SERVICE MANUAL

WORKMASTER™ 35
WORKMASTER™ 40
Compact Tractor

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NEW HOLLAND AGRICULTURE

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International symbols

As a guide to the operation of the machine, various universal symbols have been utilized on the instruments, controls, switches, and fuse box. The symbols are shown below with an indication of their meaning.

- Thermostart starting aid
- Alternator charge
- Fuel level
- Automatic Fuel shut-off
- Engine speed (rev/min x 100)
- Hours recorded
- Engine oil pressure
- Engine coolant temperature
- Coolant level
- Tractor lights
- Headlamp main beam
- Headlamp dipped beam
- Work lamps
- Stop lamps
- Horn
- Radio
- KAM Keep alive memory
- Turn signals
- 1 Turn signals -one trailer
- 2 Turn signals -two trailers
- Front wind-shield wash/wipe
- Rear wind-shield wash/wipe
- Heater temp-erature control
- Heater fan
- Air conditioner
- Air filter blocked
- Parking brake
- Brake fluid level
- Trailer brake
- Roof beacon
- Warning ! Corrosive substance
- PTO
- N Transmission in neutral
- Creeper gears
- Slow or low setting
- Fast or high setting
- Ground speed
- Differential lock
- Rear axle oil tem-perature
- Transmission oil pressure
- FWD engaged
- FWD dis-engaged
- Warning!
- Hazard warning lights
- Variable control
- Pressurized! Open carefully
- Position Control
- Draft Control
- Accessory socket
- Implement socket
- %age slip
- Hitch raise (rear)
- Hitch lower (rear)
- Hitch height limit (rear)
- Hitch height limit (front)
- Hitch dis-abled
- Hydraulic and transmission filters
- Remote valve extend
- Remote valve retract
- Remote valve float
- Malfunction! See Operator's Manual
- Malfunction! (alter-native symbol)

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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.

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General specification

	Model Workmaster 35-Hydrostatic/Gear	Model Workmaster 40-Hydrostatic/Gear
ENGINE		
Type	Diesel	Diesel
Model	L3BL	L3AL
Engine Gross Horsepower	**24.6 kW** (**33 Hp**)	**28.3 kW** (**38 Hp**)
Cylinders	3	3
Bore	**88 mm** (**3.37 in**)	**90 mm** (**3.54 in**)
Stroke	**105 mm** (**4.13 in**)	**105 mm** (**4.13 in**)
Displacement	**1.915 l** (**116.86 in³**)	**2.003 l** (**122.23 in³**)
Compression Ratio	22.0:1	20.0:1
Firing Order	1-3-2	1-3-2
Low Idle Speed	**1120±20 RPM**	**1120±20 RPM**
Maximum Speed:		
High Idle	**2800±20 RPM**	**2900±20 RPM**
Rated	**2600 RPM**	**2600 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	**28.0 l** (**7.4 US gal**)	**28.0 l** (**7.4 US gal**)
Cooling System	**5 l** (**1.3 US gal**)	**5 l** (**1.3 US gal**)
Engine Crankcase:		
With Filter	**6.5 l** (**6.9 US qt**)	**6.5 l** (**6.9 US qt**)
Rear Axle & Transmission (Includes Hydraulics)		
Gear	**30.0 l** (**7.9 US gal**)	**30.0 l** (**7.9 US gal**)
HST	**30.0 l** (**7.9 US gal**)	**30.0 l** (**7.9 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**)
Radiator Cap	**90 kPa** (**13 psi**)	**90 kPa** (**13 psi**)

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Consumables

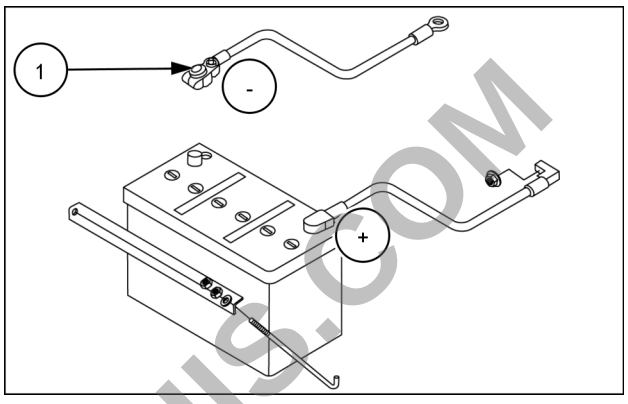
Lubricant	Type and Description	Part Number	Container Size
Engine Oil	**NEW HOLLAND AMBRA SUPER GOLD 10W-30**	**104104A1**	**0.946 l** (**1 US qt**)
		139033A1	**3.785 l** (**1 US gal**)
		104106A1	**18.93 l** (**5 US gal**)
	NEW HOLLAND AMBRA SUPER GOLD 15W-40	**407410R2**	**0.946 l** (**1 US qt**)
		139034A1	**3.785 l** (**1 US gal**)
		407414R2	**18.93 l** (**5 US gal**)
Transmission/Hydraulic Oil	**NEW HOLLAND AMBRA MULTI G 134™ HYDRAULIC TRANSMISSION OIL**	**404787A1**	**18.93 l** (**5 US gal**)
	NEW HOLLAND AMBRA F200A HYDRAULIC FLUID	**B17805**	**18.93 l** (**5 US gal**)
Front Axle/Gear Oil	**NEW HOLLAND AMBRA HYPOIDE 90**	**87299775**	**0.946 l** (**1 US qt**)
		87299136	**18.93 l** (**5 US gal**)
Grease	**NEW HOLLAND AMBRA GR-9 MULTI-PURPOSE GREASE**	**132096A1**	Tube **14 oz**
Coolant	Ethylene Glycol Coolant Concentrate		

