SERVICE MANUAL

Boomer™ 20
Boomer™ 25
Compact Tractor

Part number 84557214
1st edition English
July 2012

NEW HOLLAND AGRICULTURE

Safety rules

Personal safety

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual and on machine decals, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

⚠ DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury. The color associated with DANGER is RED.

⚠ WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

⚠ CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation which, if not avoided, could result in machine or property damage. The color associated with Notice is BLUE.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information which clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

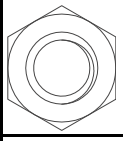
ACCIDENT PREVENTION

Most accidents or injuries that occur in workshops are the result of a non compliance to simple and fundamental safety regulations. For this reason, IN MOST CASES THESE ACCIDENTS CAN BE AVOIDED by foreseeing possible causes and consequently acting with the necessary caution and care.

Accidents may occur with all types of machines, regardless of how well the machine in question was designed and built.

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

Decisive awareness of the most basic safety rule is normally sufficient to avoid many serious accident.

SAE Markings for Hex Nuts			
Grade A-B-C Locknuts	**A (No Notches)**	**B (Three Marks)**	**C (Six Marks)**

METRIC HARDWARE IDENTIFICATION CHART

Class	**5.8**	**8.8**	**10.9**
			
Hex Cap Screw and Carriage Bolts	Located on the face or flat, on the cap of the bolt	Located on the face or flat, on the cap of the bolt	Located on the face or flat, on the cap of the bolt
Hex Nuts and Locknuts	Located on the face or flat of the nut	Located on the face or flat of the nut	Located on the face or flat of the nut

Metric cap screws and nuts are identified by the grade number stamped on the head of the cap screw or on the surface of the nuts. U.S. customary cap screws are identified by radial lines stamped on the head of the cap screw.

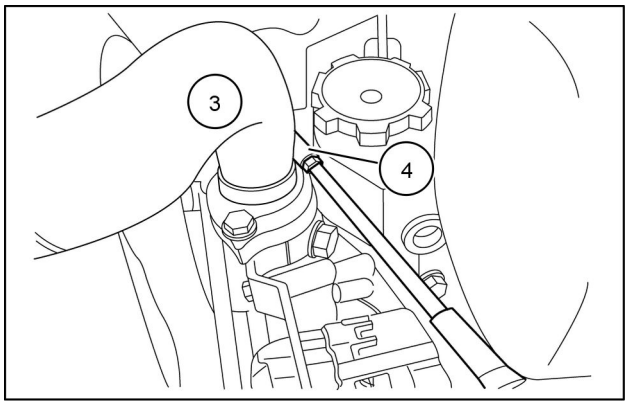
DEFINITIONS:

1. Break-Away Torque - Torque measured in the direction of tightening, the moment before the bolt/nut starts to turn.
2. Clamping Force - Force equal to the tension in the fastener that clamps the parts together.
3. Stabilized Torque - Torque measured on a joint that has had a settling time after fastener installation, and the torque is measured in the direction of tightening, the moment after the bolt/nut begins to turn.
4. Proof Load - Safe test load for fasteners, approximately 10% below the yield load.
5. Torque - Force on the wrench handle times the handle length.
6. Torque and Turn - Bolting method utilizing a torque sufficient to close the joint, followed by rotation of a specific angle to obtain the desired bolt stretch.
7. Torque to Yield - Bolting method that tightens the joint until 0.2% yield is detected. Generally requires a computer monitored tightening tool.
8. Target Torque - Torque specified by engineering, generally nominal torque.
9. Ultimate Load - Load when bolt failure occurs.
10. Yield Load - Load when 0.2% deformation occurs.

	Model Boomer 20	Model Boomer 25
WHEEL TREAD SETTINGS:		
(6)-FRONT:		
Turf Tires: 23.5 x 8.50-12	**930 mm** (**36.6 in**)	**930 mm** (**36.6 in**)
Ind. Tires: 23.5 x 8.50-12	**930 mm** (**36.6 in**)	**930 mm** (**36.6 in**)
(7)-REAR:		
Turf Tires: 33x 12.00-16.5	**940 mm** (**37.0 in**)	**940 mm** (**37.0 in**)
Ind. Tires: 12.00 x 16.5	**940 mm** (**37.0 in**)	**940 mm** (**37.0 in**)
WEIGHT: less tires:		
HST (FWD)	**720 kg** (**1587 lb**)	**730 kg** (**1609 lb**)

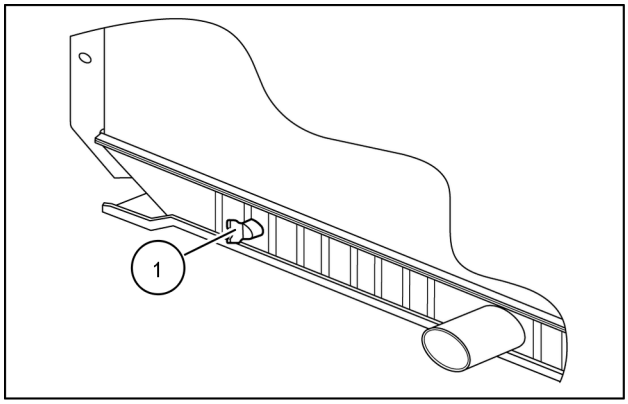
Inspection point	Nominal	Standard	Limit	Remark
Piston ring Clearance between the piston ring and ring groove				
- Top compression ring		**0.09 - 0.11 mm** (**0.0035 - 0.0043 in**)	**0.30 mm** (**0.0118 in**)	Replace the rings until the limits are reached, then replace the piston.
- Intermediate ring		**0.07 - 0.11 mm** (**0.0028 - 0.0043 in**)	**0.20 mm** (**0.0079 in**)	Replace the rings until the limits are reached, then replace the piston.
- Oil ring		**0.03 - 0.07 mm** (**0.0012 - 0.0028 in**)	**0.20 mm** (**0.0079 in**)	Replace the rings until the limits are reached, then replace the piston.
Piston ring end gap				
- Top compression ring		**0.15 - 0.30 mm** (**0.0059 - 0.0118 in**)	**1.50 mm** (**0.0591 in**)	Replace
- Intermediate ring		**0.15 - 0.30 mm** (**0.0059 - 0.0118 in**)	**1.50 mm** (**0.0591 in**)	Replace
- Oil ring		**0.20 - 0.40 mm** (**0.0079 - 0.0157 in**)	**1.50 mm** (**0.0591 in**)	Replace
Connecting rod Bend and torsion (over a **100 mm** (**3.9 in**) span		**0.05 mm** (**0.0020 in**) or less	**0.15 mm** (**0.0059 in**)	
End play		**0.10 - 0.35 mm** (**0.0039 - 0.0138 in**)	**0.50 mm** (**0.0197 in**)	Replace the connecting rod
Crankshaft Crank journal outside diameter	**52 mm** (**2.05 in**)	**51.985 - 52.000 mm** (**2.0467 - 2.0472 in**)		
Crank pin outside diameter	**48 mm** (**1.89 in**)	**47.950 - 47.965 mm** (**1.8878 - 1.8884 in**)		
Crankshaft runout		**0.025 mm** (**0.0010 in**) or less	**0.050 mm** (**0.0020 in**)	Repair or replace
Main bearing oil clearance		**0.030 - 0.077 mm** (**0.0012 - 0.0030 in**)	**0.100 mm** (**0.0039 in**)	Replace main bearing
Connecting rod bearings oil clearance		**0.025 - 0.072 mm** (**0.0010 - 0.0028 in**)	**0.150 mm** (**0.0059 in**)	Replace connecting rod bearings
End play		**0.050 - 0.175 mm** (**0.0020 - 0.0069 in**)	**0.500 mm** (**0.0197 in**)	Replace flanged No. 3 main bearing
Timing gear backlash Between crankshaft gear and idler gear		**0.04 - 0.12 mm** (**0.0016 - 0.0047 in**)	**0.30 mm** (**0.0118 in**)	Replace
Between idler gear and valve camshaft gear		**0.04 - 0.12 mm** (**0.0016 - 0.0047 in**)	**0.30 mm** (**0.0118 in**)	Replace
Between idler gear and pump camshaft gear		**0.04 - 0.12 mm** (**0.0016 - 0.0047 in**)	**0.30 mm** (**0.0118 in**)	Replace

12. Install the upper coolant hose **(3)**. Tighten the hose clamp **(4)**.



83118789 11

13. Close the drain cock under the left hand side of the radiator **(1)**.



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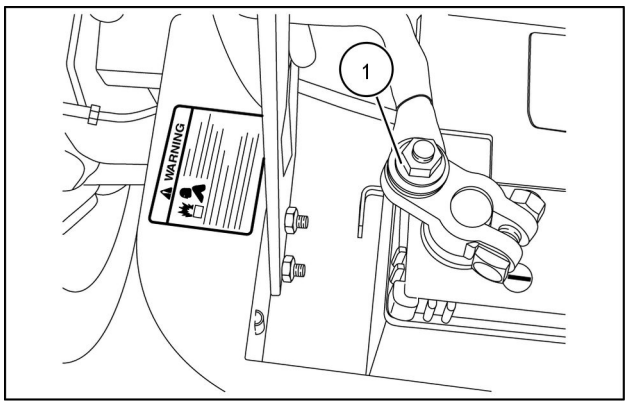
14. Fill coolant to proper level, use Ethylene Glycol Coolant Concentrate

NOTE: *Engine coolant capacity is* ***3.8 l*** *(****1 US gal****)*

15. Connect the negative (-) battery terminal **(1)**.



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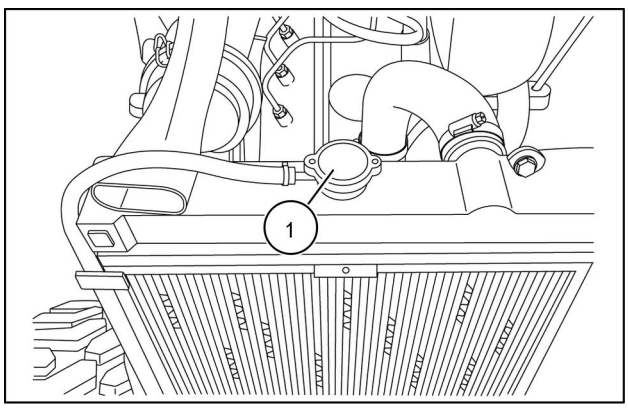
16. Install radiator cap, **(1)** run engine until the thermostat opens , insuring all air is displaced.



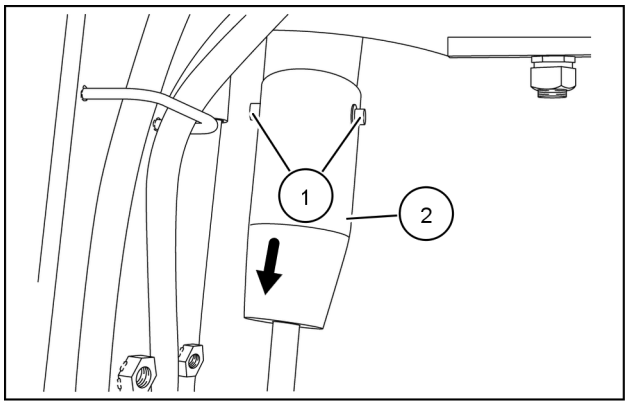
83118787 14

Index

Engine - 10

Engine cooling system - 400

5. Remove the four wheel drive shaft guard bolts **(1)**, and move the shaft guard **(2)** in the direction of the arrow.



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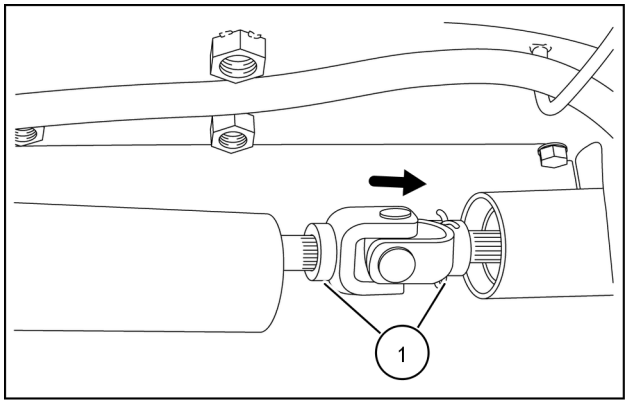
6. Remove the four wheel drive universal joint retaining spring pins **(1)** and move the universal joint in the direction of the arrow.

NOTICE: *Install new spring pins at assembly.*



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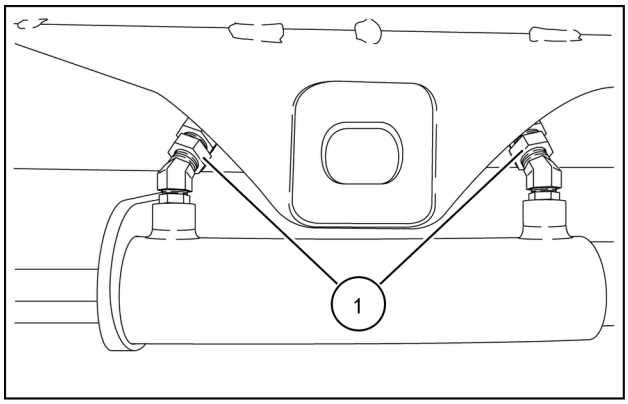
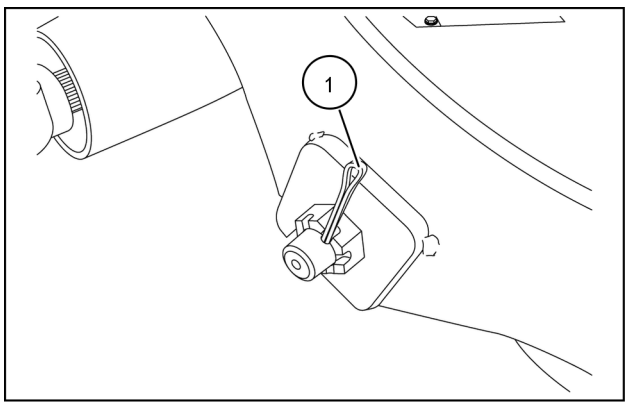
7. Disconnect the steering cylinder hoses **(1)**.

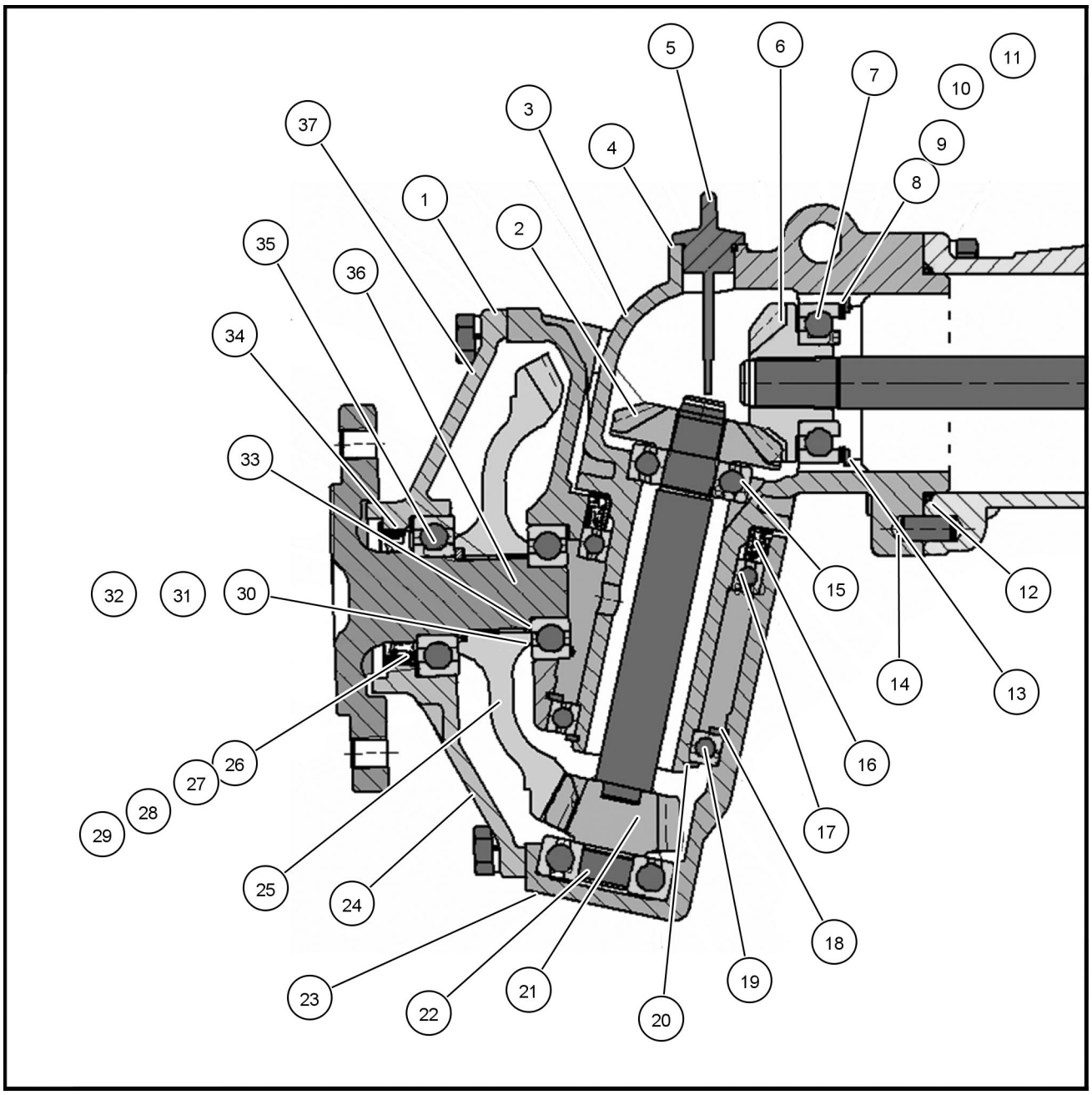


83118700 8

8. Remove the cotter pin **(1)**.



83118701 9



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Steering Knuckle

NOTE: *Refer to figure* ***1*** *for table use.*

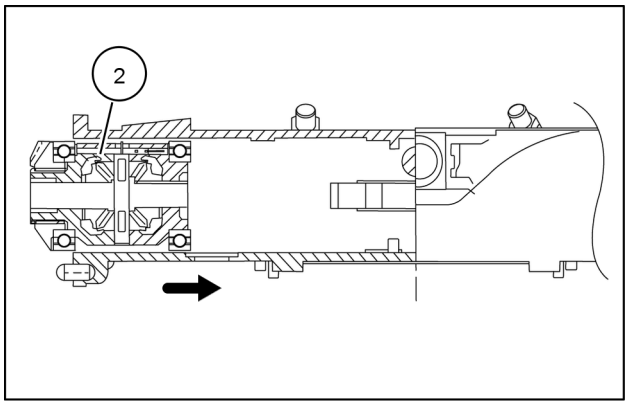
(1) Cover Plate	**(7)** Bearing	**(13)** O ring	**(19)** Bearing	**(25)** Bevel Gear **32T**	**(31)** Washer
(2) Bevel Gear **15T**	**(8)** Shim	**(14)** Pin	**(20)** Snap Ring	**(26)** Shim	**(32)** Washer
(3) King Pin Case	**(9)** Shim	**(15)** Bearing	**(21)** Bevel Gear **9T**	**(27)** Shim	**(33)** Collar
(4) O ring	**(10)** Shim	**(16)** Oil Seal	**(22)** Bearing	**(28)** Shim	**(34)** Bearing
(5) Oil Plug	**(11)** Shim	**(17)** Bearing	**(23)** Gear Case LH	**(29)** Shim	**(35)** Bearing
(6) Bevel Gear **13T**	**(12)** Snap Ring	**(18)** Snap Ring	**(24)** Gear Case RH	**(30)** Washer	**(36)** Outer Axle Shaft **(37)** Gear Case

