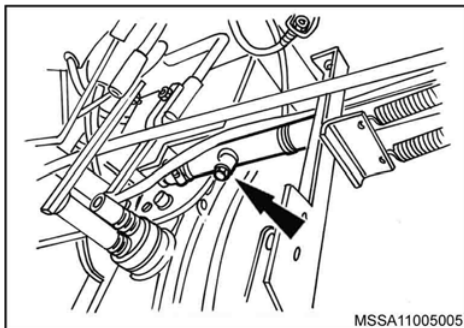
4. LOOSEN and DISCONNECT the battery positive and negative cables (arrows).



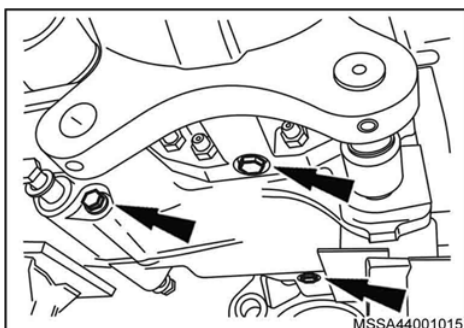
5. REMOVE the propeller shaft shield (1) by removing the four attaching bolts (arrows).



6. MAKE a positioning reference mark (A) on propeller shaft and output shaft for front drive wheel flanges, so as they are assembled in the same position.
7. REMOVE the six propeller shaft rear flange-to-output shaft attaching bolts (arrows) at the transmission and REMOVE the propeller shaft.



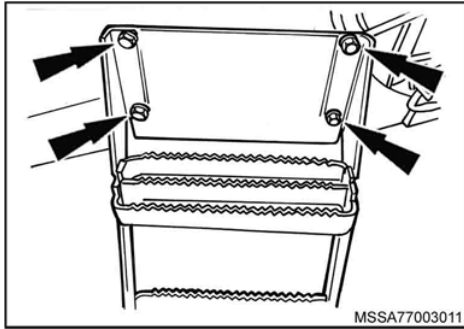
8. PREPARE a proper reservoir at the right side of tractor, under the draining plug, at the hydraulic system pump suction pipe. REMOVE the draining plug (arrow) and LET the oil drip completely.
9. After draining the oil completely, CLEAN and INSTALL the draining plug and tighten it to 25 N-m (2.5 kgf-m).



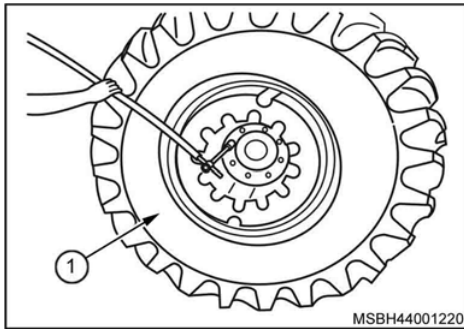
10. PREPARE a proper reservoir and DRAIN the oil from the gearbox and final drivers, and remove the draining plugs (arrows).

After draining the oil, INSTALL and TIGHTEN the plugs to 100 N-m (10 kgf-m).

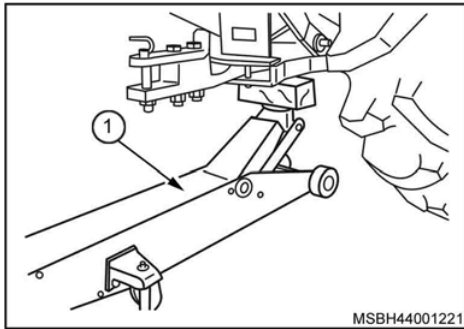
11. REMOVE the front floor. For more information, REFER to the item "[Front Floor – Removal and Installation](#)", in [Section 880-01](#).



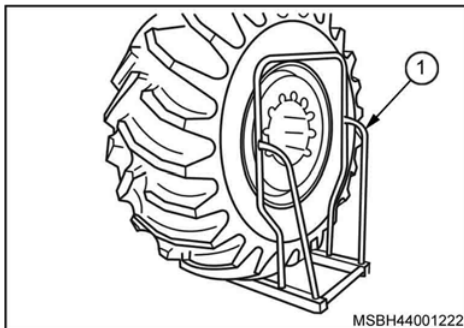
12. REMOVE the running board, by removing the four attaching bolts (arrows).



13. LOOSEN the attaching nuts from the rear wheels (1), without removing them.



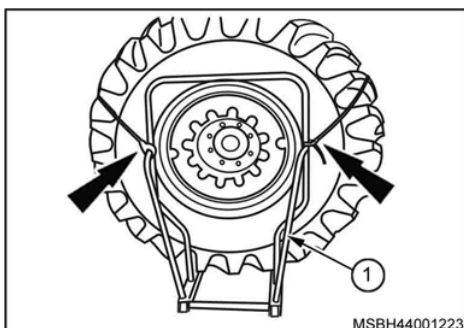
14. LOCATE the hydraulic lift roller jack (1) (CAPACITY 10 t) under the towing hook.



15. LIFT the hydraulic lift roller jack until both wheels do not touch the floor anymore and until it is possible the installation of a special dolly (Equipment 1) under both wheels so as to remove them.

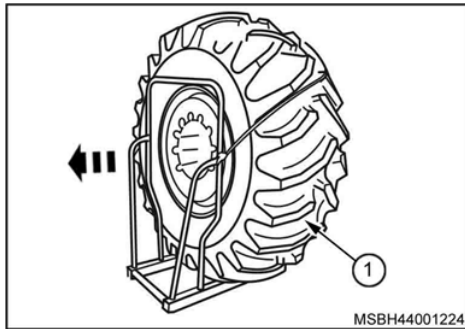
NOTE: USE two similar special dollies so as to remove both rear wheels at the same time.

16. LOWER the hydraulic lift roller jack until the wheels are supported on the special dollies and the wheel studs are free of tension.



