

SERVICE MANUAL

Boomer 30 / Boomer 35

Compact Tractor

Part number 84373326

1st edition English
January 2011



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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.

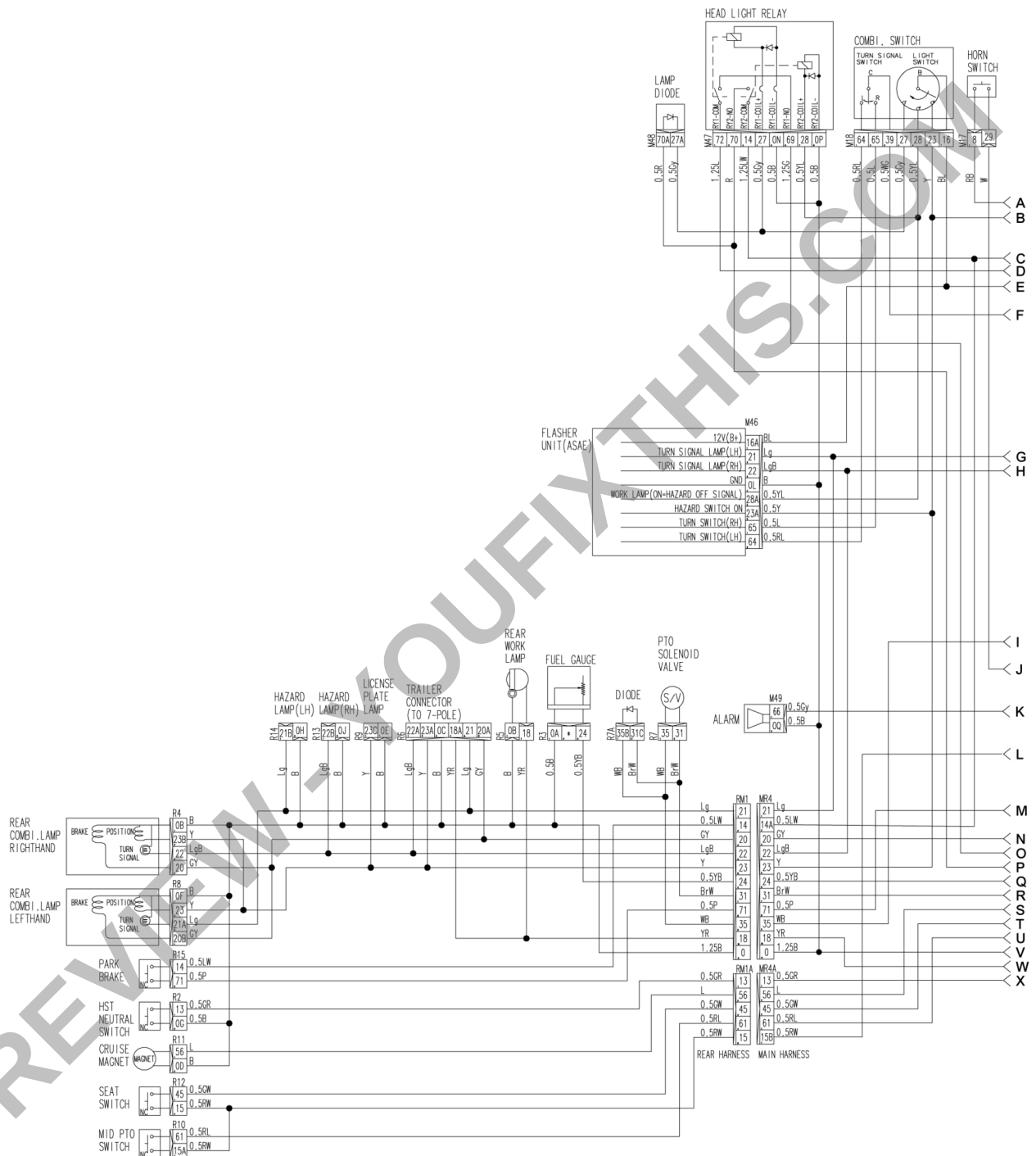
Accidents may occur with all types of machines, regardless of how well the machine in question was designed and built.

