FARMALL® 50A
FARMALL® 60A
FARMALL® 70A
Tier 4B (final)
Tractor

SERVICE MANUAL

Part number 47866582
1st edition English
December 2015

CASE AGRICULTURE

Foreword Ecology and the environment

Soil, air, and water are vital factors of agriculture and life in general. When legislation does not yet rule the treatment of some of the substances which are required by advanced technology, common sense should govern the use and disposal of products of a chemical and petrochemical nature.

NOTICE: *The following are recommendations which may be of assistance:*

- Become acquainted with and ensure that you understand the relative legislation applicable to your country.
- Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, antifreeze, cleaning agents, etc., with regard to their effect on man and nature and how to safely store, use and dispose of these substances.
- Agricultural consultants will, in many cases, be able to help you as well.

Helpful hints

- Avoid filling tanks using cans or inappropriate pressurized fuel delivery systems which may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of them contain substances which may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when draining off used engine coolant mixtures, engine, gearbox and hydraulic oils, brake fluids, etc. Do not mix drained brake fluids or fuels with lubricants. Store them safely until they can be disposed of in a proper way to comply with local legislation and available resources.
- Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. They should not be allowed to get into the soil but should be collected and disposed of properly.
- Do not open the air-conditioning system yourself. It contains gases which should not be released into the atmosphere. Your CASE IH dealer or air conditioning specialist has a special extractor for this purpose and will have to recharge the system properly.
- Repair any leaks or defects in the engine cooling or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
- Protect hoses during welding as penetrating weld splatter may burn a hole or weaken them, allowing the loss of oils, coolant, etc.

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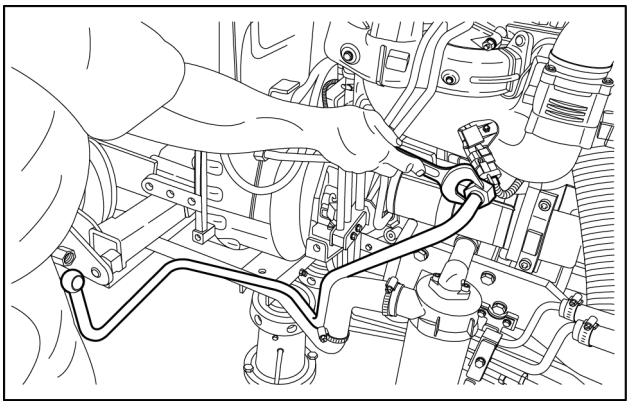
35. Disconnect the hydraulic line between the pump and the mid mount valve.



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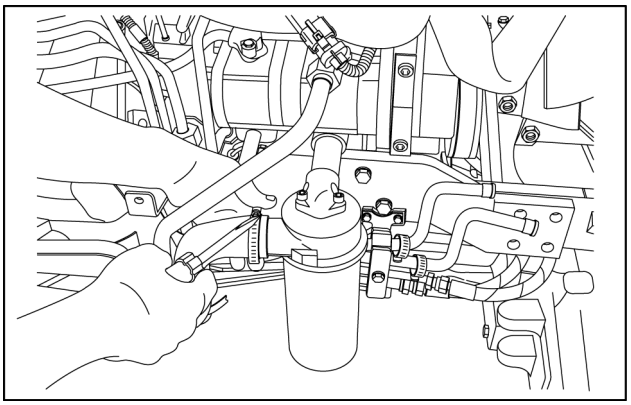
36. Loosen the clamp and remove the suction pipe from the hydraulic filter.



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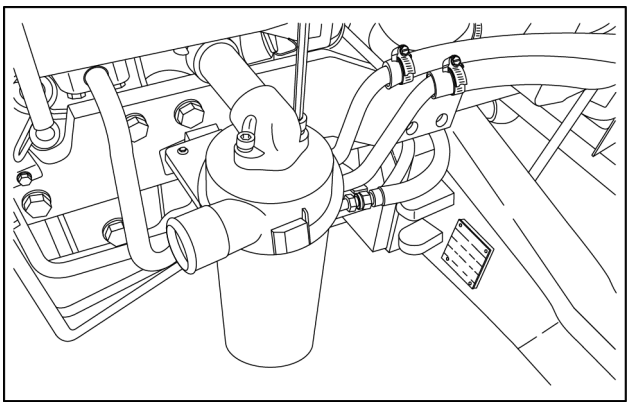
37. Loosen the set screws and remove the hydraulic filter.



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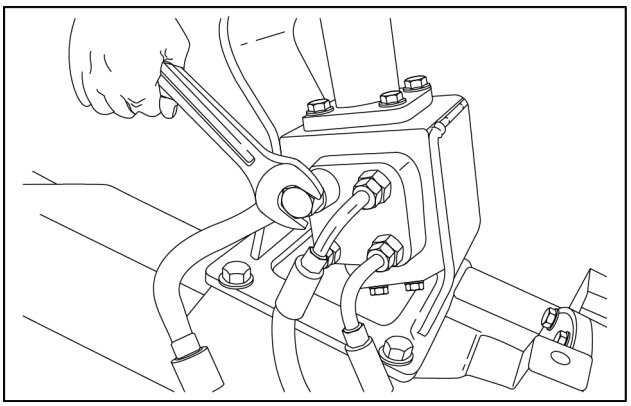
38. Disconnect the power steering hoses on the steering motor.



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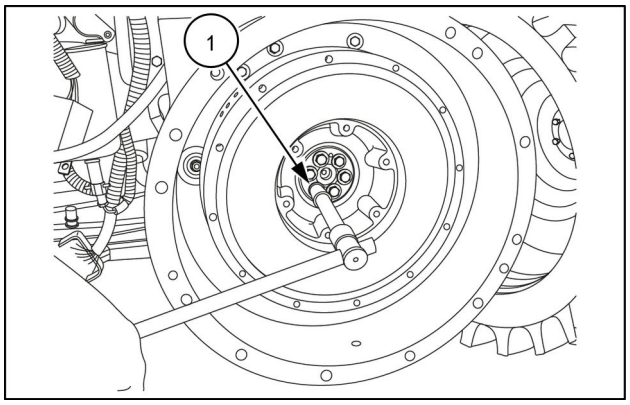
5. Remove the bolts **(1)** and take out the flywheel from the main clutch housing.



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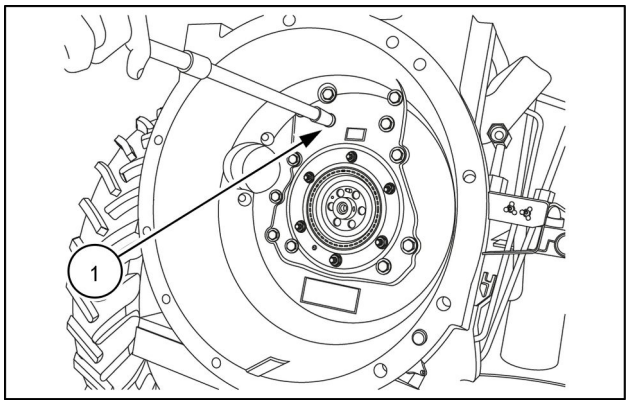
Clutch housing separation from the engine (if necessary)

6. Place a suitable support. Remove the bolts **(1)** and separate the clutch housing.



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Air cleaner - Assemble

Fitment

For assembly, follow the reverse order of disassembly. Clean the interior of the air filter housing using a clean cloth.

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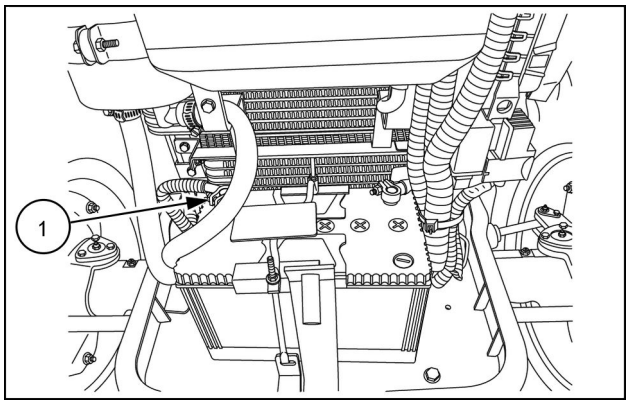
5. Connect the negative terminal **(1)** of the battery.



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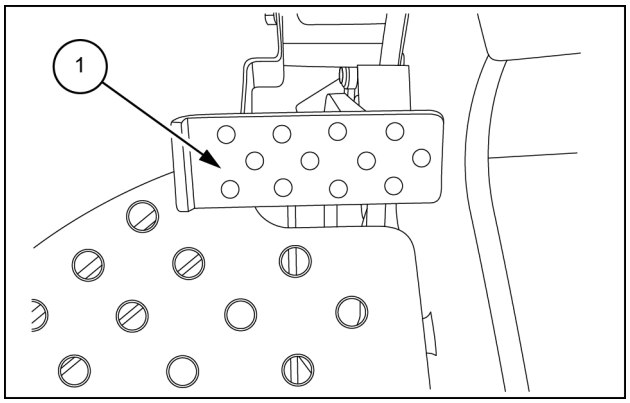
All data given in this publication is subject to production variations. Dimensions and weight are approximate only and the illustrations do not necessarily show products in standard condition. For exact information about any particular product, please consult your CASE IH Dealer.

Clutch mechanical release control - Adjust

Clutch pedal free play should be **30.00 - 45.00 mm** (**1.18 - 1.77 in**). To adjust the clutch pedal free play proceed as follows:



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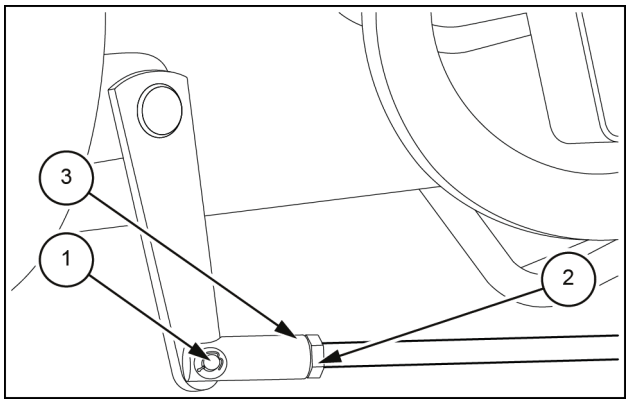
1. Remove the split pin **(1)** and disconnect the linkage.
2. Loosen the lock nut **(2)**.
3. Rotate the yoke **(3)** clockwise to reduce the play and anti-clockwise to increase the play.
4. Connect the linkage back to the cross shaft.



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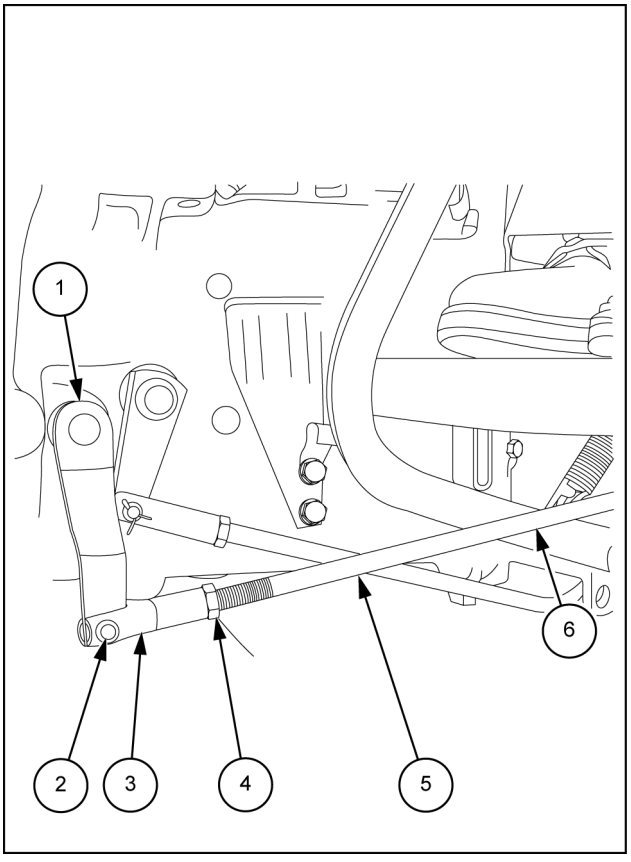
Power Take-Off (PTO) clutch lever free play (double speed)

1. Remove the pin **(2)**, fork **(3)** and rod **(5)** separately.
2. Keep lever **(1)** at the right most position such that the bearing just touches the clutch fingers.
3. Insert rod **(5)** into fork **(6)** and tight the threads up to **15.00 mm** (**0.59 in**).
4. Keep end of lever **(7)** at **30.00 - 35.00 mm** (**1.18 - 1.38 in**) from edge as shown in figure.
5. Keep the rod in static position and insert fork **(3)** into rod **(5)**.
6. Match the hole of fork **(3)** with hole of lever **(1)**. Keep the lever in initial position.
7. Insert pin **(2)** in matching holes and lock lever **(1)**.



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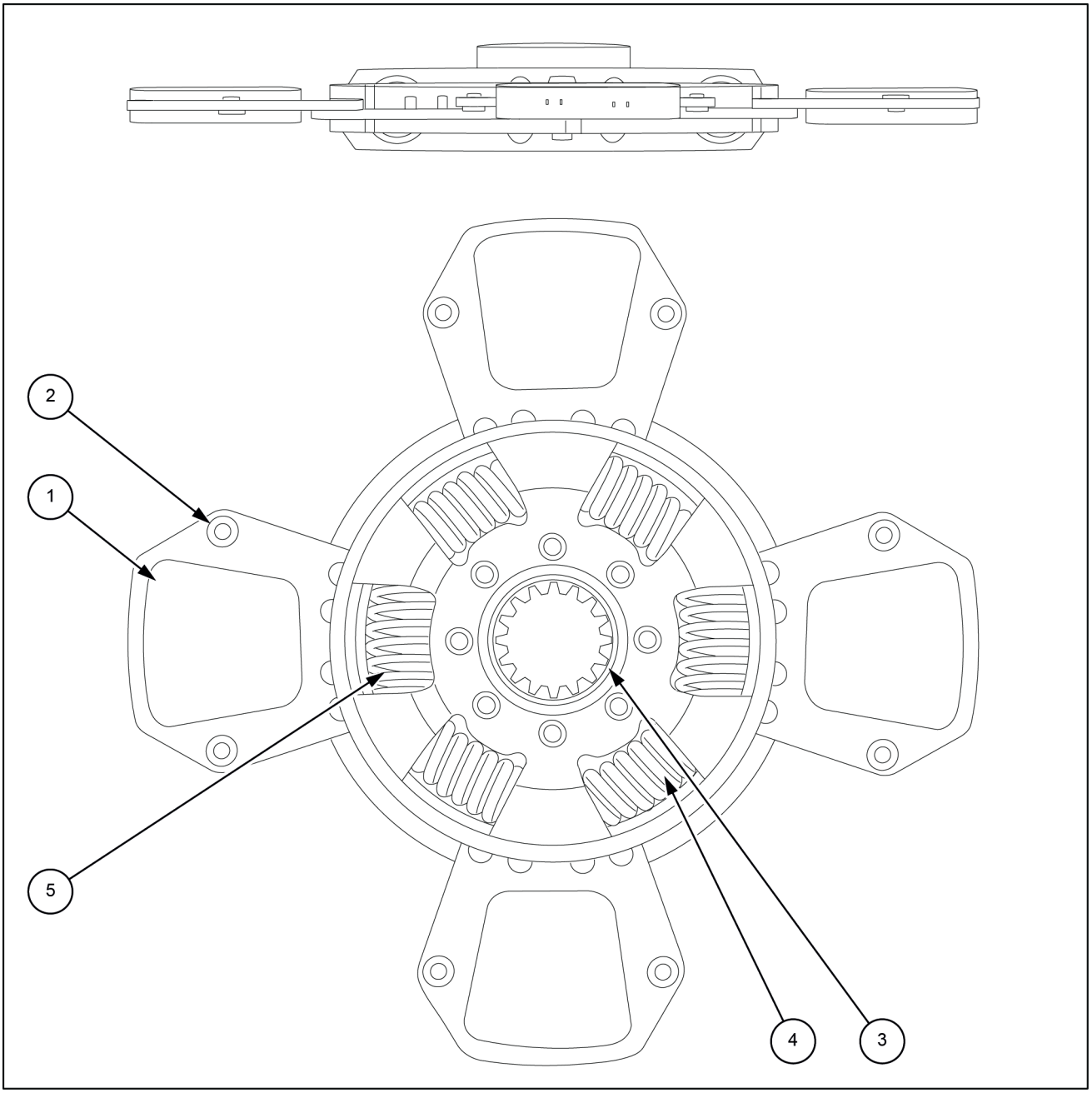

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(1) – Clutch facing
(2) – Facing rivet
(3) – Hub
(4) – Idle damper spring
(\5) – Main damper spring

Clutch control mechanism - Remove

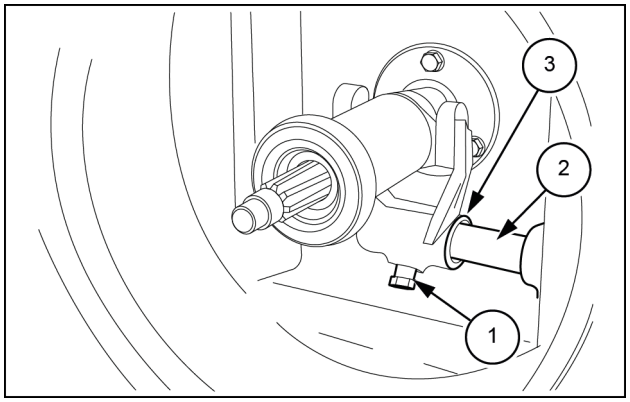
⚠ WARNING

Avoid injury!
Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.
Failure to comply could result in death or serious injury.

W0208A

It is necessary to split the tractor between engine and transmission housing to gain access to the clutch.

1. Loosen the set screw **(1)** from fork.
2. Pull out the cross shaft **(2)**.
3. Remove clutch release fork **(3)**.



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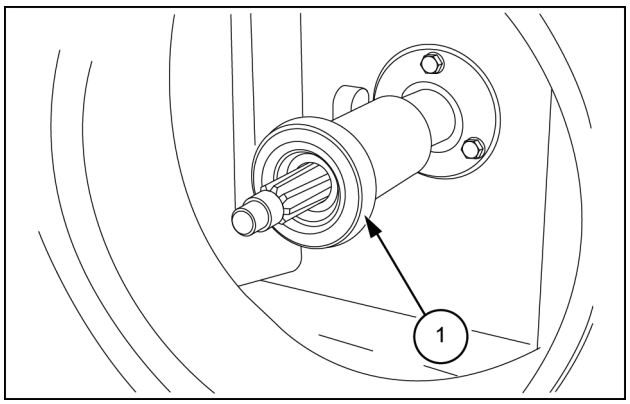
4. Slide out the clutch release bearing **(1)**.