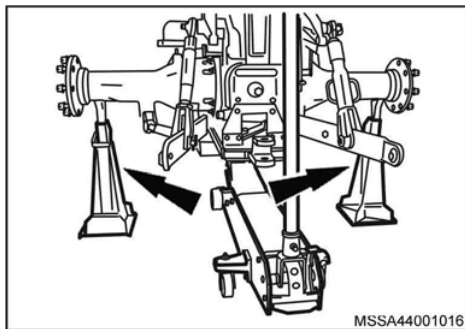
17. ATTACH the wheel to the special dolly (1) and wind the tire with a safety band (arrows), and attach it to the dolly.

(Light Line - A650 - A750 - A850 - A950 - A990) – 09/2011



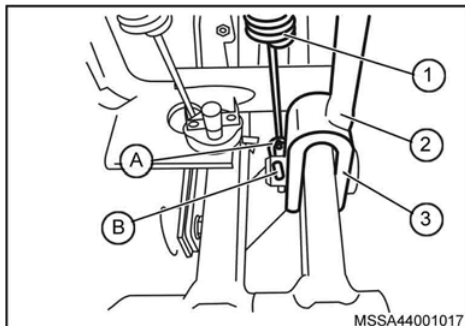
18. REMOVE the wheel from the tractor (1), by pulling it out of the wheel hub studs carefully.

19. REPEAT the three last operations above for the opposite side wheel.

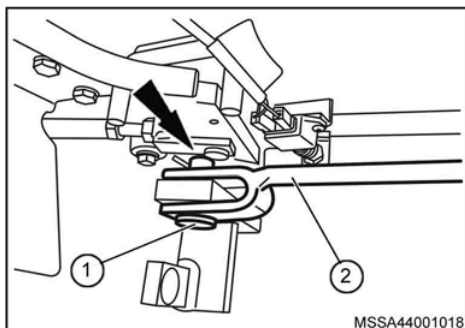


20. SHIM the rear axle with trestles (arrows) on both sides. LOWER and REMOVE the hydraulic lift roller jack.

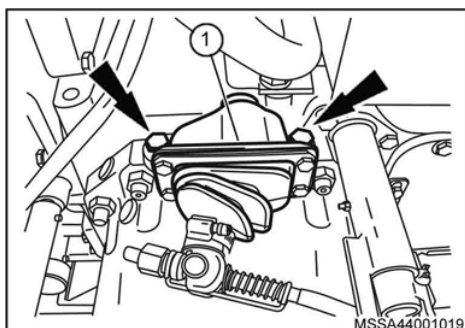
21. REMOVE the safety structure (cabin). For more information, REFER to the item "[Safety Structure, Complete – Removal and Installation](#)", in [Section 880-01](#).



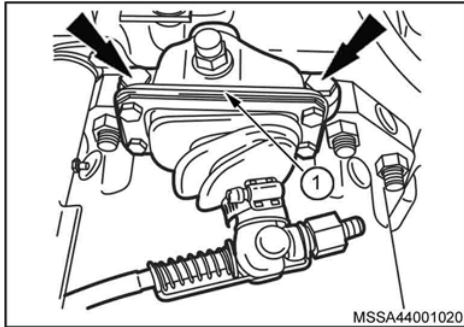
22. DETACH the brake pedal return spring (1), right-hand side, from the push rod (A). REMOVE the R-clip (B) and the retainer pin (3) from the brake push rod, right-hand side.



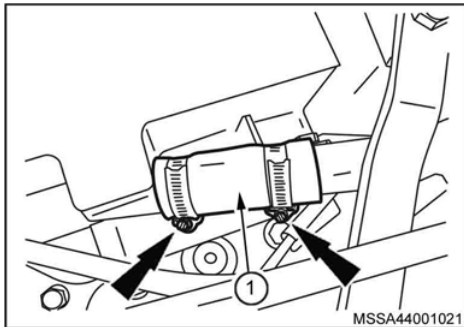
23. REMOVE the R-clip (B) and the retainer pin (1) from the brake push rod, right-hand side.



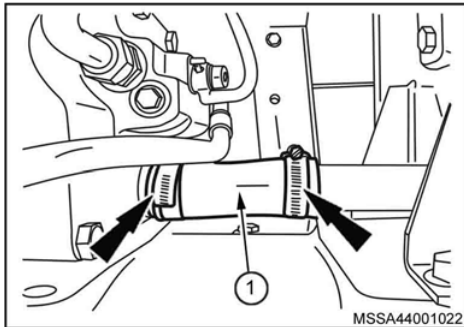
24. REMOVE the attaching bolts (arrows) from the brake actuating device (1) support assembly, right-hand side and REMOVE the corresponding support together with the rod.



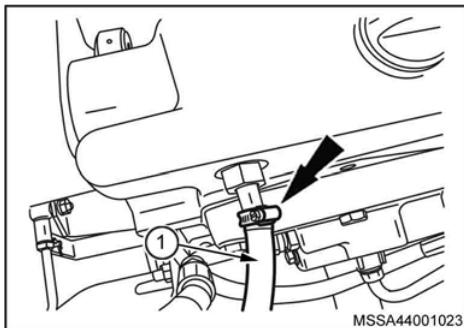
25. REMOVE the attaching bolts (arrows) from the brake actuating device (1) support assembly, left-hand side and REMOVE the corresponding support together with the rod.



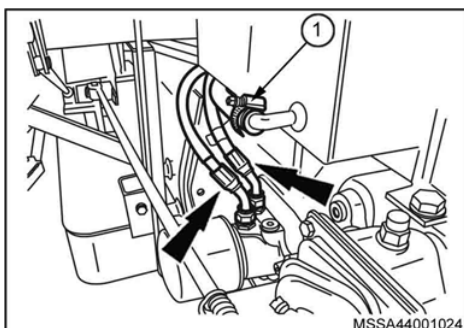
26. LOOSEN the hydraulic oil reservoir-to-hydraulic pump suction pipe connecting hose attaching clamps (arrows), and UNCOUPLE them.



27. LOOSEN the hydraulic oil reservoir-to-hydraulic command cover attaching clamps (arrows), and UNCOUPLE them.



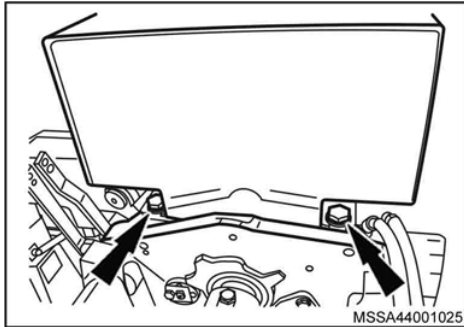
28. LOOSEN the attaching clamp (arrow) from the breather hose (1) at TDP housing outlet and UNCOUPLE it.