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

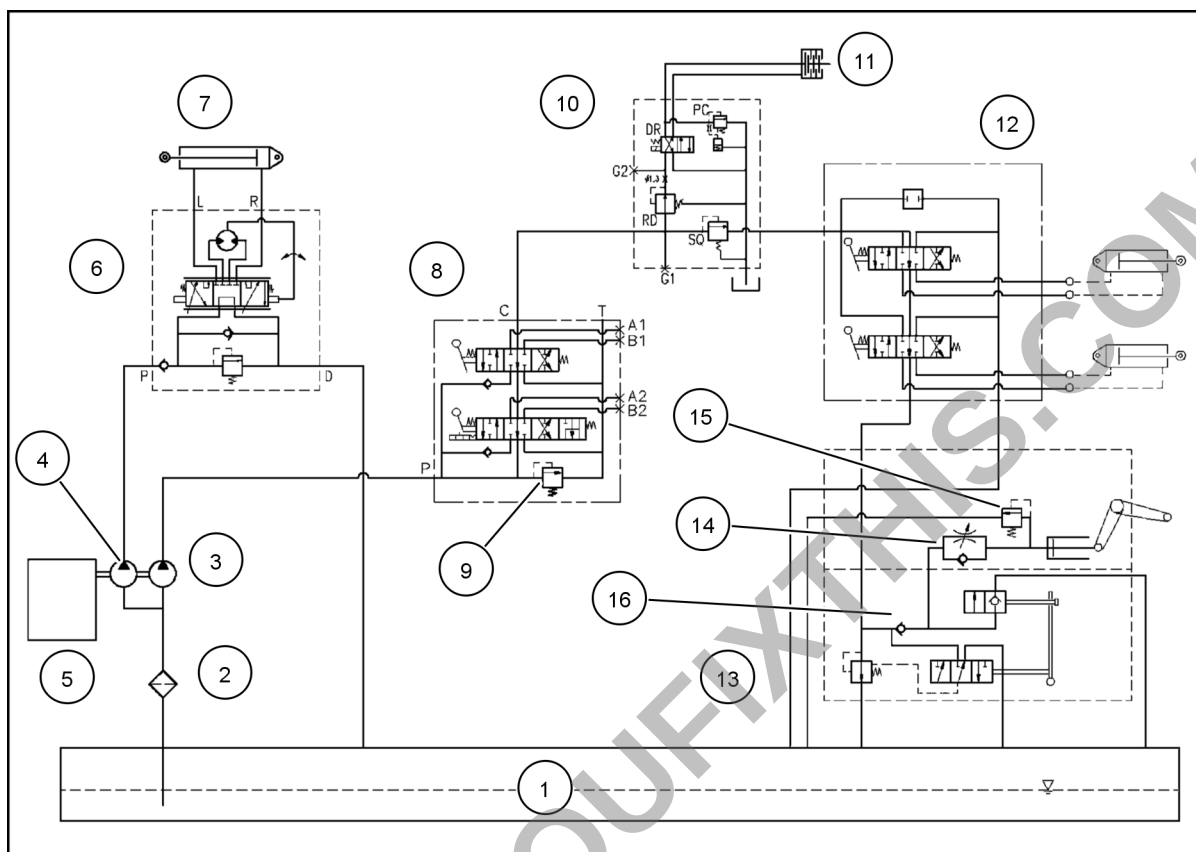
General specification

	Model Boomer 30 - Hydrostatic/Gear	Model Boomer 35 - Hydrostatic/Gear
ENGINE		
Type	Diesel	Diesel
Model	S4L	S4L2
Engine Gross Horsepower	21 kW (28 Hp)	28 kW (38 Hp)
Cylinders	4	4
Bore	78 mm (3.07 in)	78 mm (3.07 in)
Stroke	78.5 mm (3.09 in)	92 mm (3.62 in)
Displacement	1.500 l (91.5 in³)	1.758 l (100.7 in³)
Compression Ratio	22.0:1	20.0:1
Firing Order	1-3-4-2	1-3-4-2
Low Idle Speed	970±30 RPM	970±30 RPM
Maximum Speed:		
High Idle	2800±20 RPM	2900±20 RPM
Rated	2600 RPM	2700 RPM
Valve Clearance (Cold)		
Intake	0.25 mm (0.010 in)	0.25 mm (0.010 in)
Exhaust	0.25 mm (0.010 in)	0.25 mm (0.010 in)
CAPACITIES		
Fuel Tank	33.0 l (8.7 US gal)	33.0 l (8.7 US gal)
Cooling System	4.5 l (4.8 US qt)	4.5 l (4.8 US qt)
Engine Crankcase:		
With Filter	4.7 l (5.0 US qt)	4.7 l (5.0 US qt)
Rear Axle & Transmission (Includes Hydraulics)		
Gear	32.0 l (8.5 US gal)	32.0 l (8.5 US gal)
HST	32.0 l (8.5 US gal)	32.0 l (8.5 US gal)
Front Axle	5.5 l (5.8 US qt)	5.5 l (5.8 US qt)
COOLING SYSTEM		
Type	Pressurized Liquid with Recirculating Bypass	Pressurized Liquid with Recirculating Bypass
Water Pump:		
Type	Centrifugal	Centrifugal
Drive	V-Belt	V-Belt
Belt Deflection	10 - 13 mm (0.4 - 0.5 in) when 10 kg (22 lb) pressure is applied midway between belt pulleys	10 - 13 mm (0.4 - 0.5 in) when 10 kg (22 lb) pressure is applied midway between belt pulleys
Fan Diameter	380 mm (15.0 in)	380 mm (15.0 in)
Thermostat:		
Start to Open	76.5 °C (170 °F)	76.5 °C (170 °F)
Fully Open	90 °C (194 °F)	90 °C (194 °F)

ELECTRICAL POWER SYSTEM - Electrical schematic frame 01 - Complete tractor schematic, HST



PRIMARY HYDRAULIC POWER SYSTEM - Hydraulic schematic frame 01 - Gear transmission



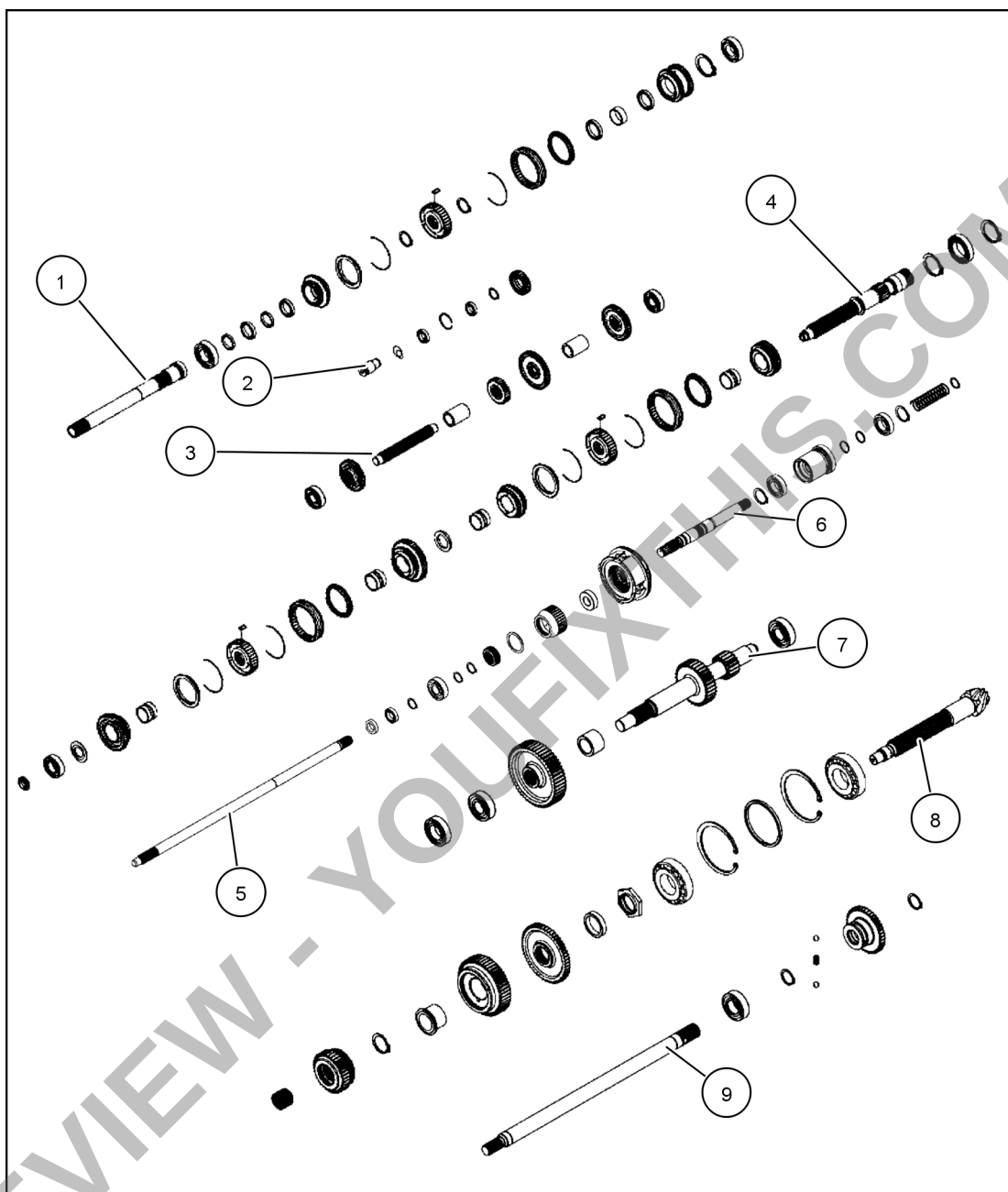
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- | | | | |
|-------------------------------|------------------------------|----------------------------------|----------------------------------|
| 1. Reservoir | 5. Engine | 9. System Relief Valve | 13. Hydraulic Lift Housing |
| 2. Suction Filter (45 micron) | 6. Steering Control Valve | 10. PTO Valve Block | 14. Drop Rate Valve |
| 3. Hydraulic Pump | 7. Steering Cylinder | 11. PTO Clutch | 15. Safety Relief Valve |
| 4. Steering Pump | 8. Two Spool Mid Mount Valve | 12. Rear Remote Valve (optional) | 16. Hydraulic Lift Control Valve |

PTO Valve Block Components

RD	Reduction Valve / PTO Pressure Regulating Valve
DR	Solenoid Valve
PC	PTO Modulation Engagement Valve
SQ	Sequence Valve
) (1.3	Restrictor Orifice 1.3 mm

Shaft - Exploded view



76106807 1

12 x 12 Transmission Shafts - Exploded View

- | | |
|------------------------------------|------------------------------|
| (1) Forward/reverse drive shaft | (6) PTO drive shaft |
| (2) Reverse counter shaft | (7) Range gear counter shaft |
| (3) Main shift drive counter shaft | (8) Pinion drive shaft |
| (4) Main shift drive shaft | (9) FWD drive shaft |
| (5) Main PTO shaft | |

Torque Specification Tables

Standard Bolt Hardware & Hydraulic Connector Torques, Specifications and Information

This specification establishes general torque values to be used in bolted joints for metric and inch hardware. This specification is assumed to apply unless another specification (standard or specified requirement) is indicated in the repair manual.