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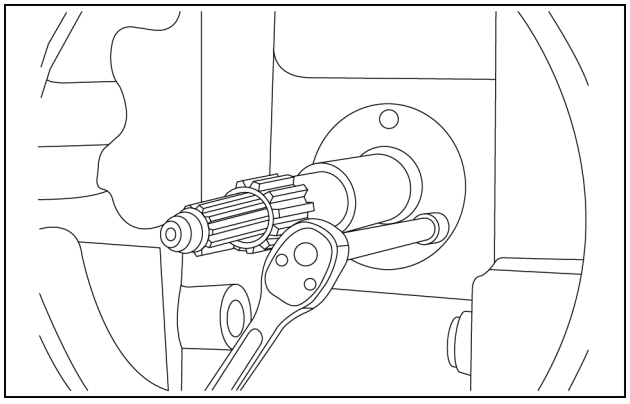
5. Loosen the bolts 3 numbers as shown in figure.



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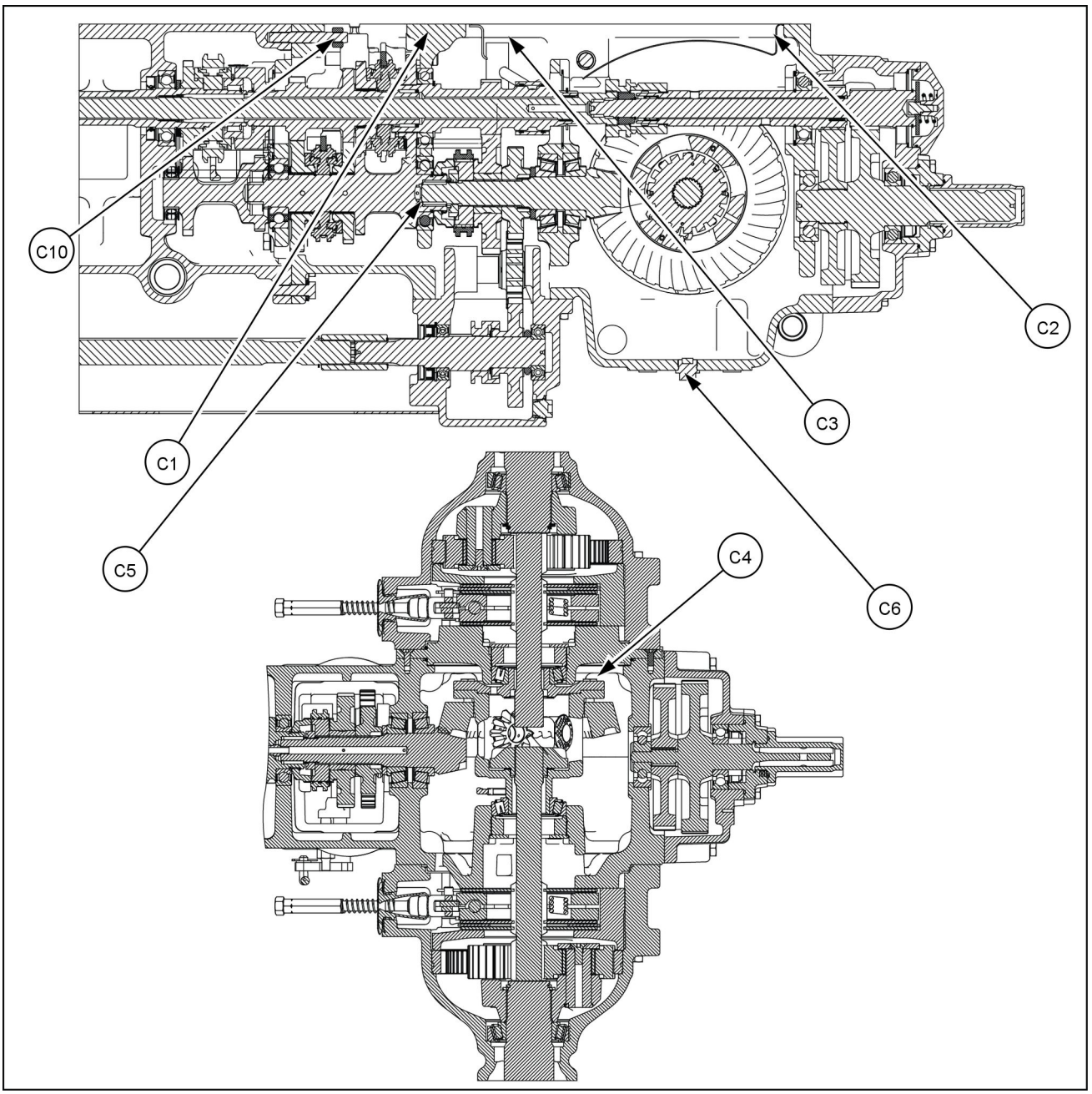

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Mechanical transmission - Remove

⚠ WARNING

Avoid injury!
Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.
Failure to comply could result in death or serious injury.

W0208A

⚠ DANGER

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply will result in death or serious injury.

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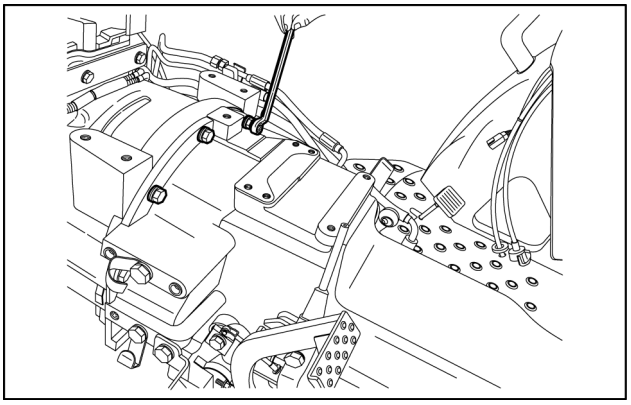
NOTE: *To remove the transmission housing from the tractor, tractor has to be split at clutch and transmission housing. Fenders, hydraulic housing, three point linkage, rear tires and final drive housing have to be removed from the tractor.*

1. Loosen the bolts and remove the transmission assembly from the tractor. See engine removal section.



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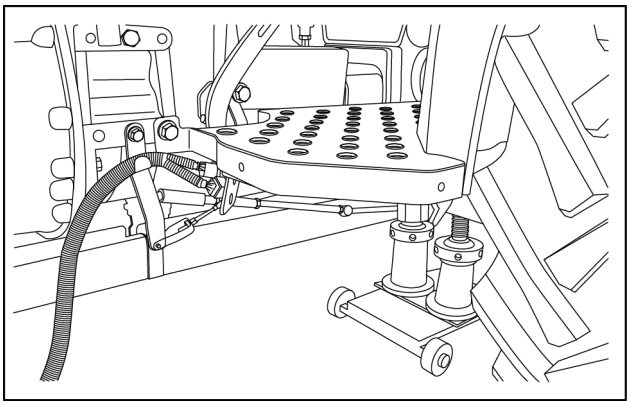
2. Loosen bolts securing foot boards on left-hand side and right-hand side fenders. Disconnect all the wirings. See **Protections and footboards - Remove (90.118)**.



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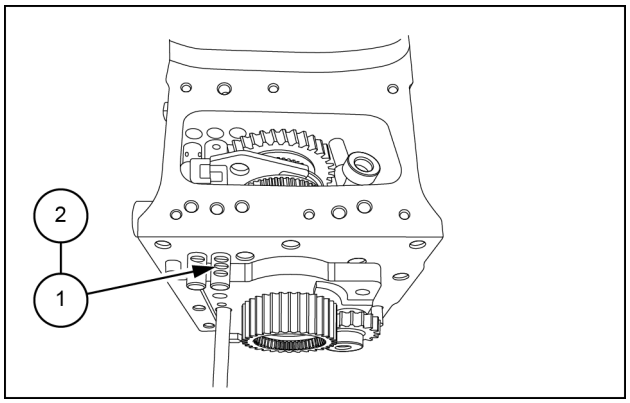
10. Install all the shift rails shift gates and shift forks after installing the springs **(1)** and detent balls **(2)**.



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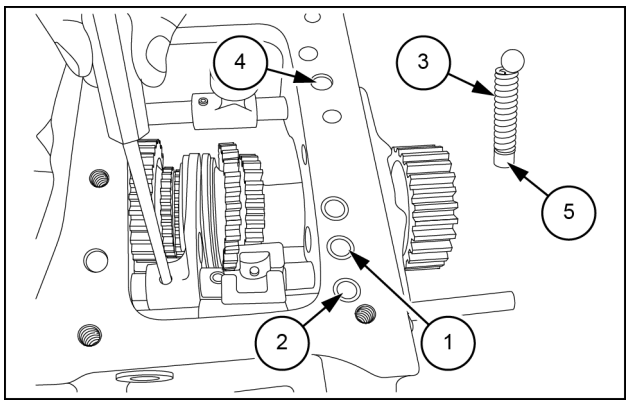
11. Install all roll pins to shift rails along with springs and detent balls.

NOTE: *Install the detent balls and springs where shown **(1)** and **(2)**. Insert the Hi/Low rail detent ball and spring **(3)** where shown **(4)**. Install the plug **(5)** above the Hi/Low rail detent ball and spring at **(4)**.*



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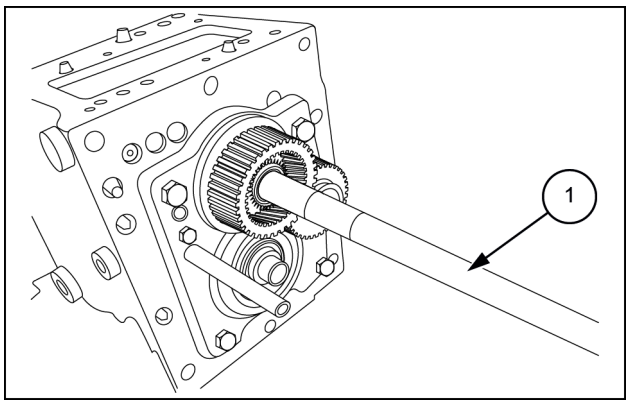
12. Install the Power Take-Off (PTO) shaft **(1)**.



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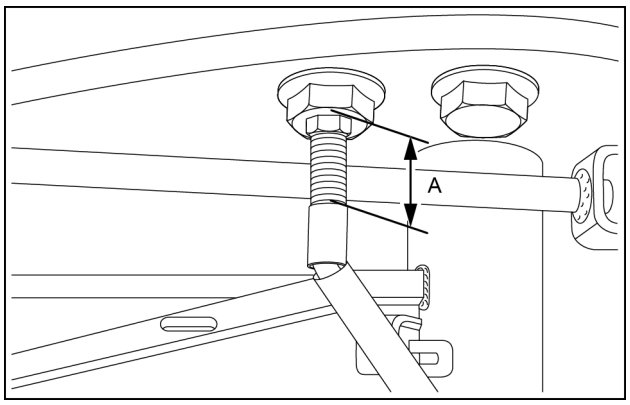
Mechanical transmission external controls - Adjust

Shuttle interlock cable

1. Measure dimension **(A)** at cable end as shown in figure **1**. (Top of nut to bottom of threads). The desired length of **(A)** is approximately **26.000 mm** (**1.024 in**), adjust if required.



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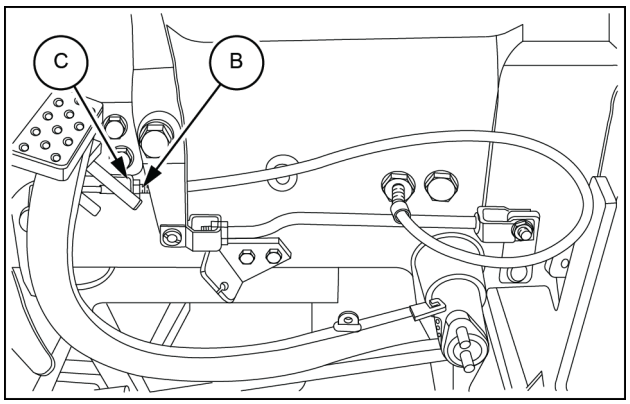
2. At the opposite cable end, count the number of visible threads **(B)**, there should be 6 or 7. Thread length can be changed by adjusting the nuts on either side of cable mounting bracket **(C)**.
3. Adjust the nuts so that the shuttle lever starts to move when clutch pedal is depressed beyond free play **50.00 - 55.00 mm** (**1.97 - 2.17 in**) from rest) and then tighten.



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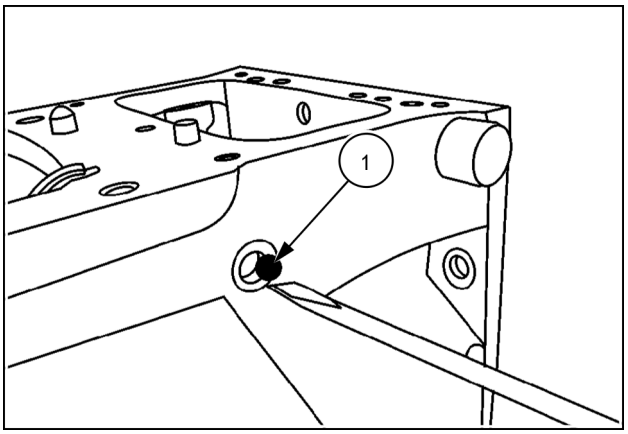
4. After fitting reverse rail insert ball **(1)**, applying some grease in the housing.



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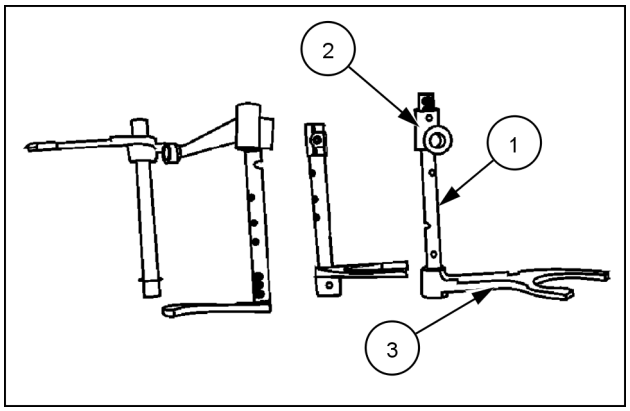
5. Insert the rail **(1)**, of 3rd/4th with gate **(2)**, passing through fork **(3)**, of 3rd/4th gear as shown in **5**.
   Insert gate of 1st/2nd rail shaft on the notch of 1st/2nd gear fork.



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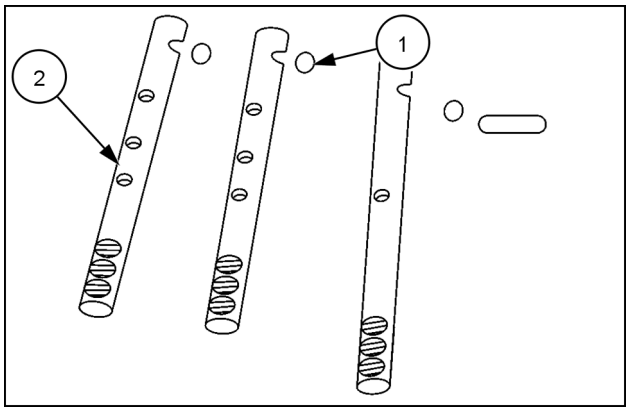
6. Insert the ball **(1)**, applying some grease in housing after removing bolt as shown in **4**.
7. Insert the 1st/2nd rail **(2)**, passing thru gate as shown in **5**.

NOTE: *Keep grooves of rails upward to make easy fitment of balls and springs.*



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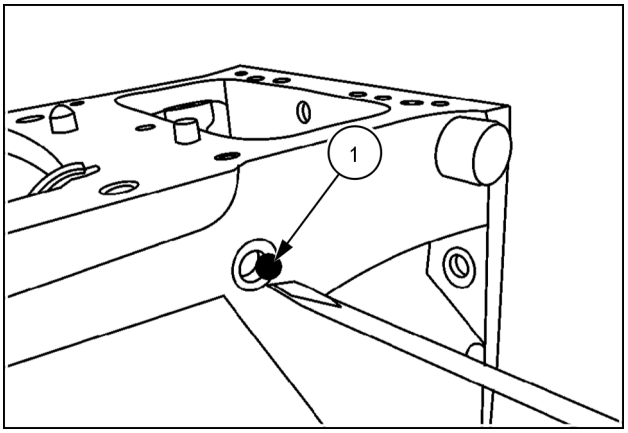
8. Insert the ball and pin **(1)**, after removing neutral safety switch for Hi/Lo rail then fit neutral safety switch and tighten it.



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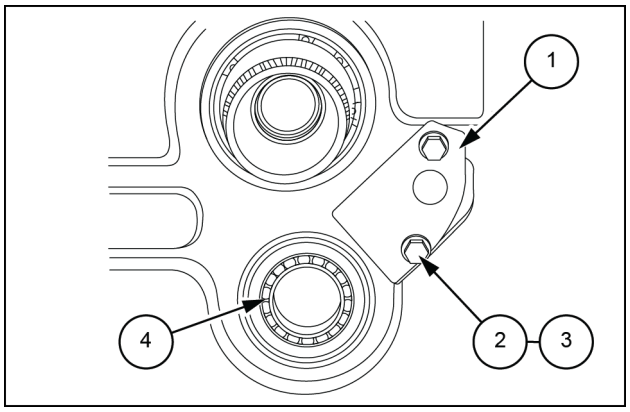
Gearbox internal components - Install

1. Place the oil trench plate **(1)** on the housing surface and tighten the bolts **(2)** with washer **(3)** to **25.5 N·m** (**18.8 lb ft**).
2. Install the ball bearing **(4)** from the rear of the clutch housing.



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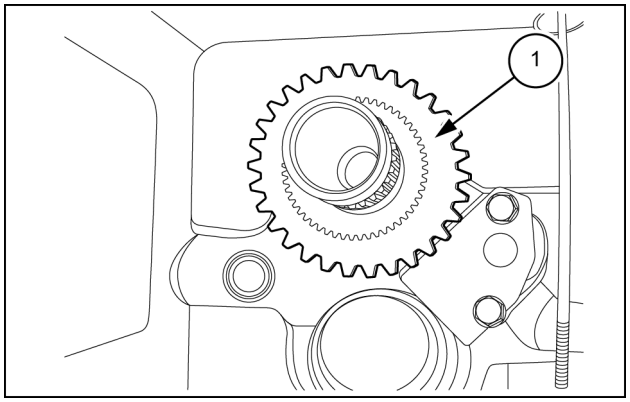
3. Install the reverse gear **(1)** over the input shaft spacer.



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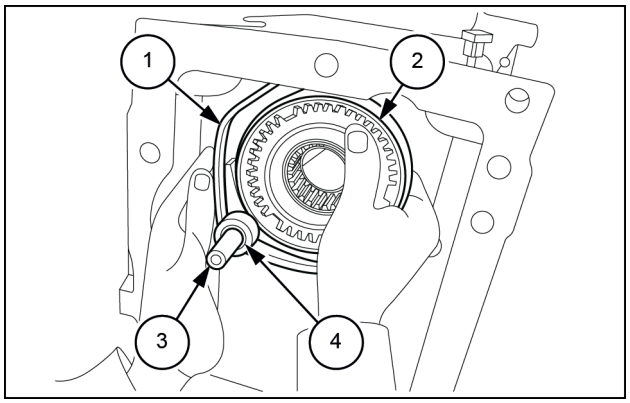
4. Install the shift fork **(1)** onto the synchronizer **(2)**.
5. Insert the shift rail **(3)** through the shift fork **(1)**.