29. LOOSEN the attaching clamp (1) from the hydrostatic steering system oil return spring.

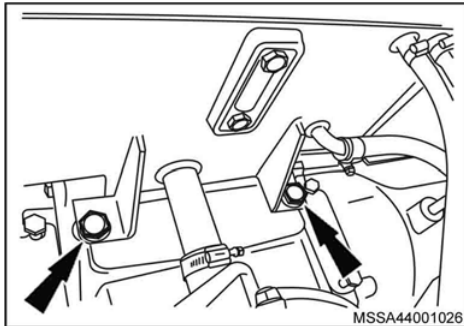
30. LOOSEN the fittings (arrows) from the gearbox oil cooling system hoses.

(Light Line - A650 - A750 - A850 - A950 - A990) – 09/2011

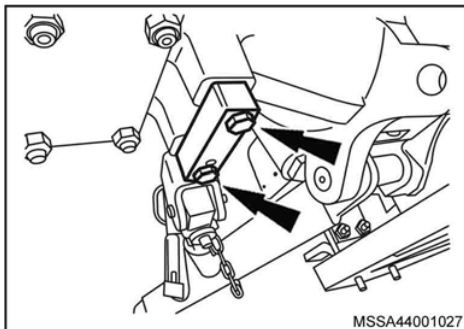


31. REMOVE the four attaching bolts (arrows) from the hydraulic oil reservoir.

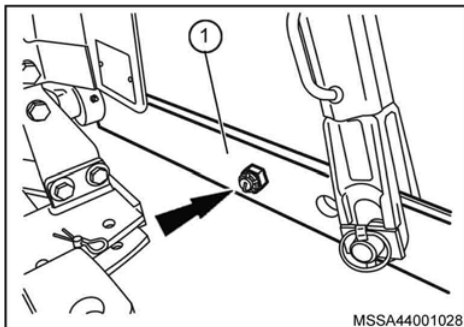
32. REMOVE the hydraulic oil reservoir from the corresponding housing.



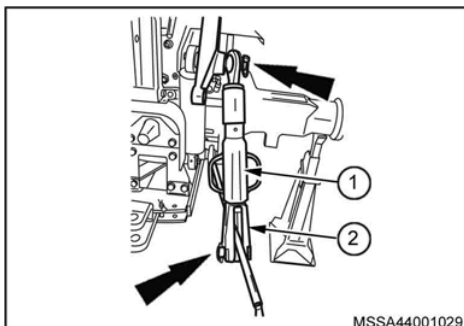
33. REMOVE the stabilizer bar-to-final drive case attaching bolts (arrows) on both sides.



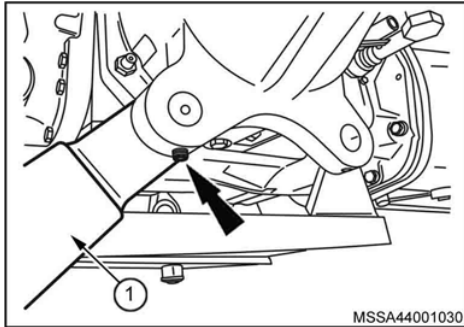
34. REMOVE the R-clip and the attaching nut (arrow) from the stabilizer bar (1) and REMOVE the corresponding bar on both sides.



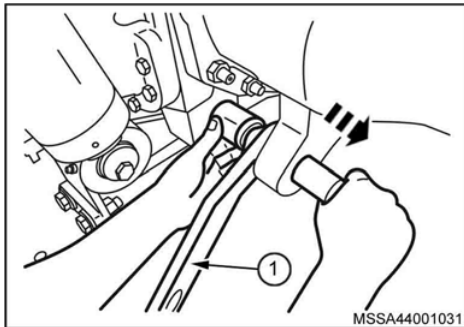
35. REMOVE the upper and lower attaching locks from the lift connection bar (1), REMOVE the pin (2) and REMOVE the corresponding bar, detaching it from the upper support, on both sides.



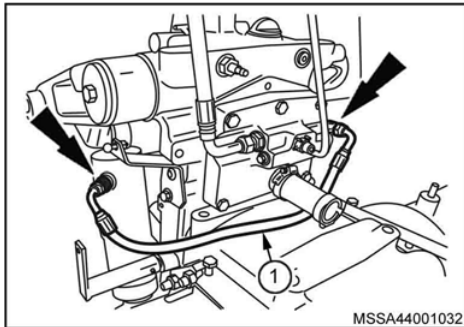
(Light Line - A650 - A750 - A850 - A950 - A990) – 09/2011



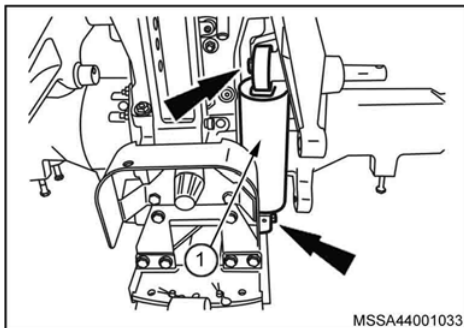
36. REMOVE the locking bolt (arrow) from the lower pull bar attaching pin (1) on both sides.



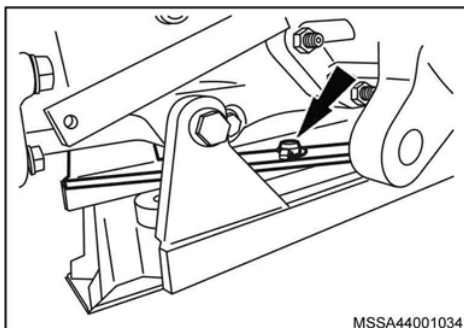
37. REMOVE the lower pull bar (1) by pulling the attaching pin outwards on both sides.