Front axle system - 25

Front bevel gear set and differential - 102

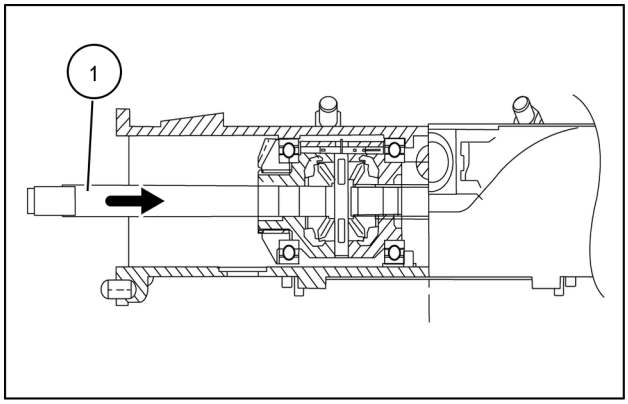
Boomer 20
Boomer 25

3. Install the front differential assembly **(2)**.



83118744 5

4. Push the inner axle shaft **(1)** in the direction of the arrow.



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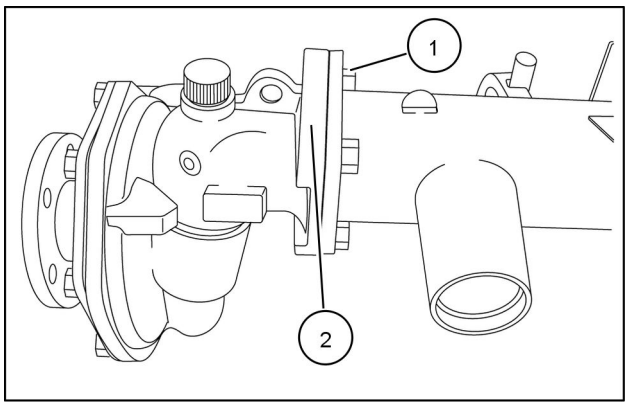
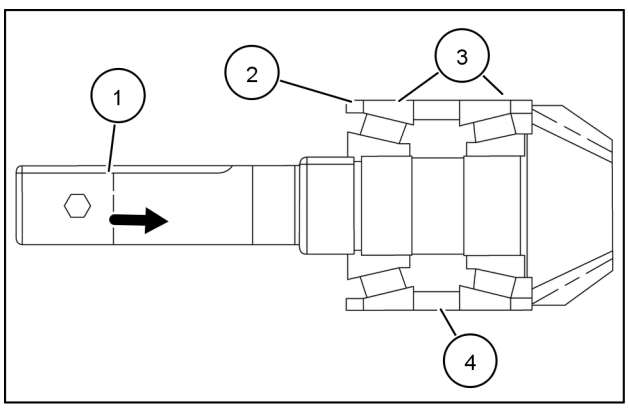
5. Install the king pin housing **(2)**.
6. Install the four **M12 x 1.75** bolts **(1)**. Torque these bolts to **137 N·m** (**101 lb ft**)



83118742 7

7. Install the collar **(2)**, taper bearing **(3)**, and the spacer **(4)** on the pinion shaft **(1)**.



83118741 8

Front axle system - 25

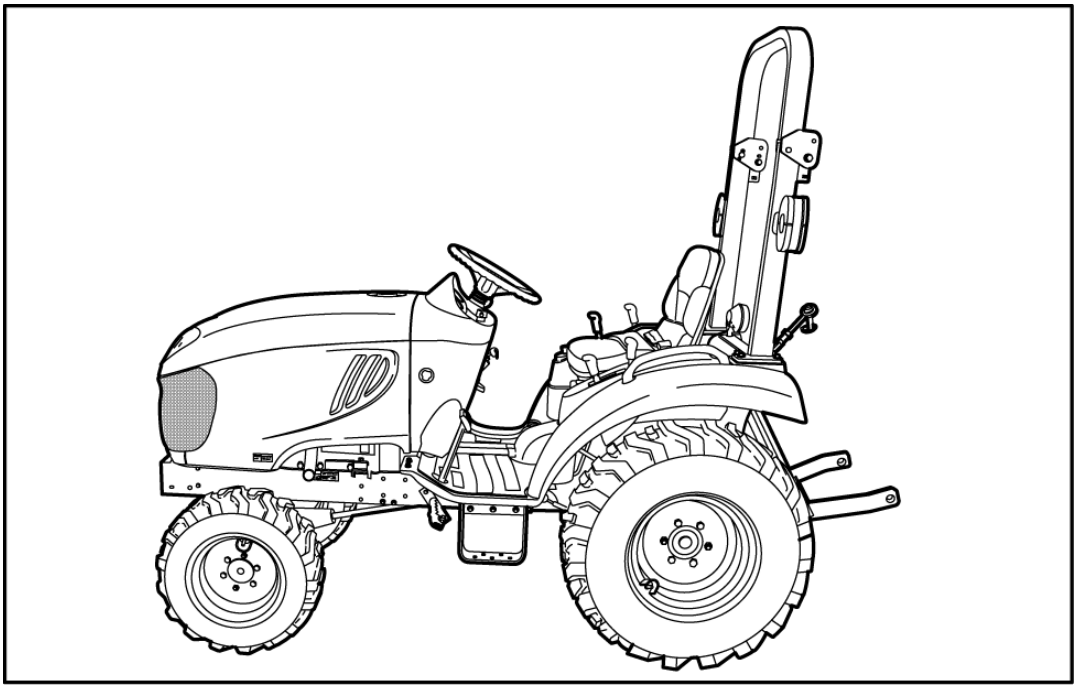
Final drive hub, steering knuckles, and shafts - 108

Boomer 20
Boomer 25

NEW HOLLAND AGRICULTURE

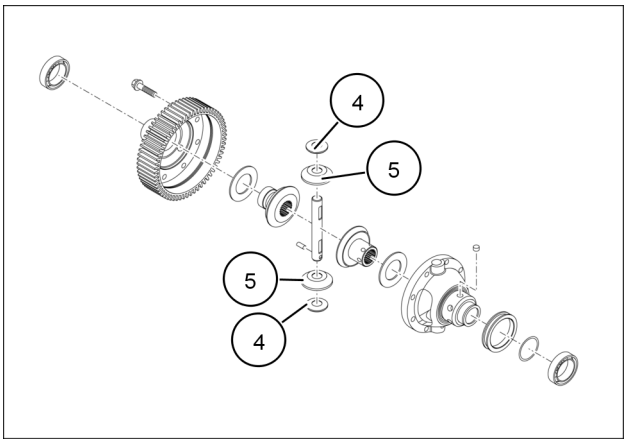
SERVICE MANUAL

Rear axle system



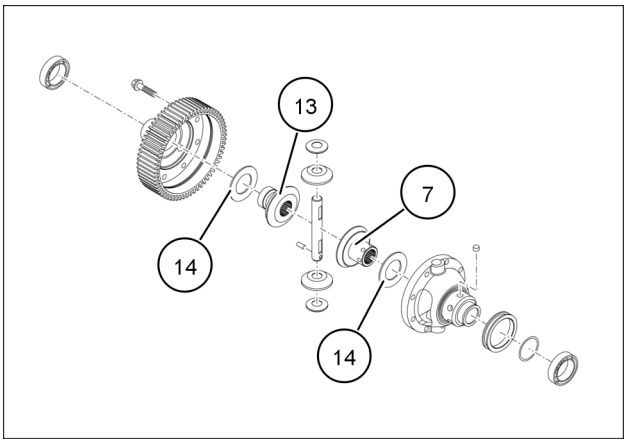
Boomer 20
Boomer 25

5. Remove pinion drives **(5)** and thrust washers **(4)**.



NHIL11TR000001F 3

6. Remove the differential gear Right hand side **(13)**.
7. Remove the differential gear Left hand side **(7)**.
8. Remove thrust washers **(14)**.



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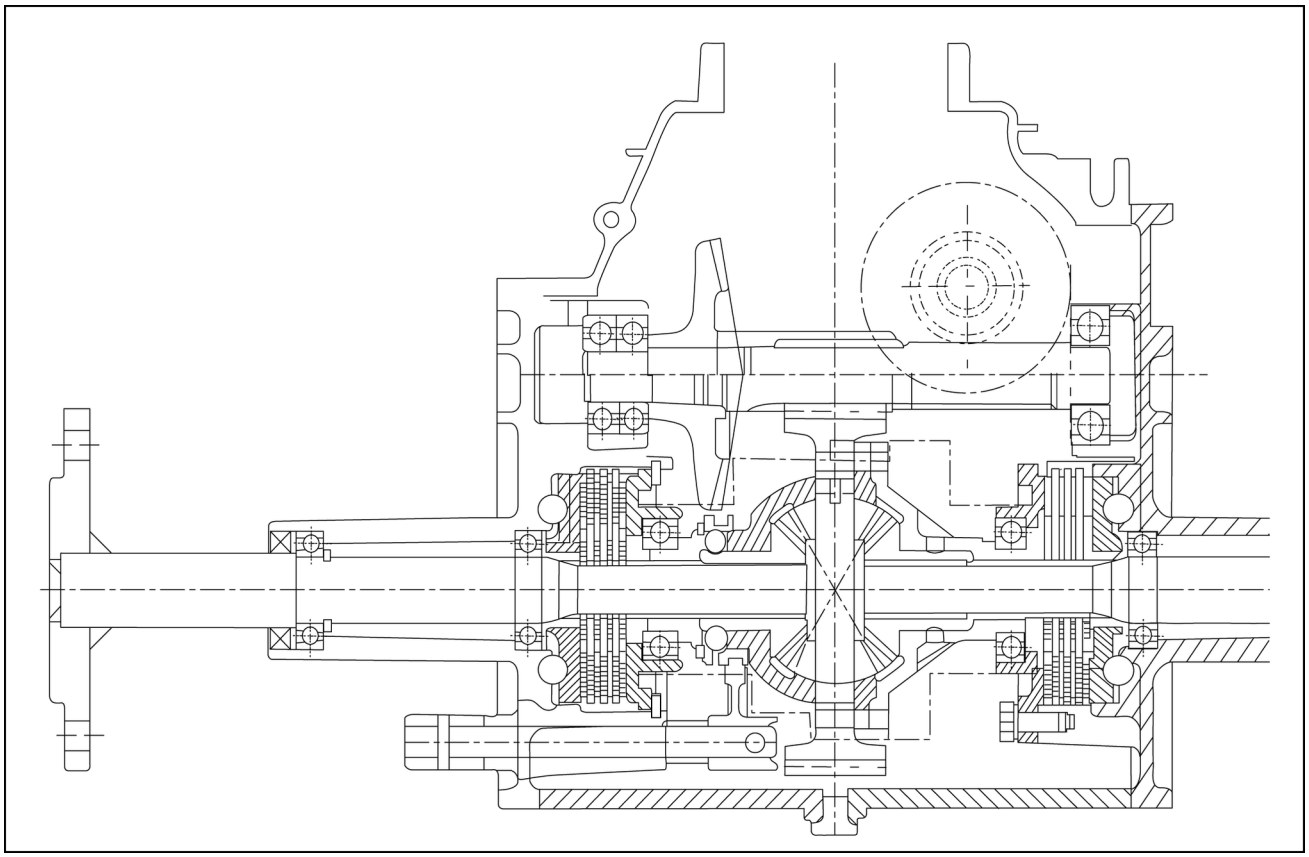
Next operation:
Differential - Assemble (27.106)

Axle shaft - Overhaul

Overhaul



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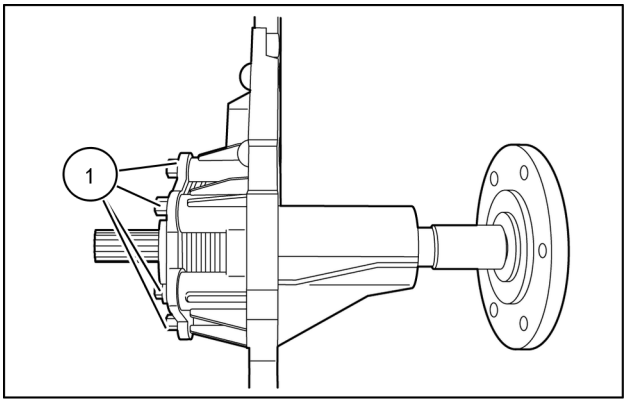
Final Drive Case cross-sectional view Left Hand Side

1. Remove the brake bearing cover plate six retaining bolts **M10 x 1.25 (1)**.



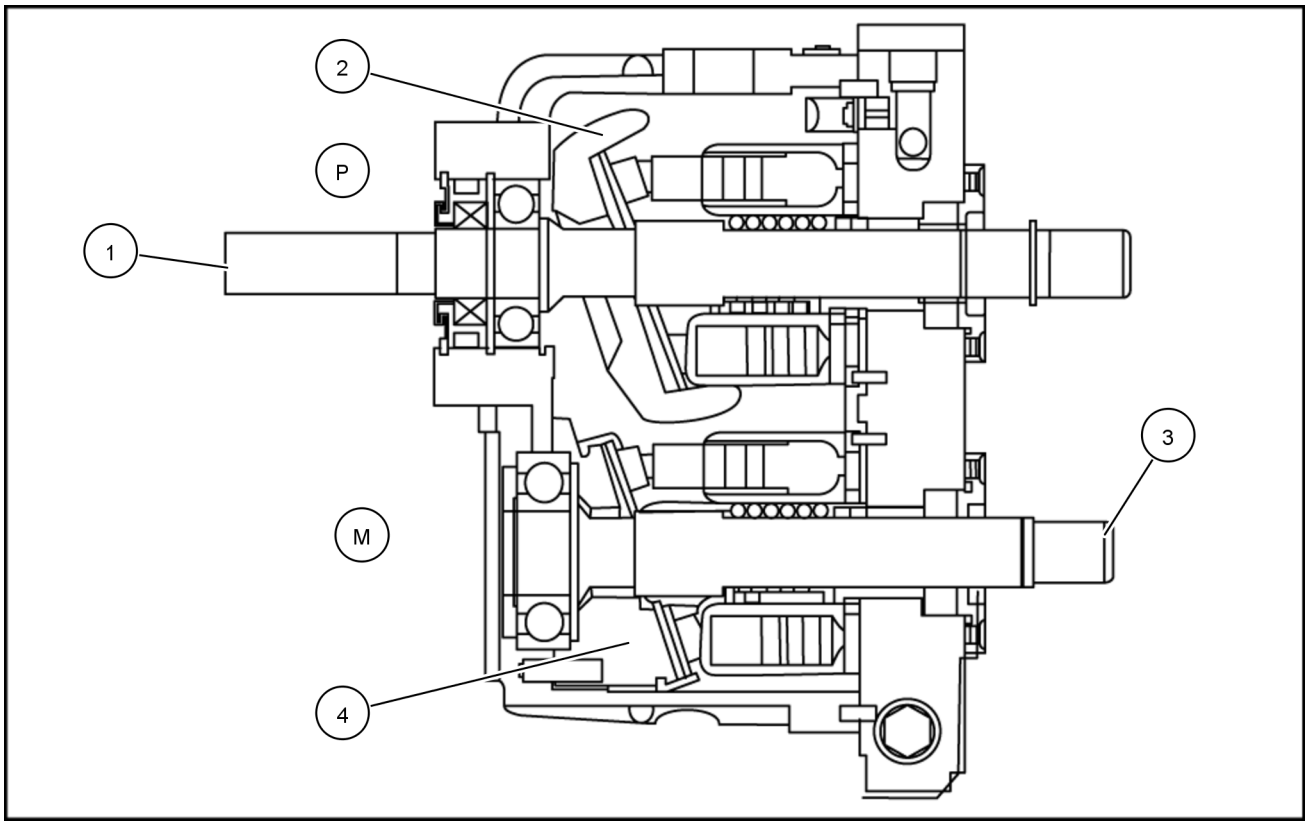
83114589 2

Hydrostatic drive - 29

Transmission and steering hydrostatic control - 100

Boomer 20
Boomer 25

Hydrostatic transmission - Dynamic description



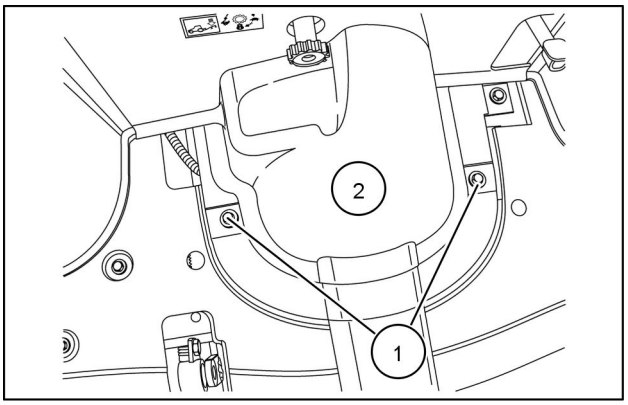
93102282 1

(P) Pump, (M) Motor.

The flywheel damper plate directly drives input shaft **(1)**. Movable cam plate **(2)** pivots on input shaft, is connected to the F/R pedal, and driven by pedal movement.

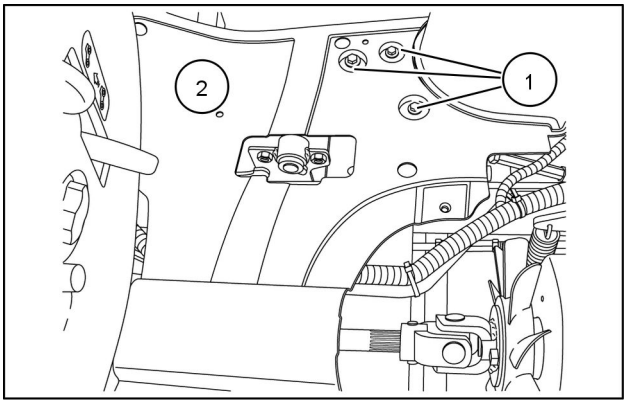
The direction of hydraulic oil flow is determined by the movable cam plate. Oil drives output shaft **(3)** by inflow to fixed cam plate **(4)** in the lower section.

8. Remove the HST unit cooling fan guard retaining bolts **(1)**, and remove the HST unit cooling fan guard **(2)**



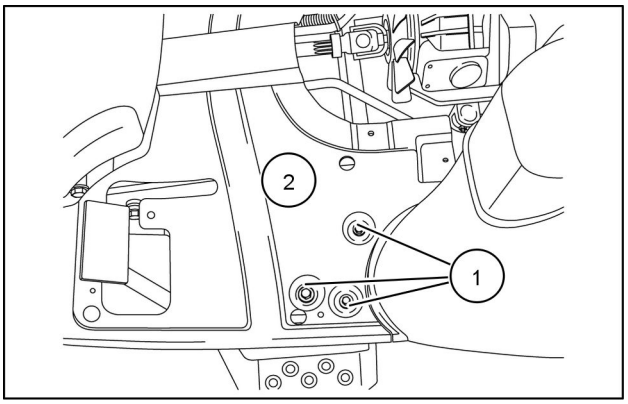
83118712 8

9. Remove the platform retaining bolts **(1)** from the Right side **(2)** of the platform.



83118711 9

10. Remove the platform retaining bolts **(1)** from the Left side and remove the platform **(2)**



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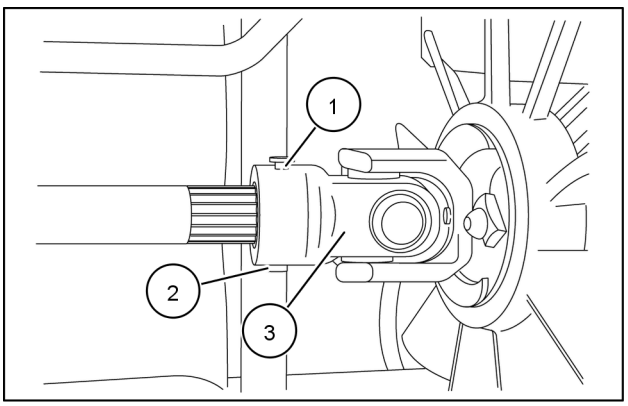
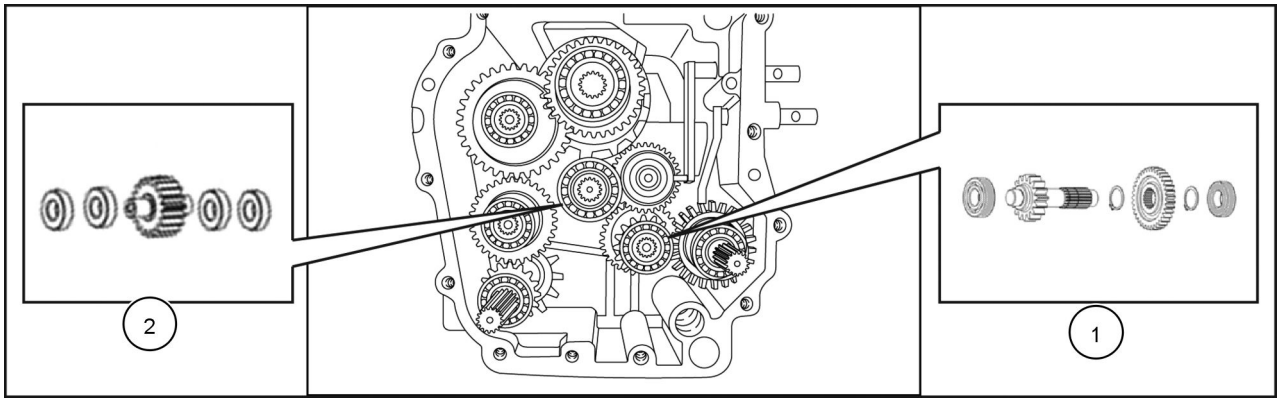
11. Remove the universal joint pin **(1)**, and cotter pin **(2)** towards the HST unit cooling fan. Remove the universal joint **(3)**.