NOTE: *Secure the spring and detent ball against the groove on the shift rail by installing the shuttle detent bolt on the left-hand side of the clutch housing.*

6. Install roll pin **(4)** after aligning the hole of the shift fork **(1)** and shift rail **(3)**.
7. Install the synchronizer kit **(1)** onto the spline of the input shaft.
8. Secure the synchronizer on the input shaft with the external retaining ring **(2)**.



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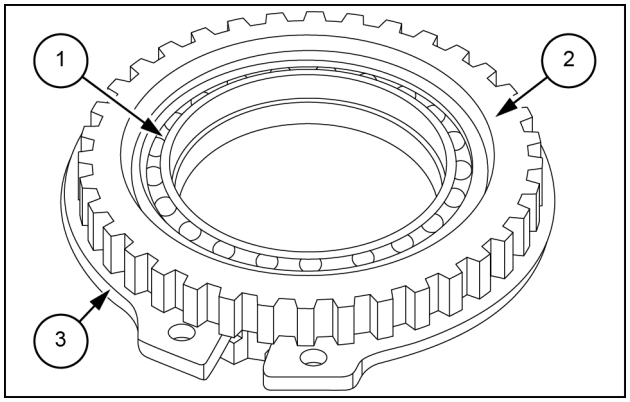
9. Press the ball bearing **(1)** inside the coupler shuttle gear **(2)**.
10. Attach the external snap ring **(3)** onto the groove of coupler shuttle gear **(2)**.



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Drive shaft - Inspect

1. Wash all parts in a suitable cleaning solution and allow to air-dry.
2. Inspect all gears for excess wear chipped gear teeth cracks or any other damage. Replace as necessary.
3. Inspect the gear coupler and synchromesh drive shaft for any cracks or damage. Replace as necessary.

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Four-Wheel Drive (4WD) axle - Install

⚠ CAUTION

Pinch hazard!
Always use suitable tools to align mating parts.
DO NOT use your hand or fingers.
Failure to comply could result in minor or moderate injury.

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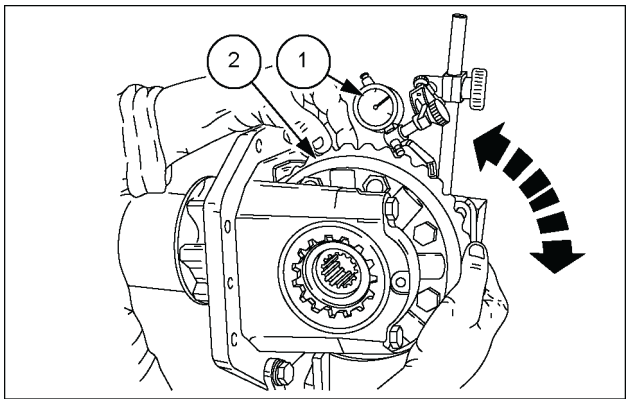
1. Refit the front axle following the instructions below.
   - Install the axle and bolt the front and rear supports in position.
   - Reconnect the power steering hoses.
   - Install the front wheels.
   - Raise the front of the tractor using the hoist.
   - Remove the fixed stand.
   - Detach the nylon cables.
   - Reconnect the drive shaft and install the drive shaft guard.
   - Attach a nylon cable to the front weights, lift, install to the tractor and secure with the locking screws.
   - Reconnect the negative battery lead.
   - See the **Four-Wheel Drive (4WD) axle - Torque (25.100)**.

4. Measure the backlash between pinion and ring gear, using a dial gauge **(1)** perpendicular to the outer edge of a tooth on the ring gear **(2)**.

5. Repeat the measurement in two other positions 120° apart and compare the average of the three values (Gm) with the prescribed normal backlash specification of **0.18 mm** (**0.007 in**) - **0.23 mm** (**0.009 in**) average value **0.20 mm** (**0.008 in**).
   If the measured backlash exceeds the prescribed value, adjust the threaded adjustment rings by screwing one of the rings in and the other out by the same amount to correct the axial preload and thus obtain the prescribed backlash.

6. With a dial gauge positioned perpendicular to the outside edge of one of the ring gear teeth, check that the backlash between the pinion and ring gear is within the tolerance limits of **0.18 mm** (**0.007 in**) - **0.23 mm** (**0.009 in**).



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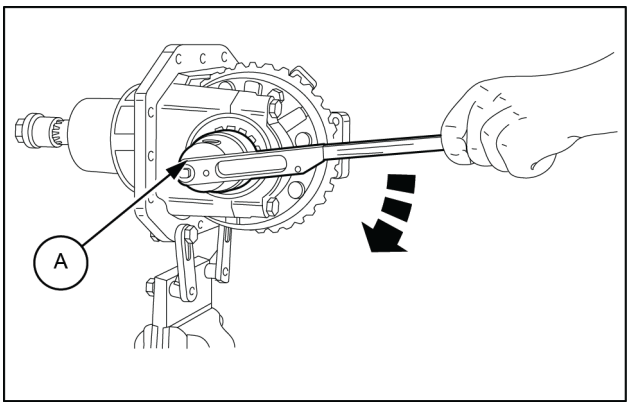

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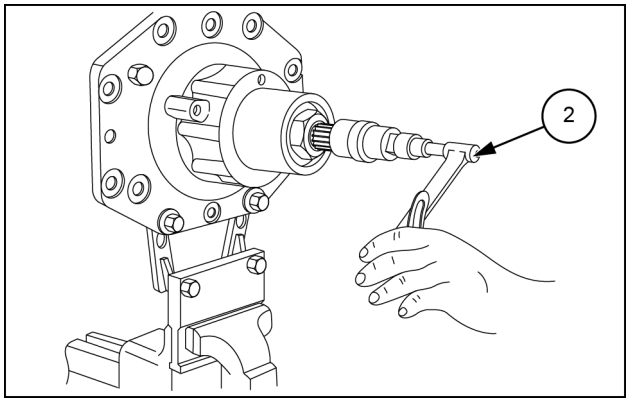
7. Using a wrench, tool number **380000252 (A)** turn the threaded adjustment ring and check, using torque wrench **(2)** that the combined rolling resistance torque of the ring gear and pinion bearings is:
   A2 = A1 + **1.0 N·m** (**0.74 lb ft**) to **1.5 N·m** (**1.11 lb ft**).
   where:
   A2 = combined ring gear/pinion rolling resistance torque
   A1 = rolling resistance torque of pinion only as measured previously
   1.0 N·m (**0.74 lb ft**) to **1.5 N·m** (**1.11 lb ft**) = rolling resistance torque of crown wheel only measured at the end of the pinion using wrench, tool number **380000257** and a torque wrench.

8. Tighten the cap bolts see figure in **Four-Wheel Drive (4WD) axle - Torque (25.100)** to a torque of **113 N·m** (**83 lb ft**).

9. Install the safety plate, screwing the threaded adjustment ring in or out up to the nearest notch.

10. Attach the bevel drive/differential to the axle casing after having carefully cleaned and degreased the mating surfaces and applied a bead of gasket eliminator **LOCTITE® 518**, approx. **2 mm** (**0.08 in**) wide along the line shown in the figure.



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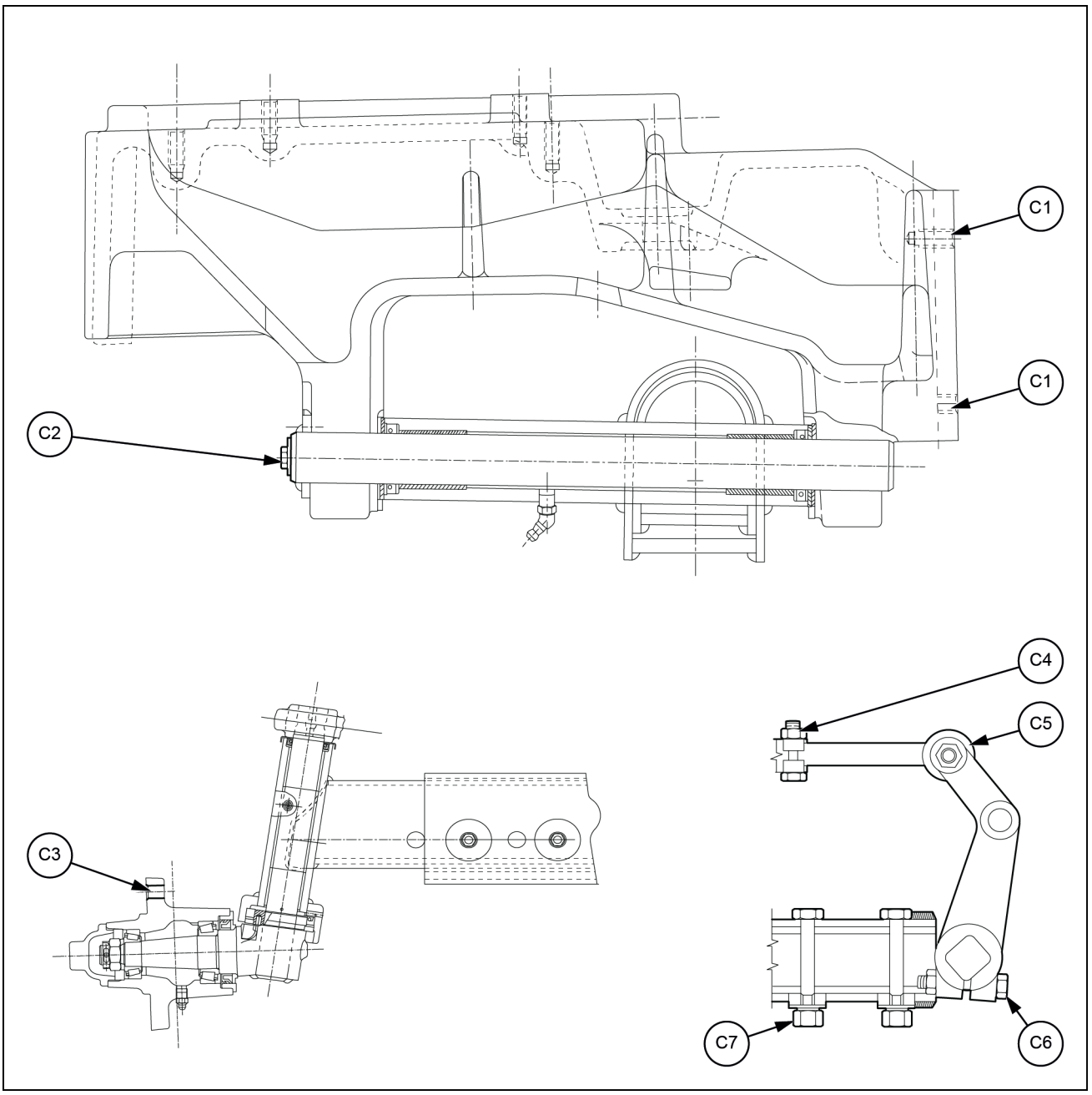

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Non-powered front axle - Special tools

Tool description	Tool number
Slide hammer for centre pin	**380001545**
Adapter for slide hammer	290793

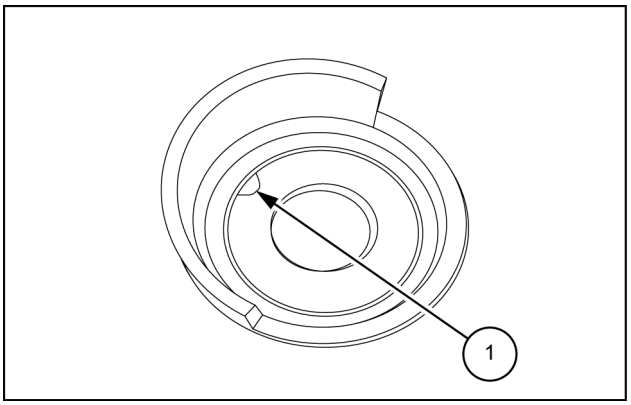
Non-powered front axle - Sealing

Operation description	Specification
Front wheel hub sleeve	**LOCTITE® 638™**
King pin thrust washer	**LOCTITE® 638™**

Front axle - Install – Spindle assembly

Reinstall the spindle assembly to the front axle following the disassembly procedure in reverse.

NOTE: *Make sure that the slot **(1)** in the thrust washer fits on the notch provided on the axle outer section.*



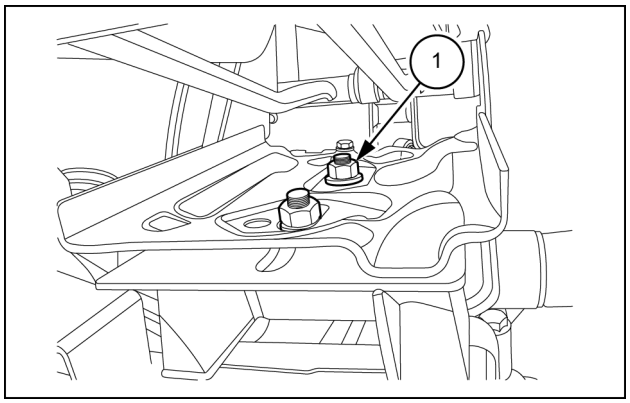
GNIL14TR04456AB 1

Contents

Rear axle system - 27

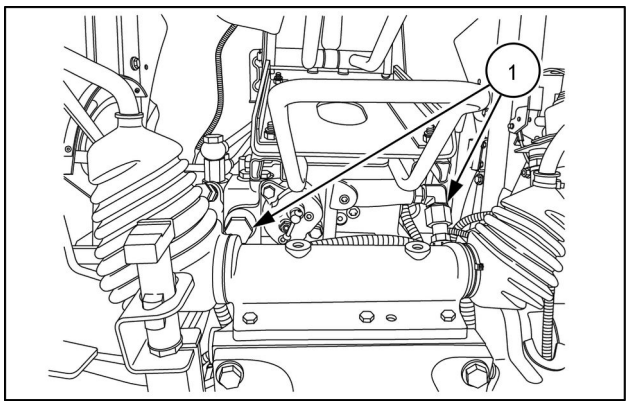
Powered rear axle - 100

4. Loosen the bolts **(1)**, detach electrical connection and remove operator seat from the hydraulic housing.



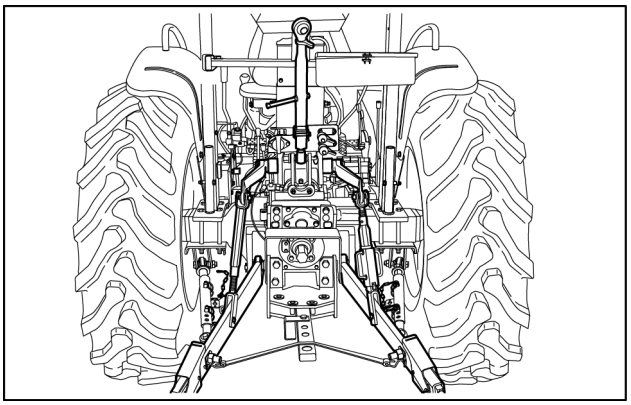
GNIL14TR04246AB 4

5. Disconnect hydraulic lines **(1)** on the hydraulic lift body.



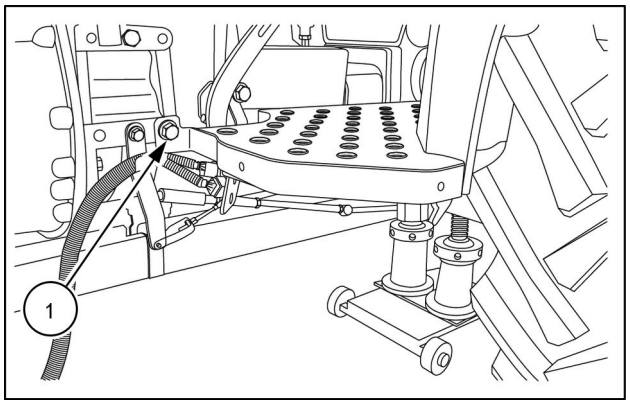
GNIL14TR00798AA 5

6. Remove three point linkages from the tractor.



GNIL14TR00562AA 6

7. Loosen bolts securing foot rest to fender on both sides.



GNIL14TR00767AA 7

Differential - Assemble

⚠ CAUTION

Pinch hazard!
Always use suitable tools to align mating parts. DO NOT use your hand or fingers.
Failure to comply could result in minor or moderate injury.

C0044A

Re-install all the components of the differential assembly observing the following.

- Re-assembly follows the disassembly procedure in reverse.. See **Differential - Disassemble (27.106)**.
- Set crown or pinion backlash and total preload setting. See **Differential - Backlash (27.106)**.
- Use suitable tools to fit bearings.
- Tighten to correct torques.
- Use thread sealant **LOCTITE® 243™** on crown wheel bolts.
- Set sun star backlash to **0.180 - 0.250 mm** (**0.007 - 0.010 in**).

Contents

Rear axle system - 27

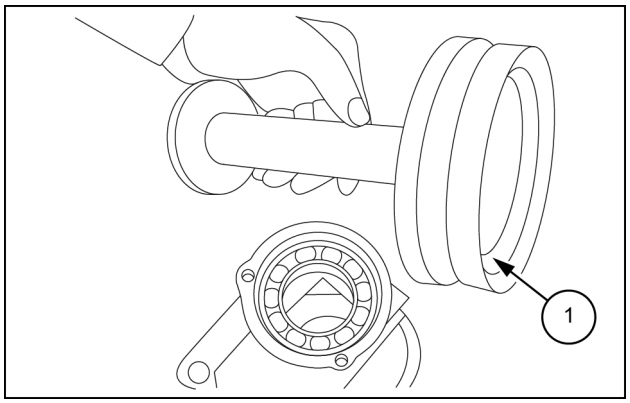
Planetary and final drives - 120

Final drive housing - Assemble

Reinstall wheel and axle shaft in final drive housing observing the following:

- Re assembling follows the removal procedure. See **Final drive housing - Disassemble (27.120)**.
- Refer to figure for correct orientation of the shafts bearings sleeves and seals.
- Check seals and replace if damaged.
- Fit final drive housing oil seal back, by using the special tool number 84261386.
- Check planet carrier after fitting circlip lock on axle for free play. If notice any free play remove circlip lock and place suitable shim below the spacer, so as to eliminate free play completely.

  NOTE: *In low duty trumpet housing bearing preload is not required.*
- Before reassembling housing and covers thoroughly clean and de-grease mating surfaces and apply a **2.00 mm** (**0.08 in**) bead of sealant following the pattern shown in the figure.