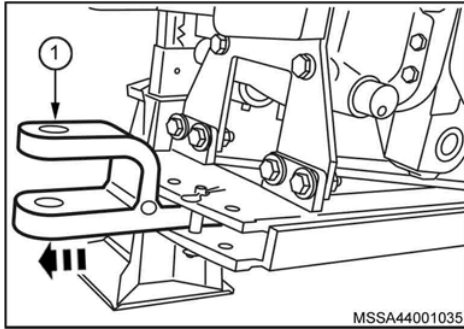
38. LOOSEN the fittings (arrows) and REMOVE the high pressure hose (1) that feeds the hydraulic lifting cylinder, right-hand side.



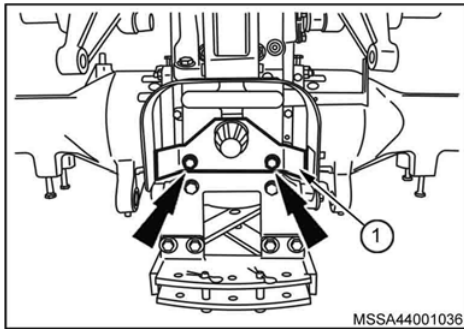
39. REMOVE the attaching bolts (arrows) from hydraulic lifting cylinder (1) and REMOVE it, by detaching it from the lifting arm and from the lower support.



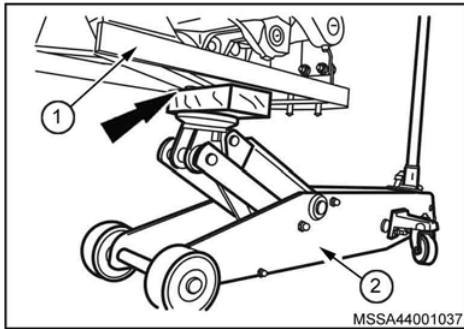
40. TAKE the lock away and REMOVE the attaching pin (arrow) from the traction bar, by displacing it downwards.



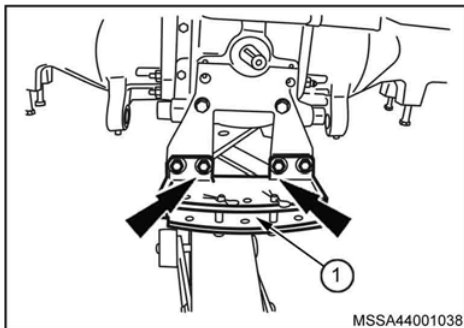
41. REMOVE the traction bar (1), by pulling it outwards.



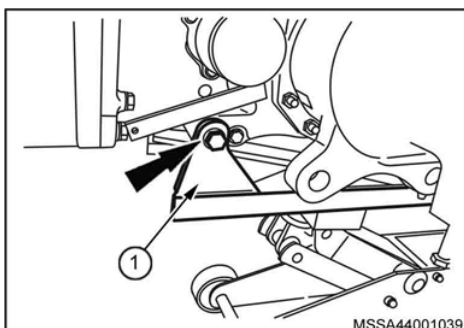
42. REMOVE the protective plate (1) from TDP shaft, by removing the attaching bolts (arrows).



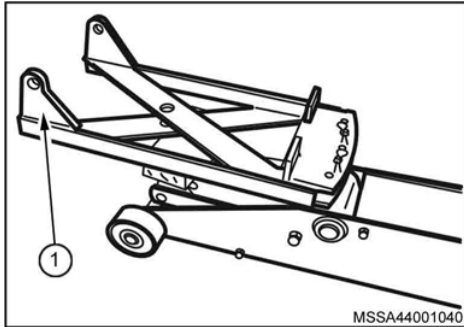
43. LOCATE the hydraulic lift roller jack (2) under the towing hook (1) and LIFT it until touching the hook base (arrow).



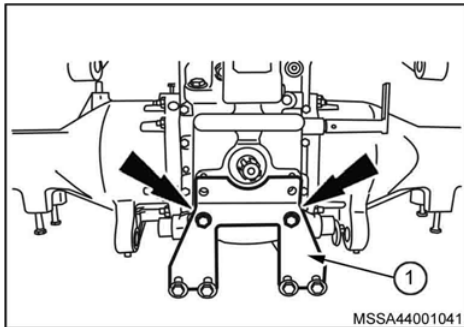
44. REMOVE the attaching bolts (arrows) from the towing hook (1) at the front support.



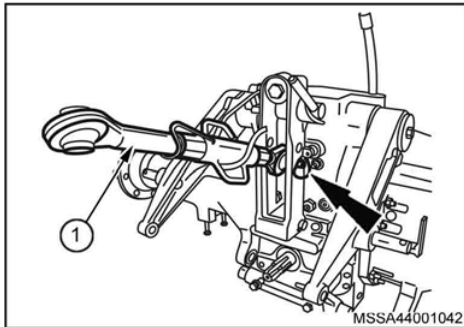
45. REMOVE the attaching bolt (arrow) from the towing hook (1) at the gearbox housing, on both sides.



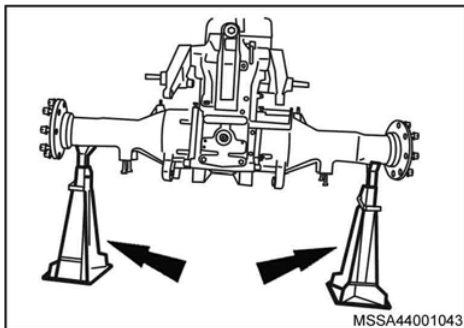
46. REMOVE the towing hook (1), by lowering the hydraulic lift roller jack.



