

QUANTUM® 80F
QUANTUM® 90F
QUANTUM® 100F
QUANTUM® 110F
QUANTUM® 80CL
QUANTUM® 90CL
QUANTUM® 100CL
QUANTUM® 110CL
Tractor

PIN HLRQ010FEJLU00031 and above

SERVICE MANUAL

Part number 51526031

English

November 2018

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Link Product / Engine

Product	Market Product	Engine
Quantum® 100CL With cab [HLRQ010L*JLU***** -]	Europe	F5DFL413K*C001
Quantum® 100CL With cab [HLRQ010L*JLU***** -]	Asia Pacific	F5DFL413K*C001
Quantum® 100CL With cab [HLRQ010L*JLU***** -]	Middle East Africa	F5DFL413K*C001
Quantum® 100CL Without cab [HLRQ010L*JLU***** -]	Europe	F5DFL413K*C001
Quantum® 100CL Without cab [HLRQ010L*JLU***** -]	Asia Pacific	F5DFL413K*C001
Quantum® 100CL Without cab [HLRQ010L*JLU***** -]	Middle East Africa	F5DFL413K*C001
Quantum® 110CL With cab [HLRQ011LTHLU10320 -]	Middle East Africa	F5DFL413J*C002
Quantum® 110CL With cab [HLRQ011LTHLU10320 -]	Europe	F5DFL413J*C002
Quantum® 110CL With cab [HLRQ011LTHLU10320 -]	Asia Pacific	F5DFL413J*C002
Quantum® 110CL Without cab [HLRQ011LEHLU08502 -]	Asia Pacific	F5DFL413J*C002
Quantum® 110CL Without cab [HLRQ011LEHLU08502 -]	Europe	F5DFL413J*C002
Quantum® 110CL Without cab [HLRQ011LEHLU08502 -]	Middle East Africa	F5DFL413J*C002
Quantum® 80CL With cab [HLRQ080LLHLU09186 -]	Middle East Africa	F5DFL413B*H001
Quantum® 80CL With cab [HLRQ080LLHLU09186 -]	Europe	F5DFL413B*H001
Quantum® 80CL With cab [HLRQ080LLHLU09186 -]	Asia Pacific	F5DFL413B*H001
Quantum® 80CL Without cab [HLRQ080LPHLU09194 -]	Asia Pacific	F5DFL413B*H001
Quantum® 80CL Without cab [HLRQ080LPHLU09194 -]	Middle East Africa	F5DFL413B*H001
Quantum® 80CL Without cab [HLRQ080LPHLU09194 -]	Europe	F5DFL413B*H001
Quantum® 90CL With cab [HLRQ090C*JLU***** -]	Middle East Africa	F5DFL413L*C001
Quantum® 90CL With cab [HLRQ090C*JLU***** -]	Asia Pacific	F5DFL413L*C001
Quantum® 90CL With cab [HLRQ090C*JLU***** -]	Europe	F5DFL413L*C001
Quantum® 90CL Without cab [HLRQ090C*JLU***** -]	Europe	F5DFL413L*C001
Quantum® 90CL Without cab [HLRQ090C*JLU***** -]	Asia Pacific	F5DFL413L*C001
Quantum® 90CL Without cab [HLRQ090C*JLU***** -]	Middle East Africa	F5DFL413L*C001

Product	Market Product	Engine
Quantum® 100F With cab [HLRQ010FEJLU00031 -]	Middle East Africa	F5DFL413K*C001
Quantum® 100F With cab [HLRQ010FEJLU00031 -]	Europe	F5DFL413K*C001
Quantum® 100F With cab [HLRQ010FEJLU00031 -]	Asia Pacific	F5DFL413K*C001
Quantum® 100F Without cab [HLRQ010F*JLU***** -]	Asia Pacific	F5DFL413K*C001
Quantum® 100F Without cab [HLRQ010F*JLU***** -]	Europe	F5DFL413K*C001
Quantum® 100F Without cab [HLRQ010F*JLU***** -]	Middle East Africa	F5DFL413K*C001
Quantum® 110F With cab [HLRQ011FCHLU05201 -]	Europe	F5DFL413J*C002
Quantum® 110F With cab [HLRQ011FCHLU05201 -]	Asia Pacific	F5DFL413J*C002
Quantum® 110F With cab [HLRQ011FCHLU05201 -]	Middle East Africa	F5DFL413J*C002
Quantum® 110F Without cab [HLRQ011F*JLU***** -]	Asia Pacific	F5DFL413J*C002
Quantum® 110F Without cab [HLRQ011F*JLU***** -]	Europe	F5DFL413J*C002
Quantum® 110F Without cab [HLRQ011F*JLU***** -]	Middle East Africa	F5DFL413J*C002
Quantum® 80F With cab [HLRQ080FKHLU10308 -]	Europe	F5DFL413B*H001
Quantum® 80F With cab [HLRQ080FKHLU10308 -]	Asia Pacific	F5DFL413B*H001
Quantum® 80F With cab [HLRQ080FKHLU10308 -]	Middle East Africa	F5DFL413B*H001
Quantum® 80F Without cab [HLRQ080FJJLU00045 -]	Europe	F5DFL413B*H001
Quantum® 80F Without cab [HLRQ080FJJLU00045 -]	Asia Pacific	F5DFL413B*H001
Quantum® 80F Without cab [HLRQ080FJJLU00045 -]	Middle East Africa	F5DFL413B*H001
Quantum® 90F With cab [HLRQ090FTHLU07802 -]	Middle East Africa	F5DFL413L*C001
Quantum® 90F With cab [HLRQ090FTHLU07802 -]	Europe	F5DFL413L*C001
Quantum® 90F With cab [HLRQ090FTHLU07802 -]	Asia Pacific	F5DFL413L*C001
Quantum® 90F Without cab [HLRQ090F*JLU***** -]	Europe	F5DFL413L*C001
Quantum® 90F Without cab [HLRQ090F*JLU***** -]	Asia Pacific	F5DFL413L*C001
Quantum® 90F Without cab [HLRQ090F*JLU***** -]	Middle East Africa	F5DFL413L*C001