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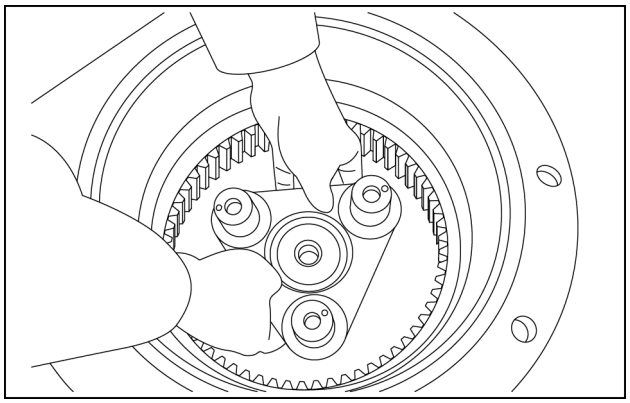
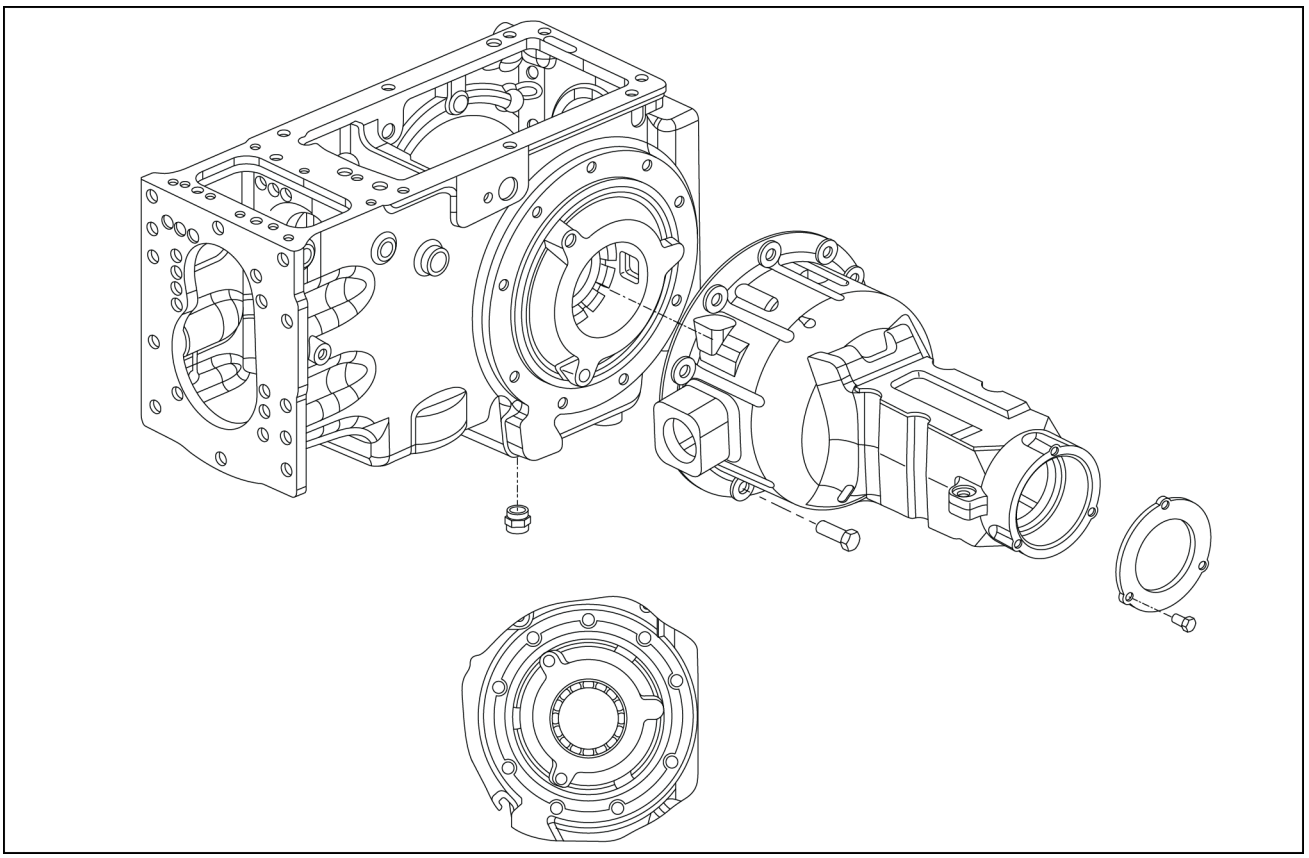
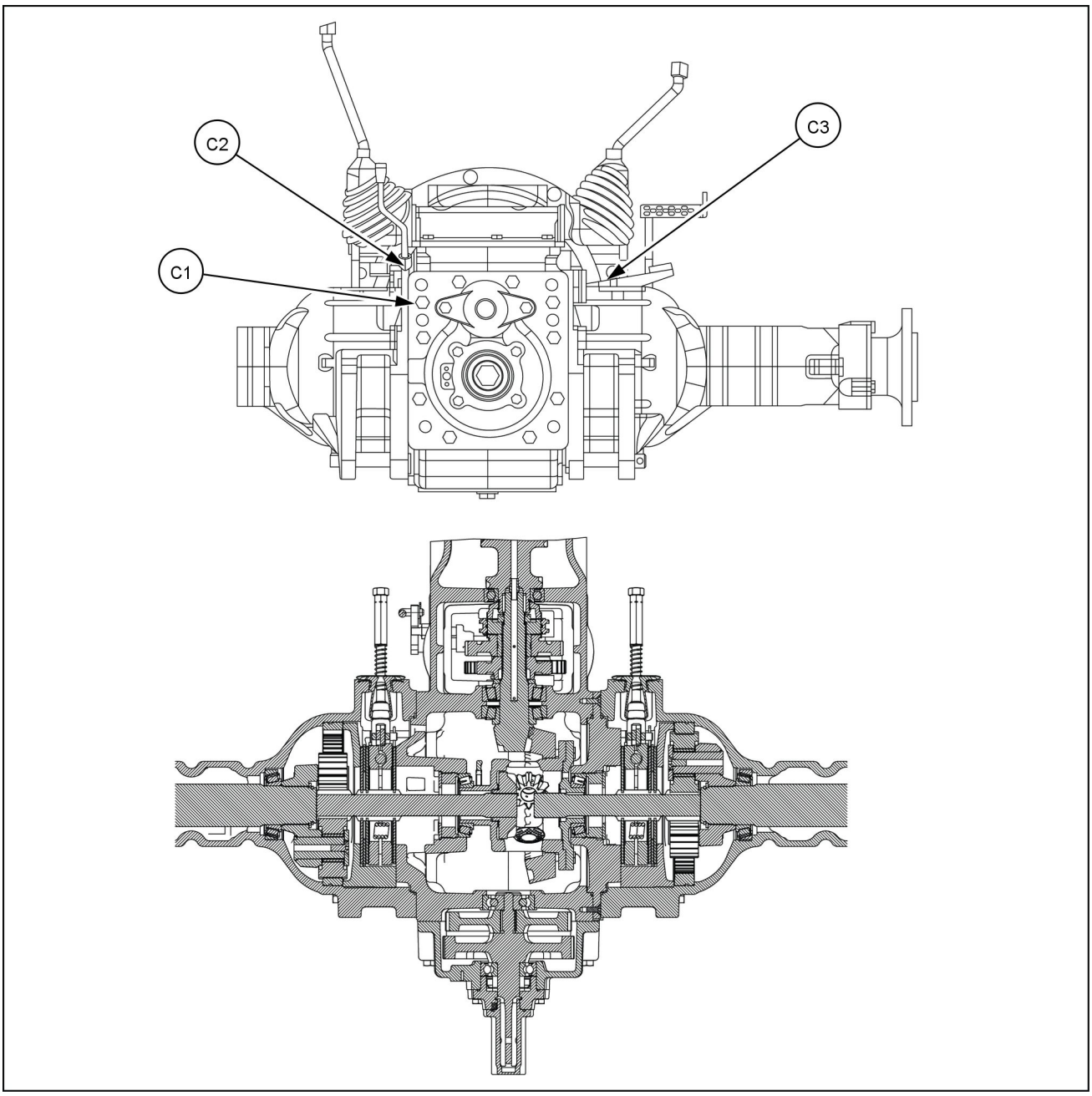


GNIL14TR04293AA 2



GNIL14TR04294FA 3



GNIL14TR00831GA 1

Rear mechanical control - Sealing

Operation description	Sealant specification
Power Take-Off (PTO) rear cover **(S1)**	**LOCTITE® 518**
Hydraulic to transmission housing **(S2)**	**LOCTITE® 518**

Contents

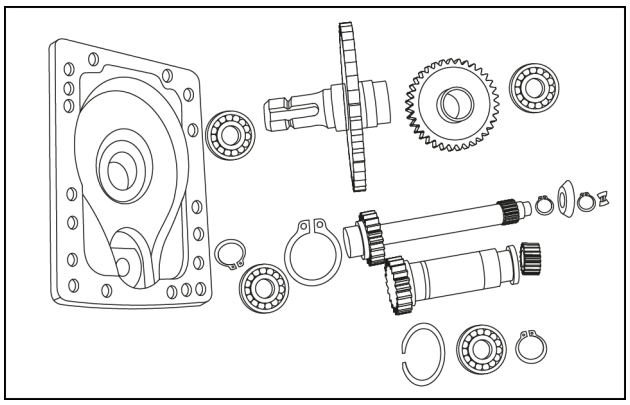
Power Take-Off (PTO) - 31

One-speed rear Power Take-Off (PTO) - 110

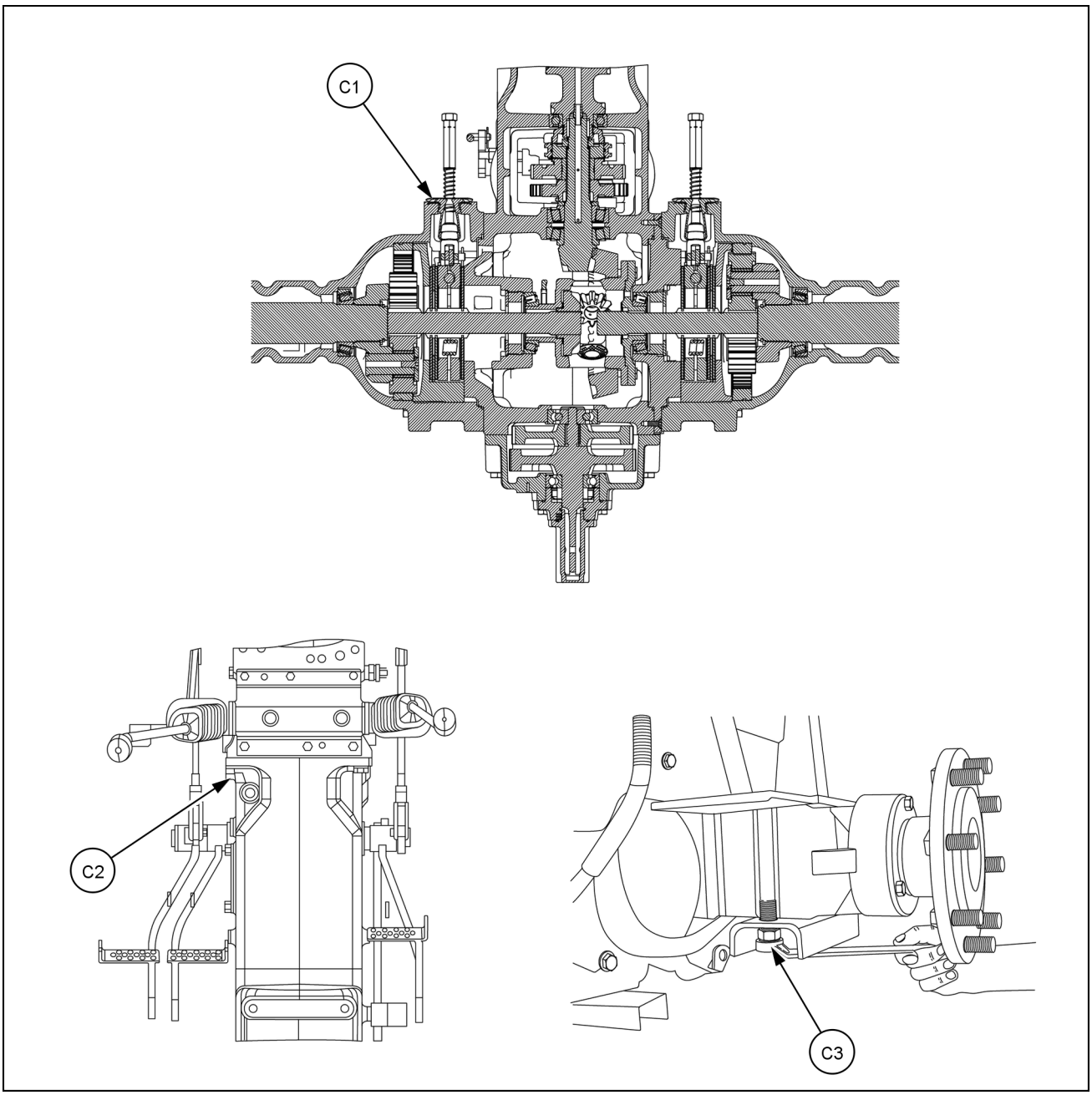
Two-speed rear Power Take-Off (PTO) - Inspect

PTO shaft assembly inspection

Check the gears shaft and bearings, for wear and damages. If required replace by new parts.



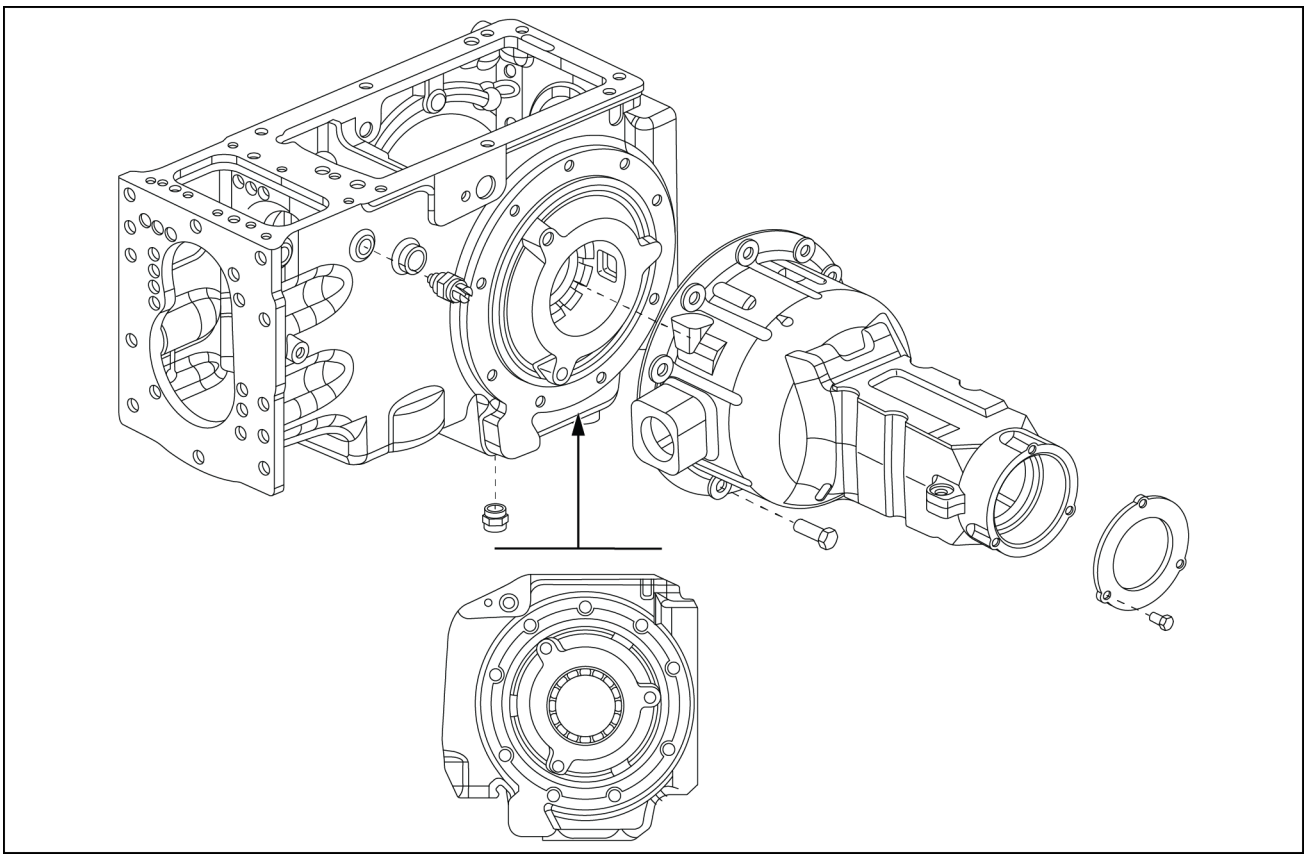
GNIL14TR04319AA 1



GNIL14TR00832GA 1

Mechanical service brakes - Sealing

Operation description	Sealant specification
Buckle up of rear axle housing to differential housing **(S1)**	**LOCTITE® 518™**



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Contents

Hydraulic systems - 35

Hydraulic systems - 000

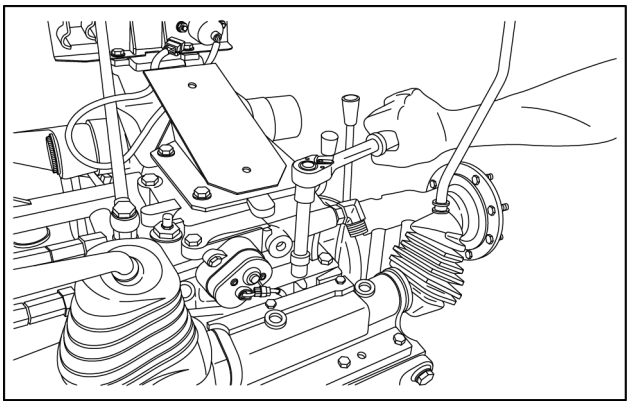
Contents

Hydraulic systems - 35

Main lift system - 100

4. Loosen the bolts securing hydraulic lift housing to transmission housing.
5. Lift the hydraulic lift assembly using suitable hoist and place it on a flat surfaced table.

NOTICE: *Never lift the housing by holding distributor knobs and delicate parts.*



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Main lift system - Adjust

In case of complete disassembly of the lift it is necessary to make the following adjustments:

A. Control valve sensitivity setting

B. Position control lever setting

C. Draft control lever setting

D. Reaction spring setting

E. Internal push rod setting

A. Position control lever setting

With reference to **1**.

The adjustment is carried out in order to establish the maximum raised position of the rockshaft's lifting arms.

Completely lower the arms and apply a light weight which creates a pressure in the cylinder of **50 - 60 bar** (**725 - 870 psi**).

Loosen the fastening screw **(6)** so as to free the position control lever **(1)** from the shaft **(5)**.

With the draft control lever **(2)** at its lowest position against the backstop **(E)** raise the position control lever **(1)** against the backstop **(F)**.

Maintaining fixed the levers **(1)** and **(2)** and with a **13.0 mm** (**0.5 in**) open end wrench rotate slowly in an anti-clockwise direction the position control shaft **(5)** so as to raise the arms to their maximum raised position which is determined by the internal hydraulic limit stop.

Since during the functioning of the position control the hydraulic limit stop must not be triggered it is necessary to have a safety margin of ~ **10.0 - 15.0 mm** (**0.4 - 0.6 in**).

In order to do this, rotate slowly in a clockwise direction the shaft **(5)** until the arms are lowered by the required safety margin.

At this point keep the shaft **(5)** fixed and with lever **(1)** against the backstop **(F)** keep the lever fixed with the shaft by tightening fully the fastening screw **(6)**.