47. REMOVE the towing hook (1) by removing the attaching bolts (arrows).

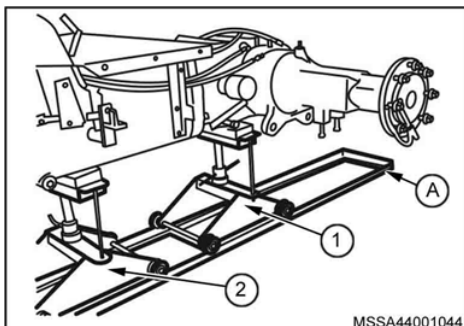


48. REMOVE the upper pull bar (1) by removing the lock and the attaching pin (arrow).



49. LOCATE the lifting strap to the gearbox, by engaging the strap rings to a power winch / hoist.

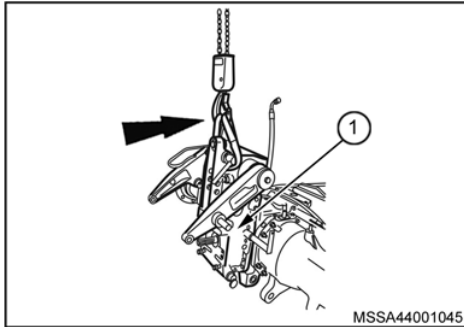
LIFT the transmission assembly and REMOVE the trestles (arrows).



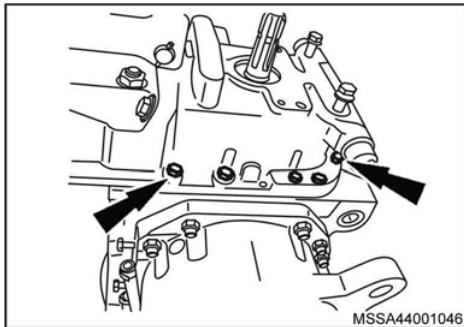
50. PLACE a rail (Equipment "A") under the tractor and USE two dollies (1 and 2) with height adjustment over the rails.

51. LOCATE the dolly (1) under the gearbox and the dolly (2) under the fuel tank, adjusting them until touching the component case.

(Light Line - A650 - A750 - A850 - A950 - A990) – 09/2011

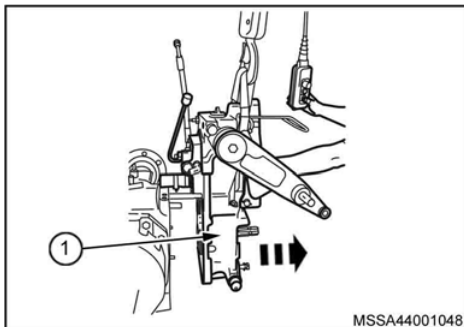
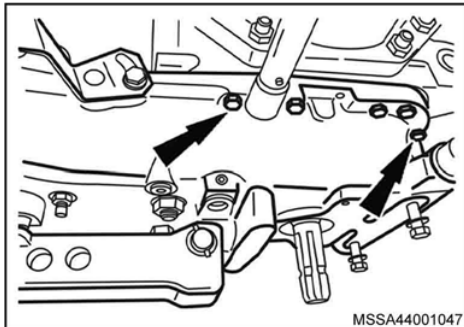


52. INSTALL a proper lifting strap (arrow) to TDP and hydraulic system case (1) and SECURE the strap0 rings to the ring with a power winch or hoist.

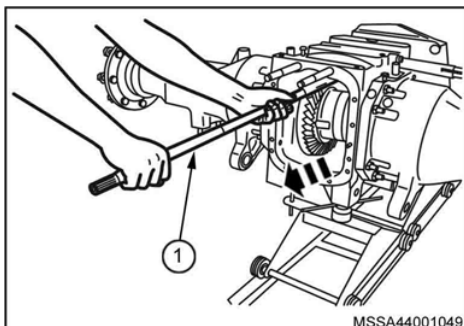


53. LIFT the winch / hoist so as to release the tension over TDP attaching bolts at the gearbox.

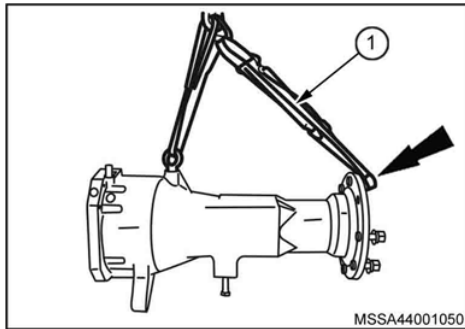
54. REMOVE the attaching bolts (arrows) from TDP housing.



55. REMOVE the TDP assembly (1) by using a power winch or hoist, DISPLACE it backwards and DETACH it from gearbox.

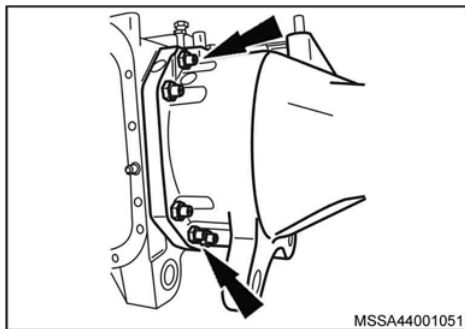


56. REMOVE the shaft (1) from TDP, by pulling it out of gearbox.



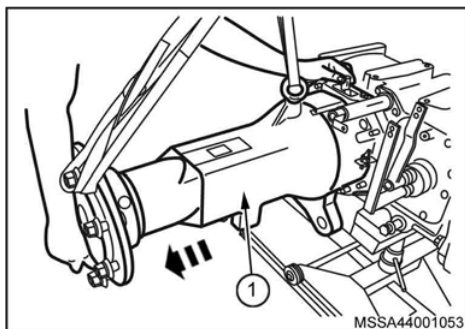
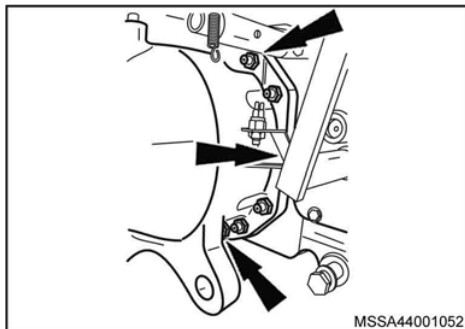
57. INSTALL a proper lifting strap (1) to the final drive assembly case, right-hand side, securing it to the points indicated (arrows) and attaching the strap hooks to the power winch or hoist ring.

NOTE: USE an adapting ring to fasten the lifting strap to the final drive case front end.