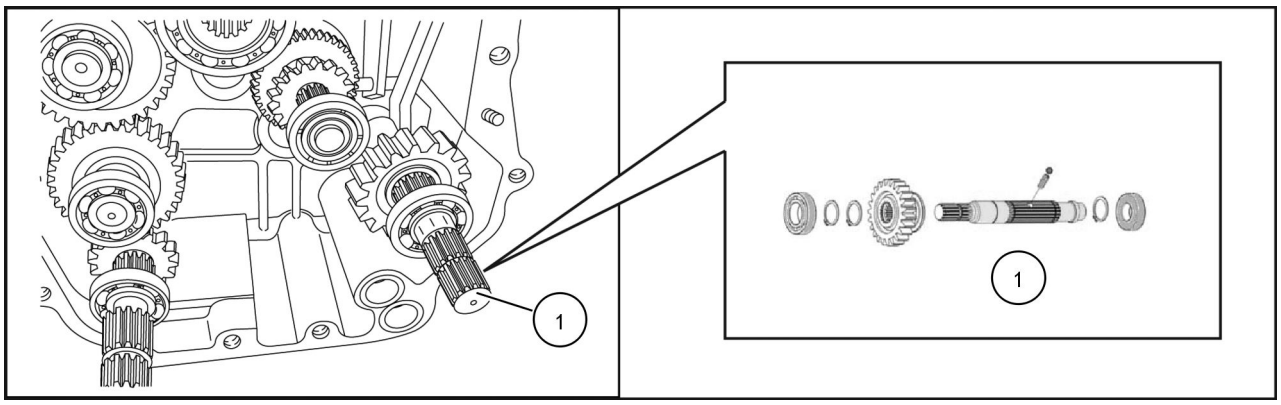


83114544 11



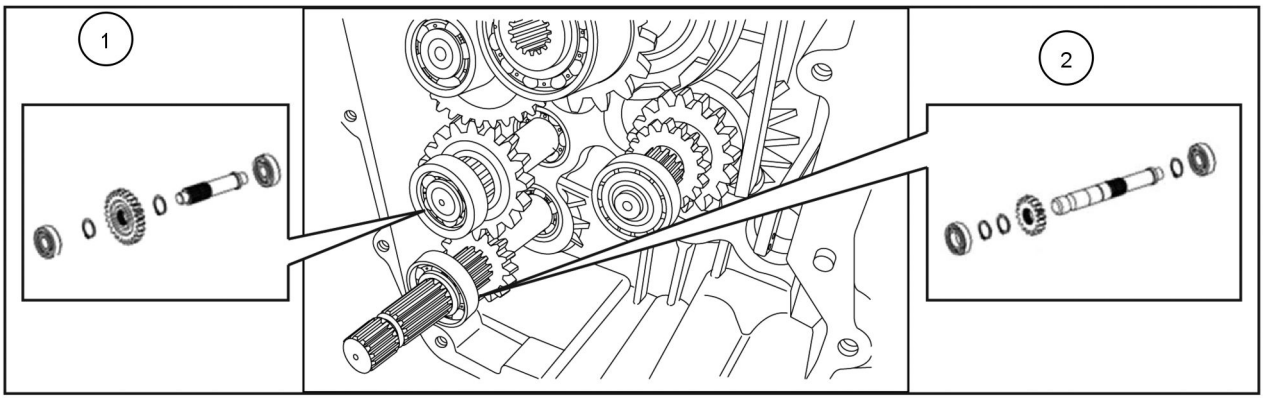
83114571 16

14. Remove the FWD drive shaft gear assembly **(1)**, and the PTO idler gear shaft assembly **(2)** at the same time.



83114572 17

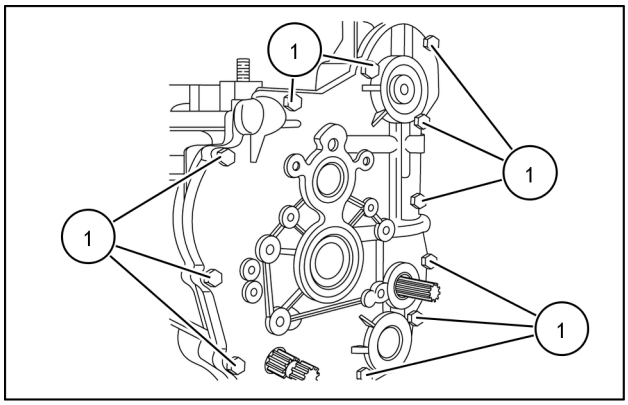
15. Remove the FWD shaft **(1)** as a complete assembly.



83114573 18

16. Remove the mid PTO idler shaft assembly **(1)**, and the middle PTO counter shaft assembly **(2)**.

12. Install transmission front cover plate retaining **M10 x 1.25** bolts **(1)**.Torque to **49 - 54 N·m** (**36 - 40 lb ft**).



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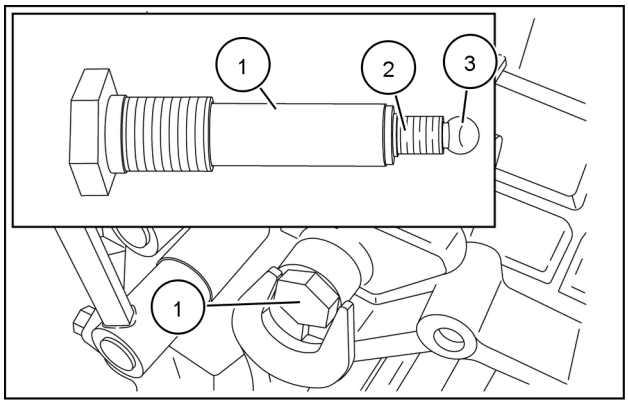
NOTICE: *Inspect the bolt for any damage, replace if necessary.*

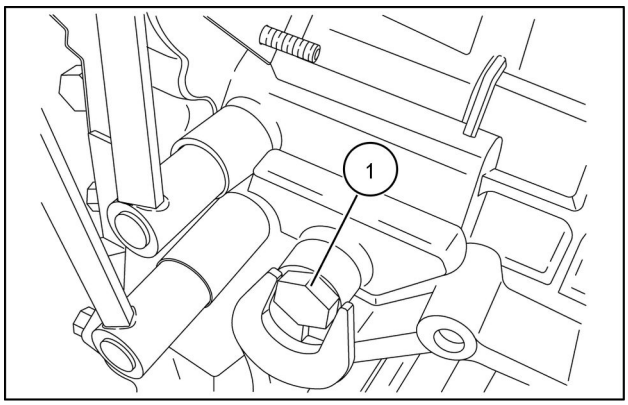
13. Install the bolt, **(1)** spring **(2)** and ball **(3)**.



83114566 15

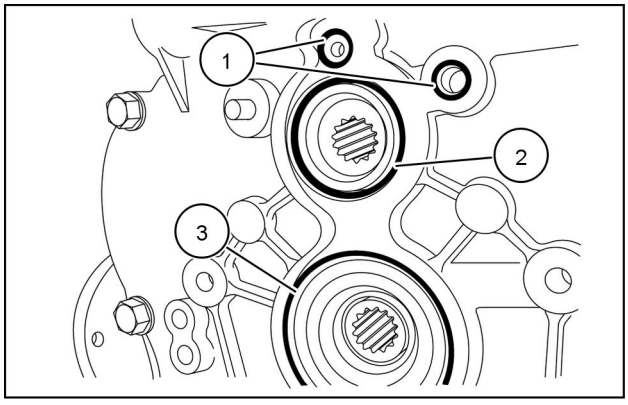
NOTICE: *Inspect the O rings, replace if necessary.*

14. Install the range gear rail bolt, **(1)** spring **(2)** and ball **(3)**.



83114565 16

15. Inspect O rings **(1)**, **(2)** and **(3)**.



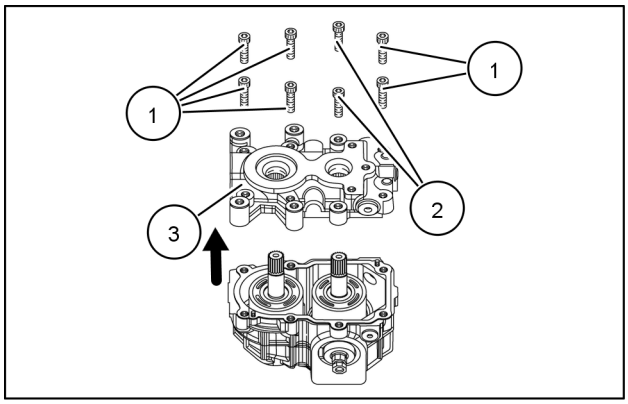
83114563 17

Hydrostatic unit disassembly

1. Remove the Port block by removing six **M10 x 45mm** allen bolts **(1)** and two **M10 x 40mm** allen bolts **(2)**.

NOTICE: *DO NOT drop Port Block.*

NOTE: *Tap lightly on the Port Block **(3)** with a plastic hammer to separate.*



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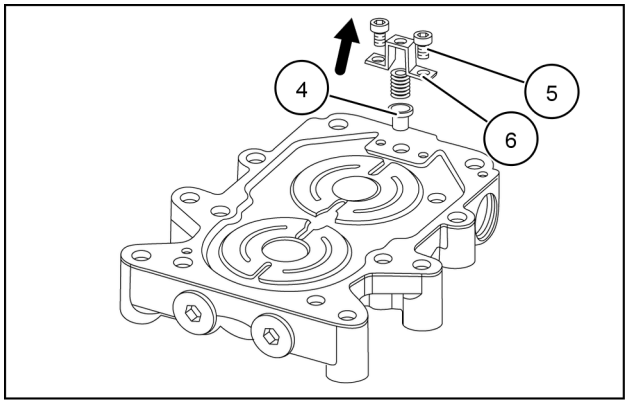
2. Remove the charge relief poppet **(4)** by removing two **M6 x 10mm** allen bolts **(5)**.
3. Remove holder **(6)**.



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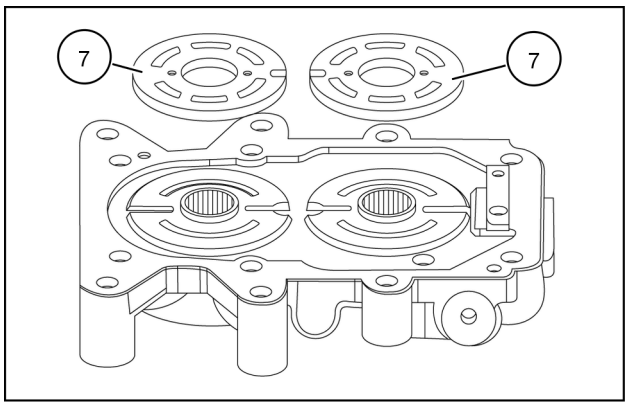
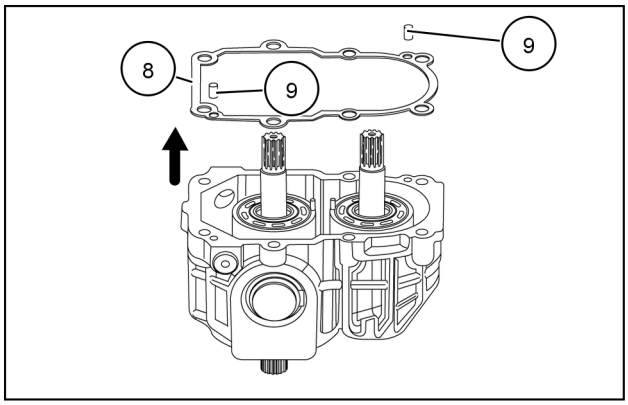
4. Remove two valve plates **(7)**.



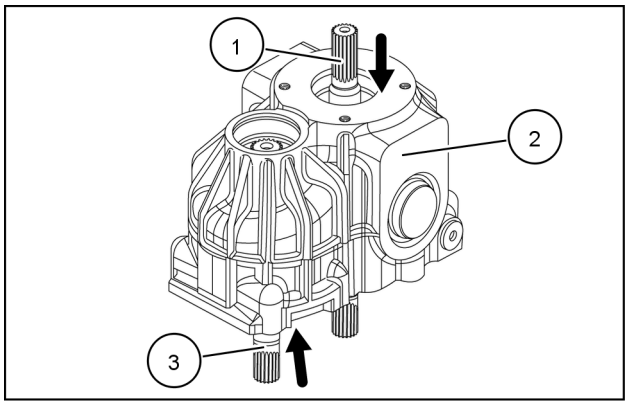
NHIL11CT00003AA 4

5. Remove gasket **(8)** and pins **(9)**.



NHIL11CT00004AA 5

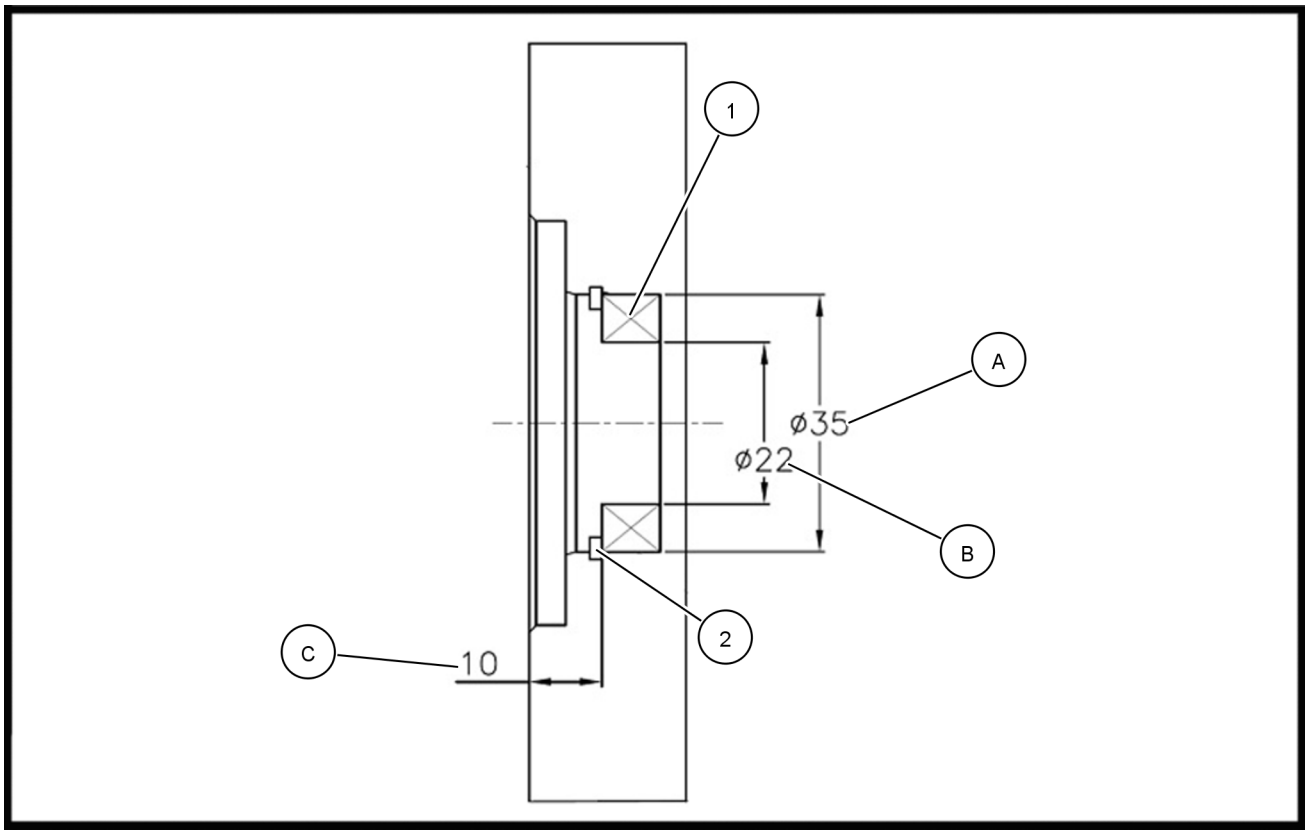
1. Install pump shaft, bearing and snap **(1)** ring into body **(2)**.
2. Install motor shaft, bearing and snap **(3)** ring into body **(2)**.



NHIL11CT00021AA 6

Seal Cap Assembly

Pump side



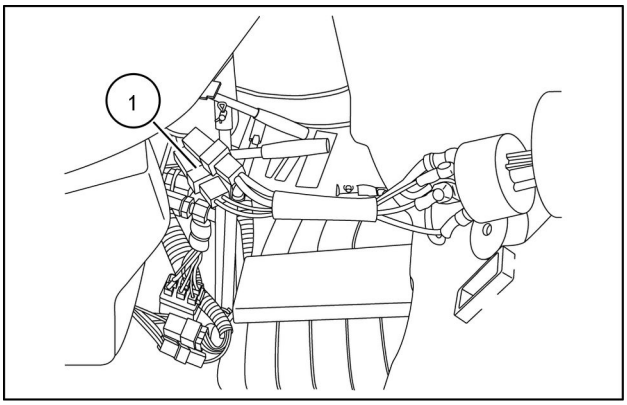
NHIL11CT00034AA 7

Oil Seal Installation Illustration

(1) Seal **(2)** Snap Ring **(A)** Seal O.D., **35mm** **(B)** Seal I.D., **22mm** **(C)** Seal Depth, **10mm**

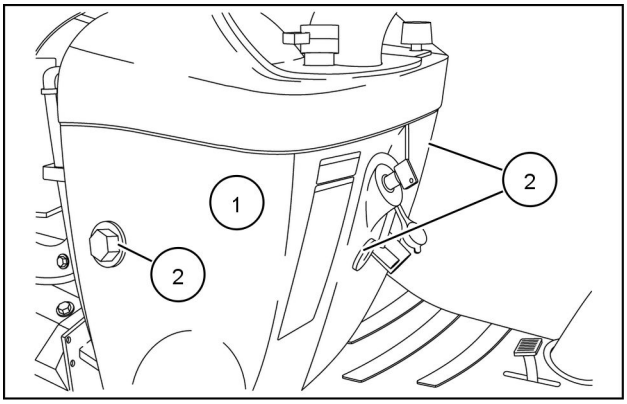
NOTICE: *Install Oil Seal with installation kit* ***380002703***

16. Connect the ignition switch electrical connections **(1)**.



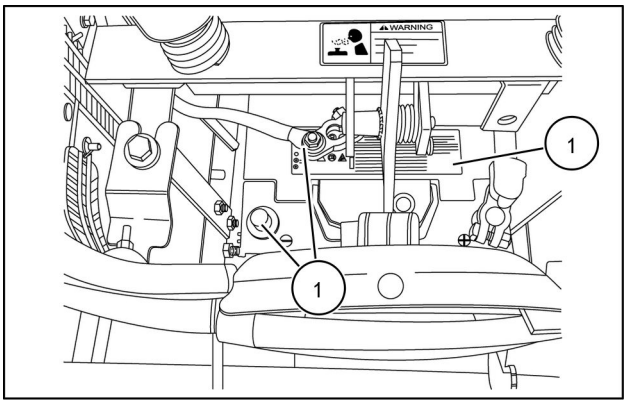
83114521 15

17. Install the lower cowling **(1)**, secure with three thumb screws **(2)**, left, center and right sides.



83114535 16

18. Connect the negative (-) cable to the negative (-) battery post **(1)** of the battery **(2)**.



83114520 17

9. With the test completed, remove gages and hoses and install test port plugs, torque to **30 N·m** (**22 lb ft**) MAXIMUM.