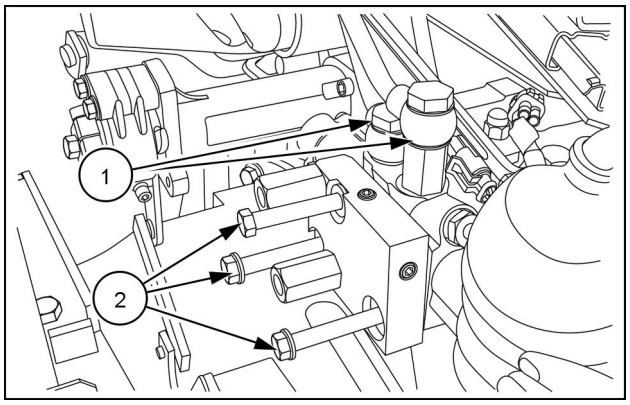
To control, raise completely the arms by moving the position control lever **(1)** against the backstop **(F)** raising completely the draft control lever **(2)** there is a further movement upwards of the rockshaft arms. This movement should be contained within **15.0 - 20.0 mm** (**0.6 - 0.8 in**).

Contents

Hydraulic systems - 35

Fixed displacement pump - 104

5. 1. Remove the hydraulic pipes **(1)** on remote control valve.
   2. Loosen the bolts **(2)** and remove the plate.
   3. Remove the remote control valve.



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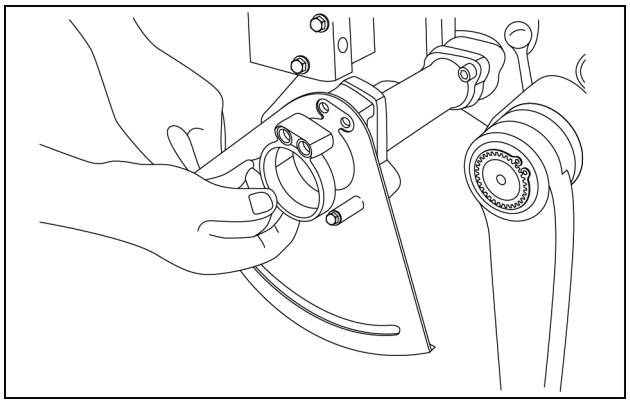
Contents

Hydraulic systems - 35

Reservoir, cooler, and filters - 300

SERVICE

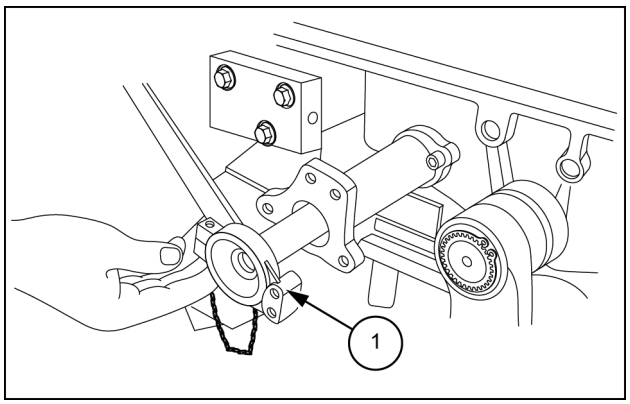
4. 1. Remove draft control lever hub by loosening set screws **(1)** along with the nylon washer.
   2. Remove sector plate.



GNIL14TR04613AB 4

5. Draft control lever is welded on draft control shaft. Remove the position control shaft and draft control shaft to remove the draft control lever internal linkages.
   1. Remove set screw.
   2. Remove linkages from the shafts.

NOTE: *Remove hydraulic linkages to remove set screw.*



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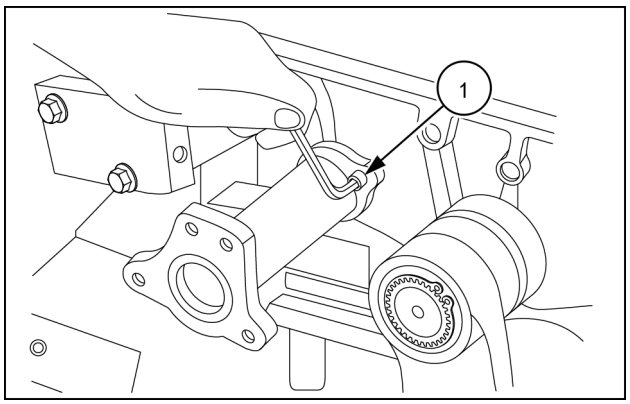
6. Remove set screw **(1)** to remove shaft.



GNIL14TR04615AA 6

Main control valve - Remove (Distributor assembly)

⚠ WARNING

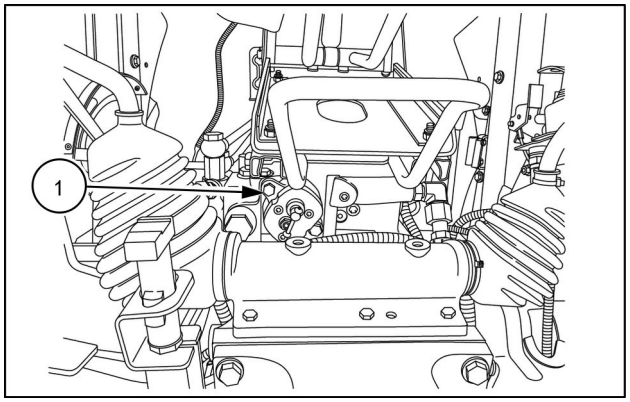
Avoid injury!
Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.
Failure to comply could result in death or serious injury.

W0208A

1. Loosen the bolts **(1)** and remove distributor assembly from lift housing.

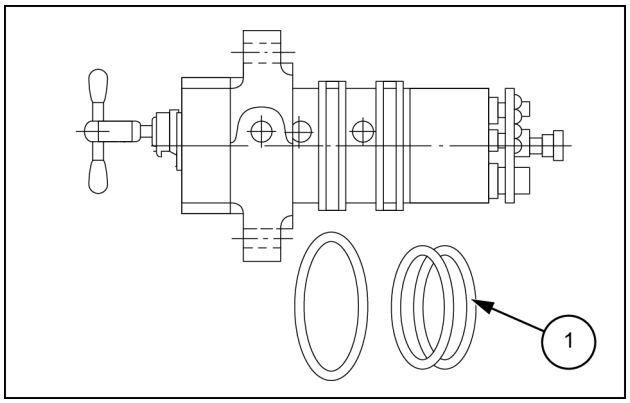
NOTE: *Distributor assembly is not serviceable. Replace complete assembly if found defective.*

2. Insert the distributor assembly back on the lift assembly and tighten the bolts **(1)**.



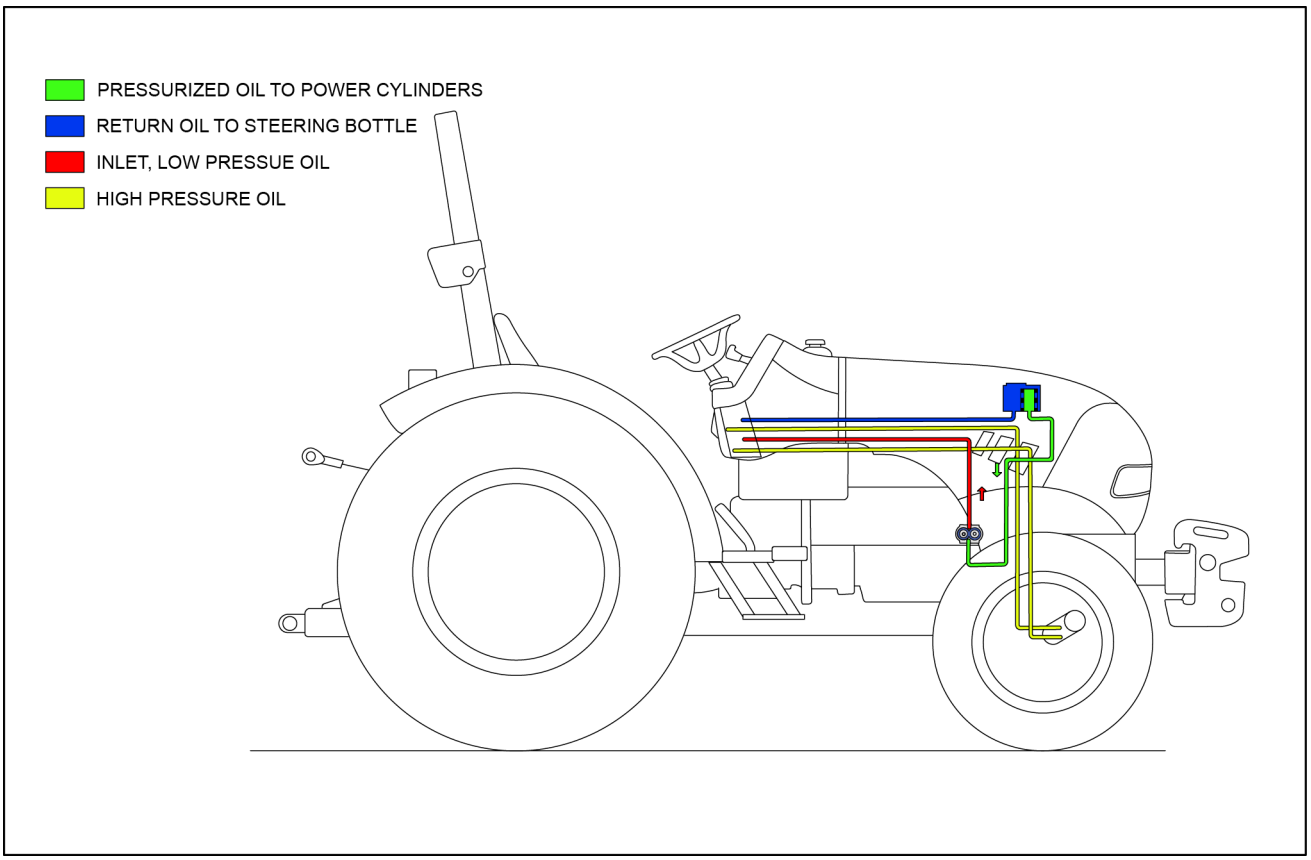
GNIL14TR00798AA 1

NOTE: *Check the O-rings **(1)** for any damage on distributor assembly before installing and replace if required.*



GNIL14TR04649AB 2

Steering control - Overview – Hydrostatic steering



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D1. Control valve
E. Filter cartridge
H. Power cylinder
M. Pump outlet line
P. Hydraulic pump
S. Return to tank
T. Reservoir
V. Steering wheel

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Hydraulic control components - 200

SERVICE

Power steering control valve - Assemble

⚠ WARNING

Avoid injury!
Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.
Failure to comply could result in death or serious injury.

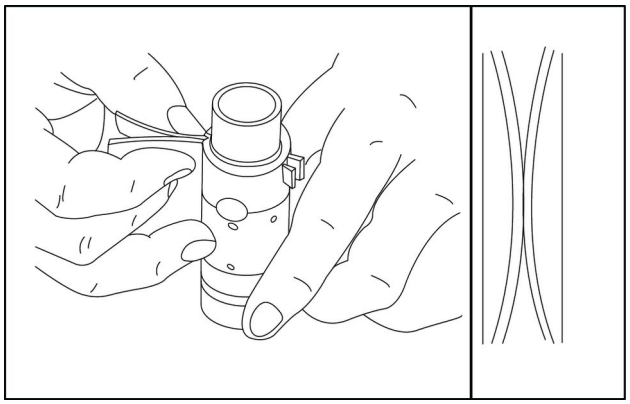
W0208A

⚠ CAUTION

Pinch hazard!
Always use suitable tools to align mating parts. DO NOT use your hand or fingers.
Failure to comply could result in minor or moderate injury.

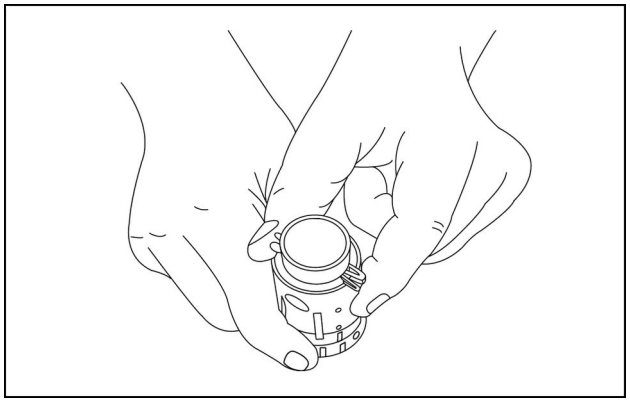
C0044A

1. Place the two flat neutral position springs in the slot. Place the curved springs between the flat ones and press them into the place.



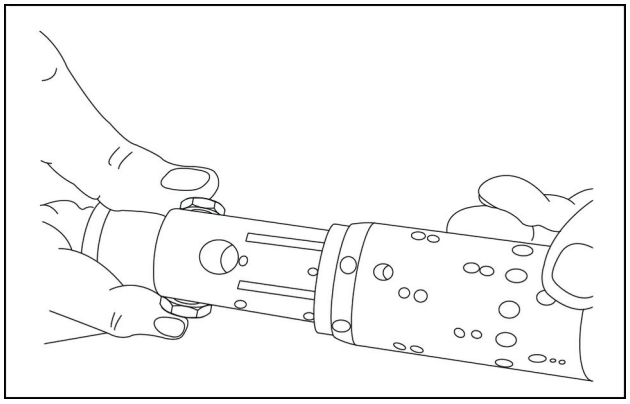
GNIL14TR04508AA 1

2. Line up the spring set.



GNIL14TR04509AA 2

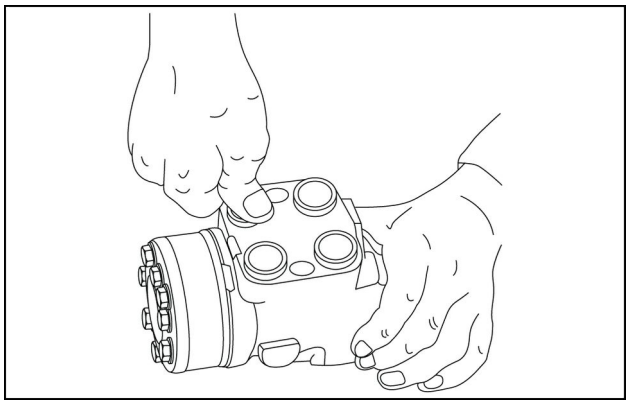
3. Guide the spool into the sleeve. Make sure that spool and sleeve are placed correctly in relation to each other.



GNIL14TR04510AA 3

20. Press the plastic plugs into the connection ports.

NOTE: *Do not use a hammer.*



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Securing Bolt Locations	2WD
AC	1472 mm
BD	1572 mm
CE	1672 mm
DF	1772 mm
EG	1872 mm
FH	1972 mm

4. Tighten the nuts on the axle extension securing bolts to **118 N·m** (**87 lb ft**).
   With both front wheels parallel, install the locating bolt **(2)** in the nearest aligning notch in the tie rod. Tighten the nut on the locating bolt to **24.5 N·m** (**18 lb ft**).

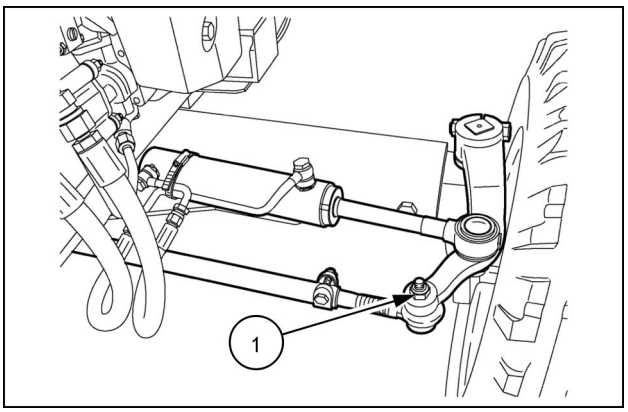
NOTE: *The tread settings shown are approximate. The front wheel discs are off-set, relative to the center line of the rim. The tread settings in the table are with the dished side of the wheel nearest the axle hub. If the front wheels are reversed on the hubs the tread settings shown in the table will be increased by approximately **25 mm** (**0.98 in**).*

Tractor model	Front wheel bolt torque
	320.0 N·m (**236.0 lb ft**)

NOTE: *Re-check all torque settings after **50 h** of operation.*

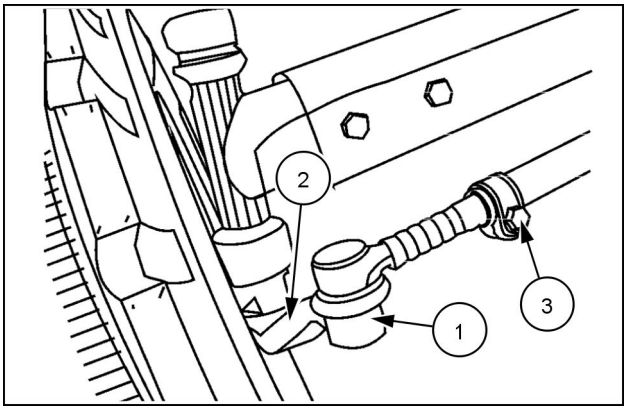
Tie rod

5. The tie rod located behind the axle must be disengaged to permit adjustment of the axle. The tie rod is telescopic and consists of a central hollow tube with a solid extendible section at each end. Remove the locating bolt **(1)** from both ends of the tie rod. The position for the setting of the steering cylinder will also change respectively. Reset the left and right axle telescopic sections, passing the securing bolts through the center beam and telescopic sections, as indicated in **3**, see chart.



86090130N 4

6. Remove the nut **(1)** at the right end of the tie rod. Withdraw the tie rod from arm **(2)**. Loosen the bolt **(3)** and rotate the threaded end to shorten or lengthen the tie rod assembly until the toe-in is correct. Torque all bolts or nuts securely to correct values.