NOTE: These Standards do not include electrical or hydraulic components, they are referred to in their specific charts or tables.

INCH 'NON-FLANGED' HARDWARE AND LOCKNUTS {MINIMUM HARDWARE TIGHTENING TORQUES}

IN NEWTON-METERS (FOOT-POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS								
	SAE GRADE 2		SAE GRADE 5		SAE GRADE 8		LOCKNUTS	
Nominal Size	Unplated or Plated Silver	Plated w/ZnCr Gold	Unplated or Plated Silver	Plated w/ZnCr Gold	Unplated or Plated Silver	Plated w/ZnCr Gold	Gr.B w/Gr5 Bolt	Gr.C w/Gr8 Bolt
1/4	6.2 (55)*	8.1 (72)*	9.7 (86)*	13 (112)*	14 (121)*	18 (157)*	8.5 (75)*	12.2 (109)*
5/16	13 (115)*	17 (149)*	20 (178)*	26 (229)*	28 (21)	37 (27)	17.5 (155)*	25 (220)*
3/8	23 (17)	30 (22)	35 (26)	46 (34)	50 (37)	65 (48)	31 (23)	44 (33)
7/16	37 (27)	47 (35)	57 (42)	73 (54)	80 (59)	104 (77)	50 (37)	71 (53)
1/2	57 (42)	73 (54)	87 (64)	113 (83)	123 (91)	159 (117)	76 (56)	108 (80)
9/16	81 (60)	104 (77)	125 (92)	163 (120)	176 (130)	229 (169)	111 (82)	156 (115)
5/8	112 (83)	145 (107)	174 (128)	224 (165)	244 (180)	316 (233)	153 (113)	215 (159)
3/4	198 (146)	256 (189)	306 (226)	397 (293)	432 (319)	560 (413)	271 (200)	383 (282)
7/8	193 (142)	248 (183)	495 (365)	641 (473)	698 (515)	904 (667)	437 (323)	617 (455)
1	289 (213)	373 (275)	742 (547)	960 (708)	1048 (773)	1356 (1000)	654 (483)	924 (681)

NOTE: Torque values shown with * are inch pounds.

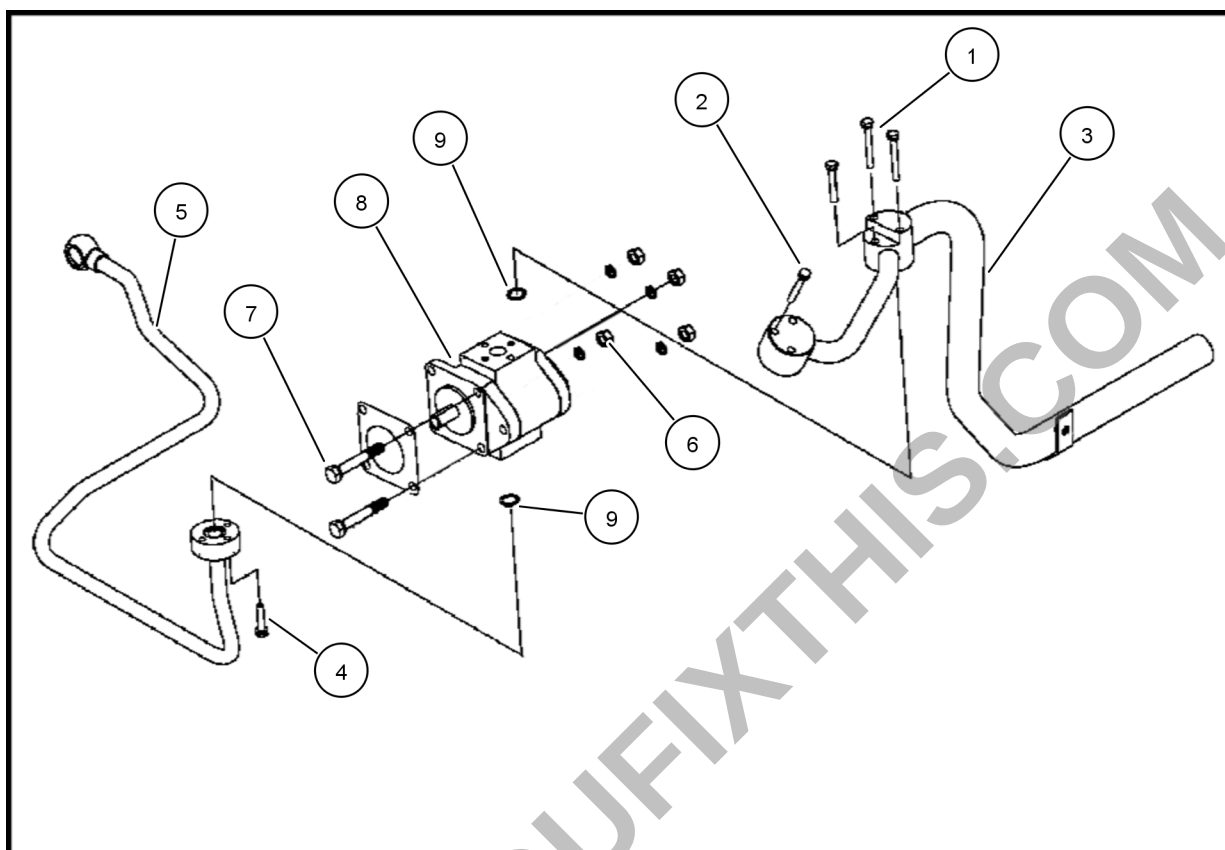
NOTICE: Values shown on these charts are minimum hardware tightening torques unless otherwise stated.

METRIC 'NON-FLANGED' HARDWARE AND LOCKNUTS {MINIMUM HARDWARE TIGHTENING TORQUES}

IN NEWTON-METERS (FOOT-POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS							
	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCK-NUTS
Nominal Size	Unplated	Plated w/ZnCr	Unplated	Plated w/ZnCr	Unplated	Plated w/ZnCr	Cl.8 w/Cl8.8 Bolt
M4	1.7 (15)*	2.2 (19)*	2.6 (23)*	3.4 (30)*	3.7 (33)*	4.8 (42)*	2.3 (20)*
M6	5.8 (51)*	7.6 (67)*	8.9 (79)*	12 (102)*	13 (115)*	17 (150)*	7.8 (69)*
M8	14 (124)*	18 (159)*	22 (195)*	28 (21)	31 (23)	40 (30)	19 (169)*
M10	28 (21)	36 (27)	43 (32)	56 (41)	61 (45)	79 (58)	38 (28)
M12	49 (36)	63 (46)	75 (55)	97 (72)	107 (79)	138 (102)	66 (49)
M16	121 (89)	158 (117)	186 (137)	240 (177)	266 (196)	344 (254)	164 (121)
M20	237 (175)	307 (226)	375 (277)	485 (358)	519 (383)	671 (495)	330 (243)
M24	411 (303)	531 (392)	648 (478)	839 (619)	897 (662)	1160 (855)	572 (422)

NOTE: Torque values shown with * are inch pounds.