Hydrostatic drive - 29

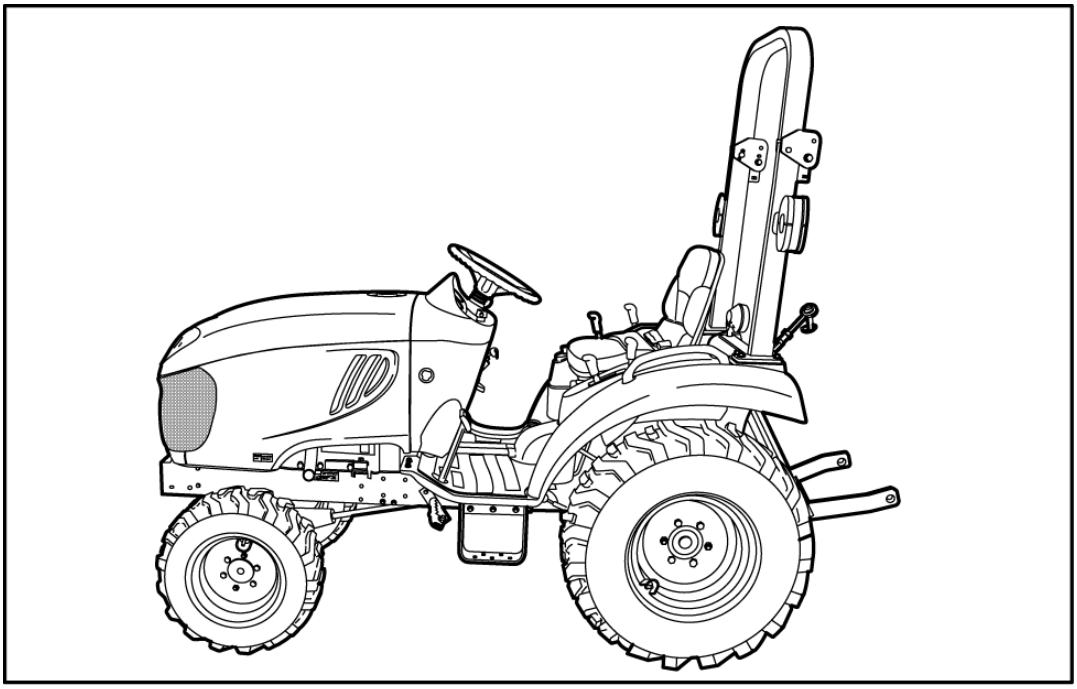
Reservoir, cooler, and lines - 204

Boomer 20
Boomer 25

NEW HOLLAND
AGRICULTURE

SERVICE MANUAL

Power Take-Off (PTO)



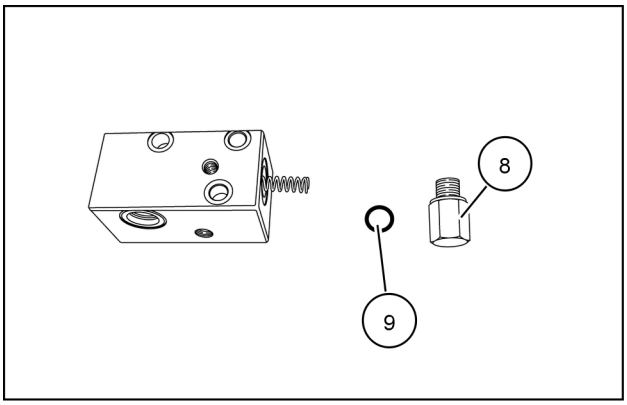
Boomer 20
Boomer 25

Power Take-Off (PTO) - 31

Rear electrohydraulic control - 104

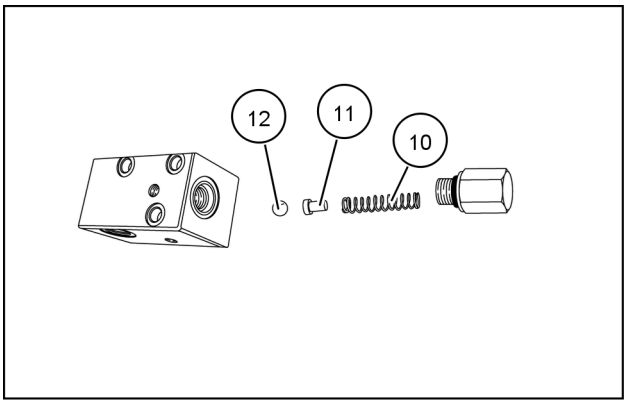
Boomer 20
Boomer 25

7. Remove relief valve plug **(8)** ,O-ring **(9)**.



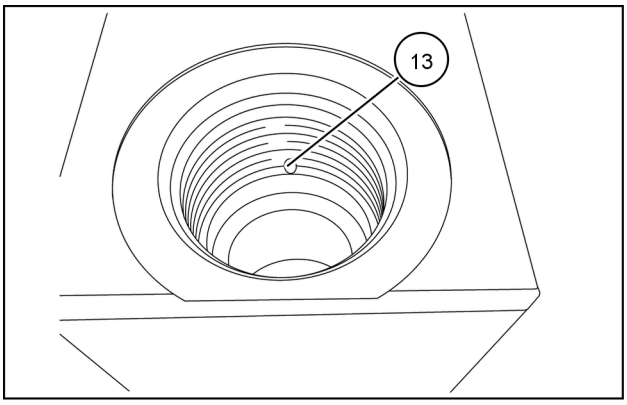
NHIL12CT00130AA 4

8. Remove spring **(10)**, poppet **(11)** and ball **(12)**.



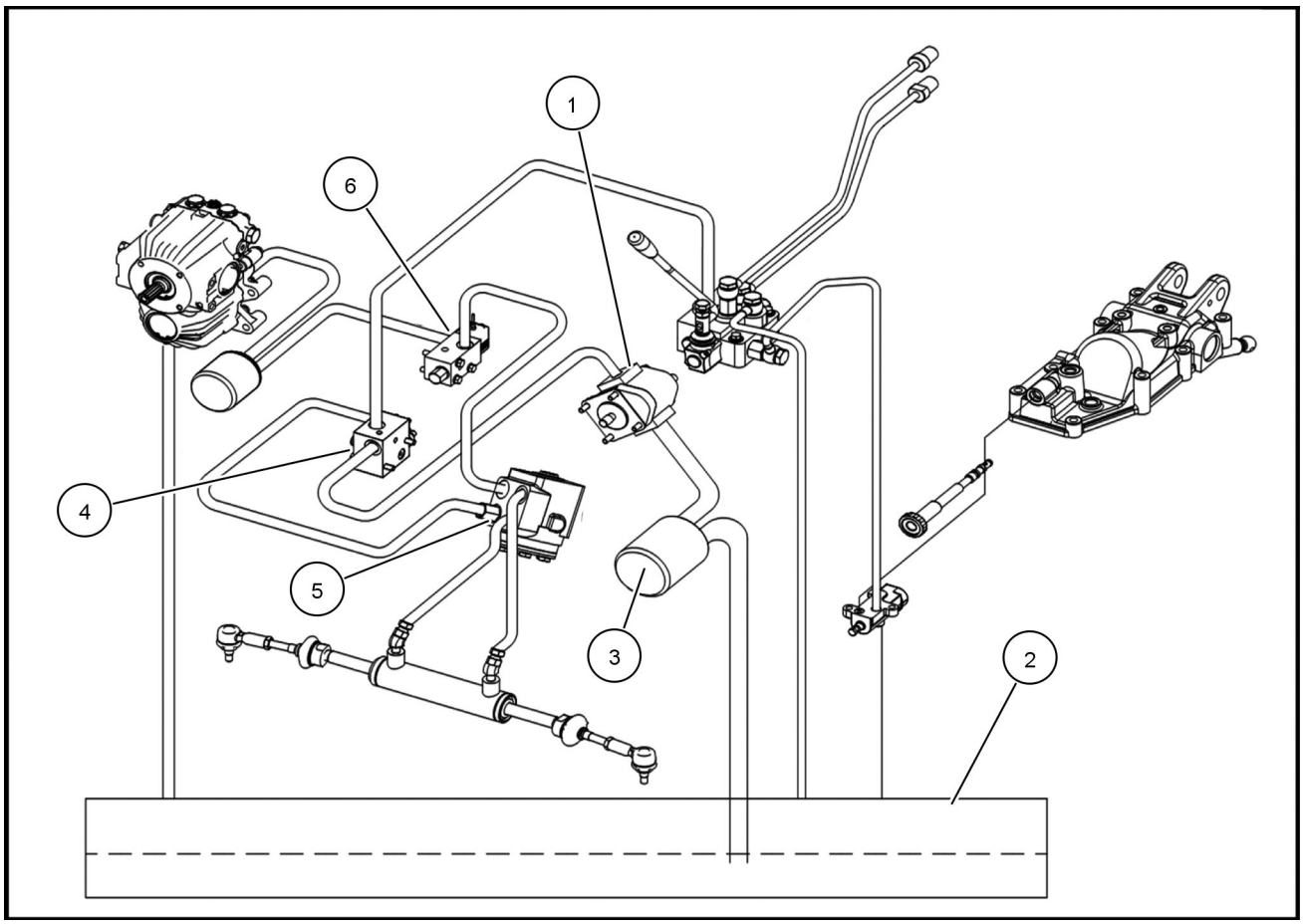
NHIL12CT00129AA 5

NOTE: *After complete disassembly of the solenoid valve, an internally machined fixed orifice is exposed in the solenoid valve port, just below the threads* ***(13)****.*



NHIL12CT00128AA 6

One-speed rear Power Take-Off (PTO) - Hydraulic schema

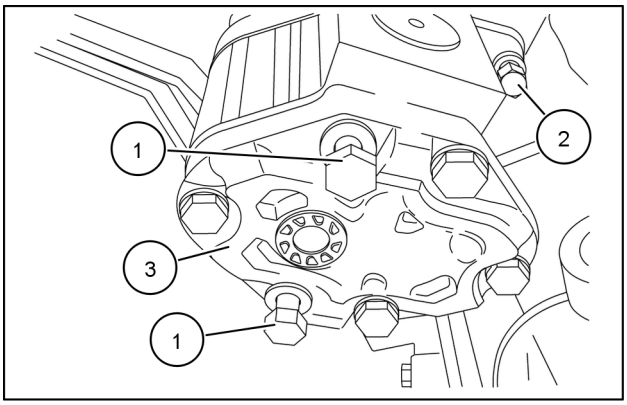


73118443 1

PTO hydraulic flow

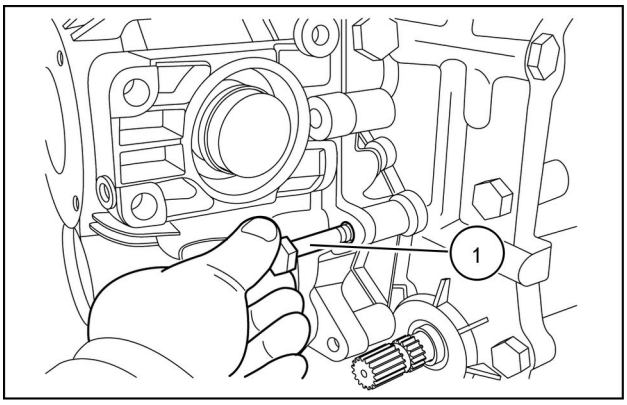
The main hydraulic pump **(1)** is powered by the engine and supplies pressurized hydraulic fluid from the transmission oil reservoir **(2)** through a filter **(3)**, the priority valve **(4)**, the power steering control valve **(5)** then to the PTO control valve **(6)**. When the solenoid valve on the PTO valve is electrically energized, pressurized hydraulic fluid is sent to the PTO clutch, and engages the PTO clutch.

6. Remove bolts **M8 x 1.25 (1)**, and two **M8** nuts **(2)** to remove the hydraulic pump **(3)**.



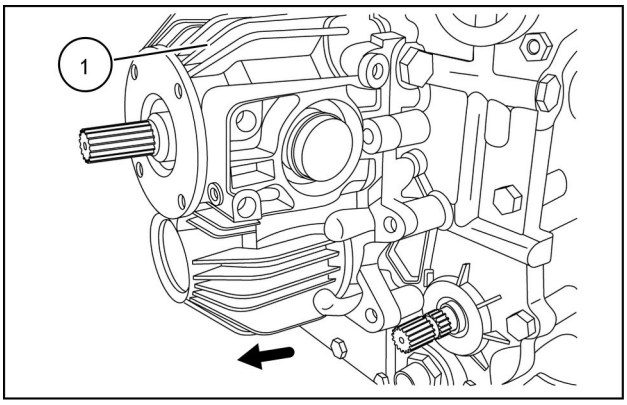
83114560 7

7. Remove the HST neutralizer linkage from the right side of the transmission.
8. Remove the four HST retaining bolts **(1)**.



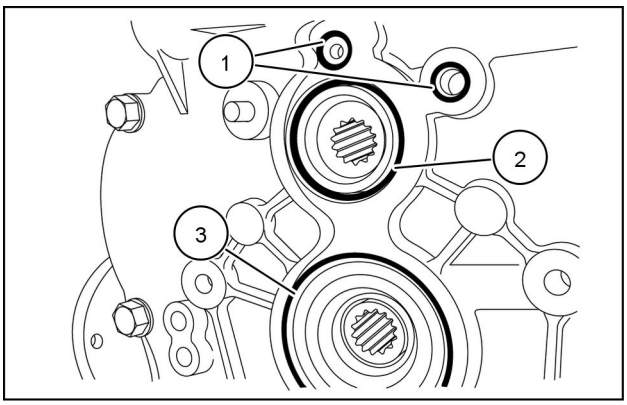
83114561 8

9. Use a prying tool to remove the HST **(1)** as a complete assembly.



83114562 9

10. Remove and inspect O rings **(1)**, **(2)** and **(3)**.



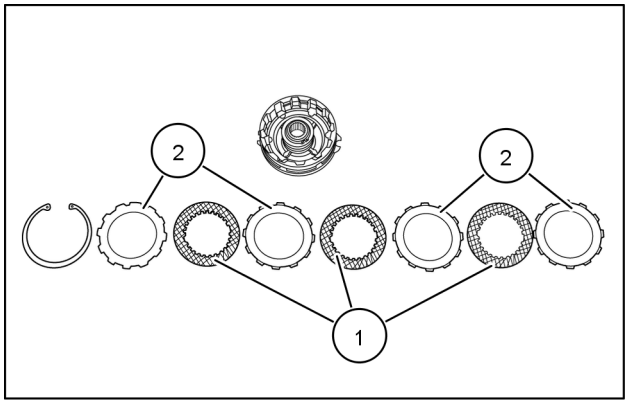
83114563 10

NOTICE: *Inspect the O rings, replace if necessary.*

Clutch Assemble

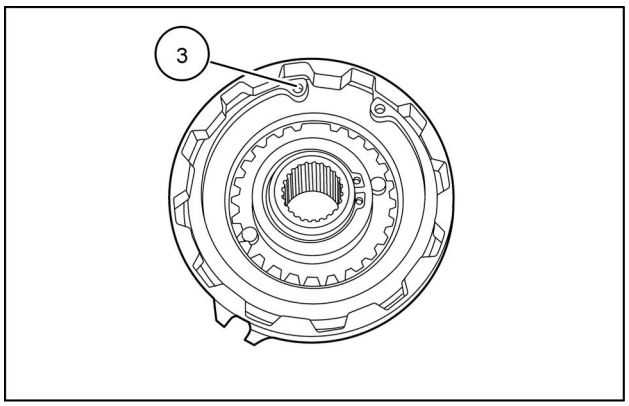
NOTICE: *Check for damage and wear on these components and replace if necessary.*

3. Install the three friction discs **(1)** and the four clutch plates **(2)** in the order shown.



NHIL12CT00238AA 4

4. Install the snap ring **(3)**.



NHIL12CT00239AA 5

Central Power Take-Off (PTO) - Disassemble

⚠ 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.

D0076A

⚠ DANGER

Heavy parts!
Support designated component(s) with adequate lifting equipment.
Failure to comply will result in death or serious injury.

D0018A

⚠ WARNING

Personal Protective Equipment (PPE) required.
When assembling, operating, or servicing the machine, wear protective clothing and PPE necessary for the particular procedure. Some PPE that may be necessary includes protective shoes, eye and/or face protection, hard hat, heavy gloves, filter mask, and hearing protection.
Failure to comply could result in death or serious injury.

W0353A

⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.
1. **Disengage all drives.**
2. **Engage parking brake.**
3. **Lower all attachments to the ground, or raise and engage all safety locks.**
4. **Shut off engine.**
5. **Remove key from key switch.**
6. **Switch off battery key, if installed.**
7. **Wait for all machine movement to stop.**

Failure to comply could result in death or serious injury.

W0047A

Brakes and controls - 33

Parking brake / Parking lock - 110

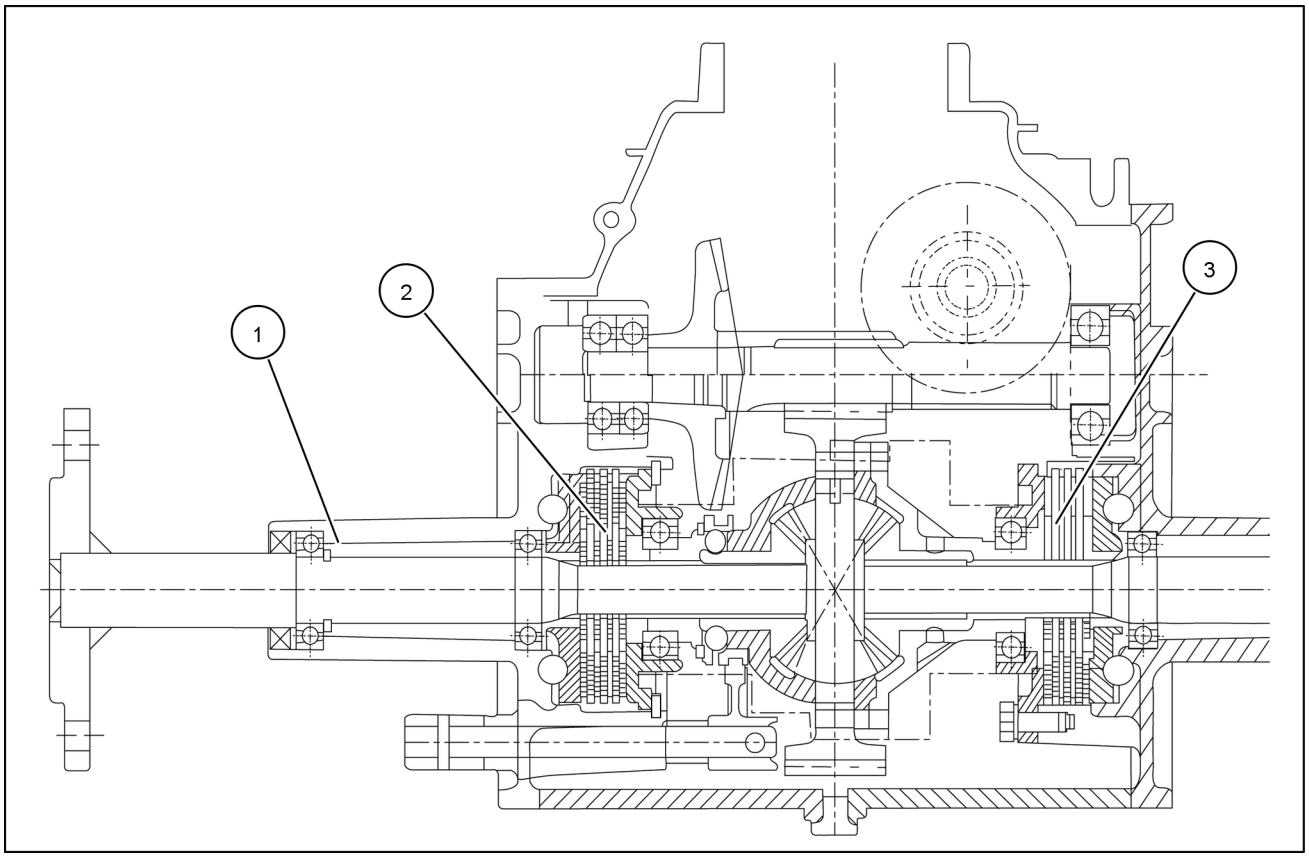
Boomer 20
Boomer 25

Brake Assembly

(Refer to figure **1**.)The brake assembly consists of brake assembly arms **(1)** and **(8)**, brake discs **(3)** and stator discs **(4)**.