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SERVICE - Technical Publications & Tools

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SERVICE

(*) See content for specific models

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FUNCTIONAL DATA

Wiring harnesses

Wire connectors

Wiring harnesses - Electrical schematic sheet 06 SH06-IGNITION/ CONTROL SWITCHES

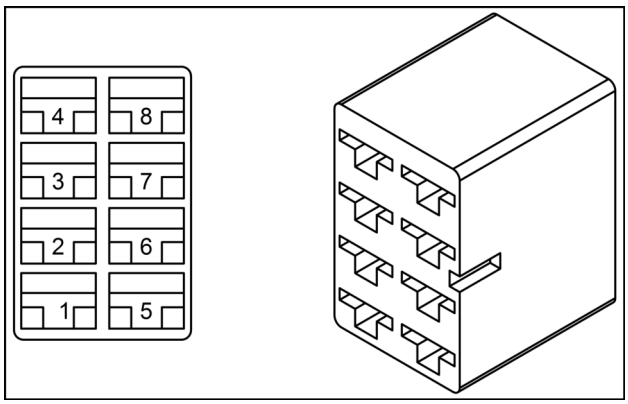
Type	Component	Connector / Link	Description
Fuse	**F-003**		FUSE ECU 01
Fuse	**F-015**		FLASHER
Fuse	**F-016**		CLUSTER / FT
Fuse	**F-017**		HAZARD HOT
Fuse	**F-018**		HORN/ LIGHT SW
Fuse	**F-019**		SAFETY LOGIC
Fuse	**F-020**		BECON LAMP
Switch	**S-001**	**X-003**	IGNITION SWITCH
Switch	**S-009**	**X-520**	JOYSTICK LOADER
Connector	X-001	**X-001**	
Connector	X-003	**X-003**	IGNITION SWITCH
Connector	X-005	**X-005**	LIGHT SWITCH
Connector	X-007	**X-007**	HORN SWITCH CN1
Connector	X-008	**X-008**	HORN SWITCH CN2
Connector	X-011	**X-011**	TURN FLASHER
Connector	X-012	**X-012**	TURN SWITCH
Connector	X-013	**X-013**	WORK LAMP
Connector	X-400A	**X-400A**	MAIN-FENDER INTERCONNECT
Connector	X-400B	X-400B	FENDER-MAIN INTERCONNECT
Connector	X-404A	X-404A	ENGINE-MAIN INTERCONNECT
Connector	X-404B	**X-404B**	MAIN-ENGINE INTERCONNECT
Connector	X-406A	X-406A	TO ENGINE HARNESS
Connector	X-406B	**X-406B**	TO MAIN HARNESS
Connector	X-515A	**X-515A**	TO JOYSTICK PIGTAIL
Connector	X-515B	X-515B	TO HARNESS FENDER
Connector	X-520	**X-520**	LOADER JOYSTICK

Wiring harnesses - Electrical schematic sheet 11 SH11-REAR LIGHTS

Type	Component	Connector / Link	Description
Connector	X-011	**X-011**	TURN FLASHER
Connector	X-400A	**X-400A**	MAIN-FENDER INTERCONNECT
Connector	X-400B	X-400B	FENDER-MAIN INTERCONNECT
Connector	X-404A	X-404A	ENGINE-MAIN INTERCONNECT
Connector	X-404B	**X-404B**	MAIN-ENGINE INTERCONNECT
Connector	X-516	**X-516**	BECON LAMP
Connector	X-517	**X-517**	IMPLEMENT LAMP
Connector	X-518	**X-518**	LICENCE LAMP
Connector	X-612	**X-612**	ROPE LAMP RH
Connector	X-613	**X-613**	ROPE LAMP LH

Wire connectors - Component diagram 02

X-020 - UP/DOWN SWITCH [S-008] (87745329) (Female)

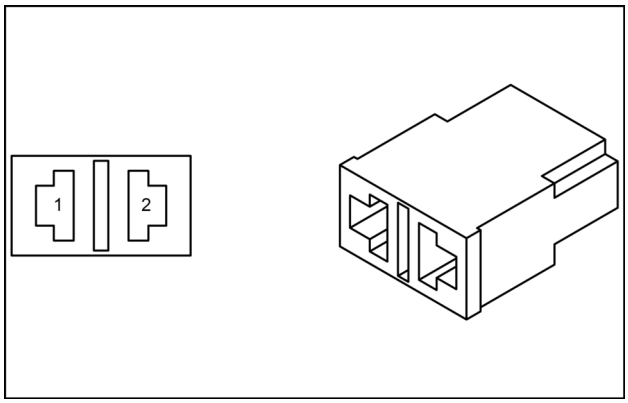


87745329 1

87745329

Pin	From	Wire	Description	Color-Size	Frame
1	**X-050 (Female) pin 22** INSTRUMENT CLUSTER CN-1	040	NAVIGATION SW DWN	PK/BK - 0.75	**SHEET 07**
2	SP-006-P-X	005H	005H	BK - 0.75	
3	SP-006-P-X	005K	005K	BK - 0.75	
4	**X-050 (Female) pin 23** INSTRUMENT CLUSTER CN-1	041	NAVIGATION SW UP	BL/BK - 0.75	

X-021 - SWITCH LAMP U/D [S-008] (84131048) (Female)

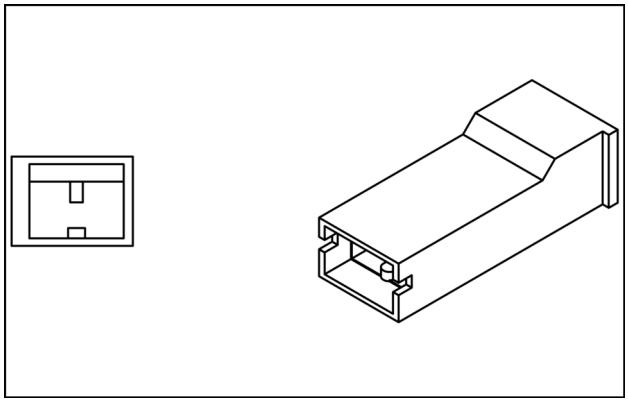


84131048 2

84131048

Pin	From	Wire	Description	Color-Size	Frame
1	SP-059-P-X	133	133	BL/BK - 0.75	**SHEET 07**
2	SP-006-P-X	005J	005J	BK - 0.75	

X-213 - AIR CLOG SWITCH (87581782) (Female)

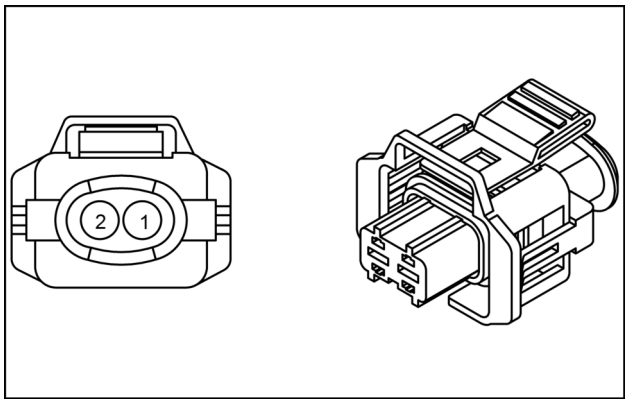


87581782 3

87581782

Pin	From	Wire	Description	Color-Size	Frame
1	**X-404B pin 18** MAIN-ENGINE INTERCONNECT	123	AIR CLOG SENSOR	BL/RD - 0.5	**SHEET 07**

X-214 - INLET DOC TEMP SENSOR (87709793) (Female)

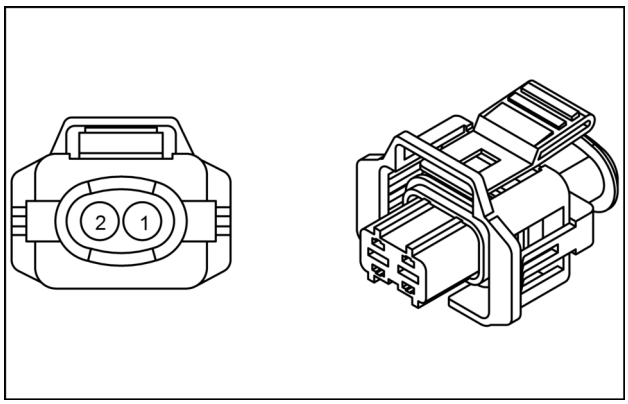


87709793 4

87709793

Pin	From	Wire	Description	Color-Size	Frame
1	**X-201 (Female) pin 80** ECU VEHICLE	173	173	BL/BK - 0.75	**SHEET 08**

X-215 - OUTLET POC TEMP SENSOR (87709793) (Female)



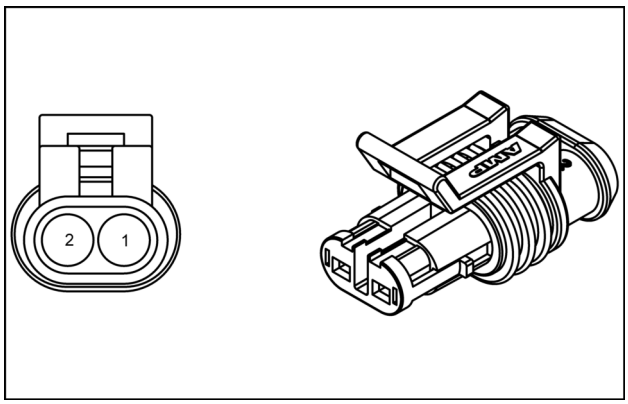
87709793 5

87709793

Pin	From	Wire	Description	Color-Size	Frame
2	**X-201 (Female) pin 83** ECU VEHICLE	182	182	GN/WH - 0.75	**SHEET 08**

Wire connectors - Component diagram 51

X-515A - TO JOYSTICK PIGTAIL (82012083) (Female)

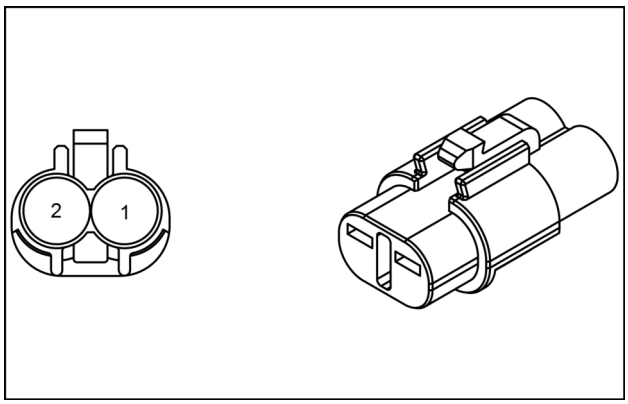


82012083 1

82012083

Pin	From	Wire	Description	Color-Size	Frame
1	X-400B-P-9	067	067	BL/YE - 0.5	**SHEET 06**
2	SP-010-P-X	010D	010D	BK - 0.5	

X-516 - BECON LAMP (84182898) (Female)

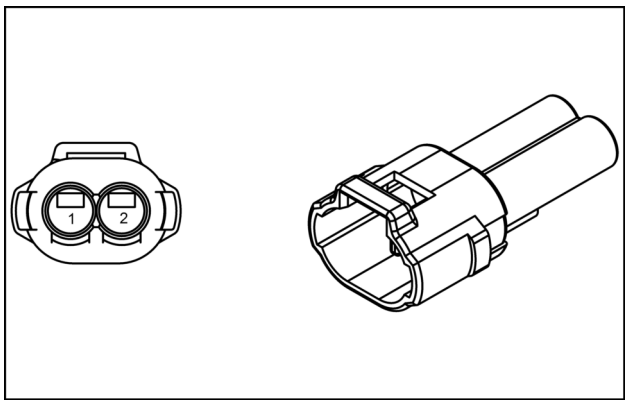


84182898 2

84182898

Pin	From	Wire	Description	Color-Size	Frame
1	SP-024-P-X	025	025	PK - 0.75	**SHEET 11**
2	SP-014-P-X	164E	164E	BK - 0.75	

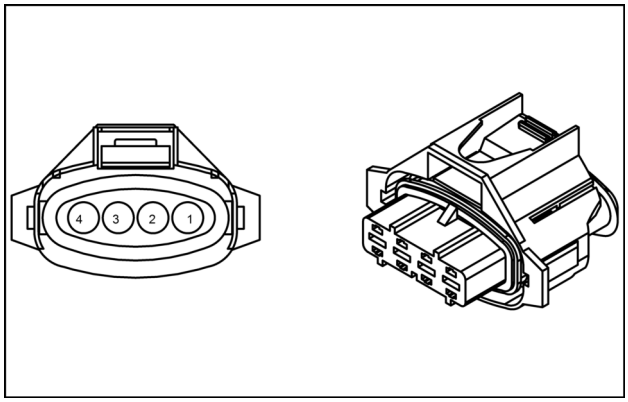
X-517 - IMPLEMENT LAMP (84477032) (Male)



84477032 3

84477032

Connector X-9003 - Intake manifold pressure and temperature sensor

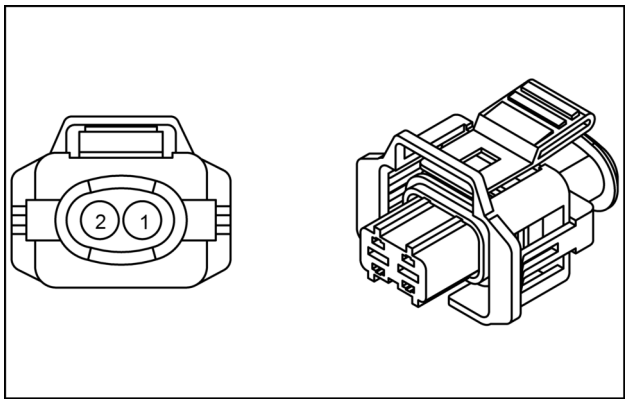


87709809 2

87709809

CONNECTOR X-9003 - Intake manifold pressure and temperature sensor			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
1	EN-9103	Engine Control Unit (ECU) reference ground, pressure and temperature	**SHEET 03**
2	EN-9104	ECU input signal, temperature	
3	EN-9101	ECU **+5 V** sensor supply, pressure sensor	
4	EN-9102	ECU input signal, pressure	

Connector X-9005 - Fuel temperature sensor



87709793 3

87709793

CONNECTOR X-9005 - Fuel temperature sensor			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
1	EN-9117	Engine Control Unit (ECU) input signal, temperature	**SHEET 03**
2	EN-9116	ECU reference ground	

CONNECTOR X-9102 - ECU connector K			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
K27	VE-9174	LSD, Starter control relay	**SHEET 02**
K28	VE-9084	LSD, Main relay	
K29	-	-	
K30	-	-	
K31	-	-	
k32	-	-	
K33	-	-	
K34	-	-	
K35	-	-	
K36	-	-	
K37			
K38			
K39	-	-	
K40	-	-	
K41	VE-9074	Reference ground, GCU	**SHEET 02**
K42	-	-	
K43	-	-	
K44	-	-	
K45	-	-	
K46	-	-	
K47	-	-	
K48	-	-	
K49	-	-	
K50	-	-	
K51	-	-	
K52	VE-9072	LSD, GCU	**SHEET 02**
K53	VE-9173	HSD, Starter control relay	
K54	VE-9053	Input signal, Key switch ON/ACC position	
K55	-	-	
K56	-	-	
K57	-	-	
K58	-	-	
K59	-	-	
K60	-	-	
K61	-	-	
K62	-	-	
K63	VE-9156	Input signal, Lambda sensor voltage nernst	**SHEET 02**
K64	VE-9154	Input signal, Lambda sensor current pump	
K65	-	-	
K66	-	-	
K67	-	-	
K68		ISO-K Interface, Diagnostic and monitoring connector K-line	**SHEET 02**
K69	-	-	
K70	-	-	
K71	-	-	
K72	-	-	
K73	-	-	
K74	-	-	
K75	-	-	
K76	-	-	
K77	-	-	

K-013 - FRONT LOADER (Relay)

Component Type	Relay
Wiring frames	**SHEET 02**

K-014 - HEATER (Relay)

Component Type	Relay
Wiring frames	**SHEET 02**

Contents

Electrical systems - 55

Alternator - 301

Contents

Electrical systems - 55

External lighting - 404

Contents

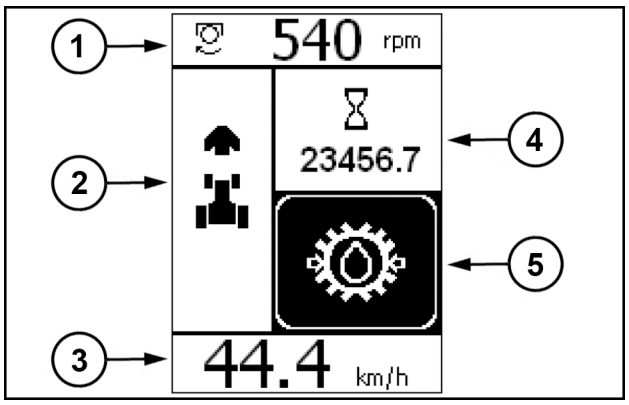
Electrical systems - 55

External lighting switches and relays - 405

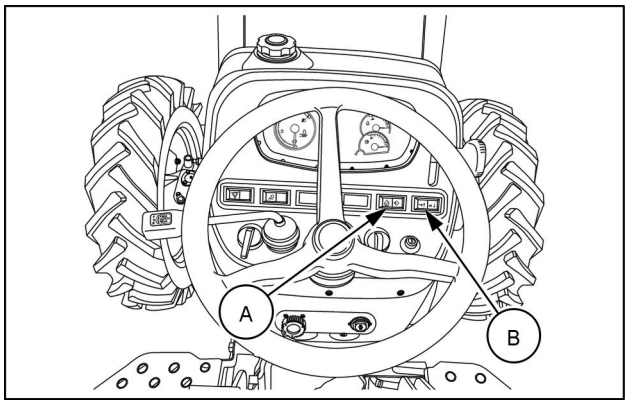
Central display

The central liquid crystal display provides the operator with a range of information

- Front or rear power take−off speed
  Front or rear lift position
  Slip
  Data displayed by pressing and releasing the button ENTER **(A)**
- Tractor direction.
- Speed of the vehicle in Km/h or MPH
- Tractor working hour meter
- Kilometers travelled
  Area worked
  Area worked per hour
  Battery voltage
  Data displayed by pressing the arrow buttons up or down **(B)**
  When necessary, warning and error messages
  Programming menu (see specific chapter)



DCAPLT5NE005S3F 5



GNIL14TR00512AA 6

DTC 131-04-Engine coolant temperature sensor voltage is lower than expected

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 monitors the engine coolant temperature sensor B-9003 signal circuit. If the ECU A-9000 determines that voltage is lower than expected in the engine coolant temperature sensor B-9003 signal circuit, this fault will occur. If this fault is active, the ECU A-9000 will set the engine coolant temperature value to a fixed replacement value of **89.96 °C** (**193.93 °F**).

Cause:
The engine coolant temperature sensor B-9003 signal voltage is less than **198.00 mV**.

Possible failure modes:

1. Faulty engine coolant temperature sensor B-9003 wiring, short to ground condition.
2. Faulty engine coolant temperature sensor B-9003, internal failure.
3. Faulty ECU A-9000, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.

2. Check the coolant temperature sensor B-9003 engine harness (EN) wiring for a short to ground condition.

   Disconnect the engine harness (EN) from the coolant temperature sensor B-9003 at connector **X-9006**.

   With the key in the OFF position, use a multimeter to perform the following continuity check on the engine harness (EN) side:

To	From	Value
X-9006 pin 1	**X-9006 pin 2**	There should be no continuity.
X-9006 pin 1	Chassis ground	There should be no continuity.

   A. If there is no continuity, leave connector **X-9006** disconnected and continue to Step **3**.

   B. If there is continuity, there is a short to ground condition in the coolant temperature sensor B-9003 engine harness (EN) wiring. Locate and repair the shorted conductor.

3. Check the coolant temperature sensor B-9003 engine harness (EN) wiring for a short to ground condition.

   Disconnect the engine harness (EN) from the ECU A-9000 at connector **X-9001**.

   With the key in the OFF position, use a multimeter to perform the following continuity check on the engine harness (EN) side:

From	To	Value
X-9001 pin A57	All pins in connector **X-9001**	There should be no continuity.