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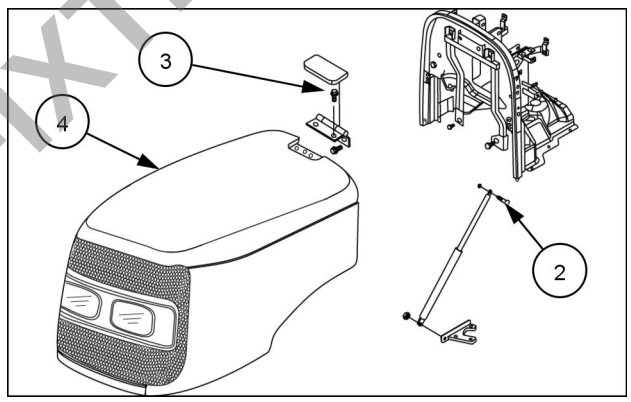
Engine - Remove - Separating the tractor at the clutch housing/engine

1. Chock all four wheels so that the tractor cannot move.
2. Disconnect negative (-) battery cable **(1)**.



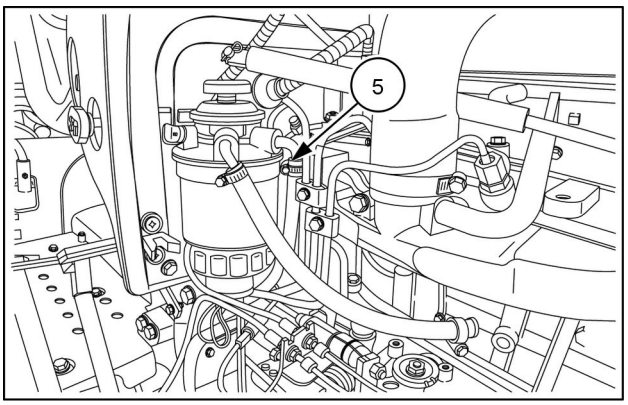
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3. Disconnect headlight wire harness.
4. Disassemble pin **(2)** at hood strut and wire harness. Remove hinge cover and **M8x16** bolts **(3)**.connector. Carefully remove hood **(4)**.



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5. Disconnect the main and engine wire harnesses.
6. Disconnect and plug fuel inlet hose **(5)** at the fuel filter.



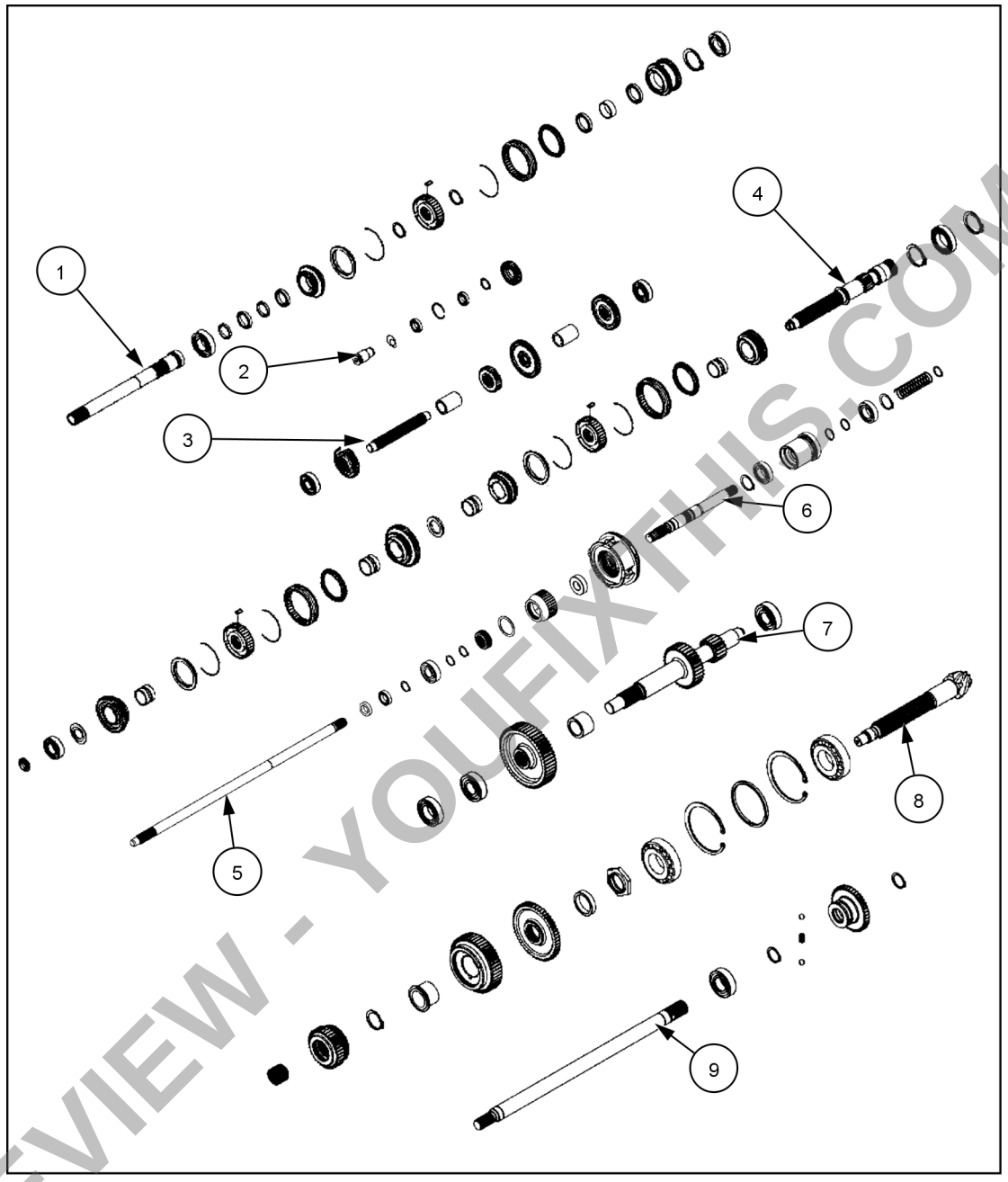
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NOTE: *There is not a fuel shutoff valve in the fuel system. To stop the fuel flow from the fuel tank, the fuel inlet hose to the fuel filter has to be removed from the fuel filter base and a plug installed or the fuel hose needs to be crimped shut to shutoff the fuel flow.*