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INTRODUCTION

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(*) See content for specific models

Note to the Owner WARNINGS FOR AIR CONDITIONING SYSTEM REPAIR OPERATIONS

Quantum® 100CL With cab [HLRQ010L*JLU***** -]	APAC --- MEA --- WE
Quantum® 100F With cab [HLRQ010FEJLU00031 -]	APAC --- MEA --- WE
Quantum® 110CL With cab [HLRQ011LTHLU10320 -]	APAC --- MEA --- WE
Quantum® 110F With cab [HLRQ011FCHLU05201 -]	APAC --- MEA --- WE
Quantum® 80CL With cab [HLRQ080LLHLU09186 -]	APAC --- MEA --- WE
Quantum® 80F With cab [HLRQ080FKHLU10308 -]	APAC --- MEA --- WE
Quantum® 90CL With cab [HLRQ090C*JLU***** -]	APAC --- MEA --- WE
Quantum® 90F With cab [HLRQ090FTHLU07802 -]	APAC --- MEA --- WE

Starting the system at low temperatures can damage the compressor. Only operate the air conditioner when the engine is hot and the temperature inside the cab is at least **20 °C (68.00 °F)**.

When disconnecting the hoses, close the ends with plastic caps to prevent foreign matter and humidity from getting inside the hoses.

Handle the thermostatic sensor carefully to avoid damage that may prevent efficient system operation.

Always use two spanners to unscrew the hose fittings to avoid twisting the fitting.

Do not use any type of engine oil to lubricate the compressor and the system.

Never leave the compressor oil container open, always make sure that it is tightly closed. If left exposed the oil will absorb humidity from the air and may, subsequently, damage the system.

Do not transfer compressor oil from the original container to another container.

Do not introduce any additives to the compressor oil. Any additional substances could contain elements which are incompatible with the chemical base of the refrigerant and thus alter its characteristics.

Check that the thermostatic sensor is correctly inserted in the fins on the evaporator to ensure efficient system operation.

Safety rules

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 SAFETY REGULATIONS

TO PREVENT ACCIDENTS

Most accidents or injuries that occur in workshops are the result of non-observance of simple and fundamental safety regulations.

For this reason, IN MOST CASES THESE ACCIDENTS CAN BE AVOIDED: by foreseeing possible causes and consequently acting with the necessary caution and care.

Accidents may occur with all types of vehicle, regardless of how well it was designed and built.

A careful and judicious service technician is the best guarantee against accidents.

Precise observance of the most basic safety rule is normally sufficient to avoid many serious accidents.

DANGER: Never carry out any cleaning, lubrication or maintenance operations when the engine is running.

GENERAL

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wristwatches, jewellery, unbuttoned or loose articles of clothing such as: ties, torn clothing, scarves, open jackets or shirts with open zips that may remain entangled in moving parts.
It is advised to wear approved safety clothing, e.g: non-slip footwear, gloves, safety goggles, helmets, etc.
- Do not carry out repair operations with someone sitting in the driver's seat, unless the person is a trained technician who is assisting with the operation in question.
- Operate the vehicle and use the implements exclusively from the driver's seat.
- Do not carry out operations on the vehicle with the engine running, unless specifically indicated.
- Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.
- All repair and maintenance operations must be carried out using extreme care and attention.
- Service steps and platforms used in a workshop or in the field should be built in compliance with the safety rules in force.
- Disconnect the batteries and label all controls to indicate that the vehicle is being serviced. Block the machine and all equipment which should be raised.
- Do not check or fill fuel tanks, accumulator batteries, nor use starting liquid when smoking or near naked flames, as these fluids are inflammable.
- Brakes are inoperative if manually released for repair or maintenance purposes.
In such cases, the machine should be kept constantly under control using blocks or similar devices.
- The fuel nozzle should always be in contact with the filling aperture. Maintain this position until filling operations are completed in order to avoid possible sparks caused by the accumulation of static electricity.
- Only use specified towing points for towing the tractor, connect parts carefully. Make sure that all pins and/or locks are secured in position before applying traction.
Never remain near the towing bars, cables or chains that are operating under load
- Transport vehicles that cannot be driven using a trailer or a low-loading platform trolley, if available.
- When loading or unloading the vehicle from the trailer (or other means of transport), select a flat area capable of sustaining the trailer or truck wheels, firmly secure the tractor to the truck or trailer and lock the wheels in the position.
- Electric heaters, battery-chargers and similar equipment must only be powered by auxiliary power supplies with efficient ground insulation to avoid electrical shock hazards.
- Always use suitable hoisting or lifting devices when raising or moving heavy parts.
- Take extra care if bystanders are present.
- Never pour gasoline or diesel oil into open, wide and low containers.
- Never use gasoline, diesel oil or other inflammable liquids as cleaning agents. Use non-flammable non-toxic proprietary solvents.
- Wear safety goggles with side guards when cleaning parts with compressed air.
- Limit the air pressure to a maximum of **2.1 bar (30.5 psi)**, according to local regulations.



SERVICE MANUAL

Engine

Quantum® 100CL With cab [HLRQ010L*JLU***** -], Quantum® 100CL Without cab [HLRQ010L*JLU***** -], Quantum® 100F With cab [HLRQ010FEJLU00031 -], Quantum® 100F Without cab [HLRQ010F*JLU***** -], Quantum® 110CL With cab [HLRQ011LTHLU10320 -], Quantum® 110CL Without cab [HLRQ011LEHLU08502 -], Quantum® 110F With cab [HLRQ011FCHLU05201 -], Quantum® 110F Without cab [HLRQ011F*JLU***** -], Quantum® 80CL With cab [HLRQ080LLHLU09186 -], Quantum® 80CL Without cab [HLRQ080LPHLU09194 -], Quantum® 80F With cab [HLRQ080FKHLU10308 -], Quantum® 80F Without cab [HLRQ080FJJLU00045 -], Quantum® 90CL With cab [HLRQ090C*JLU***** -], Quantum® 90CL Without cab [HLRQ090C*JLU***** -], Quantum® 90F With cab [HLRQ090FTHLU07802 -], Quantum® 90F Without cab [HLRQ090F*JLU***** -]