An actuating assembly within each brake assembly consists of a cam plate **(5)** and steel balls **(7)**. The cam plates contain ramp pockets **(6)** in which the steel balls ride during the braking process. The cam plates hold the friction discs **(3)** and stator plates **(4)** in place transmit input from the brake assembly arms, **(1)** and **(8)** to the actuating assembly.

When the brake pedals are depressed, rotation of the cam plates relative to one another, force the steel balls to ride up the ramps, resulting in the stator discs moving apart. Upon moving apart, the cam plate force the brake discs to provide a braking action on the intermediate shaft.



83114586 2

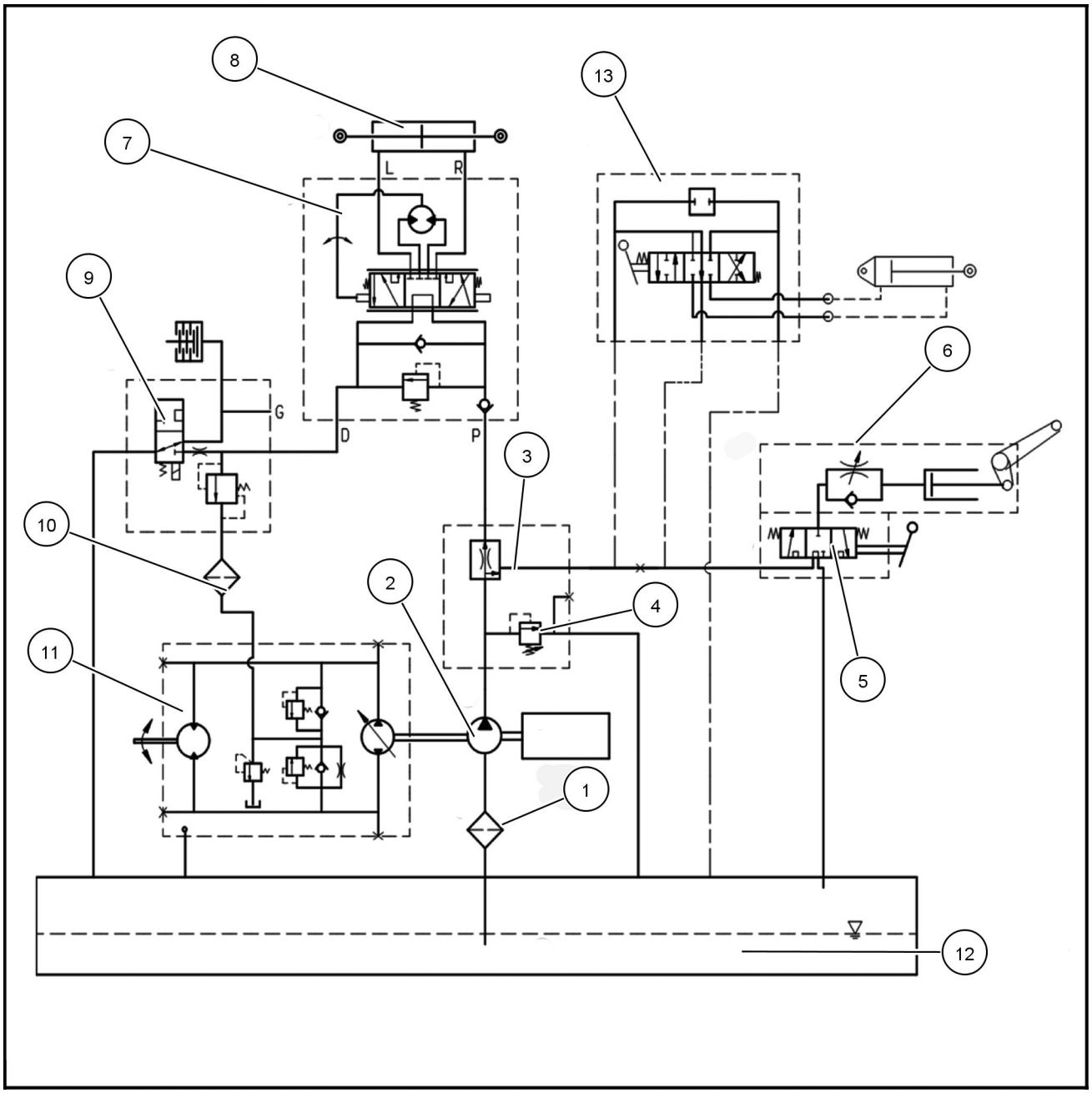
Final Drive and Brake Assembly

(1) Final Drive, Left **(2)** Brake Assembly, Left side **(3)** Brake Assembly, Right side

Mechanical service brakes - Troubleshooting

Problem	Possible Cause	Correction
Brake is Not Working or Only One Side is Working.	Pedal free play length is too long.	Adjust brake linkage.
	Free play length on both sides is different.	Adjust brake linkage.
	Abrasion to or Damage to brake lining.	Replace brake lining.
The Brake Pedal is Not Coming Back to the Original position.	Damaged return spring.	Replace the return spring.
	Lack of lubricant on the moving parts.	Remove all rust, and lubricate.

Hydraulic systems - Hydraulic schema

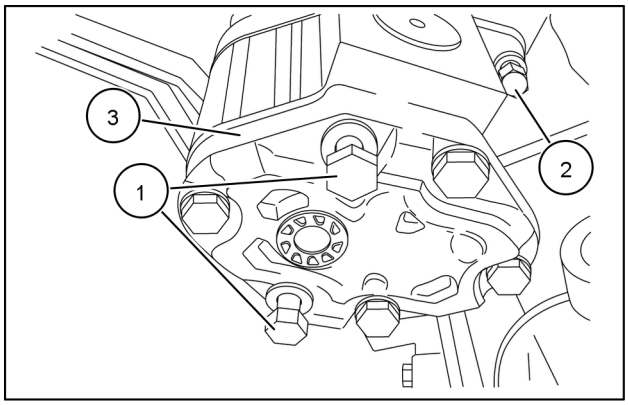


73118444 1

Hydraulic Schematic

(1) Hydraulic Suction Filter
(2) Pump
(3) Priority Valve
(4) Main Relief Valve
(5) HPL Valve
(6) Hydraulic Lift Housing
(7) Steering Valve
(8) Steering Cylinder
(9) Independent PTO Valve
(10) HST Filter
(11) HST Unit
(12) Oil sump
(13) Optional Rear Remote Valve

2. Remove two **M8 x 1.25** bolts **(1)** and two **M8** nuts **(2)** to remove the pump **(3)**.

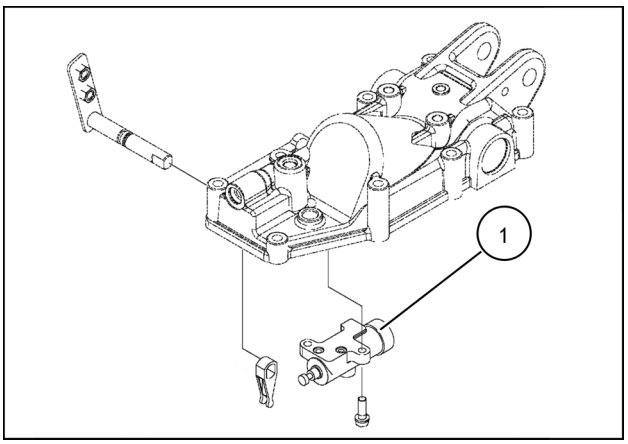


83114560 3

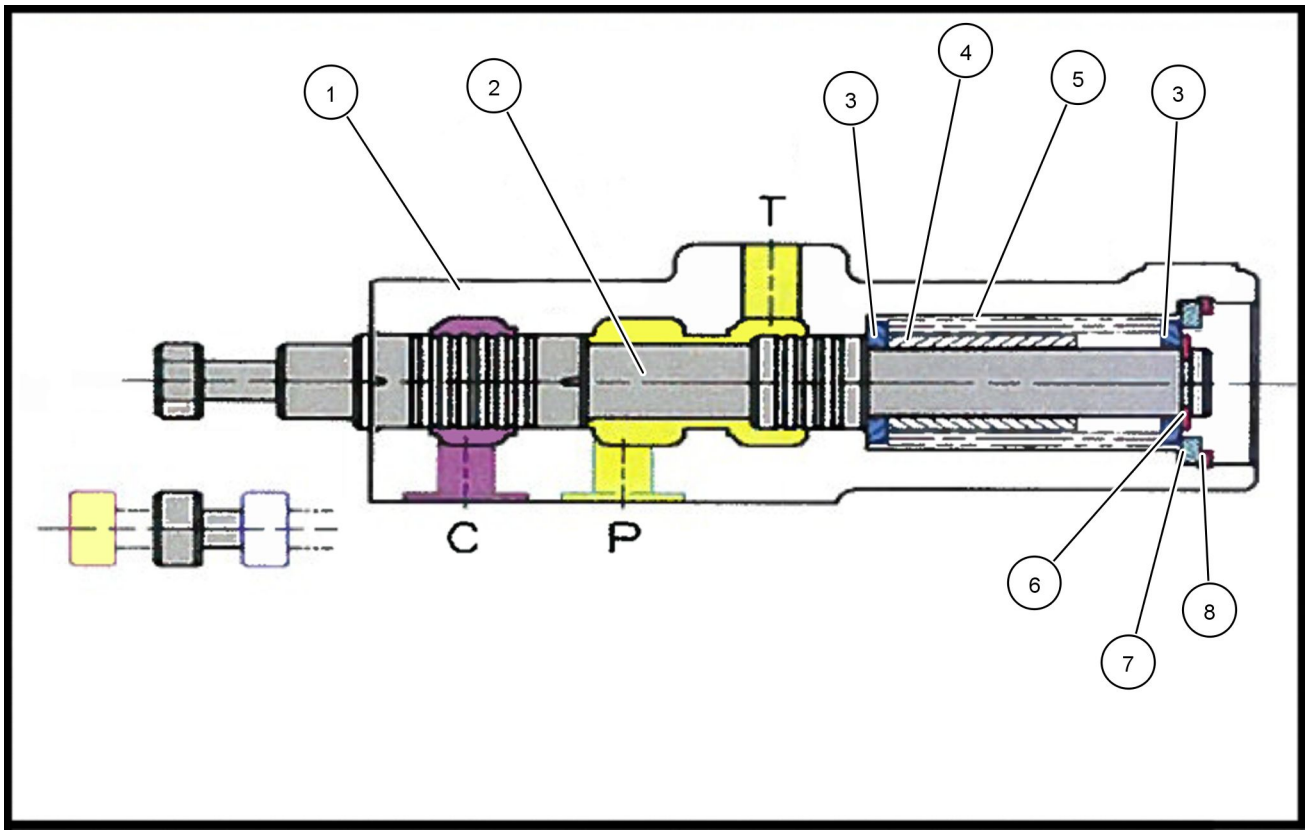
Next operation:
Fixed displacement pump - Install (35.104)

Hitch control valve - Static description

The HPL control valve **(1)** is located internally on the tractor, inside of the HPL top cover. The control valve directs oil flow to and from the HPL cylinder to allow the 3pt hitch to raise and lower.



73118482 1



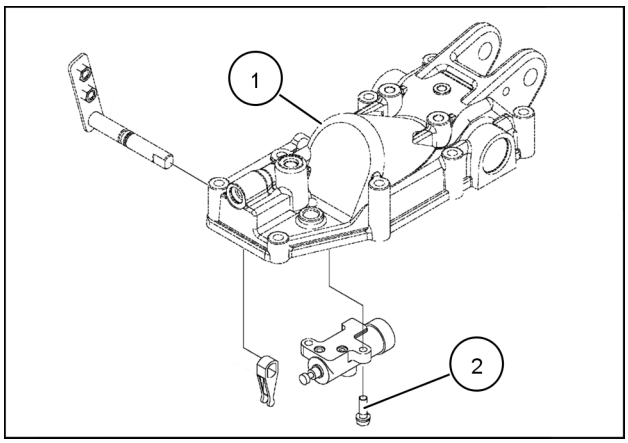
73118490 2

Control Valve Components

1. Body	**3.** Spring Retainer	**5.** Spring	**7.** Washer	**(C)** Cylinder circuit	**(T)** Tank Return Oil
2. Main Valve Spool	**4.** Spacer	**6.** Snap Ring, (E type)	**8.** Snap Ring, (C type)	**(P)** Pressure oil input from pump	

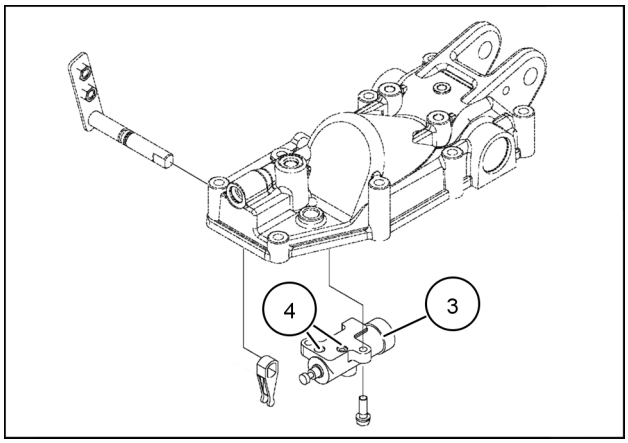
Hitch control valve - Remove

1. Lower 3pt hitch completely, to relieve all oil pressure in HPL system.
2. Remove HPL housing **(1)** from the transmission case.
3. Remove two **M8 x 1.25 x 25mm** bolts **(2)**



73118482 1

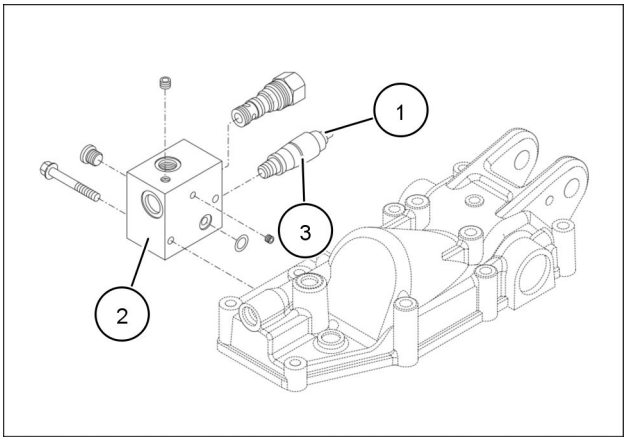
4. Remove control valve **(3)** from the HPL housing.
5. Verify the two O-rings **(4)** are present on the control valve and are not damaged.



73118482 2

Relief valve - Remove

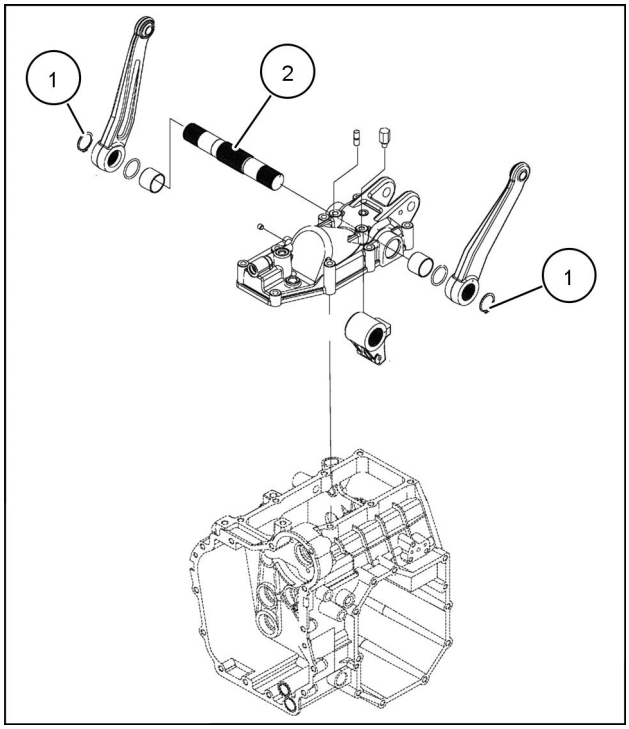
1. Lower the 3pt hitch completely, to relieve any oil in the lift cylinder.
2. Remove the relief valve **(1)** from the Priority Valve Block **(2)**, inspect O-ring **(3)** for damage.



73118487 1

Three-point hitch cylinder - Remove HPL Piston

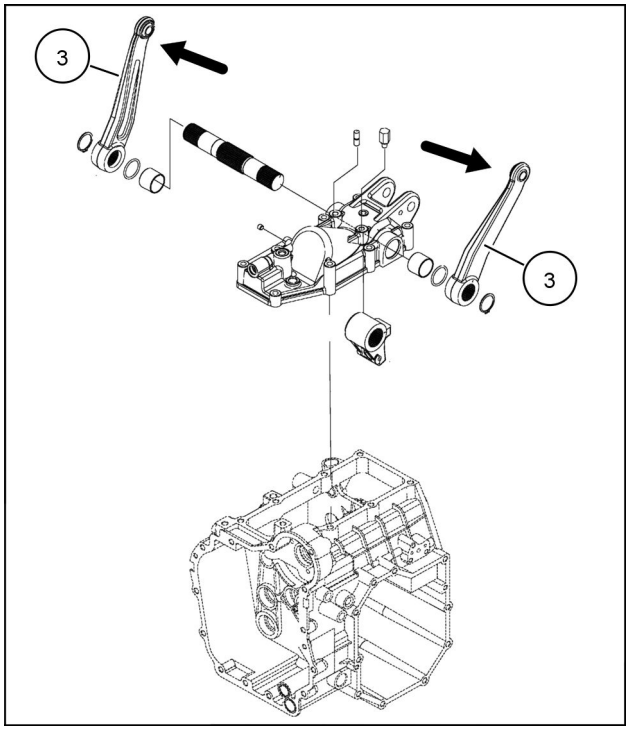
1. Remove HPL housing from tractor.
2. Remove snap rings **(1)** from both ends of hydraulic lift shaft **(2)**.



73118484 1

NOTE: *Use a plastic mallet to assist in arm removal.*

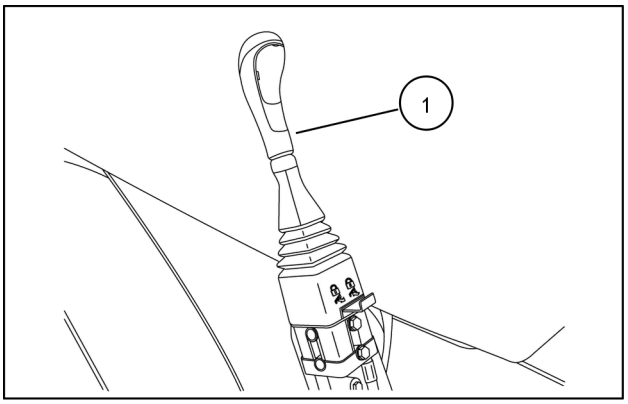
3. Remove lift arms **(3)**.



73118484 2

Remote control valve Open center mechanical remote valve - Static description Front two spool

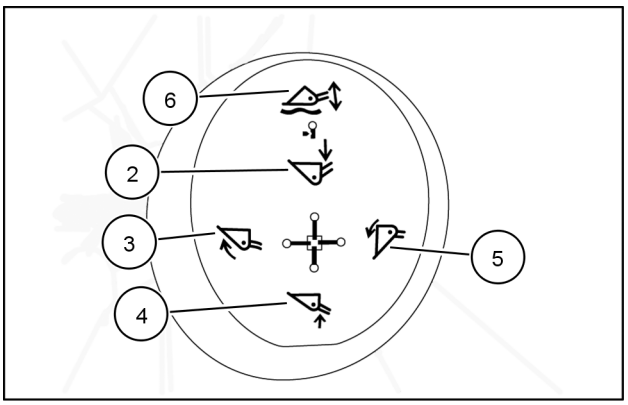
The two-spool hydraulic valve control lever **(1)** is mounted to the right hand side fender. This valve is used mainly for front end loader operation, but may also be used to operate other front mounted implements.