   A. If there is no continuity, leave connector **X-9006** disconnected and continue to Step **4**.

   B. If there is continuity, there is a short circuit in the coolant temperature sensor B-9003 engine harness (EN) wiring. Locate and repair the shorted or broken conductor.

DTC 134-04-Intake manifold pressure sensor voltage is lower than expected

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 monitors the intake manifold pressure sensor B-9001. If the ECU A-9000 determines that the intake manifold pressure sensor B-9001 signal circuit voltage is less than **202.80 mV**, this fault will occur. If this fault is active, the intake manifold pressure value will be frozen at the last valid value for a preliminary failure or jump to a fixed replacement value of **0.98 bar** (**14.21 psi**) if the failure is validated.

Cause:
The ECU A-9000 has determined that the intake manifold pressure sensor B-9001 signal circuit voltage is less than **202.80 mV**.

Possible failure modes:

1. Faulty intake manifold pressure sensor B-9001 wiring, short to ground condition.
2. Faulty intake manifold pressure sensor B-9001, internal failure.
3. Faulty ECU A-9000, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **4**.
2. Check the intake manifold pressure sensor B-9001 wiring in the engine harness (EN) for a short to ground condition.

   Disconnect the engine harness (EN) from the intake manifold pressure sensor B-9001 at connector **X-9003**.

   Disconnect the engine harness (EN) from the ECU A-9000 at connector **X-9001**.

   With the key in the OFF position, use a multimeter to perform the following continuity check on the engine harness (EN) side :

From	To	Value
X-9003 pin 4	Chassis ground	There should be no continuity.
X-9003 pin 4	**X-9003 pin 1**	There should be no continuity.
X-9001 pin A40	All pins in connector **X-9001**	There should be no continuity.

   A. If there is continuity, there is a short circuit in the intake manifold pressure sensor B-9001 wiring in the engine harness (EN). Locate and repair the shorted conductor.

   B. If there is no continuity, leave connector **X-9003** disconnected and continue to Step **3**.
3. Replace the intake manifold pressure sensor B-9001.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is no longer active, return the machine to service.

   B. If the fault is still active, check the ECU A-9000 for the appropriate software and re-flash, if necessary.

DTC 137-02-Fuel pressure relief valve reached maximum allowed opening count

Control Module : ECU

NOTE: *If the Pressure Relief Valve (PRV) is replaced, it is necessary to perform the Replacement of the Rail Pressure Relief Valve (PRV) - Reset ECU Data with the Electronic Service Tool (EST) before you return the machine to service. See* ***Common rail Relief valve - Configure - Reset ECU data (10.218)****, if necessary.*

NOTE: *If the rail pressure sensor B-9004 is replaced, it is necessary to perform the Replacement of the Rail Pressure sensor - Reset ECU Data with the Electronic Service Tool (EST) before you return the machine to service. See* ***Common rail pressure sensor - Configure - Reset ECU data (Rail pressure sensor) (55.010)****, if necessary.*

Context:
The Engine Control Unit (ECU) A-9000 monitors the fuel Pressure Relief Valve (PRV). If the ECU A-9000 determines that the PRV has exceeded its maximum open count, 50 times, this fault will occur. If the PRV has opened more than 50 times, the PRV must be replaced. Other active faults may have caused this fault to occur. For more information regarding fuel system troubleshooting, see **Fuel injection system - Troubleshooting (10.218)**.

Cause:
The ECU A-9000 has determined that the PRV has opened more than 50 times.

Possible failure modes:

1. Faulty fuel metering unit Y-9000, stuck open.
2. Faulty rail pressure sensor B-9004, drifted signal.
3. Faulty PRV, opening pressure too low.
4. Faulty fuel back-flow, clogged or damaged.
5. Faulty ECU A-9000, software.

DTC 143-04-Camshaft speed sensor pattern is not plausible

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 monitors the camshaft position sensor B-9017 characteristics for angle, speed determination, signal plausibility, and quality. If the ECU A-9000 determines that the camshaft signal does not match the expected pattern (edge, distance, level) or not all expected camshaft edges are detected during an engine revolution, this fault will occur.

Cause:
The ECU A-9000 has detected a camshaft pattern signal error.

Possible failure modes:

1. Faulty camshaft position sensor B-9017 wiring.
2. Faulty camshaft position sensor B-9017, improperly seated or mounted.
3. Faulty camshaft position sensor B-9017, internal failure.
4. Faulty ECU A-9000, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **6**.
2. Check the physical integrity of the camshaft speed sensor B-9017. The sensor should be fully seated and mounted tightly.

   A. If the sensor is not mounted/secured properly, repair as necessary.

   B. If the sensor is not damaged and is mounted/secured properly, continue to Step **3**.
3. Check the camshaft position sensor B-9017 wiring in the engine harness (EN) for an open circuit.

   Disconnect the engine harness (EN) from the camshaft position sensor at connector **X-9008**.

   Disconnect the engine harness (EN) from the ECU A-9000 at connector **X-9001**.

   With the key in the OFF position, use a multimeter to perform the following continuity check on the engine harness (EN) side :

From	To	Value
X-9008 pin 2	**X-9001 pin A28**	There should be continuity.
X-9008 pin 1	**X-9001 pin A14**	There should be continuity.
X-9008 pin 3	**X-9001 pin A13**	There should be continuity.

   A. If there is continuity, leave connectors **X-9008** and **X-9001** disconnected and continue to Step **4**.

   B. If there is no continuity, there is an open circuit in the camshaft position sensor B-9017 wiring. Locate and repair the broken conductor.
4. Check the camshaft position sensor B-9017 wiring in the engine harness (EN) for a short circuit.

   With the key in the OFF position, use a multimeter to perform the following continuity check on the engine harness (EN) side :

DTC 158-03-Fuel pump pressure has exceeded desired pressure limits

Control Module : ECU

NOTE: *If the Pressure Relief Valve (PRV) is replaced, it is necessary to perform the Replacement of the Rail Pressure Relief Valve (PRV) - Reset ECU Data with the Electronic Service Tool (EST) before you return the machine to service. See* ***Common rail Relief valve - Configure - Reset ECU data (10.218)****, if necessary.*

NOTE: *If the rail pressure sensor B-9004 is replaced, it is necessary to perform the Replacement of the Rail Pressure sensor - Reset ECU Data with the Electronic Service Tool (EST) before you return the machine to service. See* ***Common rail pressure sensor - Configure - Reset ECU data (Rail pressure sensor) (55.010)****, if necessary.*

Context:
The Engine Control Unit (ECU) Y-9000 monitors fuel rail pressure. If the ECU A-9000 determines that the requested fuel pressure can not be reached, a leakage in the fuel system is assumed and this fault will occur. For more information regarding fuel system troubleshooting, see **Fuel injection system - Troubleshooting (10.218)**.

Cause:
The ECU A-9000 has determined that a fuel system leakage is present.

Possible failure modes:

1. Faulty fuel filters, clogged.
2. Faulty low pressure fuel lines, clogged or damaged.
3. Faulty high pressure fuel lines, clogged or damaged.
4. Faulty electric fuel pump (if equipped).
5. Faulty charge gear pump, low efficiency.
6. Faulty high pressure pump, low efficiency or excessive leak-off.
7. Faulty fuel injectors, external or internal leakage.
8. Faulty Pressure Relief Valve (PRV), leaking or stuck open.
9. Faulty rail pressure sensor B-9004 or sensor leaking.
10. Faulty fuel metering unit Y-9000
11. Faulty ECU A-9000, software.

B. If there is voltage, there is a short to battery or switched battery in the fuel injector number 2 Y-9002 wiring in the engine harness (EN). Use the appropriate service manual, if necessary, to locate and repair the shorted conductor.

4. Check the fuel injector number 2 Y-9002 engine harness (EN) wiring for a short to ground condition.

   Disconnect the engine harness (EN) from the ECU A-9000 at connector **X-9001**.

   With the key in the OFF position, use a multimeter to perform the following continuity checks on the engine harness (EN) side :

From	To	Value
X-9032 pin 1	**X-9032 pin 2**	There should be no continuity.
X-9032 pin 1	Chassis ground	There should be no continuity.
X-9032 pin 2	Chassis ground	There should be no continuity.

   A. If there is no continuity, leave connector **X-9001** and **X-9032** disconnected. Continue to Step **5**.

   B. If there is continuity, there is a short circuit in the fuel injector number 2 Y-9002 wiring in the engine harness (EN). Locate and repair the shorted conductor.

5. Check the fuel injector number 2 Y-9002 engine harness (EN) wiring for a short circuit condition.

   With the key in the OFF position, use a multimeter to perform the following continuity checks on engine harness (EN) side :

From	To	Value
X-9001 pin A48	All pins in connector **X-9001**	There should be no continuity
X-9001 pin A17	All pins in connector **X-9001**	There should be no continuity

   A. If there is continuity, there is a short circuit in the fuel injector number 2 Y-9002 wiring in the engine harness (EN). Use the appropriate service manual, if necessary, to locate and repair the shorted conductor.

   B. If there is no continuity, continue with Step **6**.

6. Check the ECU A-9000 voltage supply wiring.

   Disconnect the vehicle harness (VE) from the ECU A-9000 at connector **X-9102**.

   Place a jumper wire between **X-9102 pin K28** and chassis ground. This will energize the main relay K-9102.

   Use a multimeter to perform the following voltage checks on the vehicle harness (VE) side :

From	To	Value
X-9102 pin K01	**X-9102 pin K02**	There should be approximately **12.0 V**.
X-9102 pin K03	**X-9102 pin K04**	There should be approximately **12.0 V**.
X-9102 pin K05	**X-9102 pin K06**	There should be approximately **12.0 V**.

   A. If there is not approximately **12.0 V**, there is a faulty ECU A-9000 voltage supply. Use the appropriate service manual, if necessary, to locate and repair the failed conductor.

   B. If there is approximately **12.0 V**, check the ECU A-9000 for the appropriate software and re-flash, if necessary.

7. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

4. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 03 – Engine sensors and fuel injection (engine schematics) (55.100.DP-C.20.E.03)

DTC 17E-03-Exceeded the number of injections for a given engine speed

Control Module : ECU

Context:
The ECU A-9000 monitors the requested number of fuel injections and the current capability of the injection system fulfilling that request. If the ECU A-9000 determines that the requested number of injections is greater than the current capability of the fuel injection system for the current engine speed, this fault will occur.

Cause:
The ECU A-9000 has determined that the requested number of fuel injections is greater than the capability of the fuel injection system based on engine speed.

Solution:

1. Check the ECU A-9000 for the appropriate software and re-flash, if necessary.

   A. If the fault has been resolved, return the machine to service.

   B. If the fault has not been resolved, escalate an ASIST concern.

DTC 18F-04-Lambda sensor heater power stage short circuit to ground

Control Module : ECU

NOTE: *If the Lambda sensor B-9123 is replaced, it is necessary to perform the Replacement of the Lambda Sensor - Reset ECU Data with the Electronic Service Tool (EST) before you return the machine to service. See* ***Lambda sensor - Configure - Reset ECU data (Lambda sensor) (55.989)****, if necessary.*

Context:
The Lambda sensor B-9123 has a heating element encased in ceramic that heats the sensor tip. Whenever the heater is operating, the heater low side driver power stage contained in the Engine Control Unit (ECU) A-9000 is monitored for a short circuit to ground condition. If a short to ground condition exists in the heater control circuit, this fault will occur. For information regarding the functional operation of the Lambda sensor B-9123 see **Lambda sensor - Overview (55.989)**. For more information regarding the technical specifications of the lambda sensor B-9123, see **Lambda sensor - Technical Data (55.989)**.

Cause:
The Lambda sensor B-9123 low side driver heater control circuit is shorted to ground.

Possible failure modes:

1. Faulty Lambda sensor B-9123 heater control circuit wiring, short to ground condition.
2. Faulty Lambda sensor B-9123, internal failure.
3. Faulty ECU A-9000, software.

Solution:

1. Verify that the fault present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **4**.
2. Check the Lambda sensor B-9123 heater control circuit wiring for a short to ground condition.

   Disconnect the vehicle harness (VE) from the Lambda sensor B-9123 at connector **X-9123**.

   Disconnect the vehicle harness (VE) from the ECU A-9000 at connector **X-9102**.

   Use a multimeter to perform the following continuity check on the vehicle harness (VE) side :

From	To	Value
X-9123 pin 3	chassis ground	There should be no continuity.
X-9102 pin K07	All pins in connector **X-9102**	There should be no continuity.

   A. If there is continuity, there is a short circuit in the lambda sensor B-9123 vehicle harness (VE) wiring. Use the appropriate service manual, if necessary, to locate and repair the shorted conductor.

   B. If there is no continuity, leave connector **X-9123** disconnected and continue to Step **3**.
3. Replace the Lambda sensor B-9123.

   Use the EST, see **Lambda sensor - Configure - Reset ECU data (Lambda sensor) (55.989)** if necessary, to perform the Replacement of the Lambda Sensor - Reset ECU Data.

   Use EST to check to see that this fault has been resolved.

   A. If the fault has been resolved, return the machine to service.

DTC 1B7-02-CAN transmit error - EEC1 message (Electronic Engine Control 1 message - Torque, accelerator pedal, engine speed, and other signals)

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 is capable of connecting to and communicating on two separate Controller Area Networks (CAN). Proper configuration and monitoring of the two twisted pair configured networks is also a function of the ECU A-9000. CAN Node A Bus is the main vehicle interface bus. The ECU A-9000 provides a CAN termination resistor for the CAN Node A Bus, internal to the ECU A-9000. If the ECU A-9000 senses that CAN Node A Bus is not functioning properly, this fault will occur.

Cause:
ECU A-9000 has sensed a timeout of required vehicle controller data provided on CAN Node A.

Possible failure modes:

1. Faulty supply voltage or ground, missing.
2. Faulty CAN circuit wiring, open circuit, short to ground, or short circuit.
3. Faulty ECU A-9000, termination resistor or software.

Solution:

1. Verify fault is present and in active state.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step**2**.

   B. If the fault is no longer present or is in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.
2. Check for other vehicle CAN faults.

   Use the EST to determine if vehicle CAN faults exist.

   A. If other vehicle CAN faults do exist, resolve those vehicle CAN faults first, then check to see that this fault is also resolved.

   B. If other vehicle CAN faults do not exist, continue with Step **3**.
3. Check the ECU A-9000 supply voltage.

   Disconnect the vehicle (VE) harness from the ECU A-9000 at connector **X-9102**.

   To energize the Main relay K-9102, place a jumper wire between the vehicle harness (VE) side of connector **X-9102 pin K28** and chassis ground.

   Use a multimeter to check for voltage on the vehicle (VE) harness side:

From	To	Value
X-9102 pin K01	**X-9102 pin K02**	There should be approximately **12.0 V**.
X-9102 pin K03	**X-9102 pin K04**	There should be approximately **12.0 V**.
X-9102 pin K05	**X-9102 pin K06**	There should be approximately **12.0 V**.

   A. If the voltage is present on all of the checks, leave connector **X-9102** disconnected and continue with Step **4**.

DTC 1D2-12-ECU internal failure - EEPROM write/read error

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 has detected an error during the last EEPROM write operation. The hardware encapsulation of the ECU A-9000 checks each data block of the EEPROM and sets a status flag depending on if an error is found or not found. These flags are processed every 20 milliseconds by the Diagnostic System Management (DSM) and if the value is out of range, this fault will occur.

Solution:

1. Check the ECU A-9000 for the appropriate software and re-flash, if necessary.
   A. If the fault has been resolved, return the machine to service.
   B. If the fault has not been resolved, escalate an ASIST concern.

DTC 1E1-04-Starter relay high side driver circuit shorted to ground

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 controls the starter control relay K-9104 using a low side and high side driver. If the ECU A-9000 detects a short circuit to ground in the high side driver circuit, this fault will occur.

Cause:
The ECU A-9000 has detected a short circuit to ground in the starter control relay K-9104 high side driver circuit.

Possible failure modes:

1. Faulty starter control relay K-9104 wiring, short to ground.
2. Faulty starter control relay K-9104, internal failure.
3. Faulty ECU A-9000, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.

2. Check the starter control relay K-9104 coil for an internal failure.

   Remove the starter control relay K-9104.

   Use a multimeter to measure the relay coil resistance on the starter control relay K-9104 pins :

From	To	Value
X-9120 pin 85	**X-9120 pin 86**	There should be approximately **70 - 130 Ω**.

   A. If there is approximately **70 - 130 Ω**, leave the starter control relay K-9104 disconnected and continue to Step **3**.

   B. If there is not approximately **70 - 130 Ω**, the relay has failed. Replace the starter control relay K-9104.

3. Check the starter control relay K-9104 high side driver vehicle harness (VE) wiring for a short to ground.

   With the key in the OFF position, use a multimeter to perform the following continuity check for a short to ground on the vehicle harness (VE) side :

From	To	Value
X-9120 pin 85	Chassis ground	There should be no continuity.

   A. If there is continuity, there is a short to ground in the starter control relay K-9104 wiring in the vehicle harness (VE). Use the appropriate service manual, if necessary, to locate and repair the shorted conductor.

   B. If there is no continuity, continue to Step **4**.

4. Check the starter control relay K-9104 high side driver vehicle harness (VE) wiring for a short circuit.

   Disconnect the vehicle harness (VE) from the ECU A-9000 at connector **X-9102**.

   With the key in the OFF position, use a multimeter to perform the following continuity check for a short to ground on the vehicle harness (VE) side :

DTC 1E8-03-ECU 5 volt sensor supply 3 out of range

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 provides three independent five volt sensor supplies. The ECU A-9000 monitors each sensor supply voltage to ensure they operate within a given range. If the ECU A-9000 determines that the voltage for sensor supply 3 is out of range, this fault will occur.

The ECU A-9000 pin numbers associated with sensor supply 3 are K17, K18 and A29.

Cause:
The ECU A-9000 has determined that the sensor supply 3 voltage is out of range.

Possible failure modes:

1. Faulty battery voltage.
2. Faulty ECU A-9000, supply voltage.
3. Faulty ECU A-9000 sensor supply 3 pins.
4. Faulty ECU A-9000 connector **X-9001** or **X-9102**, corrosion or damage.
5. Faulty ECU A-9000, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **6**.
2. Check the battery voltage.

   Charge the battery, then, perform a load test on the battery.

   A. If the battery passes the load test, continue to Step **3**.

   B. If the battery fails the load test, the battery has failed. Replace the battery.
3. Check the ECU A-9000 supply voltage.

   Disconnect the ECU A-9000 connector **X-9102**.

   Place a jumper wire between **X-9102 pin K28** and chassis ground. This will energize the main relay K-9102.

   With the key in the ON position, use a multimeter to perform the following voltage check on the vehicle harness (VE) side :

From	To	Value
X-9102 pin K03	**X-9102 pin K02**	There should be approximately **12 V**.
X-9102 pin K05	**X-9102 pin K04**	There should be approximately **12 V**.
X-9102 pin K01	**X-9102 pin K06**	There should be approximately **12 V**.

   A. If there is approximately **12 V**, leave the ECU A-9000 connector **X-9102** disconnected and continue to Step **4**.

   B. If there is not approximately **12 V**, there is a failure in the ECU A-9000 supply wiring. Use the appropriate service manual, if necessary, to locate and repair the failed conductor.