Engine - Remove from transmission

Quantum® 100CL With cab [HLRQ010L*JLU**** -]	APAC --- MEA --- WE
Quantum® 100F With cab [HLRQ010FEJLU00031 -]	APAC --- MEA --- WE
Quantum® 110CL With cab [HLRQ011LTHLU10320 -]	APAC --- MEA --- WE
Quantum® 110F With cab [HLRQ011FCHLU05201 -]	APAC --- MEA --- WE
Quantum® 80CL With cab [HLRQ080LLHLU09186 -]	APAC --- MEA --- WE
Quantum® 80F With cab [HLRQ080FKHLU10308 -]	APAC --- MEA --- WE
Quantum® 90CL With cab [HLRQ090C*JLU**** -]	APAC --- MEA --- WE
Quantum® 90F With cab [HLRQ090FTHLU07802 -]	APAC --- MEA --- WE

⚠ WARNING

Burn hazard!

Be very careful to avoid contact with hot fluids. If fluid is extremely hot, allow it to cool to a moderately warm temperature before proceeding.

Failure to comply could result in death or serious injury.

W0362A

⚠ WARNING

Hot surface possible!

Wait for all components to cool before performing any operation.

Failure to comply could result in death or serious injury.

W0251A

⚠ CAUTION

Hot area!

Use care when working near hot components. Wear protective gloves.

Failure to comply could result in minor or moderate injury.

C0034A

⚠ WARNING

Chemical hazard!

When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.

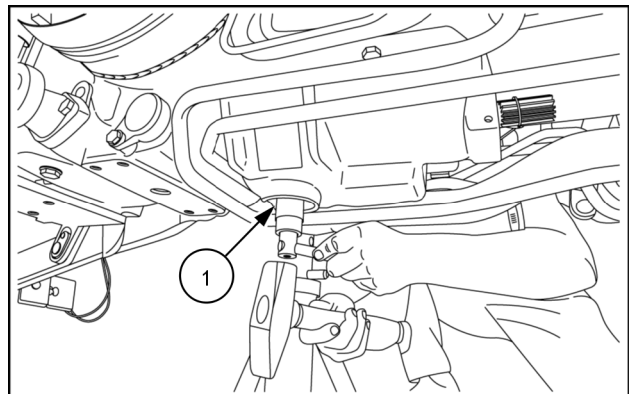
Failure to comply could result in death or serious injury.

W0371A

Prior operation:

A. Remove the front ballast - See **Front ballast - Remove (39.140)**.

1. Carefully clean the area around the central drain plug (1) on the transmission.
2. Use a suitable container to collect the transmission oil.
3. Loosen the central drain plug (1) on the transmission and drain the transmission oil.
4. Replace the central drain plug (1) on the transmission.
5. Tighten the central drain plug (1) on the transmission.
6. Carefully clean all the parts contaminated by any leaking hydraulic fluid.
7. Remove the cab – See **Cab and platform - Remove (90.150)**.
8. Remove the transmission drive shaft going from the transmission to the front axle – See **Front drive shaft - Remove (23.314)**.

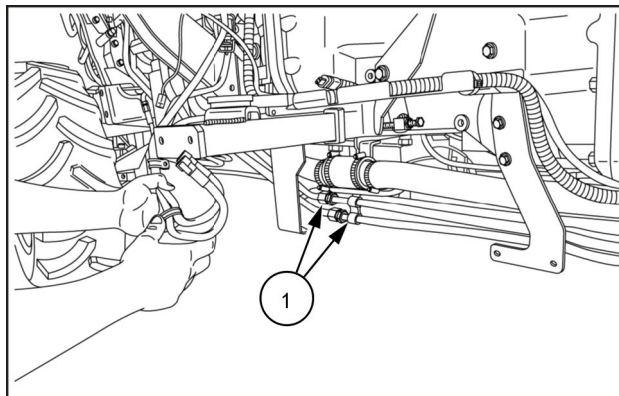


MOIL16TR01450AA 1

9. Carefully clean the area around the couplings **(1)** on the intermediate delivery and return pipes on the transmission oil exchanger.

10. Use a suitable container to collect the transmission oil.

11. Loosen the couplings **(1)** on the intermediate delivery and return pipes on the transmission oil exchanger.

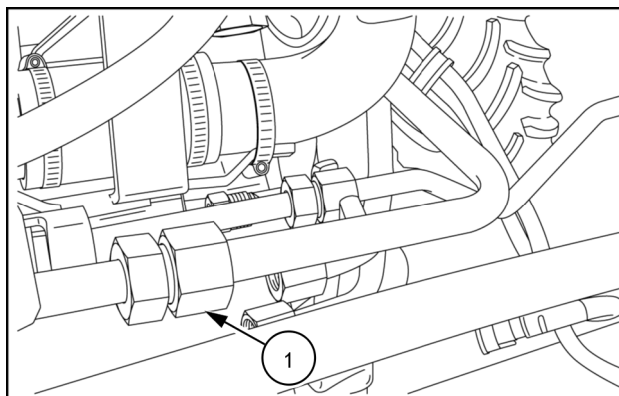


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12. Carefully clean the area around the coupling **(1)** of the intermediate differential oil delivery pipe on the left-hand side of the vehicle.