Hydraulic pump Fixed displacement pump - Remove



76109563 1

1. Remove bolts **(1)** and **(2)** from top inlet tube **(3)**.
2. Remove bolts **(4)** from bottom pressure tube **(5)**.
3. Remove the four nuts and lock washers **(6)** and the two bolts **(7)** that retain hydraulic pump **(8)**.
4. Remove the hydraulic pump from the engine, take care not to lose the two O-rings **(9)**.

Next operation:

Hydraulic pump Fixed displacement pump - Install (A.10.A)

PRIMARY HYDRAULIC POWER SYSTEM - Troubleshooting

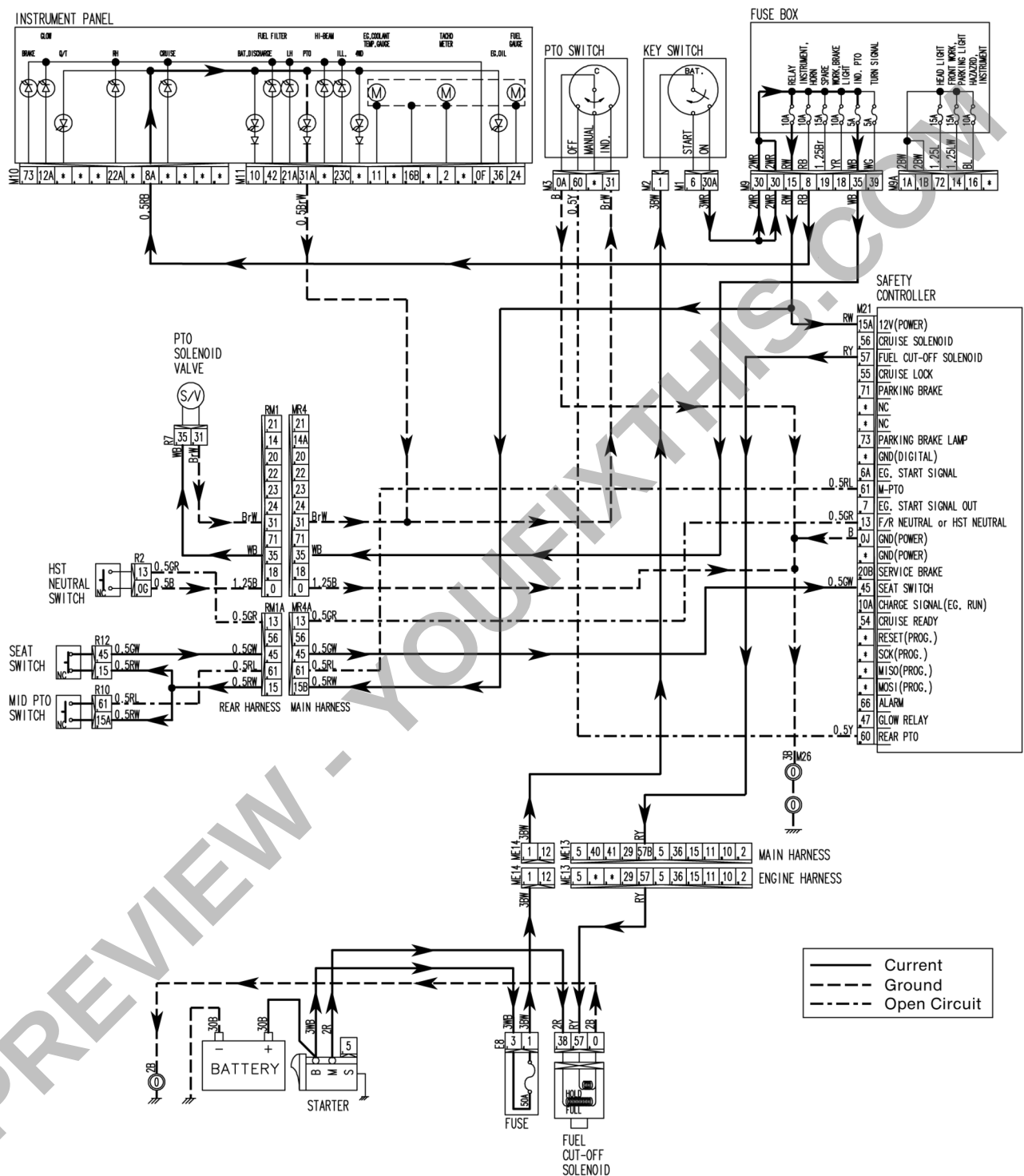
Problem	Possible Cause	Correction
Implement fails to lift when the lever is in raised position	Linkage out of adjustment	Adjust external and internal linkage
	Relief valve setting too low	Perform system relief valve pressure test
	Faulty safety valve	Repair or replace safety valve
	O-ring failure (control valve body to cover, safety valve, relief valve)	Repair as required
	Excessive oil leakage past lift cylinder piston seal	Replace seal, piston, or cylinder as required
	Restricted suction filter	Replace filter
	Dump valve does not close	Check Dump valve operation
	Lowering valve remains open	Check lowering valve adjustment and operation
Lift arms cycle up and down when lever is in neutral position	Faulty lowering valve and seat	Repair or replace as required
	Faulty check valve and seat	Replace
	Faulty O-rings (lowering valve, valve body, unload valve plug)	Inspect and repair as required
	Lowering valve out of adjustment	Adjust to proper clearance
Implement settles too fast when engine is stopped	Faulty check valve seat	Replace
	Excessive leakage past piston seals	Inspect cylinder piston seals, repair as required
Implement rises too slowly	Restricted suction filter	Replace filter
	Low pump flow	Check pump flow and replace pump if necessary.
	Low relief valve pressure setting.	Check relief valve pressure setting, adjust to specified pressure.
	Excessive leakage past HPL cylinder piston seals.	Inspect cylinder and piston seals, repair as necessary.
	Faulty safety relief valve	Repair or replace safety valve as necessary.
	Damaged O-rings (relief valve, control valve or safety valve)	Repair as required.
	Extreme cold weather operation	Change hydraulic fluid to New Holland F200 type fluid.
Implement will not lower	Lowering valve out of adjustment	Adjust lowering valve clearance
	Drop rate valve in closed position	Open drop rate valve
Implement does not raise to full height	HPL upper stop out of adjustment	Adjust position of upper stop
Hydraulic fluid overheats	Faulty pump	Replace pump
	Restricted suction filter	Replace
	HPL upper stop out of adjustment	Adjust position of upper stop
Relief valve operates when implement is in full raise position	HPL upper stop out of adjustment	Adjust position of upper stop
Hydraulic noise when control valve is in neutral	Unload valve binding in valve body, creating vibration and noise.	Clean unload valve and valve body, check fit of valve in bore.