83115268 1

NOTE: *Instructional decal for two spool valve is installed on top of the valve control lever.*

To operate the two-spool valve, move the control lever **(1)** in any of the four directions.
Release the control lever to stop the cylinder in any position, the lever automatically returns to neutral.



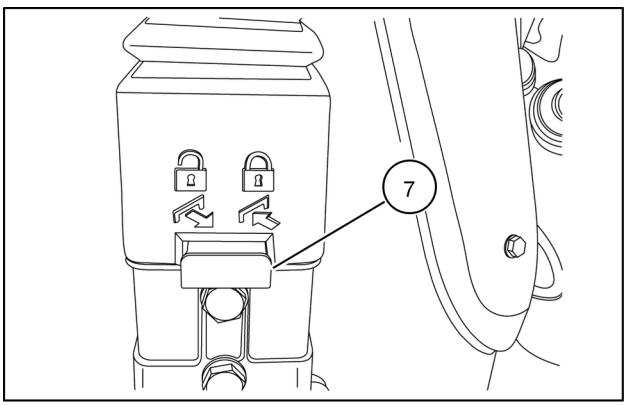
83115269 2

- Move the control lever forward to lower the loader/ retract cylinder **(2)**.
- Move the control lever to the left to lift the bucket/ retract cylinder **(3)**.
- Move the control lever rearward to raise the loader/ extend cylinder **(4)**.
- Move the control lever to the right to dump bucket/ extend cylinder **(5)**.
- Move the control lever fully forward to "FLOAT" the bucket **(6)** which allows a cylinder to extend or retract freely.

NOTE: *Do not use the "FLOAT" position if the loader is raised to its highest position.*

NOTE: *If you move the control lever diagonally the loader and bucket will operate at the same time.*

The hydraulic valve control is equipped with a mechanic lock **(7)**. Push in on the lock tab to engage the lock mechanism. When the valve lock is engaged, the valve control lever is locked in the neutral position. To disengage lock, pull out on the lock tab.



83115267 3

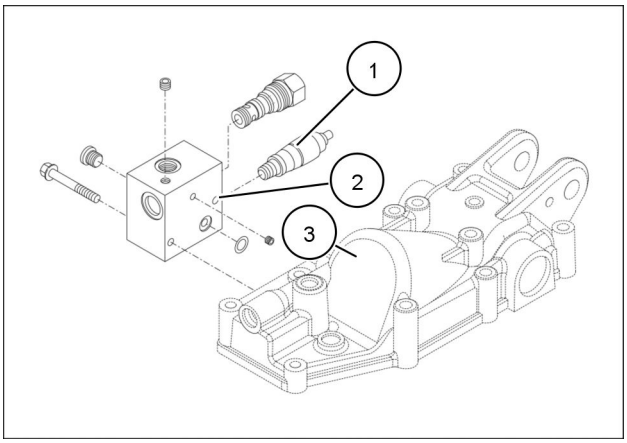
Hydraulic systems - 35

Reservoir, cooler, and filters - 300

Boomer 20
Boomer 25

Main relief valve - Install

The relief valve **(1)** is located in the Priority Valve Block **(2)**, to the right of the HPL **(3)**.

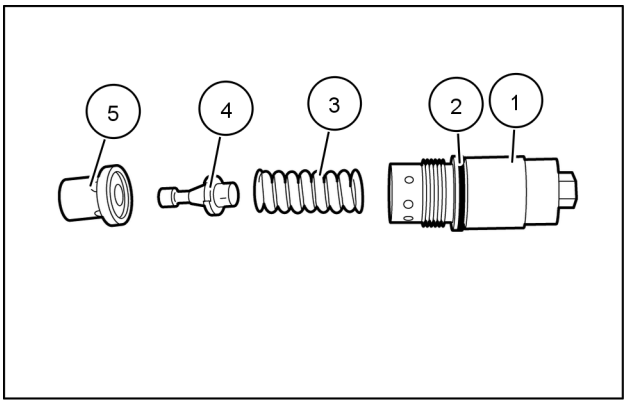


73118487 1

Assembly and Install

NOTICE: *Inspect and replace if necessary, all parts.*

1. Account for these parts :
   - Valve Body **(1)**
   - O-ring **(2)**
   - Spring **(3)**
   - Poppet **(4)**
   - Valve Seat **(5)**



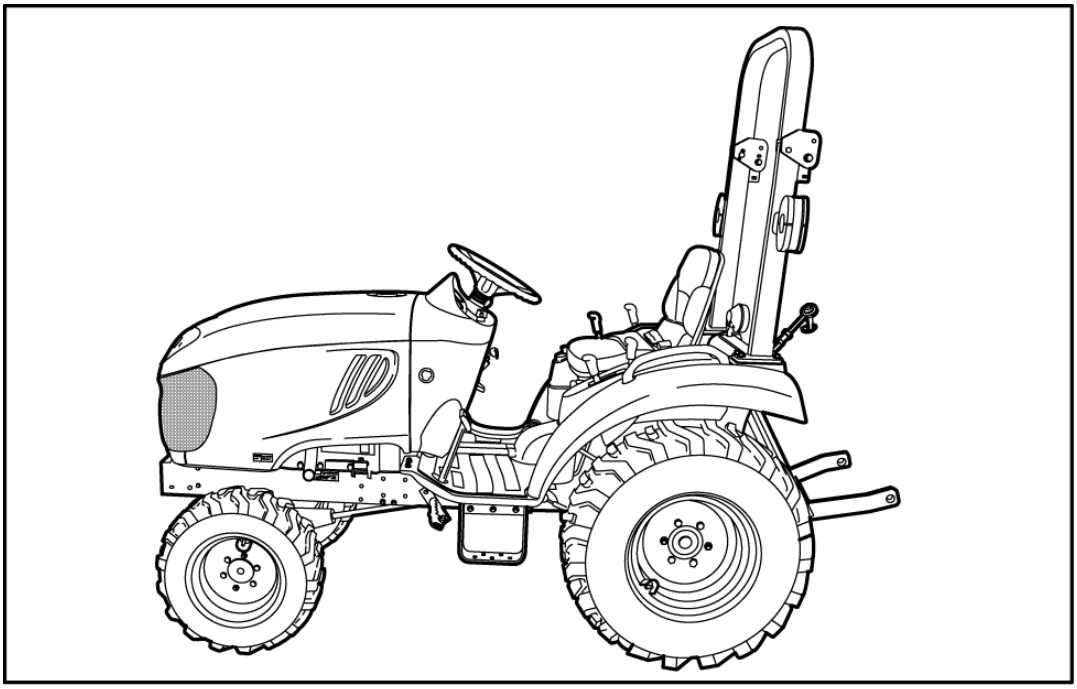
83114519 2

2. Assemble as shown in figure **2**.
3. Turn valve body clockwise to install in Priority Valve Block.

NOTE: *The Relief Valve is set for* ***14707 kPa*** *(****2133 psi****)*

SERVICE MANUAL

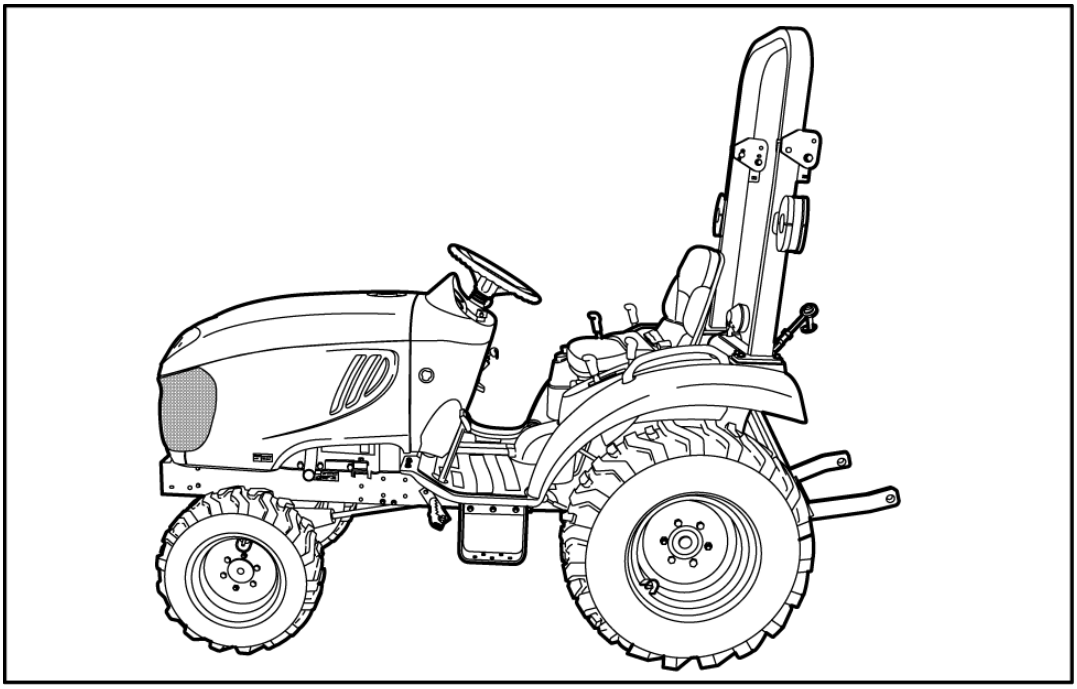
Hitches, drawbars, and implement couplings



Boomer 20
Boomer 25

SERVICE MANUAL

Steering



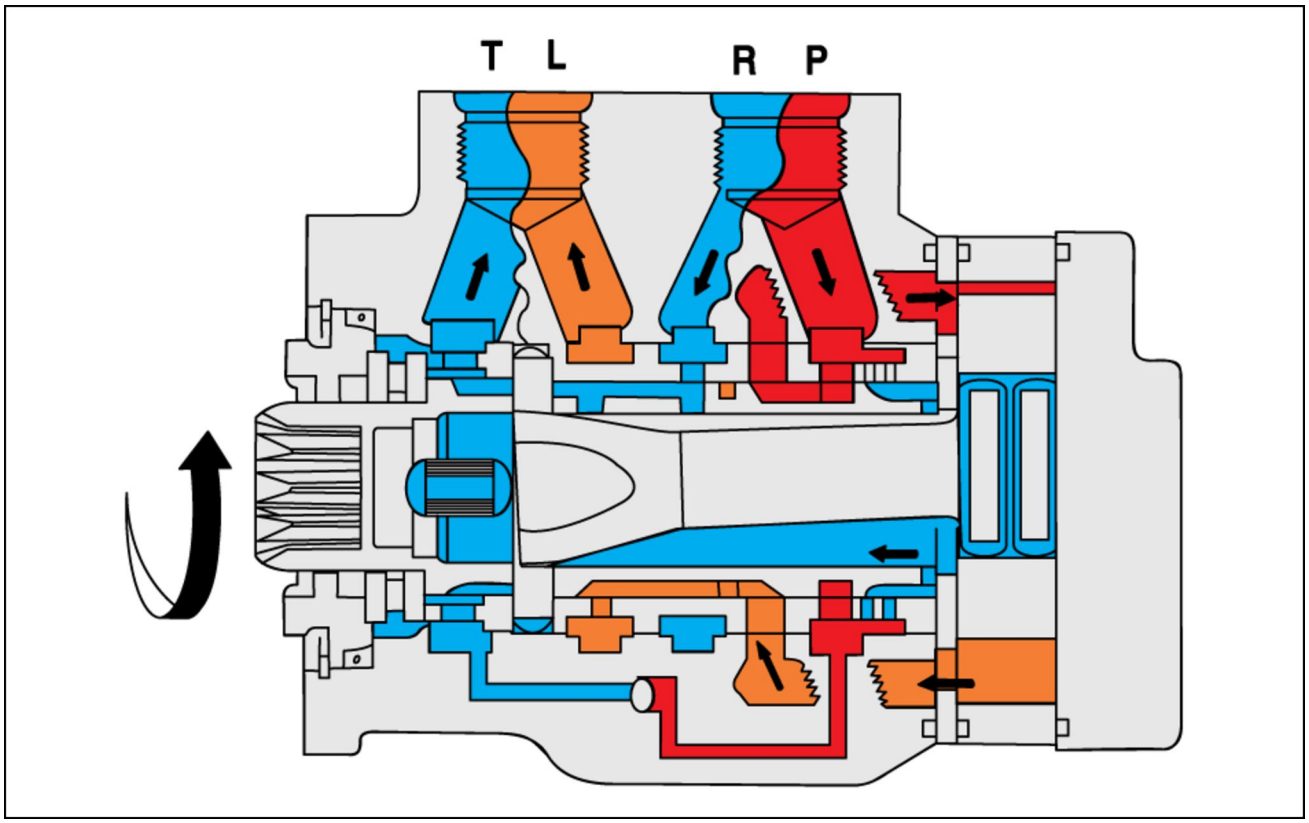
Boomer 20
Boomer 25

Steering - 41

Hydraulic control components - 200

Boomer 20
Boomer 25

Steering to the left



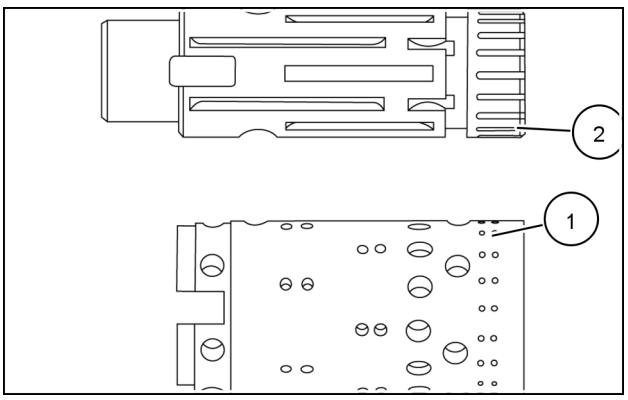
93102638 9

Steering to the left

(T) - Tank
(L) - Left steer port
(R) - Right steer port
(P) - Pump discharge

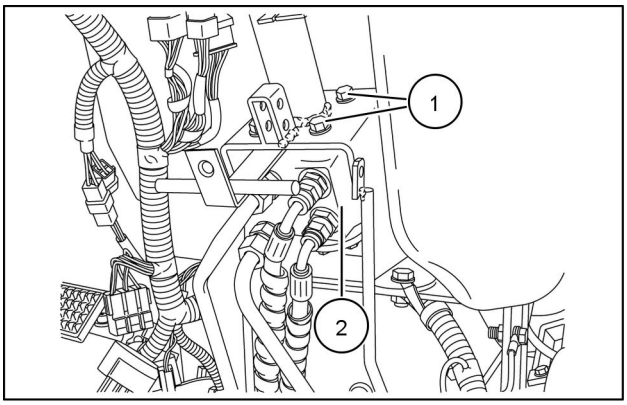
Pressurized oil from pump
Oil from rotor
Discharge
Suction
Suction or discharge
Neutral

While steering to the left, port **(1)** and groove **(2)** cross each other. In this condition, the oil returning to the sump is interrupted.

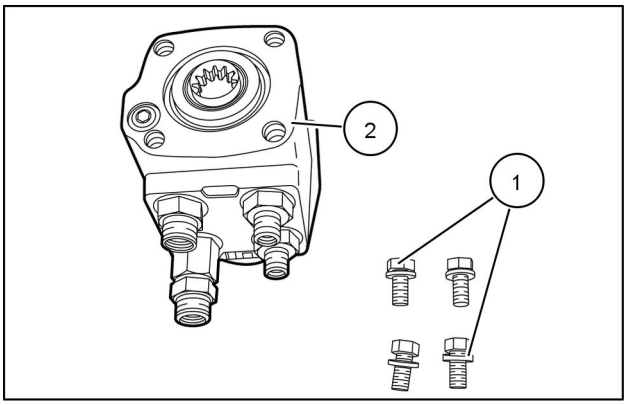


93102640 10

15. Remove the four **M10 x 20mm** bolts **(1)**, and remove valve **(2)**.

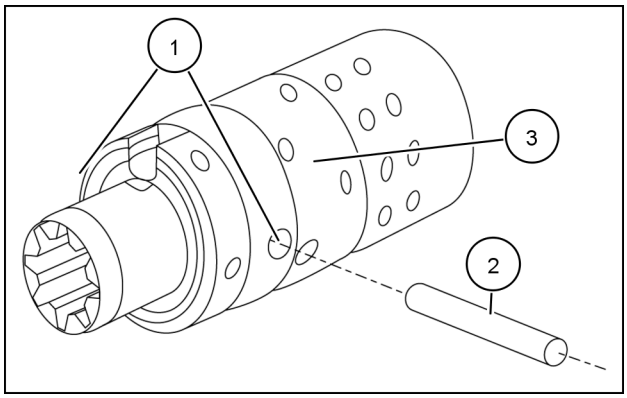


83114533 14



83114524 15

8. Align the holes, **(1)** for the pin, **(2)** in the spool and sleeve **(3)** and insert the pin until it is flush with the outside of the sleeve.

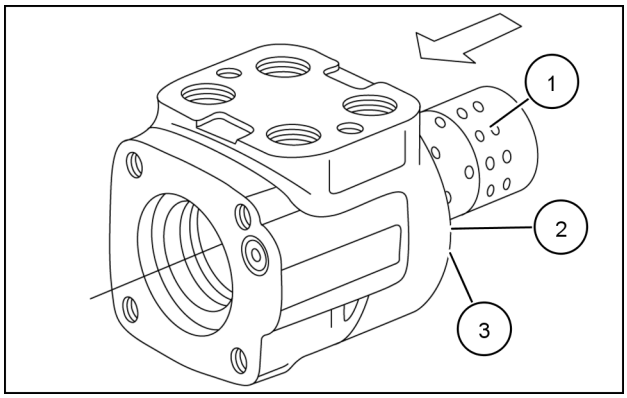


93102657 6

NOTICE: *When installing the assembly, insure that the pin* ***(2)*** *does not fall out of the hole.*

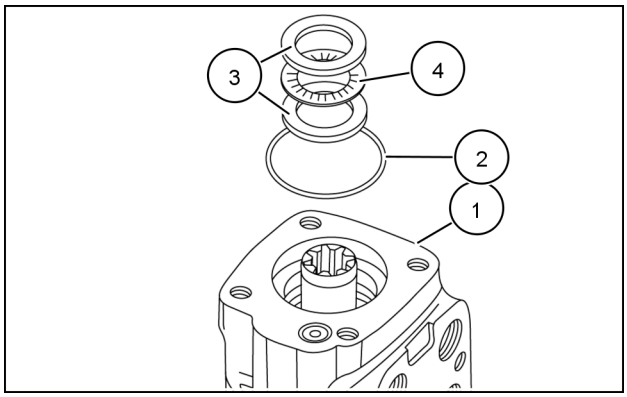
9. Insert the spool and sleeve assembly **(1)** to the rear of the valve housing **(2)** until flush with the surface of valve body **(3)**.

10. Rotate the spool and sleeve assembly in the valve body to insure smooth operation.



93102658 7

11. Place the housing **(1)** on a flat surface and install the O-ring **(2)**. Install two bearing races **(3)** and thrust bearing **(4)**..

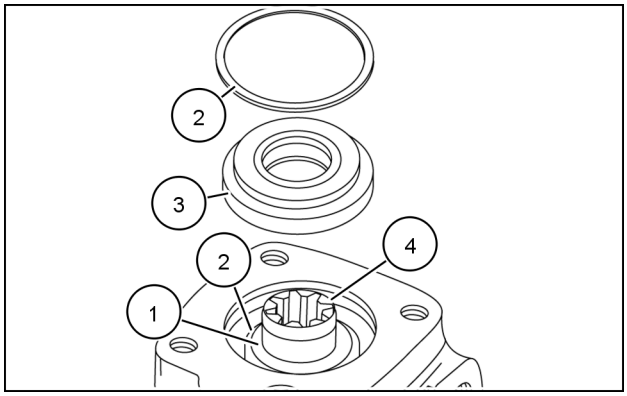


93102659 8

12. Install the dust seal **(1)** in the seal retainer **(2)**.

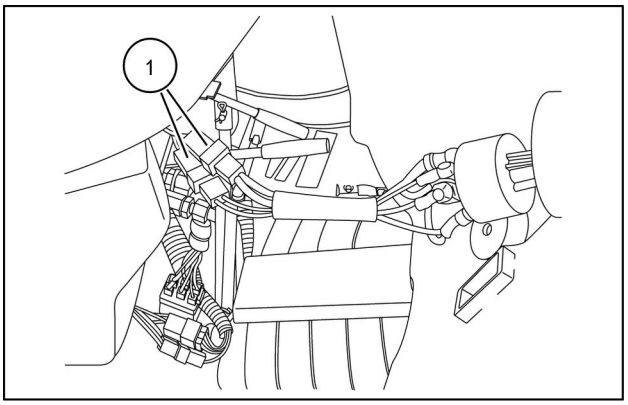
13. Install oil seal **(3)** in seal retainer **(2)** by pushing with a finger.