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Transmission shaft - Exploded view



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12 x 12 Transmission Shafts - Exploded View

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

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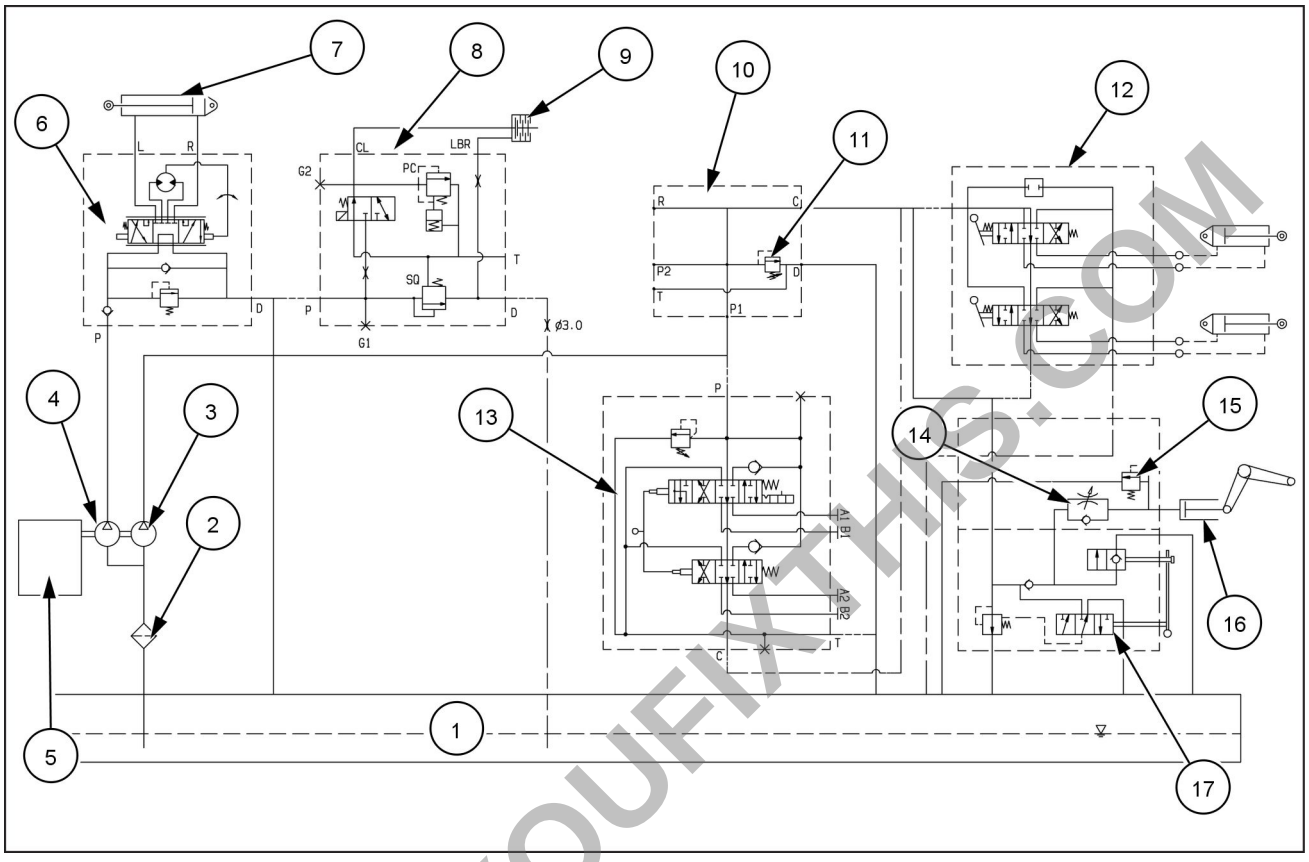
Engine lubrication system - Troubleshooting

Problem	Possible Cause	Correction
Inoperative low oil pressure indicator light	Blown #2, 10-amp fuse	Check fuse and replace if necessary
	Improper ground circuit	Check oil pressure indicator light circuit connections and circuit grounds and repair as necessary.
	Malfunctioning oil pressure switch	Test oil pressure switch and replace as necessary .
Low oil pressure indicator will not shut off	Engine oil pressure below **41.4 kPa** (**6.0 psi**).	Shut off engine, investigate cause of low oil pressure
	Malfunctioning oil pressure switch	Test oil pressure switch and replace as necessary .
	Short circuit to ground between oil pressure switch and instrument panel.	Check wiring harness for damage, repair as necessary.

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Hydraulic systems - Hydraulic schematic frame 01 - Gear transmission