HITCH AND WORKING TOOLH

HITCH Rear hitch..... H.10.C

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ELECTRICAL POWER SYSTEM - Electrical schematic frame 04 - Safe operation, operator present; HST transmission



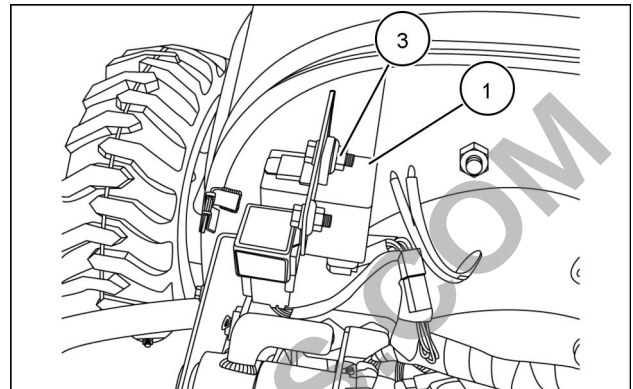
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Head light Relay - Install

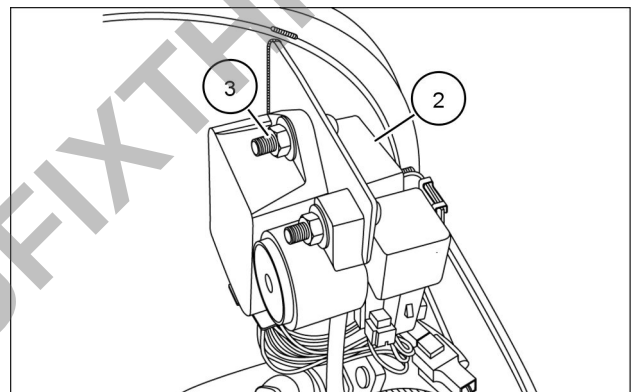
Prior operation:

Head light Relay - Test (A.40.A)

1. Install the headlight relay **(1)** (HST model) or **(2)** (Gear model) to the mount plate with M6 x 20mm retaining bolt and nut **(3)**.

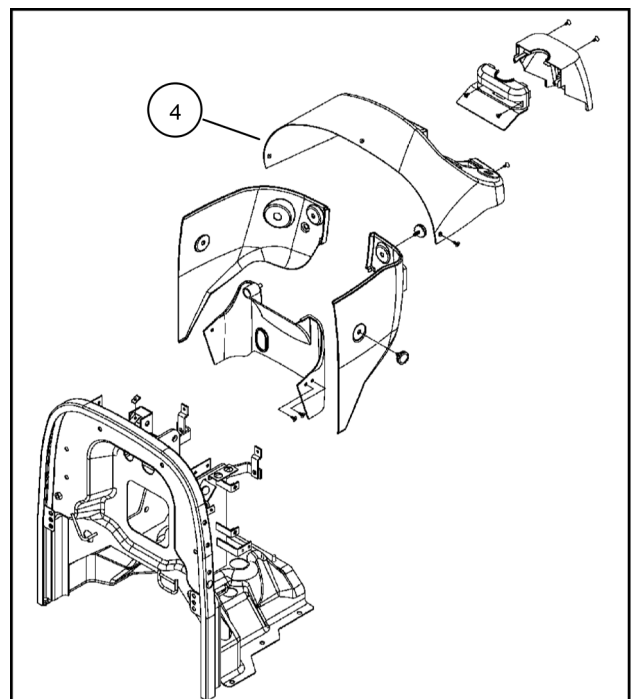


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93105612A 2

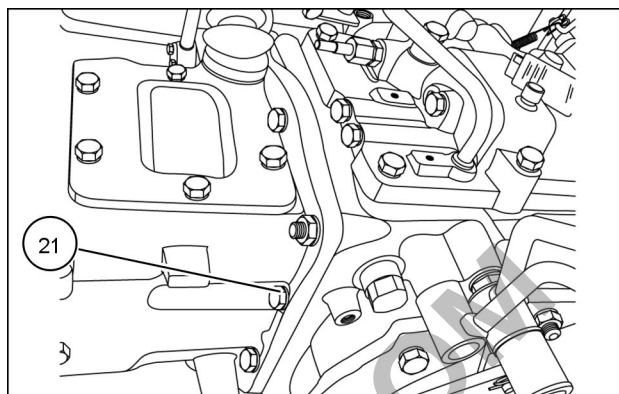
2. Connect the relay connector to the tractor wire harness.
3. Install instrument panel console panel **(4)** to the tractor.



76105667 3

4. Reconnect the negative (-) battery cable to the negative (-) battery terminal.

20. Remove **M12** bolts (21), and separate cases.



93102266 12

NOTE: Internal engine service procedures are covered in the S4L2 engine service manual.

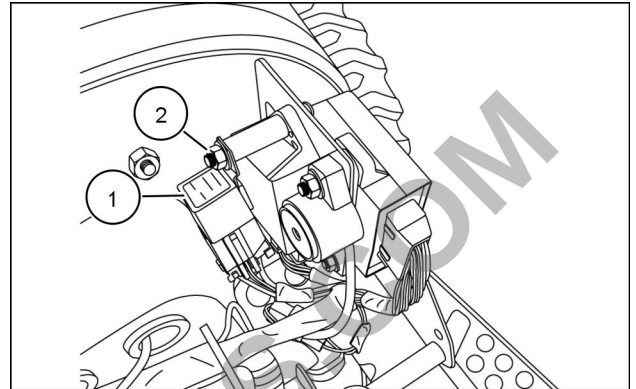
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Cold start aid Relay - Install Glow plug relay

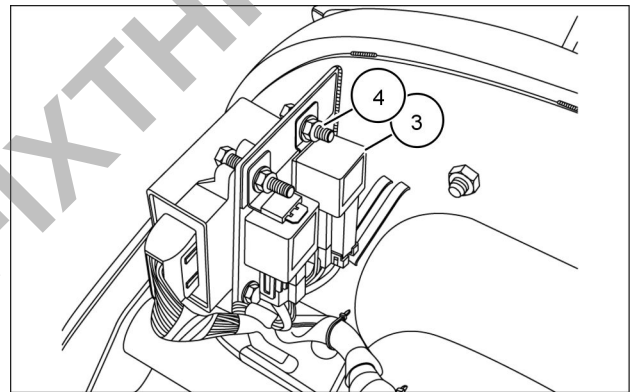
Prior operation:

Cold start aid Relay - Test Glow plug relay (B.80.A)

1. Install the start relay **(1)** to the mount plate with M6 x 60mm retaining bolt and nut. **(2)** (HST model) or relay **(3)** with M6 x 20mm retaining bolt and nut **(4)** (Gear model).