DTC 225-03-Main relay stuck error

Control Module : ECU

Context:
The Engine Control Unit A-9000 controls the main relay K-9102. The main relay K-9102 is powered on by the ECU A-9000 to achieve after-run. The main relay K-9102 is powered off once after-run is completed. If the ECU A-9000 determines that the main relay K-9102 is “stuck” or will not shut off as commanded, this fault will occur.

Cause:
The ECU A-9000 has determined that the main relay K-9102 will not shut off as commanded.

Possible failure modes:

1. Faulty main relay K-9102, wiring.
2. Faulty main relay K-9102, internal failure.
3. Faulty ECU A-9000, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **7**.

2. Check the main relay K-9102 coil for an internal failure.

   Remove the main relay K-9102.

   Use a multimeter to measure the resistance on the main relay K-9102 pins :

From	To	Value
X-9129 pin 85	**X-9129 pin 86**	There should be approximately **70 - 130 Ω**.

   A. If there is approximately **70 - 130 Ω**, leave the main relay K-9102 disconnected and continue to Step **3**.

   B. If there is not approximately **70 - 130 Ω**, the main relay K-9102 has failed. Replace the main relay K-9102.

3. Check the main relay K-9102 low side driver wiring for a short to ground.

   With the key in the OFF position, use a multimeter to perform the following continuity check for a short to ground on the vehicle harness (VE) side :

From	To	Value
X-9129 pin 86	Chassis ground	There should be no continuity.

   A. If there is continuity, there is a short circuit in the main relay K-9102 wiring in the vehicle harness (VE). Use the appropriate service manual, if necessary, to locate and repair the shorted conductor.

   B. If there is no continuity, leave the main relay K-9102 disconnected and continue to Step **4**.

4. Check the main relay K-9102 low side driver wiring for a short circuit.

   Disconnect the vehicle harness (VE) from the ECU A-9000 at connector **X-9102**.

   With the key in the OFF position, use a multimeter to perform the following continuity checks for a short circuit on the vehicle harness (VE) side :

DTC 236-04-Rail pressure sensor value is below minimum offset

Control Module : ECU

NOTE: *If the rail pressure sensor B-9004 is replaced, it is necessary to perform the Replacement of the Rail Pressure sensor - Reset ECU Data with the Electronic Service Tool (EST) before you return the machine to service. See* ***Common rail pressure sensor - Configure - Reset ECU data (Rail pressure sensor) (55.010)****, if necessary.*

DTC 259-03-Fuel metering unit is shorted to battery voltage at the low side

Control Module : ECU

Context:
The Engine Control Unit (ECU) monitors the fuel metering unit Y-9000 signal circuit. If the ECU A-9000 detects a short to a voltage source in the fuel metering unit Y-9000 low side driver circuit, this fault will occur.

Cause:
There is a short to a voltage source in the fuel metering unit Y-9000 low side driver circuit.

Possible failure modes:

1. Faulty fuel metering unit Y-9000 wiring, short to a voltage source.
2. Faulty fuel metering unit Y-9000, internal failure.
3. Faulty ECU A-9000, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.

2. Test the fuel metering unit Y-9000 internal resistance.

   Disconnect the engine harness (EN) from the fuel metering unit Y-9000 at connector **X-9007**.

   Use a multimeter to measure the resistance on the fuel metering unit Y-9000 pins :

From	To	Value
X-9007 pin 1	**X-9007 pin 2**	There should be between **2.6 - 3.2 Ω** at approximately **20.0 °C** (**68.0 °F**).

   A. If there is between **2.6 - 3.2 Ω**, leave connector **X-9007** disconnected and continue to Step **3**.

   B. If there is not between **2.6 - 3.2 Ω**, the fuel metering unit Y-9000 has failed. Replace the fuel metering unit Y-9000.

3. Check the fuel metering unit Y-9000 low side driver wiring for a short to battery condition.

   With the key in the OFF position, use a multimeter to perform the following voltage check on the engine harness (EN) side :

From	To	Value
X-9007 pin 1	Chassis ground	There should be no voltage.

   With the key in the ON position, use a multimeter to perform the following voltage check on the engine harness (EN) side :

From	To	Value
X-9007 pin 1	Chassis ground	There should be no voltage.

   A. If there is voltage, there is a short circuit to battery or switched battery in the fuel metering unit Y-9000 low side driver circuit wiring. Use the appropriate service manual, if necessary, to locate and repair the shorted conductor.

DTC 2C6-02-CAN communication failure between vehicle controller and ECU controller - TSC1_PE message

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 is capable of connecting to and communicating on two separate Controller Area Networks (CAN). Proper configuration and monitoring of the two twisted pair configured networks is also a function of the ECU A-9000. CAN Node A Bus is the main vehicle interface bus. The ECU A-9000 provides a CAN termination resistor for the CAN Node A Bus, internal to the ECU A-9000. If the ECU A-9000 senses that CAN Node A Bus is not functioning properly, this fault will occur.

Cause:
ECU A-9000 has sensed a timeout of vehicle data provided on CAN Node A.

Possible failure modes:

1. Faulty supply voltage or ground, missing.
2. Faulty CAN circuit wiring, open circuit, short to ground, or short circuit.
3. Faulty ECU A-9000, termination resistor or software.

Solution:

1. Verify fault is present and in active state.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or is in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.
2. Check for other vehicle CAN faults.

   Use the EST to determine if vehicle CAN faults exist.

   A. If other vehicle CAN faults do exist, resolve those vehicle CAN faults first, then check to see that this fault is also resolved.

   B. If other vehicle CAN faults do not exist, continue with Step **3**.
3. Check the ECU A-9000 supply voltage.

   Disconnect the vehicle (VE) harness from the ECU A-9000 at connector **X-9102**.

   To energize the Main relay K-9102, place a jumper wire between the vehicle harness (VE) side of connector **X-9102 pin K28** and chassis ground.

   Use a multimeter to check for voltage on the vehicle (VE) harness side:

From	To	Value
X-9102 pin K01	**X-9102 pin K02**	There should be approximately **12.0 V**.
X-9102 pin K03	**X-9102 pin K04**	There should be approximately **12.0 V**.
X-9102 pin K05	**X-9102 pin K06**	There should be approximately **12.0 V**.

   A. If the voltage is present on all of the checks, leave connector **X-9102** disconnected and continue with Step **4**.

DTC 2E1-03-Starter relay low side driver circuit shorted to battery

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 controls the starter control relay K-9104 using a low side and high side driver. If the ECU A-9000 detects a short circuit to battery in the low side driver circuit, this fault will occur.

Cause:
The ECU A-9000 has detected a short circuit to battery in the starter control relay K-9104 low side driver circuit.

Possible failure modes:

1. Faulty starter control relay K-9104 wiring, short to a voltage source.
2. Faulty starter control relay K-9104, internal failure.
3. Faulty ECU A-9000, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.

2. Check the starter control relay K-9104 coil for an internal failure.

   Remove the starter control relay K-9104.

   Use a multimeter to measure the relay coil resistance on the starter control relay K-9104 pins :

From	To	Value
X-9120 pin 85	**X-9120 pin 86**	There should be approximately **70 - 130 Ω**.

   A. If there is approximately **70 - 130 Ω**, leave the starter control relay K-9104 disconnected and continue to Step **3**.

   B. If there is not approximately **70 - 130 Ω**, the relay has failed. Replace the starter control relay K-9104.

3. Check the starter control relay K-9104 low side driver vehicle harness (VE) wiring for a short to a voltage source.

   With the key in the OFF position, use a multimeter to perform the following voltage check for a short to a voltage source on the vehicle harness (VE) side :

From	To	Value
X-9120 pin 85	Chassis ground	There should be no voltage.

   With the key in the ON position, use a multimeter to perform the following voltage check for a short to a voltage source on the vehicle harness (VE) side :

From	To	Value
X-9120 pin 85	Chassis ground	There should be no voltage.

   A. If there is voltage, there is a short to a voltage source in the starter control relay K-9104 low side driver wiring in the vehicle harness (VE). Use the appropriate service manual, if necessary, to locate and repair the shorted conductor.

   B. If there is no voltage, leave the starter control relay K-9104 disconnected and continue to Step **4**.

DTC 32B-04-Glow plug control circuits shorted to ground

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 requests operation of the glow plug control module Z-9101 via a Pulse Width Modulated (PWM) control circuit and monitors the status of possible electrical defects via a diagnostic feedback signal from the glow plug control module Z-9101. If the ECU A-9000 is notified of a short to ground condition in one or more of the glow plug circuits, this fault will occur. For information regarding the functional operation of the glow plug control module Z-9101 see **Glow plug system Glow plug control module - Overview – Glow plug control module (55.202)**.

Cause:
The glow plug control module Z-9101 has communicated to the ECU A-9000, via a diagnostic connection, that a short to ground circuit condition exists in one or more of the glow plugs or glow plug circuits.

Possible failure modes:

1. Faulty glow plug, internal failure.
2. Faulty glow plug control circuit wiring, short to ground condition.
3. Faulty ECU A-9000, software.

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.

2. Check each of the glow plugs for a short to ground condition.

   Disconnect the vehicle harness (VE) from each of the glow plugs at connectors **X-9034**, **X-9035**, and **X-9036**.

   Use a multimeter to measure the resistance of each glow plug on the glow plug pin :

From	To	Result
X-9034 pin 1	chassis ground	There should be **0.2 - 5.0 Ω**.
X-9035 pin 1	chassis ground	There should be **0.2 - 5.0 Ω**.
X-9036 pin 1	chassis ground	There should be **0.2 - 5.0 Ω**.

   A. If there is a nominal amount of resistance measured on each of the glow plugs, leave all of the glow plugs disconnected and continue with Step **3**.

   B. If there is less than **0.2 Ω** resistance measured on any of the glow plugs, that glow plug has failed internally, replace the faulted glow plug.

3. Check the glow plug control circuits in the vehicle harness (VE) for a short to ground circuit condition.

   Disconnect the vehicle harness (VE) from the glow plug control module Z-9101 at connector **X-9113**.

   With the key in the OFF position, use a multimeter to check for a short to ground condition on the vehicle harness (VE) side :

From	To	Result
X-9113 pin 2	chassis ground	There should be no continuity.
X-9113 pin 7	chassis ground	There should be no continuity.
X-9113 pin 1	chassis ground	There should be no continuity.

DTC 3C8-02-CAN communication failure between vehicle controller and ECU controller - TSC1_VE message

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 is capable of connecting to and communicating on two separate Controller Area Networks (CAN). Proper configuration and monitoring of the two twisted pair configured networks is also a function of the ECU A-9000. CAN Node A Bus is the main vehicle interface bus. The ECU A-9000 provides a CAN termination resistor for the CAN Node A Bus, internal to the ECU A-9000. If the ECU A-9000 senses that CAN Node A Bus is not functioning properly, this fault will occur.

Cause:
ECU A-9000 has sensed a timeout of required vehicle controller data provided on CAN Node A.

Possible failure modes:

1. Faulty supply voltage or ground, missing.
2. Faulty CAN circuit wiring, open circuit, short to ground, or short circuit.
3. Faulty ECU A-9000, termination resistor or software.

Solution:

1. Verify fault is present and in active state.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or is in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.
2. Check for other vehicle CAN faults.

   Use the EST to determine if vehicle CAN faults exist.

   A. If other vehicle CAN faults do exist, resolve those vehicle CAN faults first, then check to see that this fault is also resolved.

   B. If other vehicle CAN faults do not exist, continue with Step **3**.
3. Check the ECU A-9000 supply voltage.

   Disconnect the vehicle (VE) harness from the ECU A-9000 at connector **X-9102**.

   To energize the Main relay K-9102, place a jumper wire between the vehicle harness (VE) side of connector **X-9102 pin K28** and chassis ground.

   Use a multimeter to check for voltage on the vehicle (VE) harness side:

From	To	Value
X-9102 pin K01	**X-9102 pin K02**	There should be approximately **12.0 V**.
X-9102 pin K03	**X-9102 pin K04**	There should be approximately **12.0 V**.
X-9102 pin K05	**X-9102 pin K06**	There should be approximately **12.0 V**.

   A. If the voltage is present on all of the checks, leave connector **X-9102** disconnected and continue with Step **4**.

DTC 3E3-04-ECU internal failure - Rail pressure plausibility

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 monitors fuel pressure in the common rail. This monitoring is performed using two software levels of monitoring because fuel pressure monitoring is a critical functionality. If the ECU A-9000 sees an error in the level two monitoring but not in level one monitoring, this fault will occur.

Solution:

1. Check the ECU A-9000 for the appropriate software and re-flash, if necessary.
   A. If the fault has been resolved, return the machine to service.
   B. If the fault has not been resolved, escalate an ASIST concern.

DTC 455-03-High pressure pump fuel delivery quantity at low idle is too high

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 monitors fuel rail pressure. If the ECU A-9000 determines that the requested fuel pressure is greater than the actual fuel pressure at idle, leakage is assumed and this fault will occur. Other active faults may have caused this fault to occur. Use the Electronic Service Tool (EST) to check for other active faults. Diagnose any active faults related to the fuel system first and then return to this fault. For more information regarding fuel system troubleshooting, see **Fuel injection system - Troubleshooting (10.218)**.

Cause:
The ECU A-9000 has determined that the requested fuel pressure is greater than the actual fuel pressure at idle.

Possible failure modes:

1. Faulty low pressure fuel system, clogged filter or leakage/blockage.
2. Faulty charge gear pump, low efficiency or line clogged/damaged.
3. Faulty electric fuel pump (if equipped).
4. Faulty fuel metering unit, unable to fully open.
5. Faulty high pressure pump, low efficiency.
6. Faulty fuel injectors, stuck open or internal leakage.
7. Faulty Pressure Relief Valve (PRV), leakage.
8. Faulty rail pressure sensor B-9004 drifted signal or leaking.
9. Faulty ECU A-9000, software.

B. If there is no continuity, leave connectors **X-9011** and **X-9001** disconnected and continue to Step **4**.

4. Check the throttle valve actuator Z-9001 engine harness (EN) wiring for a short circuit condition.

   With the key in the OFF position, use a multimeter to perform the following continuity check for a short circuit on the engine harness (EN) side :

From	To	Value
X-9011 pin 6	**X-9011 pin 2**	There should be no continuity.
X-9011 pin 6	**X-9011 pin 1**	There should be no continuity.
X-9011 pin 2	**X-9011 pin 1**	There should be no continuity.

   A. If there is continuity, there is a short circuit in the throttle valve actuator Z-9001 engine harness (EN) h-bridge circuit. Locate and repair the shorted conductor.

   B. If there is no continuity, leave connectors **X-9011** and **X-9001** disconnected and continue to Step **5**.

5. Check the throttle valve actuator Z-9001 vehicle harness (VE) h-bridge circuit for a short to high source condition.

   With the key in the OFF position, use a multimeter to perform the following continuity check on the vehicle harness (VE) side :

From	To	Value
X-9001 pin A49	All pins in connector **X-9001**	There should be no continuity.
X-9001 pin A34	All pins in connector **X-9001**	There should be no continuity.

   A. If there is continuity, there is a short circuit in the throttle valve actuator Z-9001 engine harness (EN) h-bridge circuit. Use the appropriate service manual, if necessary, to locate and repair the shorted conductor.

   B. If there is no continuity, leave connector **X-9011** disconnected and continue to Step **6**.

6. Replace the throttle valve actuator Z-9001.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is no longer active, return the machine to service.

   B. If the fault is still active, check the ECU A-9000 for the appropriate service manual and re-flash, if necessary.

7. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 03 – Engine sensors and fuel injection (engine schematics) (55.100.DP-C.20.E.03)

DTC 54C-03-Engine over speed condition detected

Control Module : ECU

Context:
This fault is intended for information purposes only and does not require any further action. Other active faults may have caused this fault to occur. The Engine Control Unit (ECU) A-9000 monitors for an engine overspeed condition. An engine overspeed condition can occur from such conditions as downhill travel. If an engine speed of at least **3100 RPM** has been detected for at least **0.05 s**, this fault will occur.

DTC 5D4-02-ECU internal failure - WDA is not working correctly

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 performs “shut-off paths” which deactivate all power stages relevant to fuel injection if certain ECU A-9000 errors are detected. If an implausible response in the power-stage feedback is detected during this test, this fault will occur.

Solution:

1. Check the ECU A-9000 for the appropriate software and re-flash, if necessary.
   A. If the fault has been resolved, return the machine to service.
   B. If the fault has not been resolved, escalate an ASIST concern.

4. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires.

   Verify that the connectors are fully installed.

   Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.

   Operate the machine while you monitor the display.

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 02 – Engine Control Unit (ECU) power and after treatment system (engine schematics) (55.100.DP-C.20.E.02)

DTC 60B-03-Lambda sensor cell circuits short circuit to battery

Control Module : ECU

NOTE: *If the Lambda sensor B-9123 is replaced, it is necessary to perform the Replacement of the Lambda Sensor - Reset ECU Data with the Electronic Service Tool (EST) before you return the machine to service. See* ***Lambda sensor - Configure - Reset ECU data (Lambda sensor) (55.989)****, if necessary.*

Context:
The Engine Control Unit (ECU) A-9000 monitors the condition of the nernst cell, pump cell and virtual ground circuits. If the ECU A-9000 detects a short to a voltage source condition in any of the circuits or an open circuit condition in the virtual ground circuit, this fault will occur. For information regarding the functional operation of the Lambda sensor B-9123 see **Lambda sensor - Overview (55.989)**. For more information regarding the technical specifications of the lambda sensor B-9123, see **Lambda sensor - Technical Data (55.989)**.

Cause:
The ECU A-9000 is sensing an open circuit condition in the Lambda sensor B-9123 virtual ground circuit or a short to a voltage source condition in the nernst cell, pump cell or virtual ground circuit.

Possible failure modes:

1. Faulty Lambda sensor B-9123 nernst cell, pump cell, or virtual ground circuit wiring, short to a voltage source.
2. Faulty Lambda sensor B-9123 virtual ground circuit wiring, open circuit.
3. Faulty Lambda sensor B-9123, internal failure.
4. Faulty ECU A-9000, software.

Solution:

1. Verify that the fault present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.

2. Check the Lambda sensor B-9123 nernst cell, pump cell, and virtual ground circuit wiring for a short to voltage condition.

   Disconnect the vehicle harness (VE) from the Lambda sensor B-9123 at connector **X-9123**.

   Disconnect the vehicle harness (VE) from the ECU A-9000 at connector **X-9102**.

   With the key switch in the OFF position, use a multimeter to perform the following continuity check on the vehicle harness (VE) side :

From	To	Result
X-9102 pin K64	all pins in connector **X-9102**.	There should be no continuity.
X-9102 pin K85	all pins in connector **X-9102**.	There should be no continuity.
X-9102 pin K63	all pins in connector **X-9102**.	There should be no continuity.
X-9102 pin K86	all pins in connector **X-9102**.	There should be no continuity.

   With the key switch in the ON position, use a multimeter to perform the following voltage check on the vehicle harness (VE) side :

From	To	Result
X-9102 pin K64	chassis ground	There should be no voltage.
X-9102 pin K85	chassis ground	There should be no voltage.
X-9102 pin K63	chassis ground	There should be no voltage.
X-9102 pin K86	chassis ground	There should be no voltage.