14. Turn seal retainer **(2)** and press onto spool **(4)**. Tapping lightly with a rubber hammer, will make the seal retainer **(2)** flush with the valve body. Make sure contact is made between the seal and race.



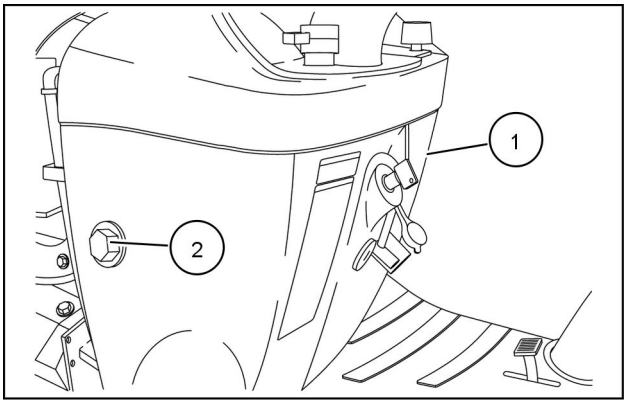
93102660 9

14. Connect the ignition switch connectors **(1)**..



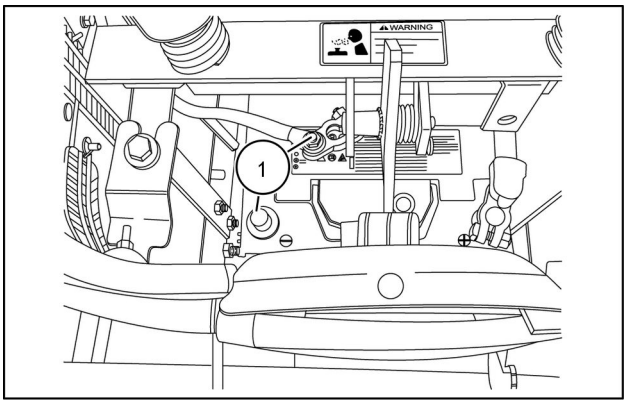
83114521 14

15. Secure the lower cowling **(1)** with three thumb screws **(2)**.



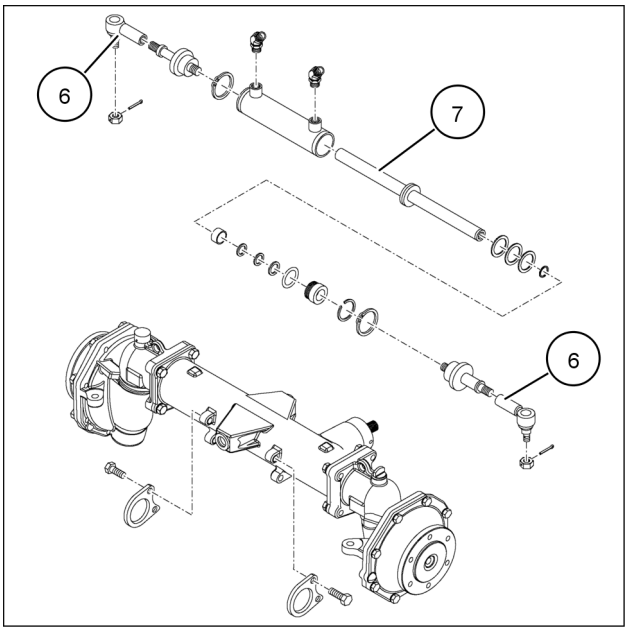
83114535 15

16. Reconnect the battery negative post cable **(1)** if ready to do so.



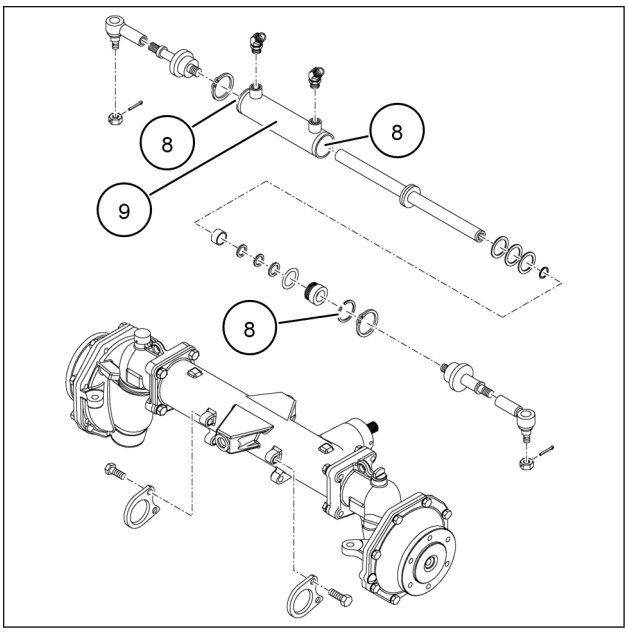
83114520 16

3. Remove tie rod ends **(6)**.The tie rod ends will turn off of the cylinder rod **(7)**.



73118453 4

4. Remove the wire ring **(8)** from each end of the cylinder **(9)**.



73118453 5

Power steering cylinder - Pressure test

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

⚠ WARNING

Escaping fluid!
Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.
Failure to comply could result in death or serious injury.

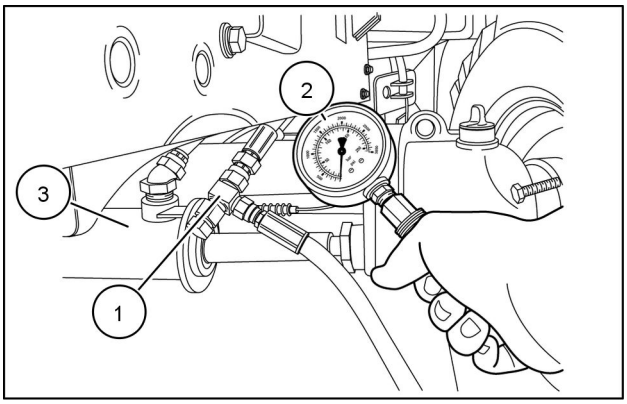
W0178A

NOTICE: *Do not hold the wheels in the full left or full right position for more than ten seconds. Oil exiting the relief valve heats up rapidly, which can cause damage to internal seals and components.*

NOTICE: *During the following procedures be observant for any leakage in the system.*

Steering cylinder operation and leak by test

1. Install a “Tee” fitting **(1)** (Special Tool number : **NH01412** and a **20684 kPa** (**3000 psi**) gauge **(2)**, in the hydraulic line that supplies the steering cylinder **(3)**.

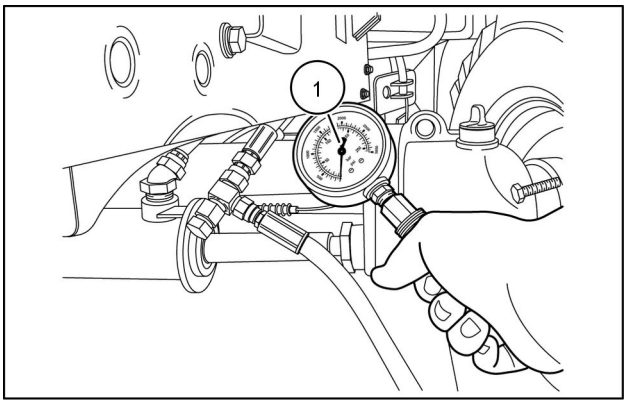


83118725 1

2. Start the tractor engine.

NOTE: *With NO steering wheel movement the pressure gauge will indicate zero pounds per square inch (psi).*

3. The gauge **(1)** indicates **0 kPa** (**0 psi**).



83118725 2

Front wheels - Remove

⚠ WARNING

Explosion hazard!
When inflating tires, use a clip-on air chuck with a gauge, remote valve, and hose long enough to allow you to stand to one side and NOT in front of or over the wheel assembly. Keep others out of the DANGER AREA. Never inflate a tire beyond the maximum allowable pressure printed on the tire.
Failure to comply could result in death or serious injury.

W0059A

⚠ WARNING

Explosion hazard!
Tires must be replaced by skilled personnel with the proper tools and technical knowledge. Unskilled personnel replacing wheels or tires could result in serious physical injuries, tire damage, and/or wheel distortion. Always have a qualified tire mechanic service wheels and tires.
Failure to comply could result in death or serious injury.

W0171A

⚠ WARNING

Crushing hazard!
Before performing service under the machine, park the machine on a level surface, engage the parking brake, and stop the engine. Put blocks at the front and rear of the tires.
Failure to comply could result in death or serious injury.

W0350A

⚠ WARNING

Roll-over hazard!
Always try to park the machine on firm level ground. Avoid parking on slopes. Block the wheels in both directions.
Failure to comply could result in death or serious injury.

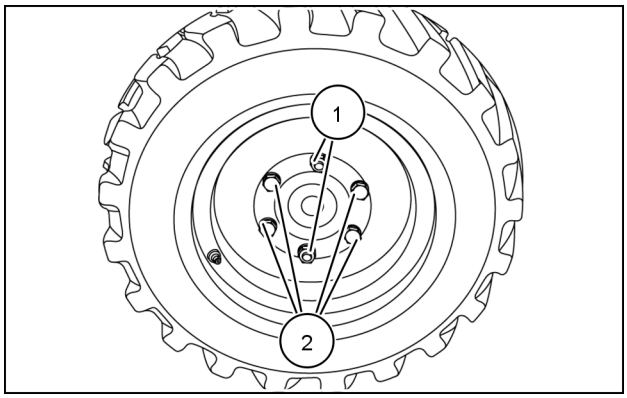
W0242A

⚠ WARNING

Heavy parts!
The wheels are very heavy. Handle with care. Make sure that the wheels, when stored, cannot fall over and cause injury.
Failure to comply could result in death or serious injury.

W0403A

1. Lift tractor at appropriate side with hydraulic jack.
2. Use appropriate jack stands, or lifting device.
3. Remove four bolts **12x30 mm (2)**.
4. Remove two **12 mm** nuts and lock washers **(1)**.

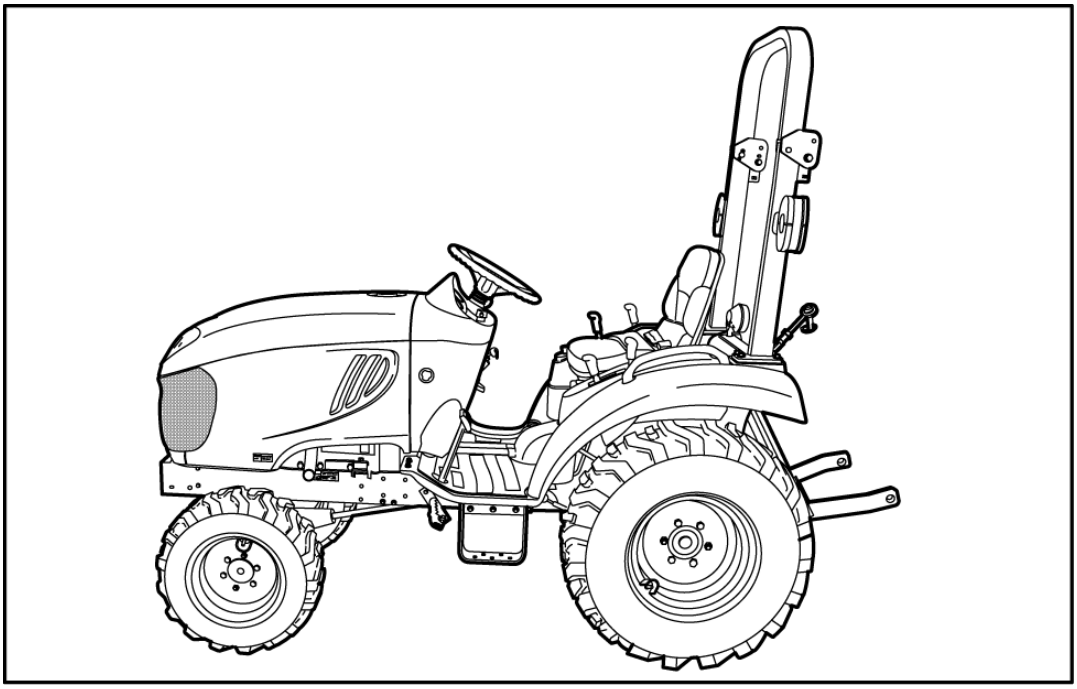


93100874 1

NEW HOLLAND
AGRICULTURE

SERVICE MANUAL

Electrical systems



Boomer 20
Boomer 25

Fuel shutoff solenoid - Troubleshooting Safe operation circuit (operator) present

NOTE: *See* ***Electrical system - Electrical schema - Safe operation, operator present (55.100)***

Problem	Possible Cause	Correction
Tractor will not remain running with operator present in seat	Faulty seat switch	Test switch, replace if necessary
	Blown #1 10-amp fuse	Replace 10-amp fuse
	Blown #2 10-amp fuse	Replace 10-amp fuse
	Faulty safety controller	Test controller, replace if necessary
	Faulty fuel shut off solenoid	Test solenoid, replace if necessary
	Improper ground	Check ground location, for clean contact area

Fuel shutoff solenoid - Troubleshooting Safe operation circuit (operator not present)

NOTE: Wire harnesses - Electrical schema - Safe operation, operator not present (55.100)

Problem	Possible Cause	Correction
Tractor will not remain running with operator not present	Faulty HST neutral switch	Test switch, replace if necessary
	Faulty mid PTO switch	Test switch, replace if necessary
	Blown #1 10-amp fuse	Replace 10-amp fuse
	Blown #2 10-amp fuse	Replace 10-amp fuse
	Faulty safety controller	Test controller, replace if necessary
	Faulty fuel shut off solenoid	Test solenoid, replace if necessary
	Improper ground	Check ground location, for clean contact area

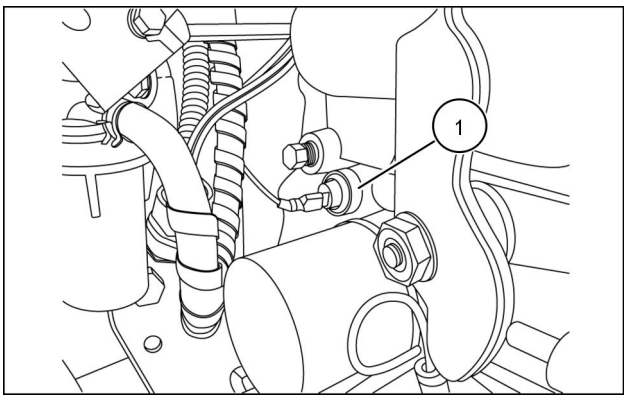
Electrical systems - 55

Engine cooling system - 012

Boomer 20
Boomer 25

Engine oil pressure sensor - Static description - Switch

The engine oil pressure switch **(1)** is located on the right-hand side of the engine block, near the engine oil filter. The oil pressure switch closes when engine oil pressure is **41 kPa** (**6 psi**) or less. When the switch closes, this completes the circuit for the engine oil pressure warning light, located in the instrument panel to illuminate, warning the operator of low engine oil pressure.

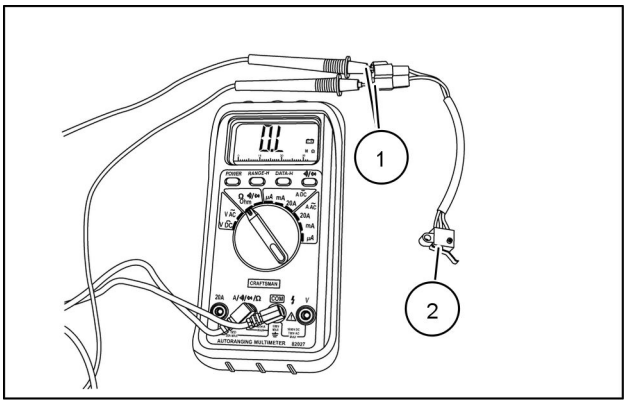


93105592 1

Parking brake electrical system - Test - Park brake switch

Prior operation:
Parking brake electrical system - Remove - Park brake switch (55.031)

1. Use an ohmmeter to test for continuity of the switch terminals **(1)**.



NHIL12CT00080AA 1

2. With the switch plunger **(2)** extended, there should not be continuity across the switch terminals.
3. With the switch plunger **(2)** in the retracted position, continuity should exist across the terminals of the switch.
4. If test results are not as described, switch is faulty and needs to be replaced.

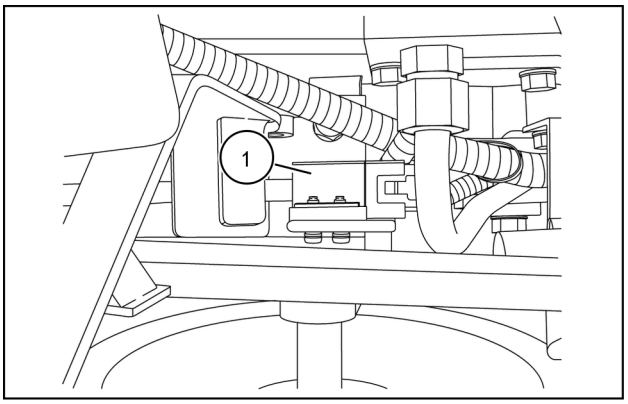
Next operation:
Parking brake electrical system - Install - Park brake switch (55.031)

Power Take-Off (PTO) speed sensor - Service instruction - Safety Switch

Prior operation:

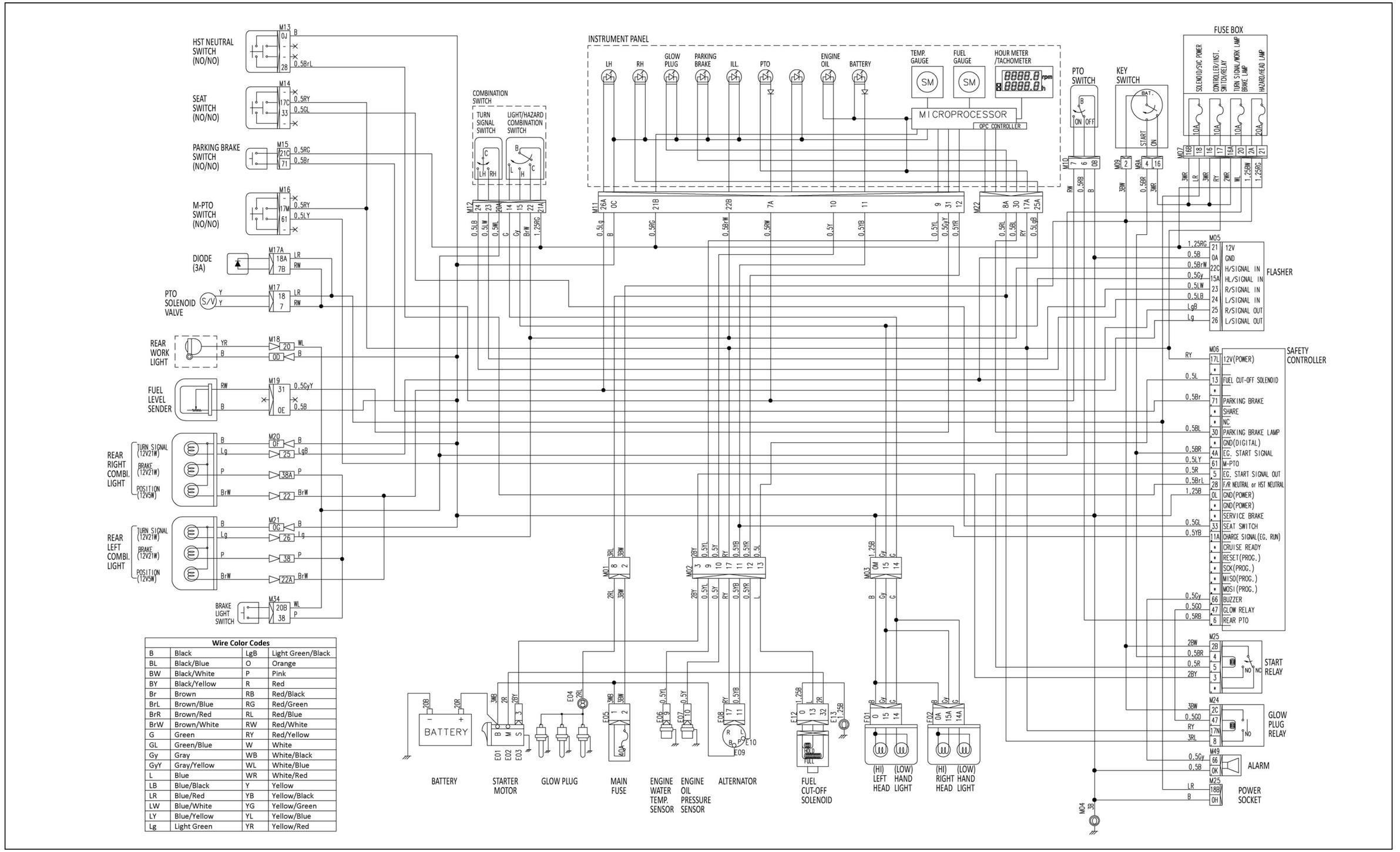
Description

The Mid PTO safety switch **(1)** is located on the right - hand side of the operator's platform, between the chassis and the operator's seat, to the inside of the rear fender. The Mid PTO switch is part of the tractor safety start system. The PTO selection lever has to be in the "Rear" PTO only position, for the tractor to start. The tractor will shut down without the operator present and the PTO selection lever is in the "Mid" or "Mid/Rear" positions. When the PTO selection lever is in the "Rear" only position the switch plunger is retracteded and the switch contacts are closed.