13. Use a suitable container to collect the transmission oil.

14. Loosen the coupling **(1)** of the intermediate differential oil delivery pipe on the left-hand side of the vehicle.



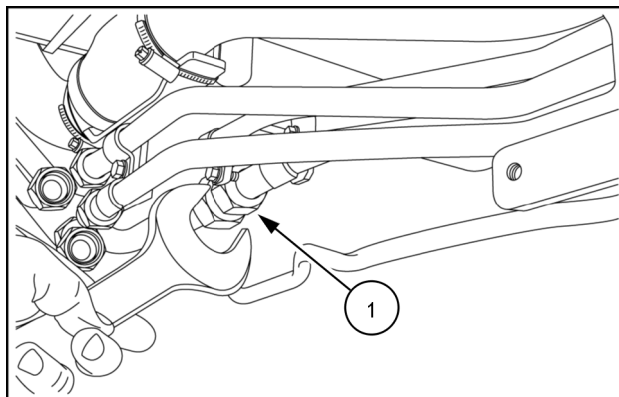
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15. Carefully clean the area around the coupling **(1)** of the intermediate delivery pipe connected to the transmission oil filter.

16. Use a suitable container to collect the transmission oil.

17. Loosen the coupling **(1)** of the intermediate delivery pipe connected to the transmission oil filter.

18. Carefully clean all the parts contaminated by any leaking hydraulic fluid.



MOIL16TR01456AA 4

19. Carefully clean the area around the sleeve **(1)** of the intermediate delivery pipe connected to the transmission oil filter.

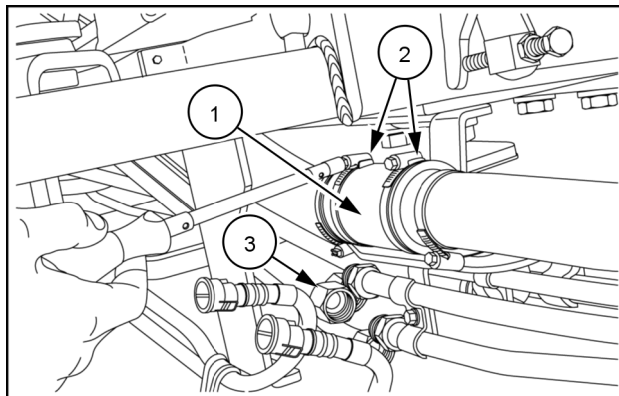
20. Use a suitable container to collect the transmission oil.

21. Loosen the two screw collars **(2)** on the sleeve **(1)** of the intermediate delivery pipe connected to the transmission oil filter.

22. Loosen the screw collar **(3)** fixing the sleeve **(1)** of the intermediate delivery pipe connected to the transmission oil filter.

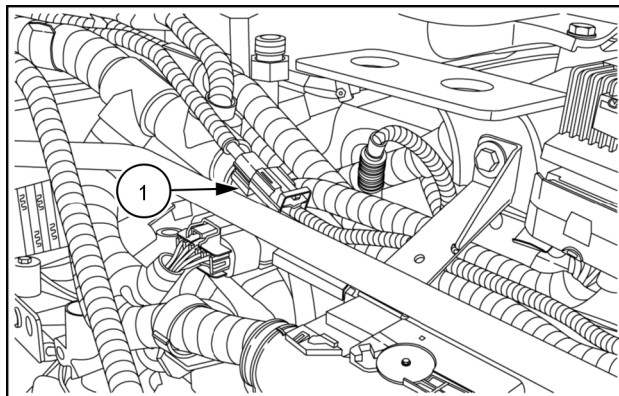
23. Disconnect the sleeve **(1)** of the intermediate delivery pipe connected to the transmission oil filter.

24. Carefully clean all the parts contaminated by any leaking hydraulic fluid.



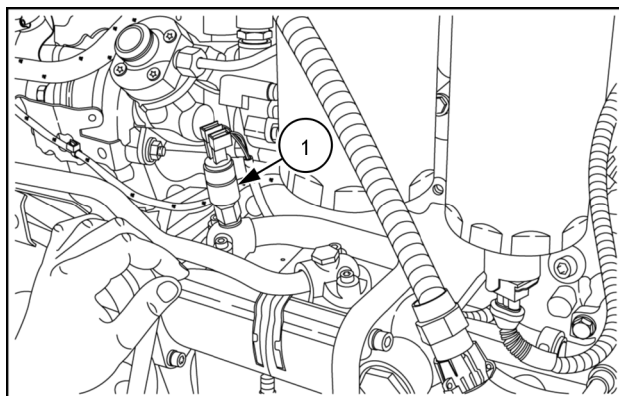
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25. Carefully clean the area around the connector **(1)** of the steering sensor.
26. Disconnect the steering sensor connector **(1)**.
27. Disconnect the connector cable **(1)** from the steering sensor.



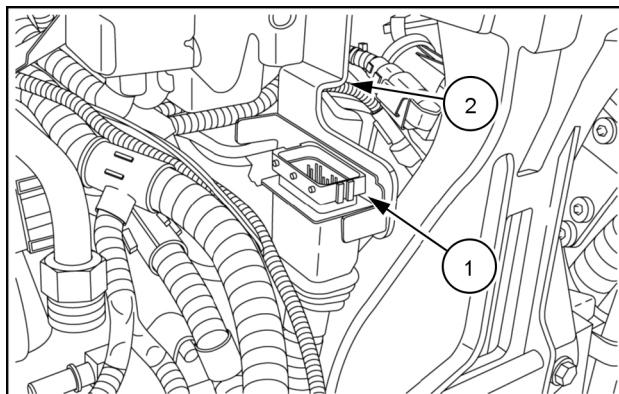
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28. Carefully clean the area around the connector **(1)** of the hydraulic fluid pressure sensor.
29. Disconnect the connector **(1)** of the hydraulic fluid pressure sensor.
30. Disconnect the connector cable **(1)** from the hydraulic fluid pressure sensor.



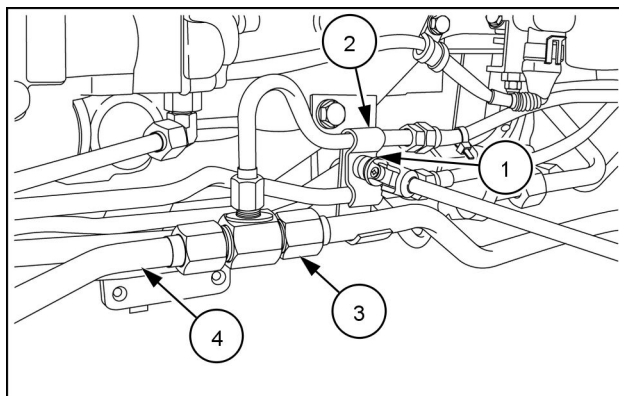
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31. Carefully clean the area around the connector **(1)**.
32. Disconnect connector **(1)**.
33. Unclamp the connector **(1)** from the support bracket **(2)**.