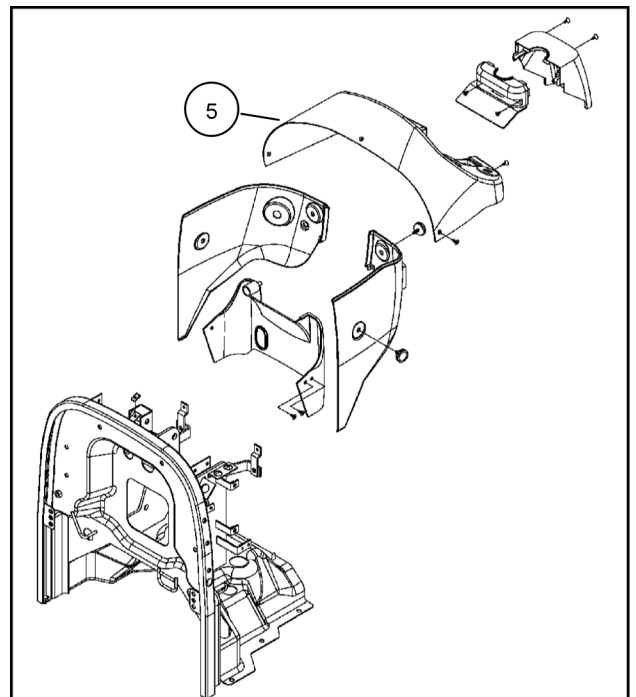


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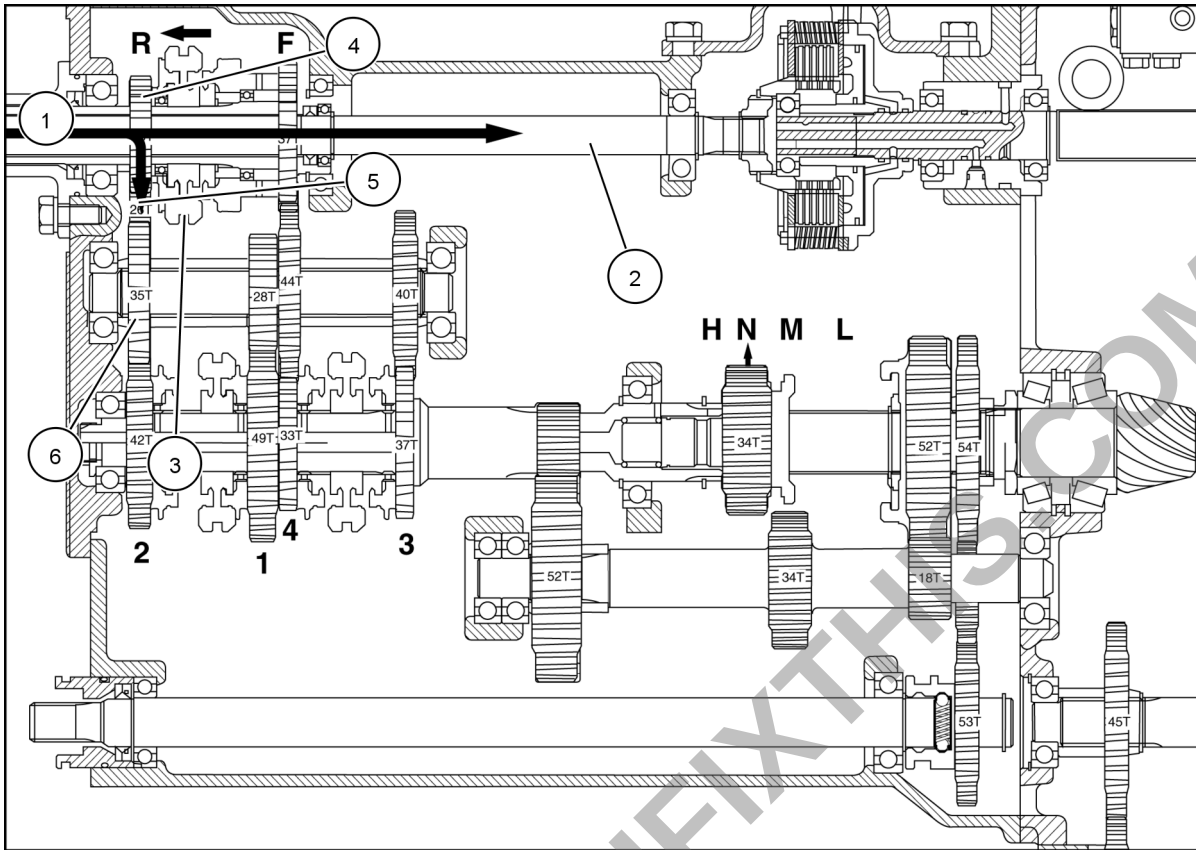
93105614 2