83118779 1

Next operation:
Power Take-Off (PTO) speed sensor - Remove - Safety Switch (55.048)
Next operation:
Power Take-Off (PTO) speed sensor - Test - Safety Switch (55.048)
Next operation:
Power Take-Off (PTO) speed sensor - Install - Safety Switch (55.048)



Wire Color Codes			
B	Black	LgB	Light Green/Black
BL	Black/Blue	O	Orange
BW	Black/White	P	Pink
BY	Black/Yellow	R	Red
Br	Brown	RB	Red/Black
BrL	Brown/Blue	RG	Red/Green
BrR	Brown/Red	RL	Red/Blue
BrW	Brown/White	RW	Red/White
G	Green	RY	Red/Yellow
GL	Green/Blue	W	White
Gy	Gray	WB	White/Black
GyY	Gray/Yellow	WL	White/Blue
L	Blue	WR	White/Red
LB	Blue/Black	Y	Yellow
LR	Blue/Red	YB	Yellow/Black
LW	Blue/White	YG	Yellow/Green
LY	Blue/Yellow	YL	Yellow/Blue
Lg	Light Green	YR	Yellow/Red

NHIL11CT00146JA 1

1. Current starts at the battery and flows through the positive (+) battery cable to the engine starter motor.
2. From the starter motor, current flows through the 40-amp main fuse and to the main harness connector. From the connector the current flows to a wire splice that sends current into two directions:

   To the "Battery" terminal of the key switch
   To terminal "2C" of the Glow Plug relay (switch side of relay)
3. When the key switch is placed in the "ON" position, current is transferred from the "BATTERY" to the "ON" terminal of the key switch.

"ON" terminal of key switch

1. Current flows from the "ON" terminal of the key switch to the fuse panel bussbar, from the bussbar current travels through:

   Fuse #2 - 10 amp

Fuse functions

1. The #2, 10 amp fuse, sends current two directions:

   Terminal "17L" of the safety controller (12V input power input)
   Terminal "17N" of the glow plug relay (coil side of relay)

Safety controller functions

1. With current supplied to terminal "17L" and ground source provided to terminal "OL" the safety controller is energized.
2. Terminal "47"of the safety controller supplies a ground source to terminal "47" of the glow plug relay (coil side of relay) and the instrument panel. The safety controller will supply this ground source for approximately eight seconds.

Relays operation

The glow plug relay coil is energized when current is supplied to terminal "17N" by the #2 10-amp fuse and the ground source is supplied to terminal "47" by the safety controller. When the relay is energized the relay latches terminals "2C" and "8". Terminal "8' sends current to the glow plugs and glow plug indicator light of the instrument panel. The glow plug relay will remain energized for approximately eight seconds, which in this time frame, the indicator light will remain illuminated and the glow plugs will generate heat. When the indicator light stops illuminating the current to the glow plugs also stops.

See: **Glow plug system - Troubleshooting (55.202)**.

1. Current starts at the battery and flows through the positive (+) battery cable to the engine starter motor.
2. From the starter motor, current flows through the 40-amp main fuse and to the main harness connector. From the connector the current flows to the "BATTERY" terminal of the key switch.
3. When the key switch is placed in the "ON" position, current is transferred from the "BATTERY" to the "ON" terminal of the key switch.

"ON" terminal of key switch

1. Current flows from the "ON" terminal of the key switch to the fuse panel bussbar, from the bussbar current travels through: · Fuse #3 - 10 amp

Fuse functions

1. The #3, 10amp fuse, sends current to terminal "20B" of the brake light switch.

Brake light switch function

1. When the brake pedal is depressed, the brake light switch closes, sending current from terminal “38” of the switch to the two rear brake lights.

Ground Sources

1. The brake lights ground source is located on the right rear side of the engine fire wall.

1. Current starts at the battery and flows through the positive (+) battery cable to the engine starter motor.
2. From the starter motor, current flows through the 40-amp main fuse and to the main harness connector. From the connector the current flows to the "BATTERY" terminal of the key switch.
3. When the key switch is placed in the "ON" position, current is transferred from the "BATTERY" to the "ON" terminal of the key switch.

"ON" terminal of key switch

1. Current flows from the "ON" terminal of the key switch to the fuse panel bussbar, from the bussbar current travels through: · Fuse #2 - 10 amp

Fuse functions

1. The #2, 10amp fuse, sends current to terminal "17A" of the instrument panel.

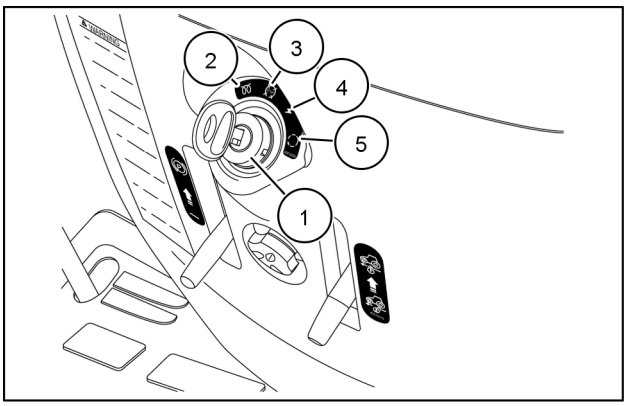
Temperature gauge function

1. Two ground paths allow the engine coolant temperature gauge to function
2. The first ground source is provided by terminal "OC" of the instrument panel. This is a constant ground source provided by the tractor main ground . located on the engine fire wall.
3. The needle within the temperature gauge is controlled by the second ground path. The second ground path exists the gauge at terminal "9" of the instrument panel to travel to the engine coolant temperature sender. At the sender, the resistance to ground changes as the engine temperature rises or lowers. The temperature gage translates this resistance into movement of the gauge needle. The greater the resistance the less needle movement and the lesser the resistance the more the needle movement.

Ignition switch - Service instruction

Description

The key switch **(1)** is located on the right-hand side console lower panel. The key switch has four positions “HEAT” **(2)** OFF" **(3)** "ON" **(4)** and "START" **(5)**. The switch is spring loaded and will return from the "START" to the "ON" position when the key is released. When the switch is place in the "HEAT " position counterclockwise from the "OFF" position the preheat system will be activated for approximately eight seconds.



83114145 1

Next operation:
Ignition switch - Remove (55.201)
Next operation:
Ignition switch - Test (55.201)
Next operation:
Ignition switch - Install (55.201)

Electrical systems - 55

Cold start aid - 202

Boomer 20
Boomer 25

Glow plug system - Troubleshooting

NOTE: *See* ***Electrical system - Electrical schema - Glow plugs (55.100)****.*

Problem	Possible Cause	Correction
Inoperative glow plugs	Blown main 40-amp fuse	Replace fuse
	Malfunctioning key switch	Test switch, replace if necessary
	Blown #2 10 amp fuse	Replace 10-amp fuse
	Faulty safety controller	Test controller, replace if necessary
	Faulty glow plug relay	Test relay, replace if necessary
	Malfunctioning glow plugs	Test glow plugs, replace as necessary
	Improper circuit connections	Check connectors and terminals, repair as necessary
	Improper ground	Check ground location, for clean contact area
Inoperative glow plug indicator light	Blown #2 10-amp fuse	Replace 10-amp fuse
	Faulty safety controller	Test controller, replace if necessary
	Faulty glow plug relay	Test relay, replace if necessary
	Faulty instrument panel	Test instrument panel, replace if necessary
	Improper ground	Check ground location, for clean contact area

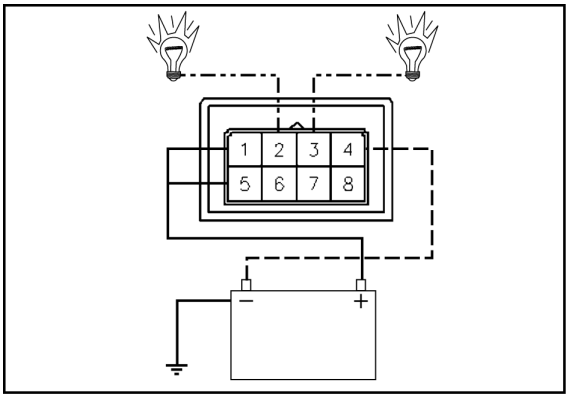
Electrical systems - 55

External lighting - 404

Boomer 20
Boomer 25

Work lights circuit test

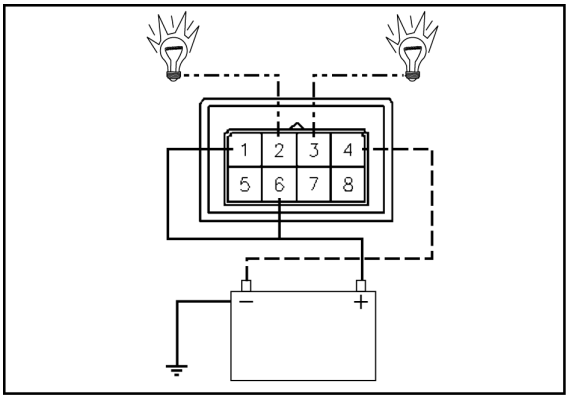
Function	Terminal #
Input current (+)	1, 5
Ground (-)	4
Output current (+)	2, 3 flashing



76105645 1

Hazard lights circuit test

Function	Terminal #
Input current (+)	1, 6
Ground (-)	4
Output current (+)	2, 3 flashing



76105646 2

Electrical systems - 55

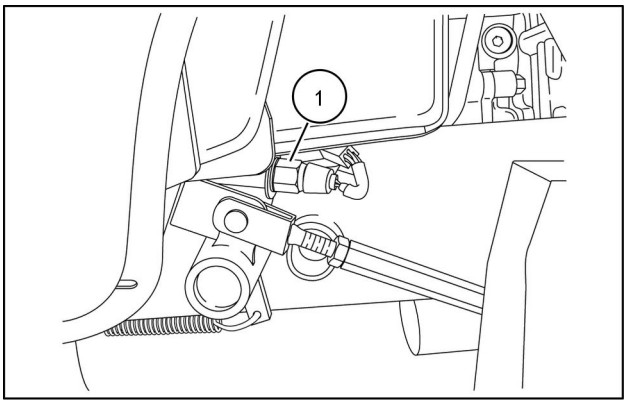
External lighting switches and relays - 405

Boomer 20
Boomer 25

Brake light switch - Install

Prior operation:
Brake light switch - Test (55.405)

1. Depress brake pedal and lock in depressed position.
2. Install the brake switch **(1)** from the rear side of the mounting bracket.
3. Adjust switch mounting so that switch plunger is fully depressed when the brake pedal is in the home position. .



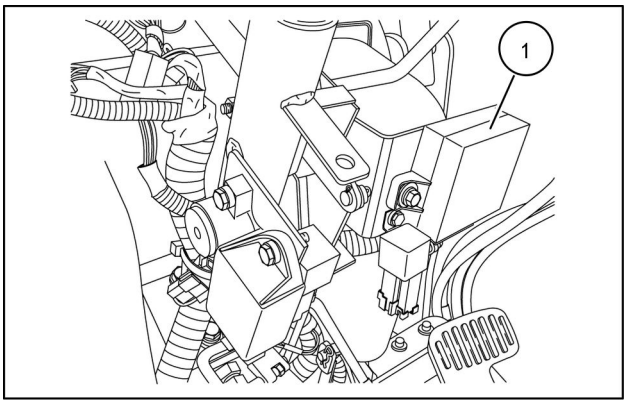
83115329 1

4. Connect switch connector to the tractor wiring harness.
5. Connect negative (-) battery cable to the negative (-) battery terminal.

Instrument cluster Analog instrument cluster - Service instruction - Safety controller

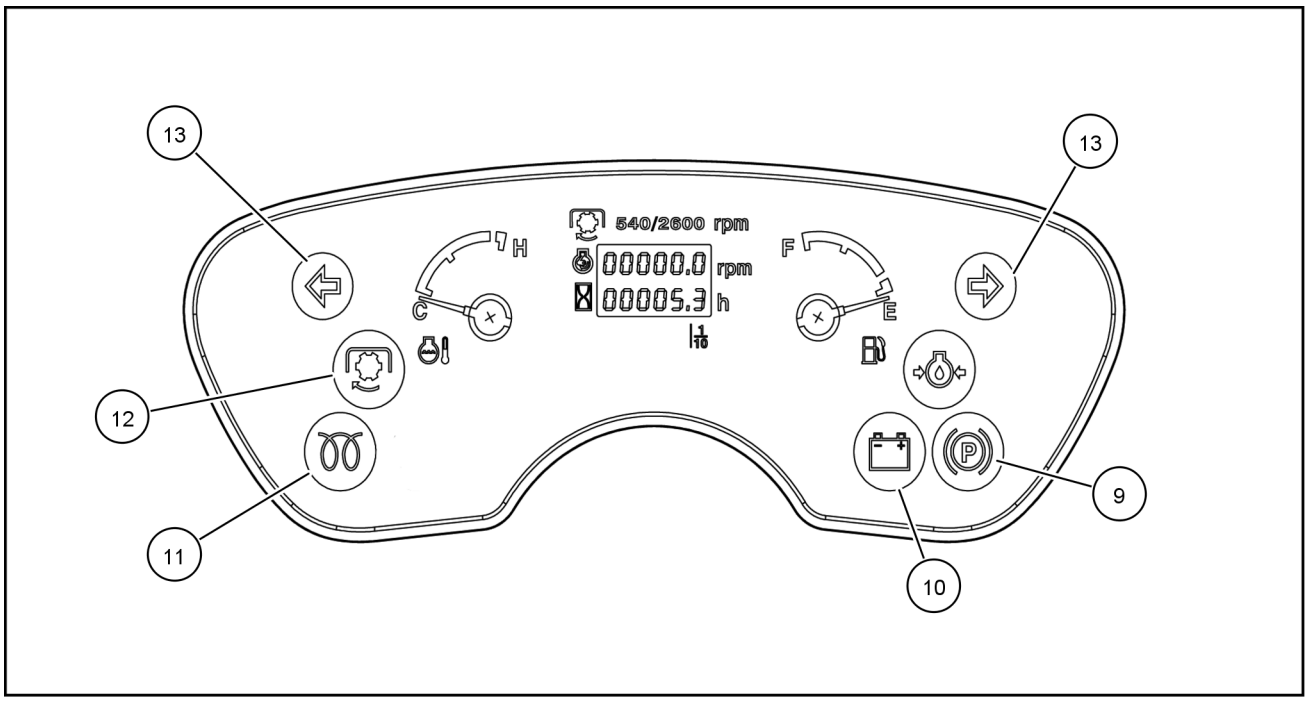
Description

The safety controller **(1)** is located on the right-hand side of the tractor, underneath the instrument panel console. The safety controller controls the safety start , shut down, and engine glow plugs circuits.



83115334 1

Next operation:
Instrument cluster Analog instrument cluster - Remove - Safety controller (55.408)
Next operation:
Instrument cluster Analog instrument cluster - Test - Safety controller (55.408)
Next operation:
Instrument cluster Analog instrument cluster - Install - Safety controller (55.408)



76115287 3

(9) Parking Brake Light - Illuminates if the park brake is engaged when the key switch is turned from the "OFF" position.

(10) Battery Charge Warning Light - Illuminates when the key switch is in the "ON" position and goes out when the engine is started. If this bulb becomes lit during operation, it indicates that the charging system is not operating normally. As the battery can become fully discharged under these conditions, the problem should be investigated as soon as possible

(11) Cold Starting Indicator Light - Illuminates when the key switch is first turned to the "HEAT" position. It remains lit for as long as key switch is in the “HEAT” position, during which time the glow plugs are heating the precombustion chambers.

(12) PTO On Indicator - When either the rear or mid PTO is engaged, the indicator will be illuminated amber with the key in the "START" or "ON" positions.

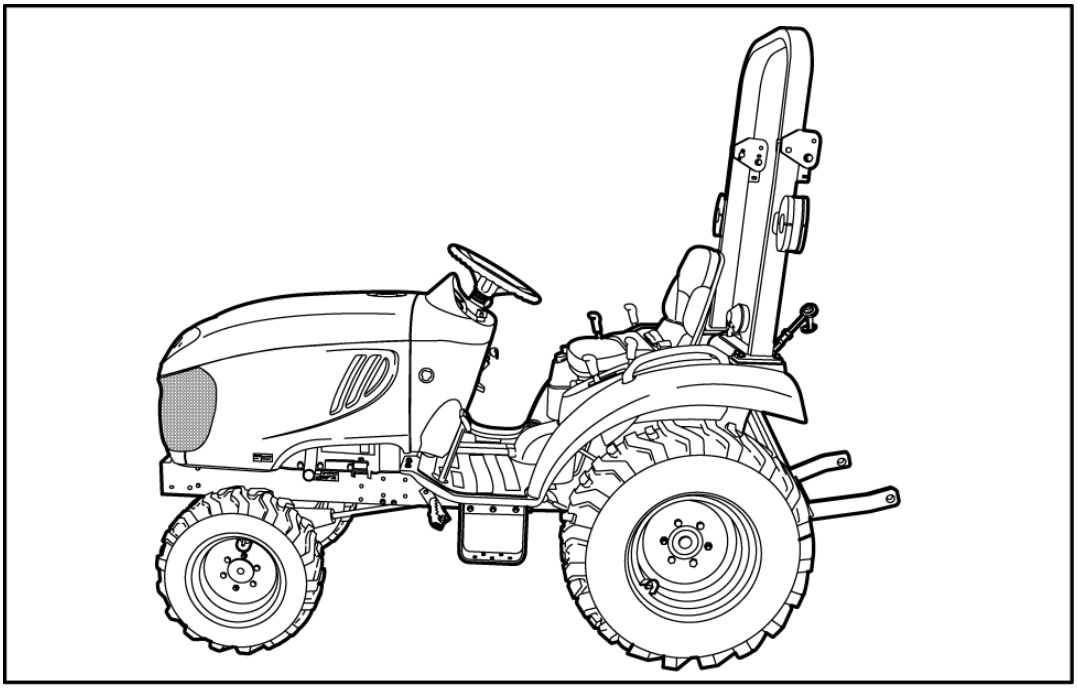
(13) Flasher Warning Lights - Operate when the multifunction switch is turned on, regardless of the key switch position. Use the flasher warning lights, road lights and the SMV sign when traveling on public roads, day or night.

Next operation:
Instrument cluster Analog instrument cluster - Remove (55.408)
Next operation:
Instrument cluster Analog instrument cluster - Test (55.408)
Next operation:
Instrument cluster Analog instrument cluster - Install (55.408)

NEW HOLLAND AGRICULTURE

SERVICE MANUAL

Platform, cab, bodywork, and decals



Boomer 20
Boomer 25