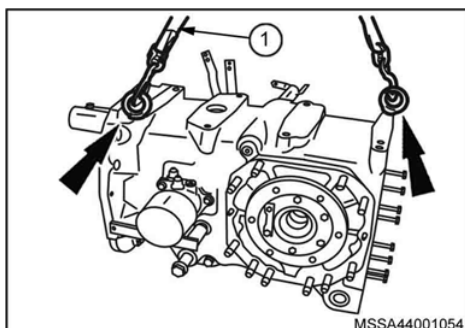
58. LIFT the winch / hoist so as to release the tension over the final drive attaching studs at the gearbox.

59. REMOVE the attaching nuts (arrows) from the final drive assembly, right-hand side.



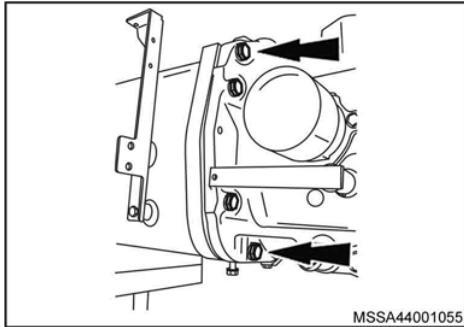
60. REMOVE the final drive assembly (1), right-hand side, by pulling it out of the gearbox.

61. REPEAT the four last operations for the final drive assembly, left-hand side.



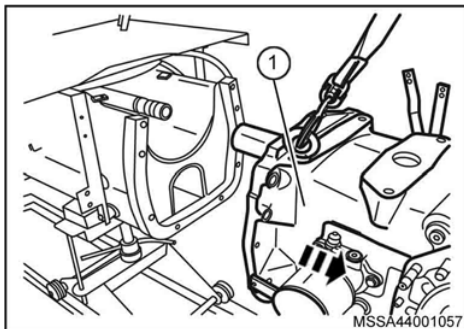
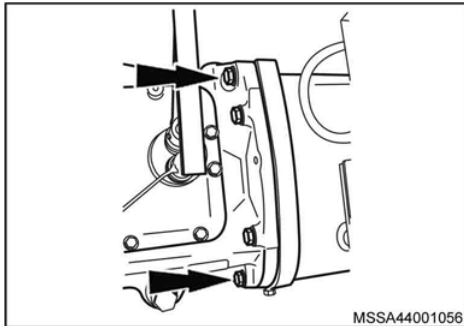
62. INSTALL a proper lifting strap (1) to the gearbox housing, securing it to the points indicated (arrows) and attaching the strap hooks to the power winch or hoist ring.

NOTE: USE two adapting rings to attach the lifting strep to the gearbox housing.

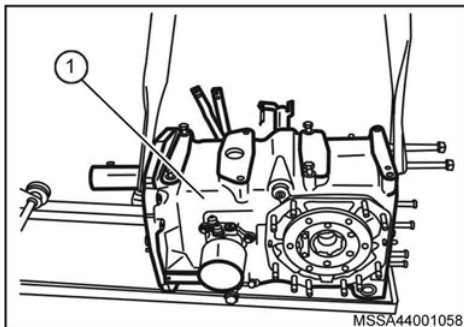


63. LIFT the winch / hoist so as to release the tension over gearbox attaching bolts at the fuel tank.

64. REMOVE the gearbox-to-fuel tank attaching bolts (arrows).



65. REMOVE the gearbox (1) by detaching it initially from the fuel tank with a proper lever and displacing it backwards later with the power winch / hoist and the support special dolly.



66. COMPLETE the gearbox removal operation (1), by lifting the power winch / hoist and removing the support special dolly. LOWER the power winch / hoist by locating the gearbox in a safe place.

Cleaning



CAUTION: for the accomplishment of the following operations all required personal protective equipment should be used at work, for instance: safety gloves, safety glasses, safety shoes, ear plugs, etc. If this equipment is not used, serious accidents may be caused as consequence.

NOTE:

- **Do not use gasoline for cleaning the parts.**
- **Never dispose used transmission lubricant oil, cleaning agents, chemical residues, etc. into any sewage system or any other place which could damage the environment. FOLLOW the local legislation.**
- **All used solvent for cleaning purposes should be properly recollected and stored for recycling it later.**

CLEAN all outer parts and components which were removed from gearbox.

CLEAN the gearbox-to-fuel tank seating area, TDP housing-to-gearbox housing seating area and final drive cases-to-gearbox housing seating area.

CLEAN the gearbox-to-fuel tank screw holes by using a tap with the same measure of the corresponding bolts.

CLEAN the thread of all bolts that which received sealing compound.

CLEAN completely the outer portion of gearbox lids and housings, and TDP, by removing the residues of sealing compound that remained adhered to the housing faces, etc.



CAUTION: AVOID scratches to the skin, fire risks and the inhalation of vapors when using liquids

Inspection

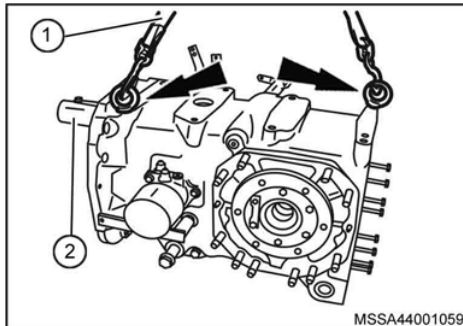
INSPECT all outer parts and components removed and disassembled from the gearbox concerning:

- a) Housings with cracks, breakages, scores, runout, distortions, etc.
- b) Bolts and nuts with damaged threads.
- c) Hoses in general with fissures, kinks, distortion or drying up.
- d) Cranked or dented tubes and fittings or damaged threads.

REPLACE the parts which present some anomaly.

NOTE: R-clips, cotter pins, self-locking bolts and nuts should be replaced whenever they are removed.