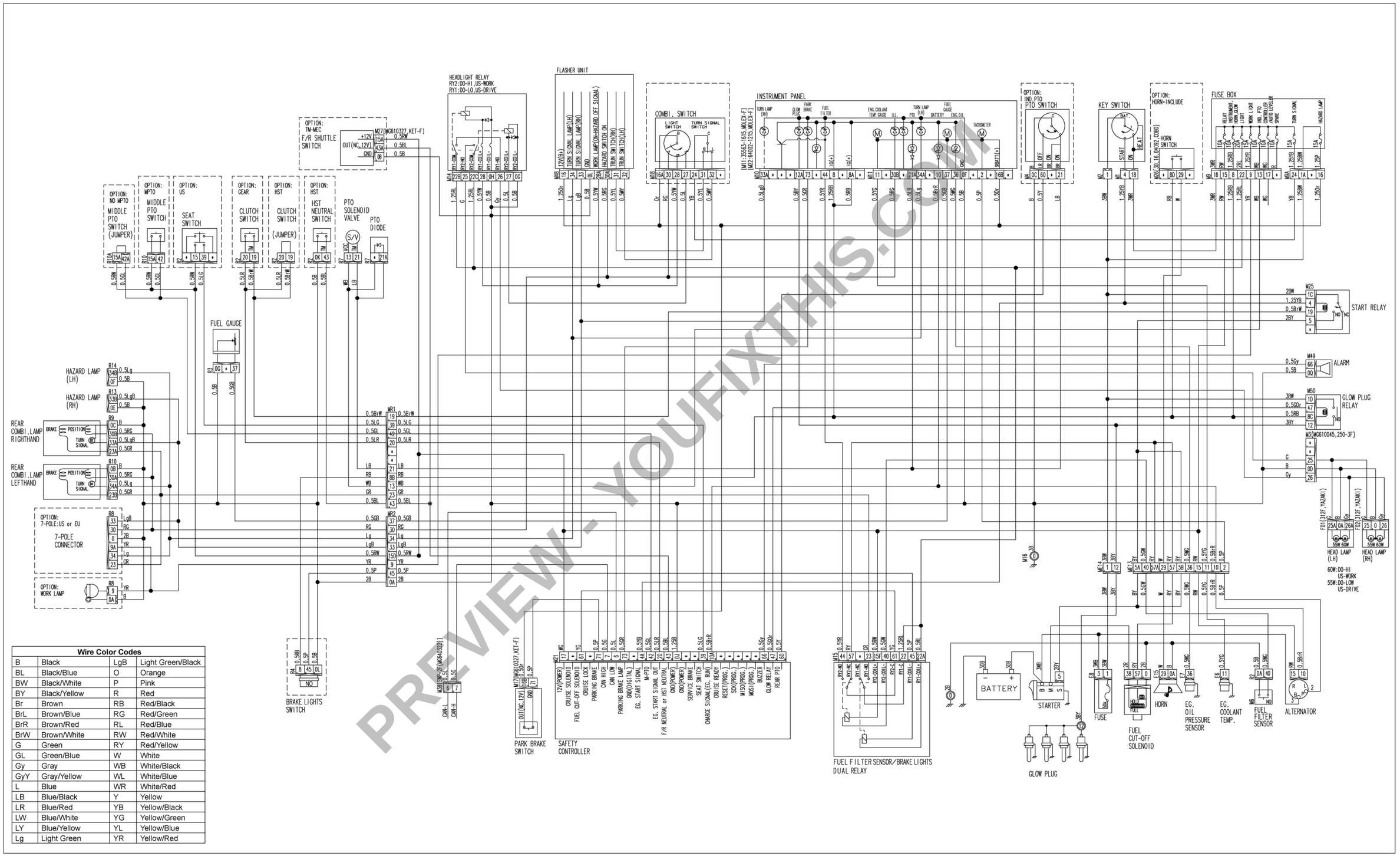


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1. Reservoir	**6.** Steering control valve	**11.** System Relief Valve	**16.** HPL cylinder
2. Suction filter (45 micron)	**7.** Steering cylinder	**12.** Rear Remote Valve (optional)	**17.** Hydraulic Lift Control Valve
3. Main hydraulic system pump	**8.** PTO Valve Block	**13.** Two Spool Mid Mount Valve (optional)	
4. Steering pump	**9.** PTO Clutch	**14.** Drop Rate Valve	
5. Engine	**10.** Front outlet valve block	**15.** Safety Relief Valve	

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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

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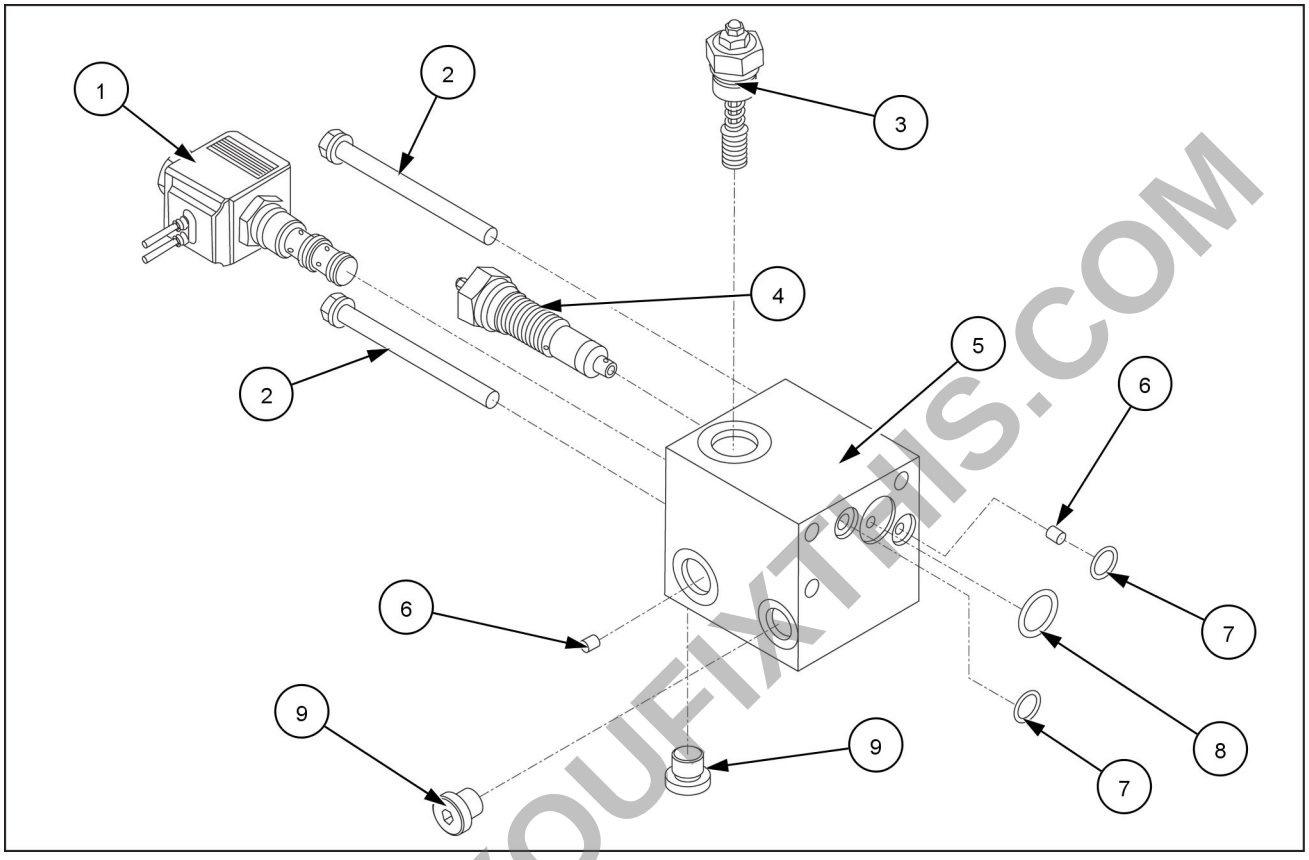
Hydrostatic transmission - Troubleshooting For the HST unit