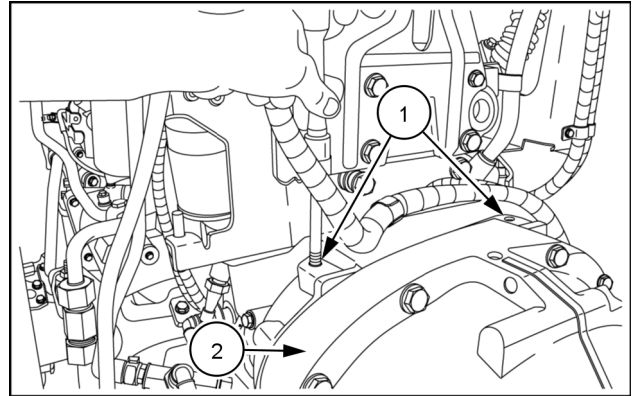
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34. Loosen the screw **(1)** and remove the collar **(2)**.
35. Loosen the sleeve **(3)** of the oil delivery pipe **(4)**.



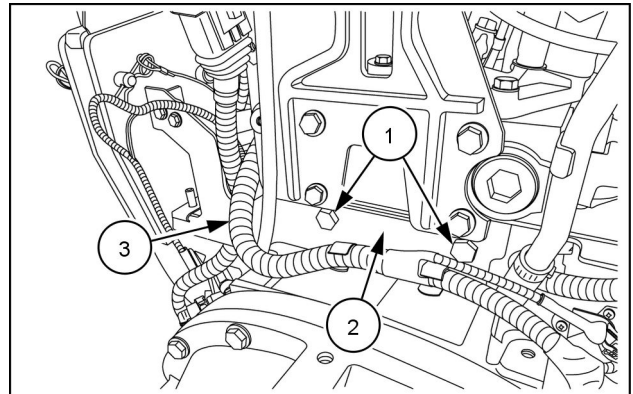
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36. Carefully clean the area around the two holes **(1)** on the upper side of the clutch bell **(2)**.
37. Restore the thread in the two holes **(1)** on the upper side of the clutch bell **(2)**.



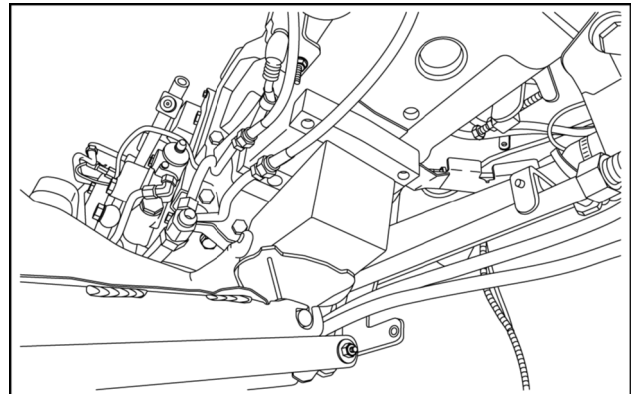
MOIL16TR01463AA 10

38. Loosen the two screws **(1)** securing the bracket **(2)**.
39. Remove the bracket **(2)** and the cable **(3)**.
40. Arrange two eyebolts suitable for lifting the engine.
41. Prepare a hoist and chains/straps that are suitable for lifting the engine.



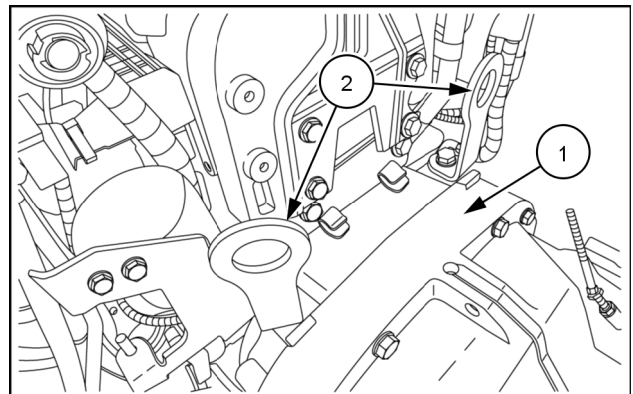
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42. Place a suitable lift under the transmission housing.



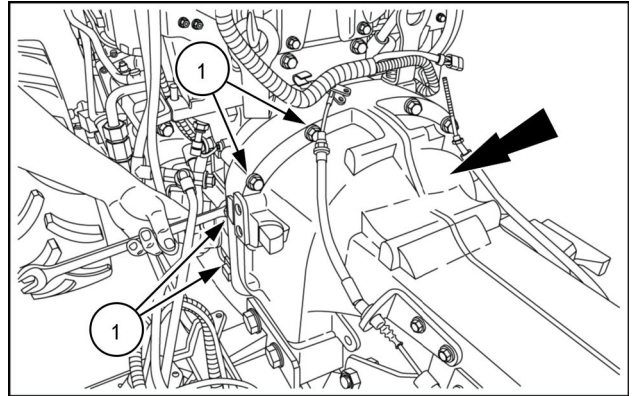
MOIL16TR01464AA 12

43. Clean the area around the clutch bell **(1)**.
44. Correctly position the two eyebolts **(1)**, and using the correct screws, lock into the holes on the upper face of the clutch bell **(2)**.
45. Correctly hook the chains/straps to the eyebolts **(1)**.
46. Use a suitable tool to separate the engine from the transmission.