2. Connect the relay connector to the tractor wire harness.
3. Install instrument console panel **(5)** to the tractor.



76105667 3

4. Reconnect the negative (-) battery cable to the negative (-) battery terminal.

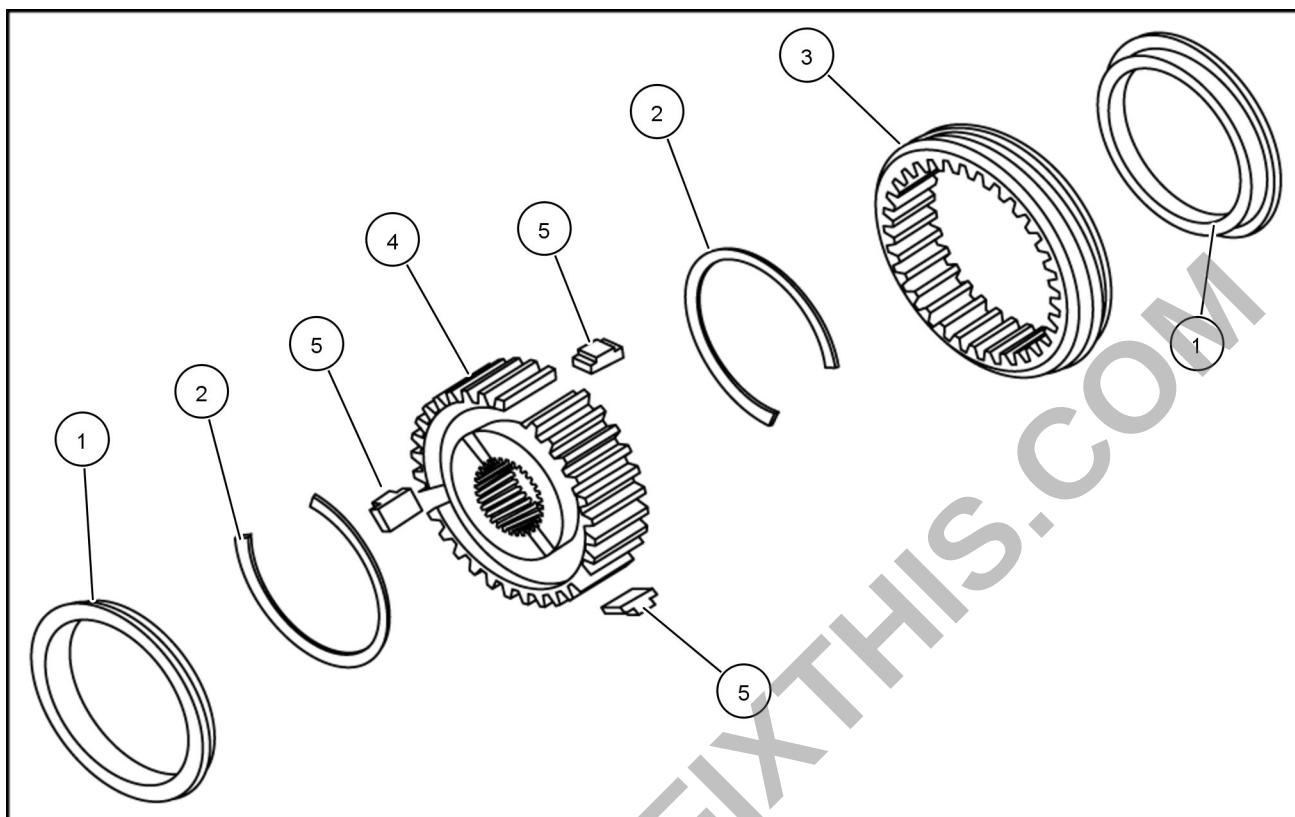


76106796 5

Power Distribution - Reverse

Reverse

Forward torque is supplied to the forward/reverse drive shaft (1) and PTO input shaft (2) directly from the engine. The 12 x 12 transmission has 12 forward gear and range selections and 12 reverse selections. When the forward/reverse lever is in the reverse position the lever moves the forward/reverse synchromesh selector (3), engaging the reverse gear (35T) (4) with the reverse idler gear (26T) (5). This reverses the forward torque creating reverse torque. The reverse torque is then applied to the main shift drive counter shaft 2nd gear (35T) (6). All the gears on the main shift drive counter shaft are fixed and rotate together.



93102313 3
Synchronizer

- | | |
|-----------------------|---------|
| (1) Synchronizer ring | (4) Hub |
| (2) Spring | (5) Key |
| (3) Shift sleeve | |

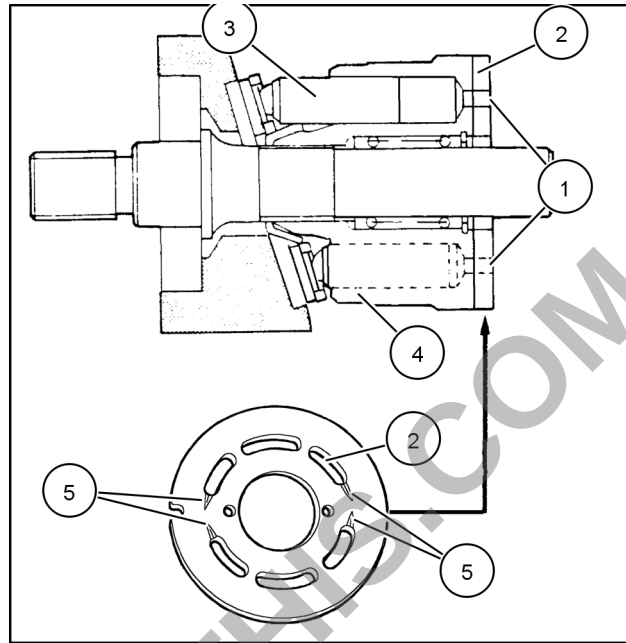
NOTICE: When assembling the hub piece spring, install the springs (1) with their gaps **180 °** apart.

Fixed displacement motor

Operation

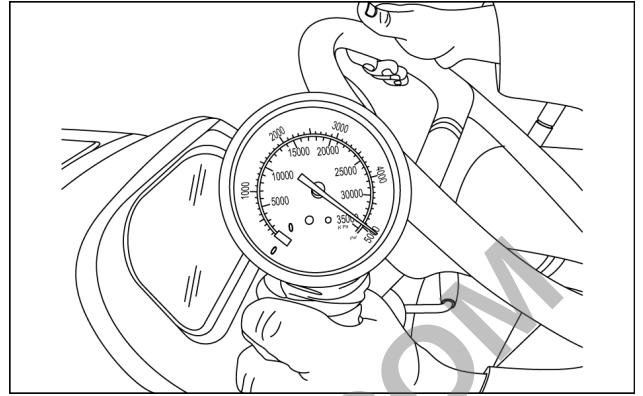
Fluid flow from the piston pump enters one of the set of ports **(1)** in the valve port plate **(2)** of the motor and exerts a pressure against the end of the pistons **(3)** in line with the port. Fluid pressure on the pistons causes the cylinder block **(4)**, and pistons **(3)** to rotate. A drive shaft splined to the motor cylinder block then drives the transmission gearbox.

NOTE: The motor rotates in both directions to provide either forward or reverse movement. Four notches **(5)** in the valve plate **(2)** allow feathered oil delivery in both directional rotations.



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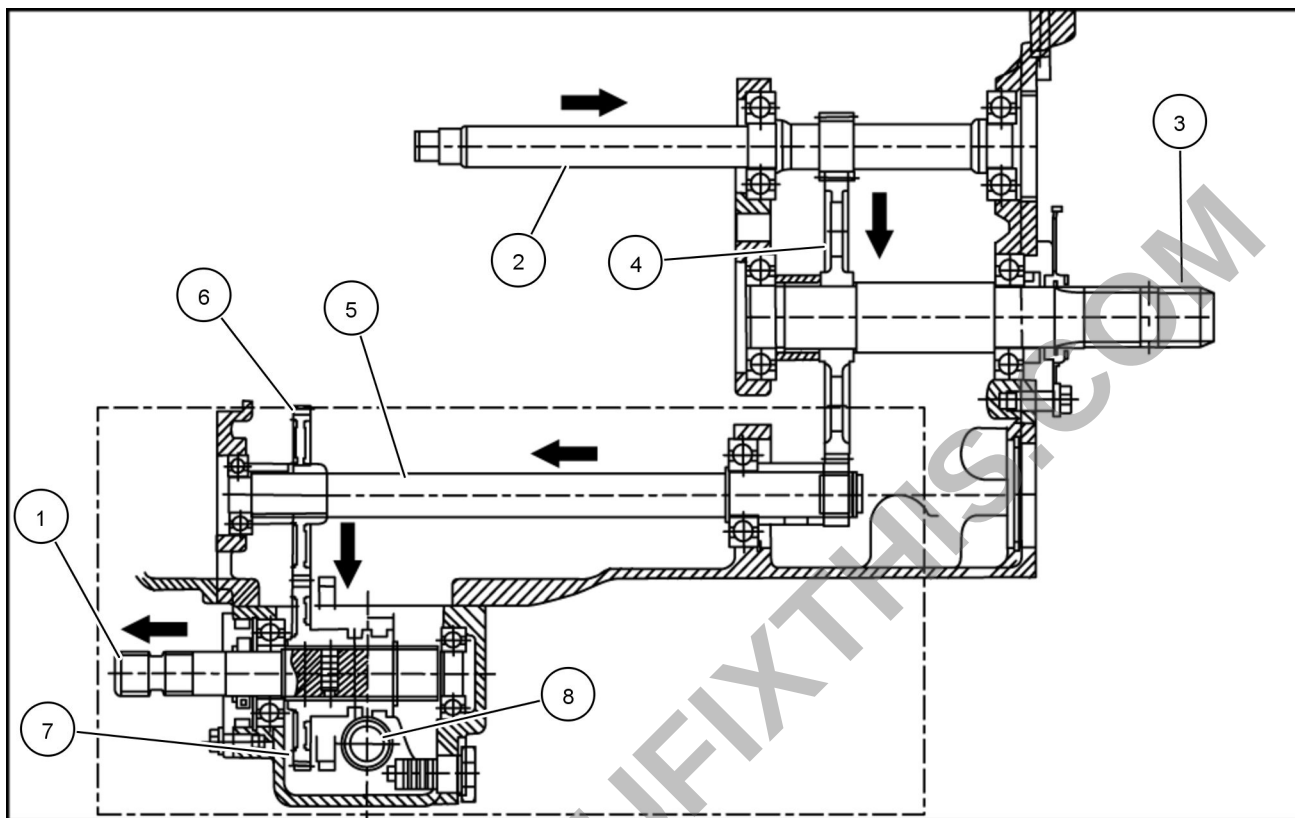
10. H S T high pressure relief valve relief pressure should read **34322 kPa (4978 psi) (1)**.