Problem	Possible Cause	Correction
HST fails to operate	Input shaft failure.	Repair or replace as required.
	Low fluid pressure.	Fill to proper level.
HST erratic operation	Low charge pressure.	Check charge relief valve.
HST abnormal noise	Clogged suction strainer.	Clean strainer.
	Clogged HST filter.	Replace HST filter.
	Fluid viscosity high.	Replace fluid.
	Defective charge pump relief valve.	Replace relief valve.
	Defective cylinder block.	Replace cylinder block.
HST tractor fails to stop at neutral	Linkage out of adjustment.	Adjust neutral position.
	Neutral cannot be adjusted.	Replace trunion shaft joint.
	Defective neutral valve.	Replace neutral valve.
HST fluid leakage	Charge pressure too high (Above **6.6 bar** (**96 psi**).)	Check charge pressure, repair as needed.
	Return oil line restricted.	Repair as required.
HST low power	Low fluid pressure.	Replace high pressure relief valve.
	Internal fluid leakage.	Remove assembly. Overhaul HST.
	Bent spring pins in HST control linkage.	Replace spring pins.
	Worn bushings in HST control linkage.	Replace bushings.
	Timing teeth in HST linkage under lubricated.	Lubricate timing teeth.
HST is slow to return to neutral position	Binding in linkage.	Inspect, lubricate or replace linkage parts as necessary.
	Tight swash plate trunnion bearing cover.	Replace trunnion bearing covers. Check swash plate trunnion surface for rough finish, polish if needed.
HST filter O ring leakage or filter element implosion	Excessive fluid viscosity.	Replace hydraulic fluid.
	Hydraulic fluid is contaminated with water.	Replace hydraulic filter, replace HST filter.

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One-speed rear Power Take-Off (PTO) - Component identification independent PTO valve



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Independent PTO valve components

Reference	Description	Quantity
1	Valve, solenoid	**1**
2	Bolt, **M8** x **1.25** x **95mm** (Two shown)	**3**
3	Valve, sequencing	**1**
4	Valve, modulation	**1**
5	Block, PTO valve	**1**
6	Orifice, 1.3mm	**2**
7	O - ring	**2**
8	O - ring	**1**
9	Plug	**2**

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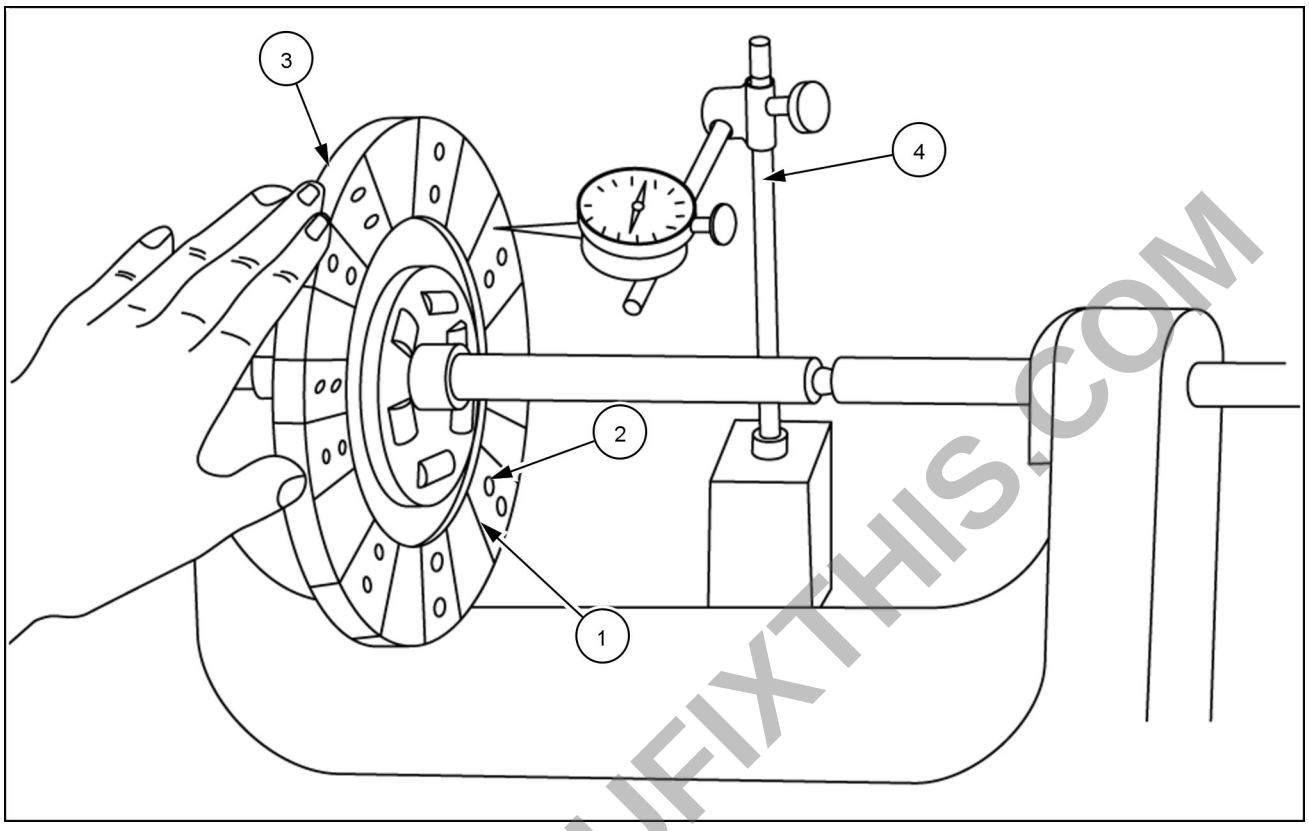
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[55.013] Engine oil system 55.9
[55.610] Ground speed control 55.10
[55.048] Rear Power Take-Off (PTO) control system 55.11
[55.031] Parking brake electrical system 55.12
[55.404] External lighting 55.13
[55.405] External lighting switches and relays 55.14
[55.408] Warning indicators, alarms, and instruments 55.15
[55.513] Cab transmission controls 55.16