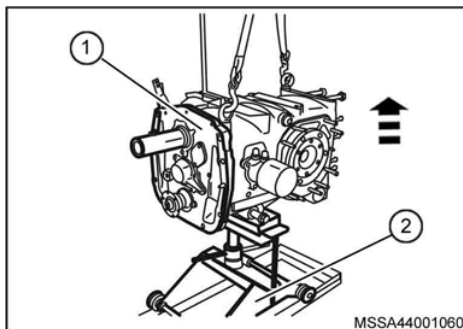
Installation



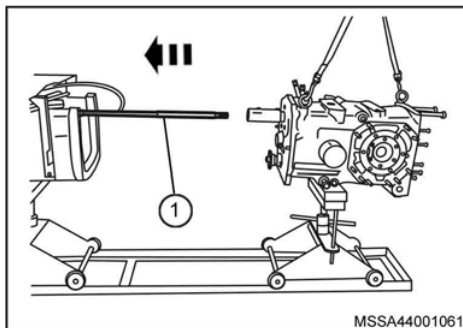
1. INSTALL a proper lifting strap (1) to the gearbox housing, securing it to the points indicated (arrows) and attaching the strap hooks to the power winch or hoist ring.

NOTE: USE two adapting rings to attach the lifting step to the gearbox housing.

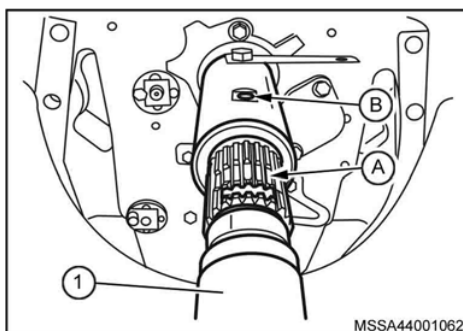
2. LOCATE the coupling sleeve (2) to the gearbox input shaft, without the attaching bolts, by aligning the center portion of groove (recess) that there is in the nicked area of gearbox input shaft, for locking the coupling sleeve attaching bolt, in the same direction of center hole of the corresponding bolt at the sleeve.



3. LIFT the gearbox (1) and LOCATE it over the support special dolly (2) with the power winch or hoist.
4. DISPLACE the gearbox assembly towards the fuel tank, together with the support special dolly.



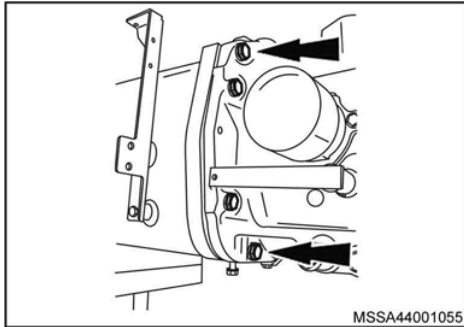
5. INSTALL the TDP drive shaft (1), by coupling it to the clutch disc.
6. DISPLACE the gearbox forwards, by fitting the TDP drive shaft inside the gearbox input shaft, crossing the gearbox from one end to the other.



7. LOCATE the transmission connecting axle (1) at the coupling sleeve input and ALIGN the nicked area (grooves) of the corresponding axle with the sleeve, as follows:

- a) ALIGN the center portion of groove (recess) that there is in the nicked area of the transmission connecting axle (arrow A), for locking the coupling sleeve attaching bolt in the same direction of corresponding bolt hole at the sleeve (arrow B).
- b) FINISH fitting the gearbox to the fuel tank, by coupling completely the connecting axle inside the coupling sleeve, so as the axle groove, for locking the attaching bolt of the corresponding sleeve, matches the center of the bolt hole.

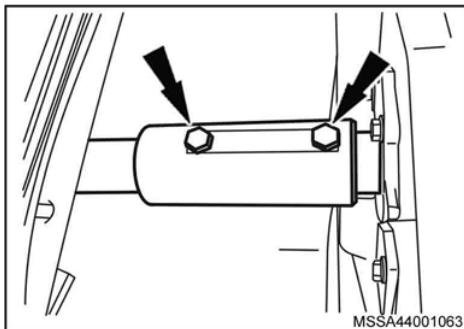
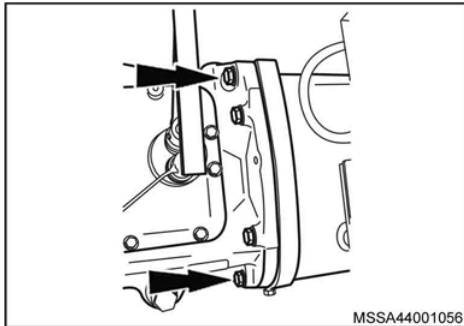
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8. APPLY the locking compound (Loctite 271) to the eight gearbox-to-fuel tank attaching bolts (arrows) and INSTALL them.

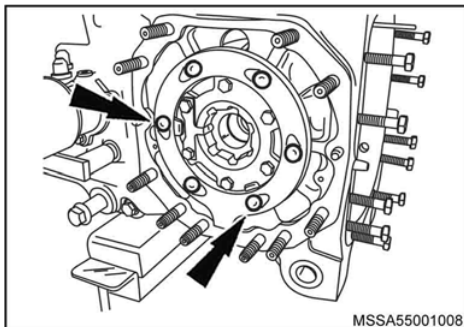
9. TIGHTEN alternately the fuel tank attaching bolts to 300 N-m (30 kgf-m).

10. REMOVE the lifting strap and the power winch / hoist.



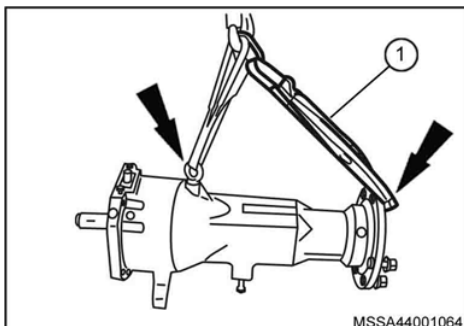
11. INSTALL the drive shaft coupling sleeve attaching bolts (arrows), by using the new lock.

TIGHTEN the sleeve bolts to 40 N-m (4 kgf-m). LOCK the corresponding bolts by bending the ends of the lock plate.



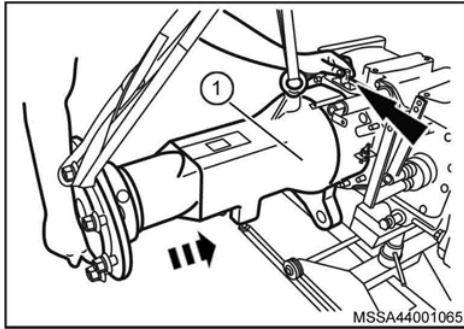
12. **NOTE: REMOVE** the impurities before installing the assembly and **CLEAN** the seating face of the housing and gearbox.