93109710 11

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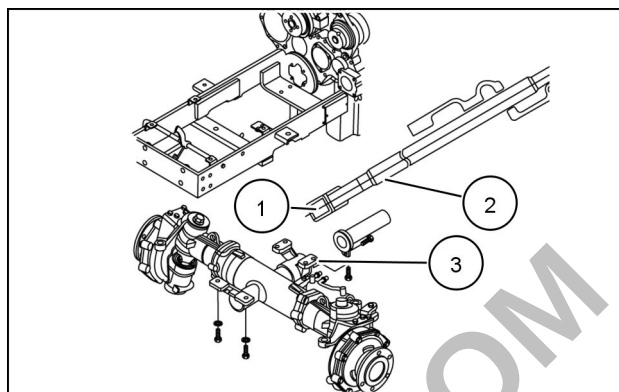
MIDDLE PTO - Dynamic description



Mid PTO Drive Components

The Middle PTO (1) is driven directly from the Rear PTO drive line. Power is transferred from the transmission to the PTO drive shaft (2) to the Rear PTO shaft (3) by the Rear PTO shaft gear (4) which also drives the Middle PTO counter shaft (5). The power is then transferred from the Middle PTO drive gear (6) to the Middle PTO gear and output shaft (7). The Middle PTO is operated by a mechanical linkage (8) controlled from the Operator's platform.

5. Lubricate and install splined coupler (1) to drive shaft (2).
6. Connect the coupler to axle input shaft (3).

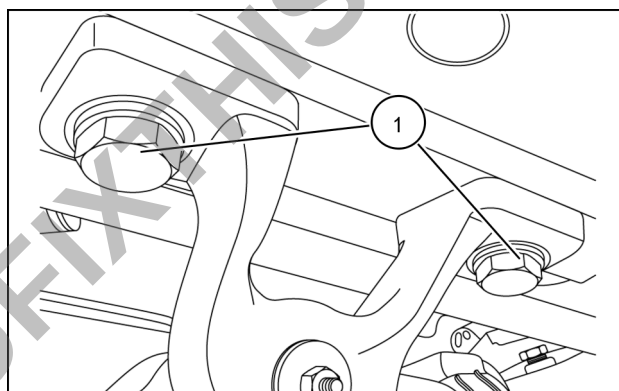


93100303 2

NOTICE: Make sure drive shaft is properly engaged in both the front and rear.

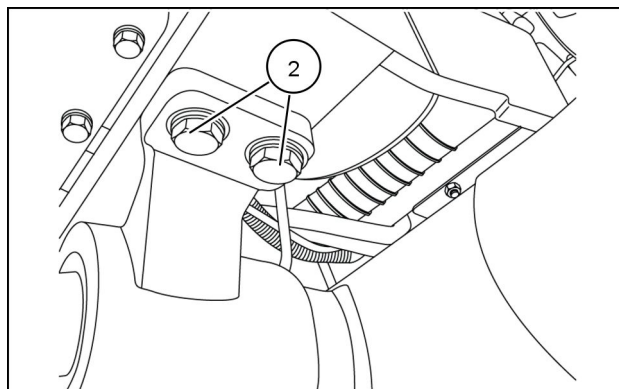
NOTICE: Apply **LOCTITE® 242** thread locking compound to front axle mounting bolts during installation.

7. Install mounting flange pivots (1) and (2).



93104524 3

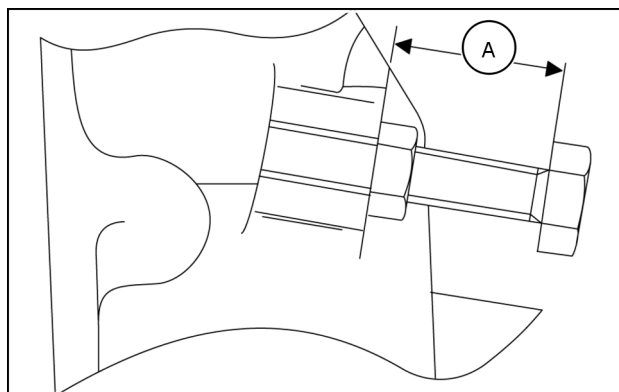
8. Connect the axle to the frame. Secure with four **M12 x 45 mm** fine thread bolts with lock washers on rear support (2) and two **M16 x 40 mm** fine thread bolts with lock washers on front support (1). Torque the **M12 x 45 mm** bolts to **93 - 108 N·m (69 - 80 lb ft)**, and the **M16 x 40 mm** to **177 - 196 N·m (131 - 145 lb ft)**.



93104523 4

NOTICE: Be sure the steering stop bolts are installed at the same length measurement (A) as before.

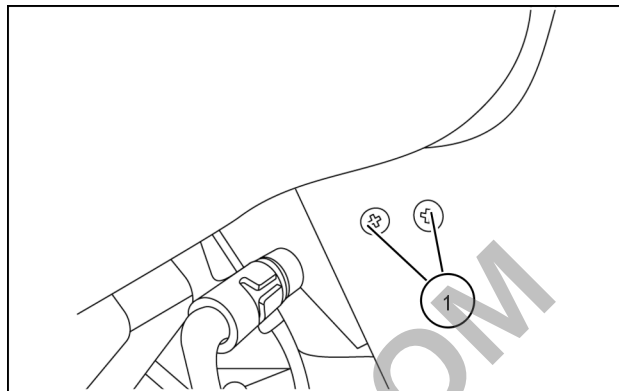
NOTICE: (A) as a reference measurement will be **36.5 mm** or **1.44 inches**.



93105721 5

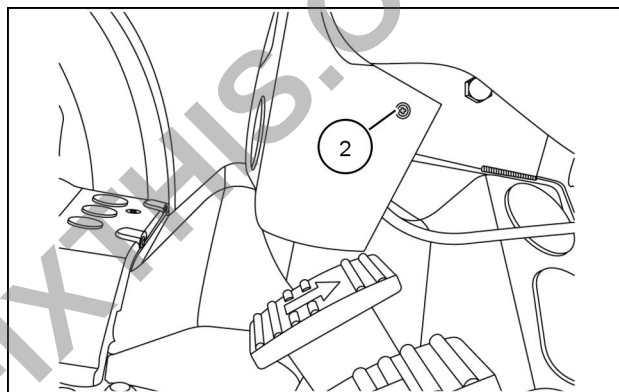
10. Install the bottom shroud, with three screws.

11. Two on the left **(1)**.



93104545 7

12. One on the right **(2)**.



93104546 8

NOTICE: Check the transmission oil level to be at the full mark.



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HITCH AND WORKING TOOL - H

HITCH Rear hitch - 10.C

**Boomer 30
Boomer 35**

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You're viewing 24 of 685 pages

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