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Clutch - Check - Disc wear limit and runout



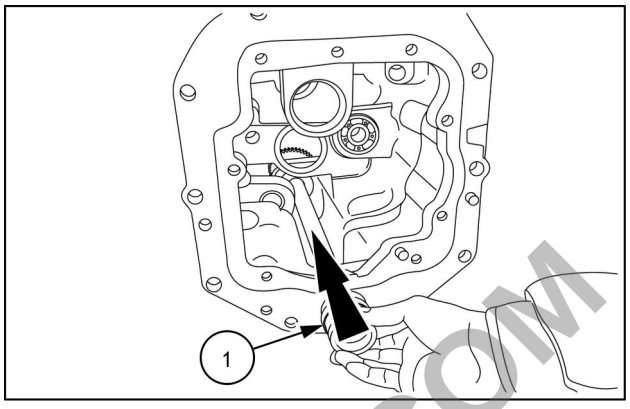
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1. When facing material **(1)** has worn to within **0.2 mm** (**0.008 in**) of the securing rivet heads **(2)**, the clutch disc **(3)** must be replaced.
2. If the clutch disc facing material is found to be saturated with oil, the disc must be replaced and the cause of oil contamination determined and corrected. If only a small amount of oil is present on the facing material, it is sufficient to remove it with cleaning fluid .
3. Check the disc for wobble as shown in figure with a dial indicator **(4)**, and replace if needed.

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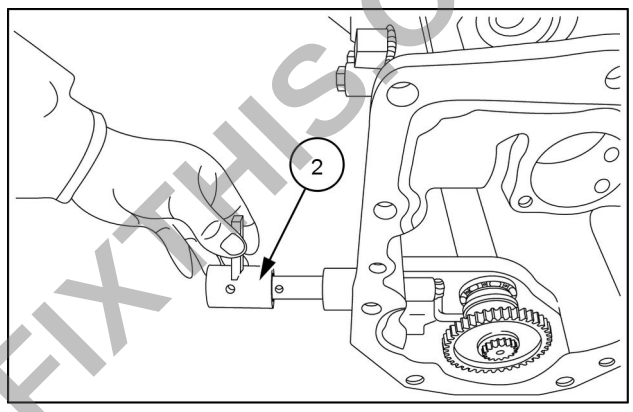
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12. Install the seal housing **(1)**.



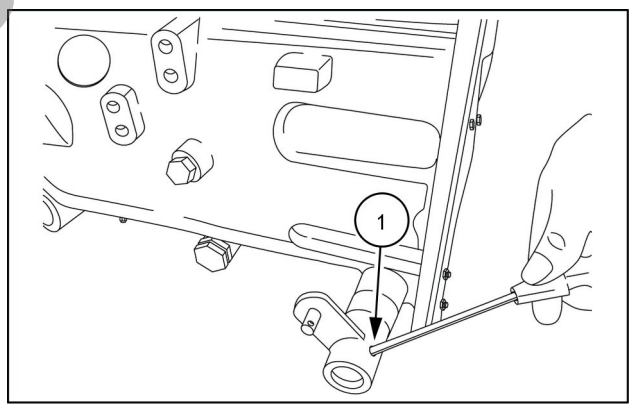
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13. Install the FWD shift lever **(2)**.



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14. Install the spring pin **(1)** in the FWD shift lever.

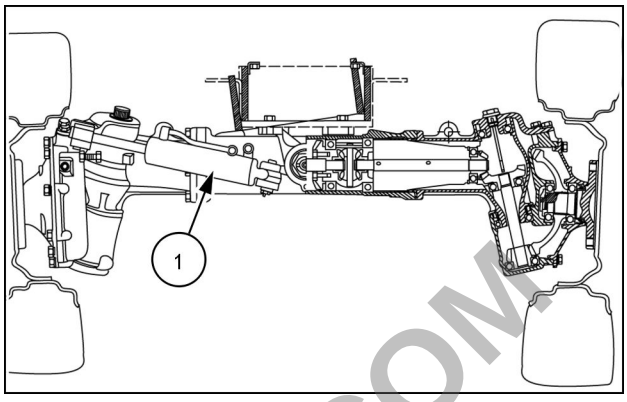


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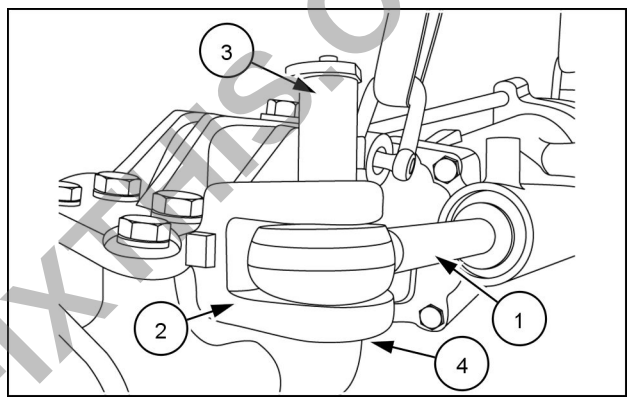
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9. Install the steering cylinder **(1)**.