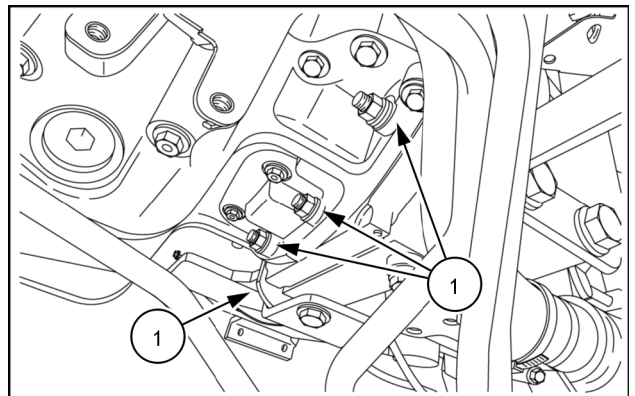


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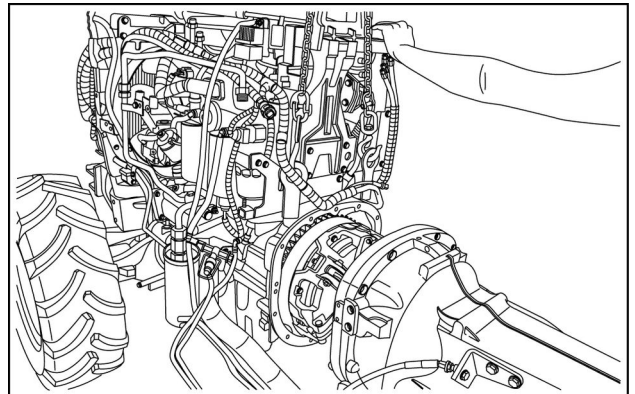
47. Loosen the four fastening screws **(1)** on the left-hand side of the clutch bell.
48. Repeat for the four fastening screws on the right-hand side of the clutch bell.



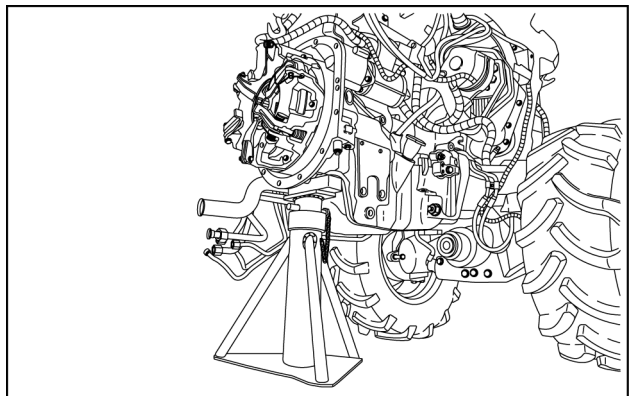
49. Loosen the four retaining nuts **(1)** on the lower side of the clutch bell.



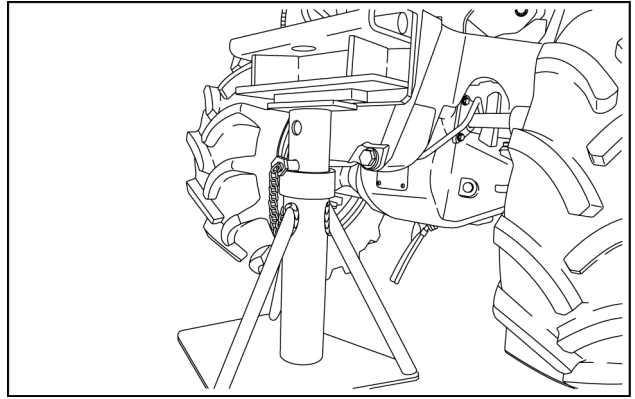
50. Using a suitable tool, separate the engine from the transmission.



51. Place a suitable bracket under the clutch bell on the engine side.
52. Place a suitable bracket under the clutch bell on the engine side.

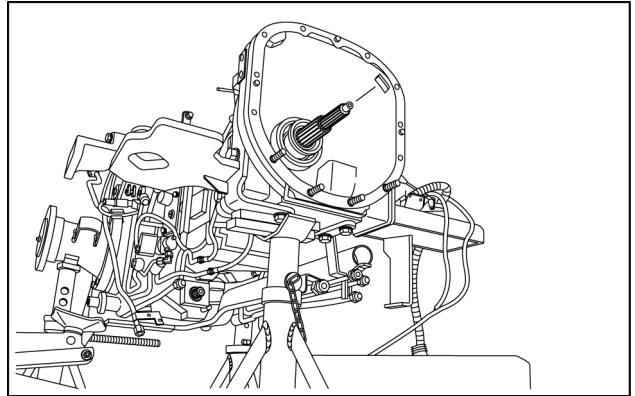


53. Place a suitable bracket under the support bracket of the front ballasts.
54. Place a suitable bracket under the support bracket of the front ballasts.
55. Unclamp the chains on the eyebolts and free the engine.



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56. Place a suitable bracket under the clutch bell on the transmission side.
57. Place a suitable bracket under the clutch bell on the transmission side.

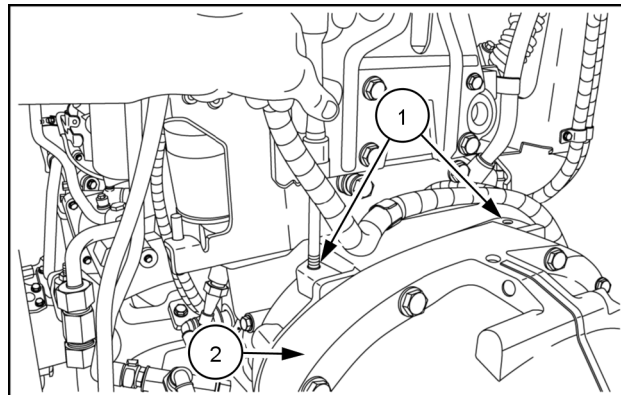


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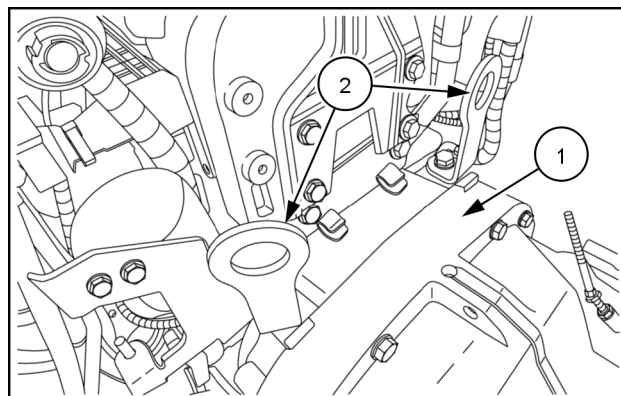
Engine - Install to the transmission