13. INSTALL the balls (arrows) to the service system ring, by using dense grease, so as the balls do not fall down when installing the final drive case to the gearbox.



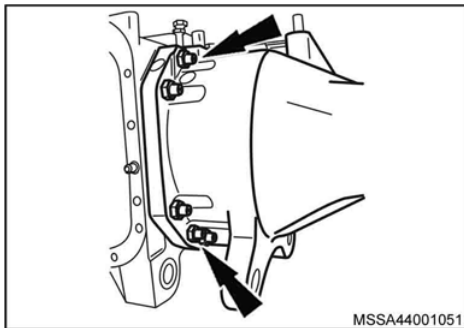
14. INSTALL a proper lifting strap (1) to the final drive assembly case, right-hand side, securing it to the points indicated (arrows) and attaching the strap hooks to the power winch / hoist ring.

NOTE: USE an adapting ring to fasten the lifting strap to the final drive case front end.

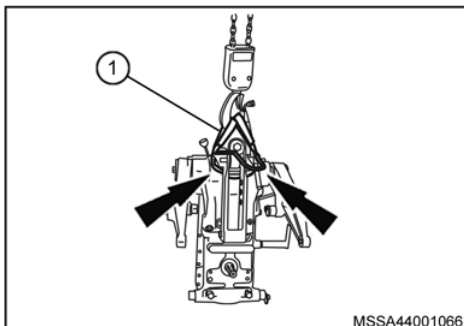
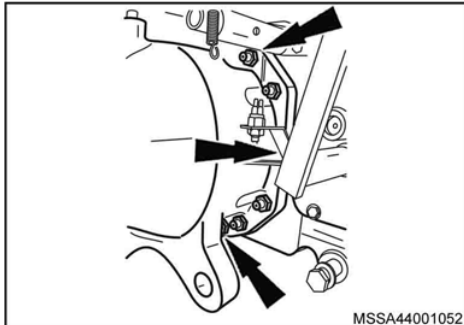


15. INSTALL a new sealing gasket to the gearbox-to-final drive assembly case junction.
16. LIFT the final drive assembly until reaching the height of its housing in the gearbox.
17. INSTALL the final drive assembly, right-hand side (1) to the gearbox, by coupling correctly the axle shaft to the differential planet gear and lifting at the same time the brake pressure disc (arrow) so as the balls fit correctly to the pressure disc.

NOTE: at this time, **BE CAREFUL** to avoid the dislocation of some pressure disc ball.

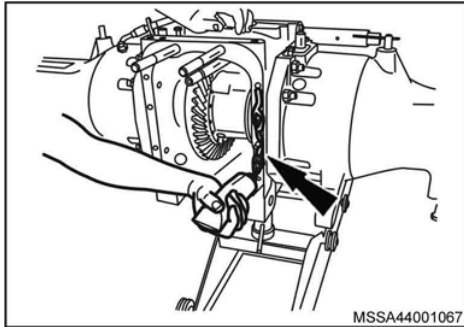


18. INSTALL the attaching nuts (arrows) to the final drive assembly, right-hand side. **TIGHTEN** alternately the nuts to 230 N-m (23.0 kgf-m).
19. REMOVE the lifting strap and the power winch / hoist.
20. REPEAT the eight last operations for the final drive assembly, left-hand side.

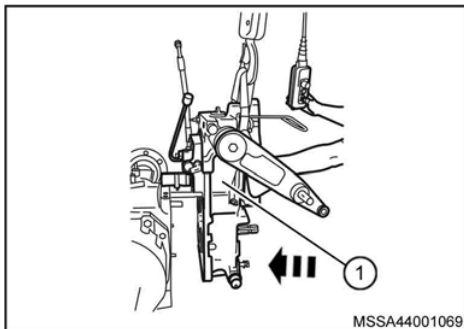
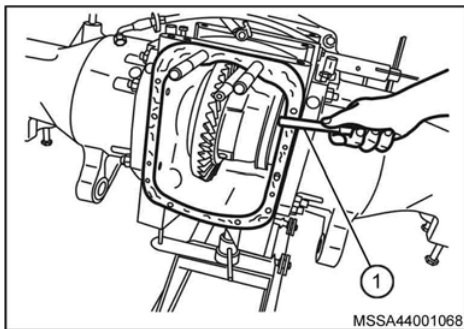


21. INSTALL a proper lifting strap (1) to the TDP assembly case, securing it to the points indicated (arrows) and attaching the strap hooks to the power winch or hoist ring.

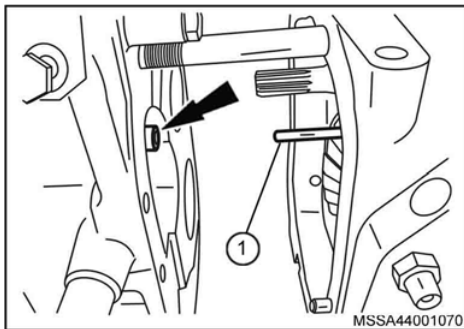
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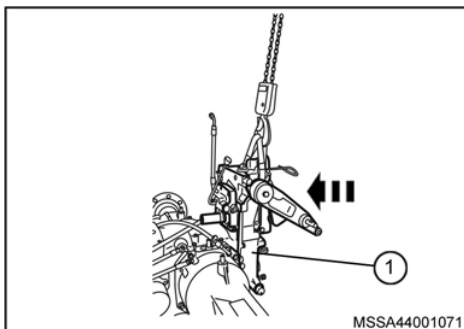
22. APPLY a moderate layer (arrow) of liquid sealing gasket (Loctite 574) to the gearbox housing all over the junction face with TDP housing, by spreading it uniformly with a proper spatula (1).



23. LIFT and DISPLACE the TDP housing (1) forwards, until reaching the height and being close to its housing in the gearbox.



24. Before coupling the TDP housing to the gearbox, ALIGN the lubrication tube (1) towards its housing hole in the TDP housing (arrow).



25. COUPLE carefully the TDP housing (1) to the gearbox, displacing it completely forwards, until the shafts are fitted.

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