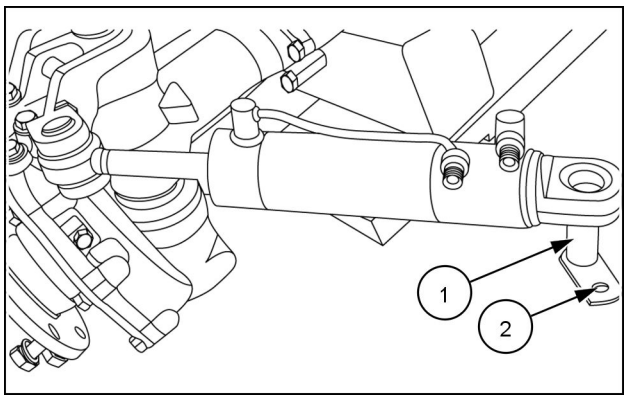
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10. Place rod end **(1)** in the steering knuckle **(2)**.
11. Secure in place with zerked pin, **(3)** install snap ring **(4)** at bottom.



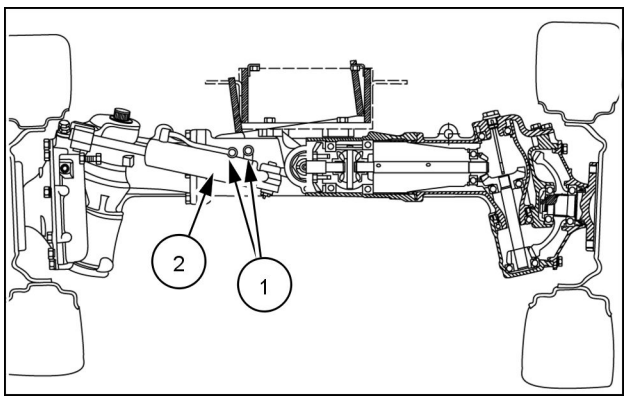
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12. Place opposite end to frame, secure with pin **(1)**.
13. Secure pin **(1)** with bolt **M8 x 13 mm** through hole **(2)** **29.4 - 34.3 N·m** (**22 - 25 lb ft**).



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14. Attach high and low pressure hydraulic lines **(1)** to steering cylinder **(2)**. Torque hose fittings to **25 N·m** (**18 lb ft**).

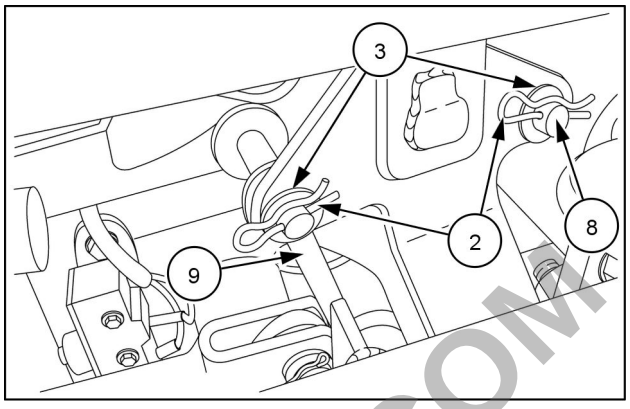


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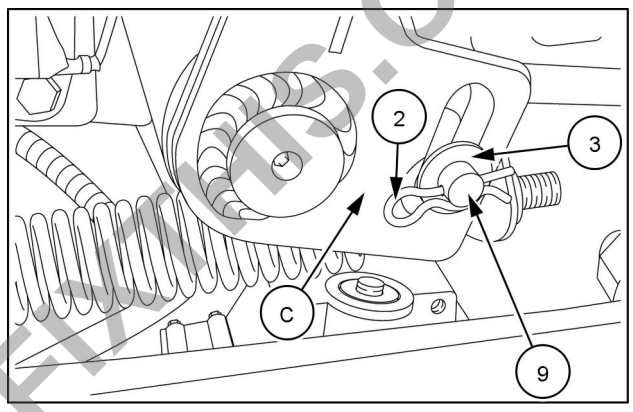
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7. Remove two clevis pins **(2)** and washers **(3)**.
8. Remove the cruise control rod **(8)**, and the cruise control release rod **(9)**.



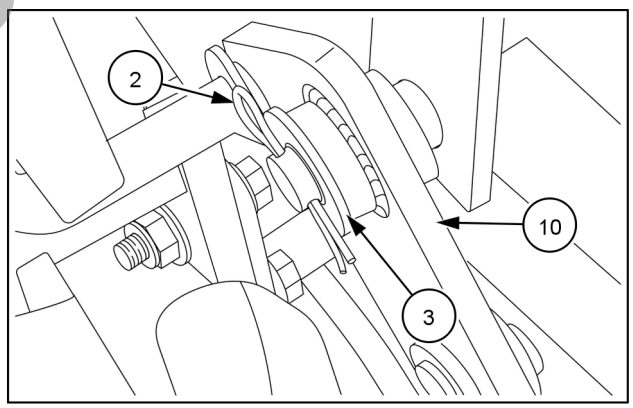
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9. Remove one clevis pin **(2)** and one washer **(3)**. remove the lower end of the cruise control release rod **(9)**,where it connects to the brake linkage **(C)**.



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10. Remove clevis pin **(2)** and washer **(3)**, remove ratchet pawl **(10)**.