Quantum® 100CL With cab [HLRQ010L*JLU**** -]	APAC --- MEA --- WE
Quantum® 100F With cab [HLRQ010FEJLU00031 -]	APAC --- MEA --- WE
Quantum® 110CL With cab [HLRQ011LTHLU10320 -]	APAC --- MEA --- WE
Quantum® 110F With cab [HLRQ011FCHLU05201 -]	APAC --- MEA --- WE
Quantum® 80CL With cab [HLRQ080LLHLU09186 -]	APAC --- MEA --- WE
Quantum® 80F With cab [HLRQ080FKHLU10308 -]	APAC --- MEA --- WE
Quantum® 90CL With cab [HLRQ090C*JLU**** -]	APAC --- MEA --- WE
Quantum® 90F With cab [HLRQ090FTHLU07802 -]	APAC --- MEA --- WE

1. Retrieve the transmission assembly and carefully clean the area around the clutch bell.
2. Retrieve the front axle and engine assembly and clean the clutch bell.
3. Arrange two eyebolts suitable for lifting the engine.
4. Prepare a hoist and chains/straps that are suitable for lifting the engine.
5. Arrange two eyebolts suitable for lifting the engine.
6. Prepare a hoist and chains/straps that are suitable for lifting the engine.
7. Carefully clean the area around the two holes **(1)** on the upper side of the clutch bell **(2)**.
8. Restore the thread in the two holes **(1)** on the upper side of the clutch bell **(2)**.
9. Correctly position the two eyebolts **(1)**, and using the correct screws, lock into the holes on the upper face of the clutch bell **(2)**.
10. Correctly hook the chains/straps to the eyebolts **(1)**.

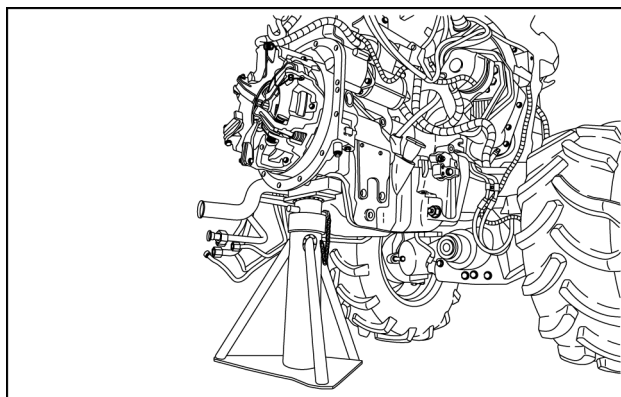


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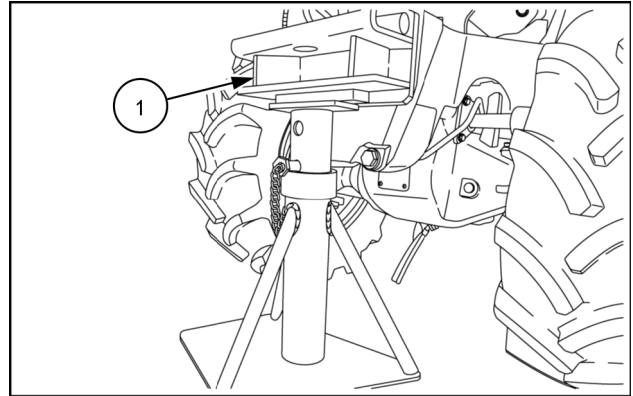
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11. Remove any supports positioned under the clutch bell on the engine side.



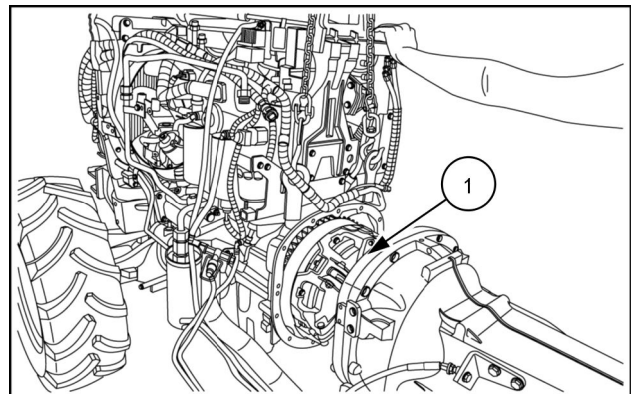
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12. Remove any supports positioned under the support bracket **(1)** of the front ballasts.
13. Use a suitable tool to fit the transmission to the engine.



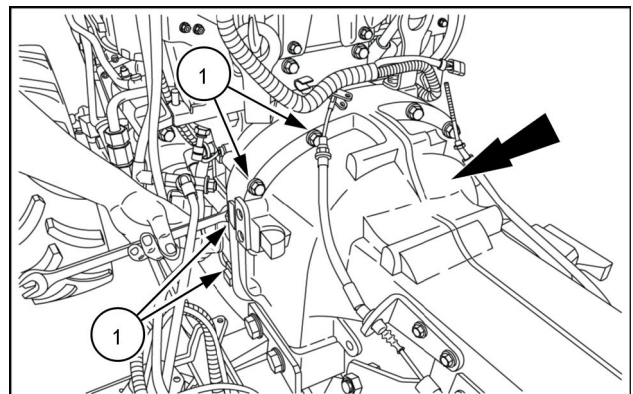
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14. Apply suitable sealing paste to the coupling face **(1)** of the transmission clutch bell.
15. Using a suitable tool, move the engine closer to the transmission.



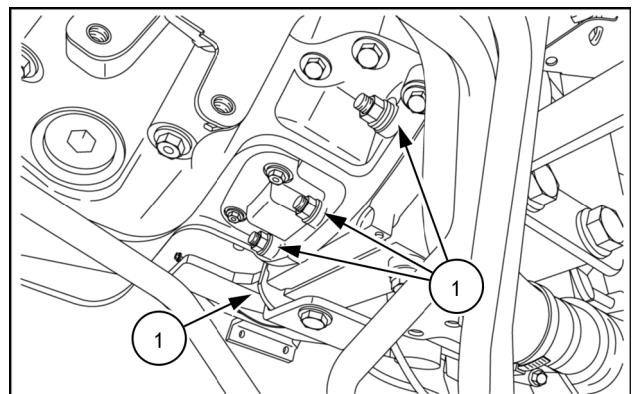
MOIL16TR01468AA 5

16. Tighten the four fastening screws **(1)** on the left-hand side of the clutch bell and tighten to the prescribed torque.
17. Repeat for the four fastening screws on the right-hand side of the clutch bell **(1)**.



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18. Tighten the four retaining nuts **(1)** on the lower side of the clutch bell and tighten to the prescribed torque.
19. Carefully clean all the parts contaminated by any sealing paste residue.
20. Unclamp the chains on the eyebolts and free the engine.
21. Remove the two eyebolts used to lift the engine.
22. Remove any supports positioned under the clutch bell on the transmission side.



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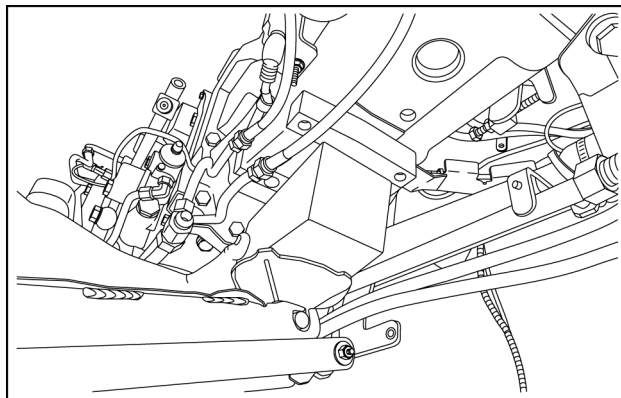
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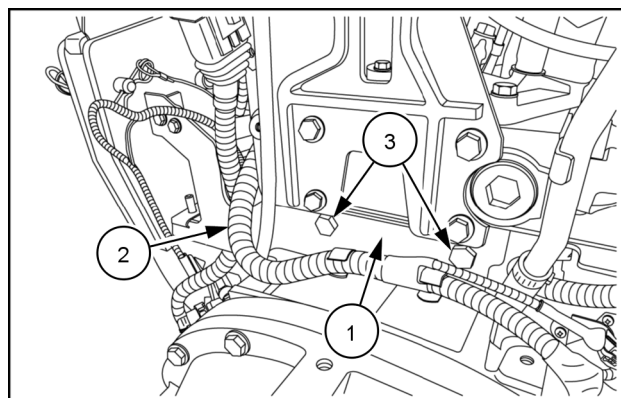
Thank you so much for reading

23. Remove any supports positioned under the transmission housing.



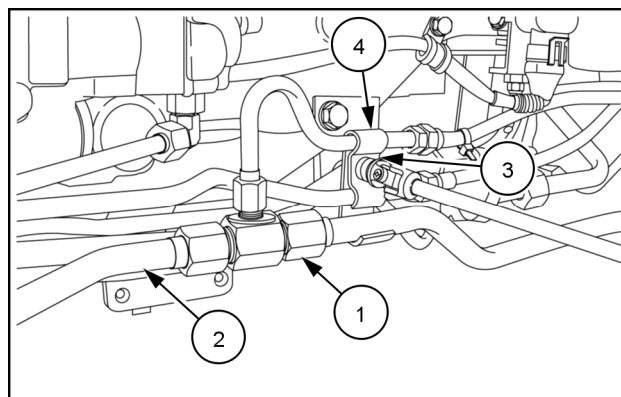
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24. Retrieve and carefully clean the bracket **(1)**.
 25. Correctly position the cable **(2)**.
 26. Correctly position the bracket **(1)** in its housing on the engine.
 27. Tighten the two screws **(3)** which fix the bracket **(1)** in place.



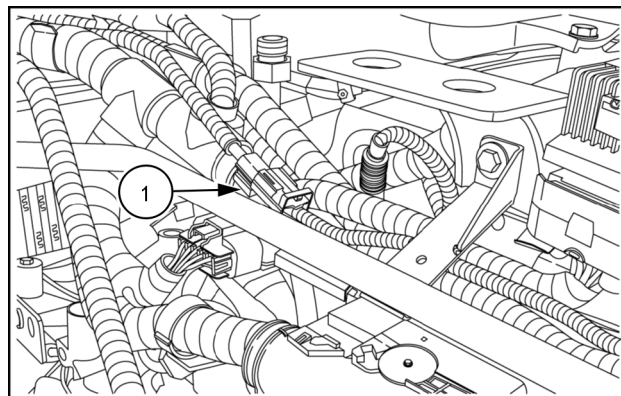
MOIL16TR01461AA 9

28. Carefully clean the area around the sleeve **(1)** of the oil delivery pipe **(2)**.
 29. Tighten the sleeve **(1)** of the oil delivery pipe **(2)**.
 30. Retrieve the collar **(3)** and position it correctly in its housing.
 31. Tighten the fastening screw **(4)** on the collar **(2)**.



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32. Carefully clean the area around the connector **(1)** of the steering sensor.
 33. Correctly position the connector cable **(1)** of the steering sensor.
 34. Connect the steering sensor connector **(1)**.



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