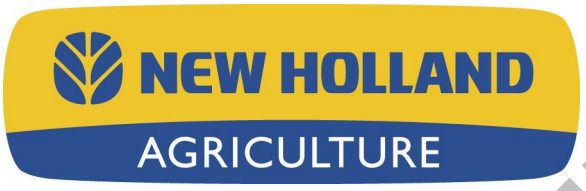
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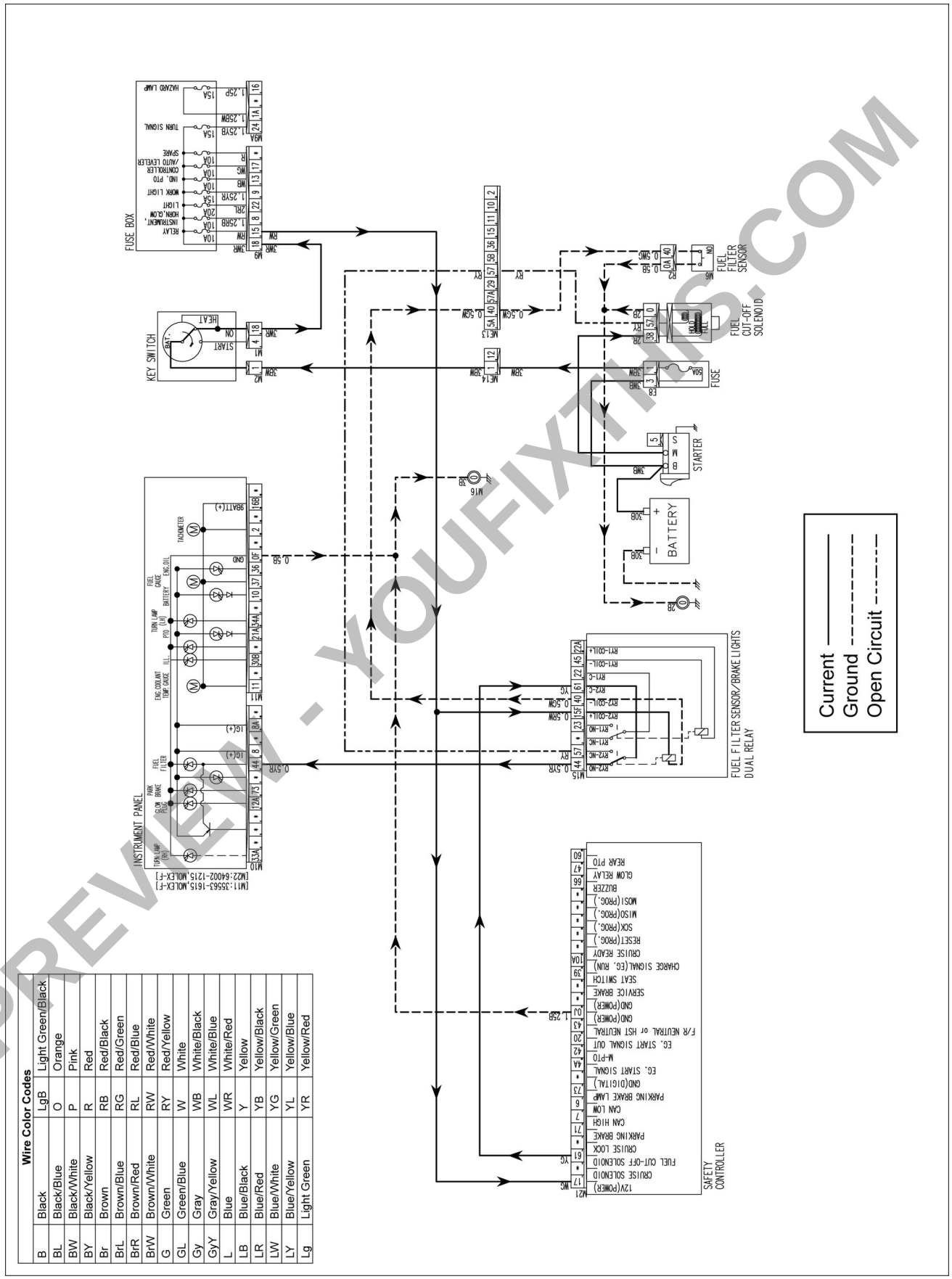
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Electrical system - Electrical schematic frame 19 - Fuel filter sensor engine shut down



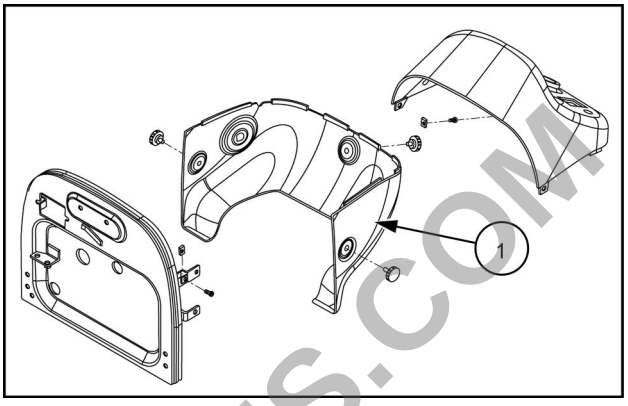
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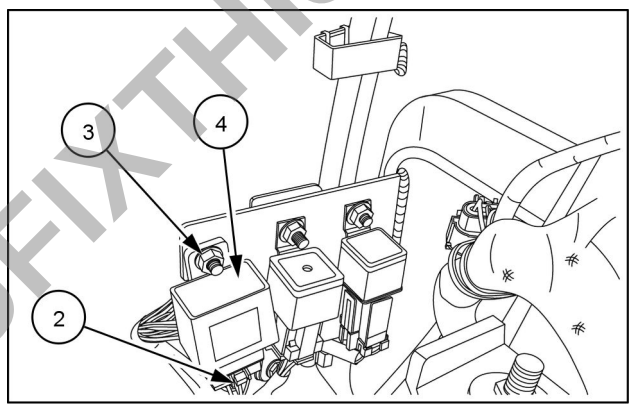
Water-In-Fuel sensor - Remove - Fuel filter sensor relay

1. Remove negative (-) battery cable from negative (-) battery terminal.
2. Remove instrument rear hood panel **(1)** from the tractor.



NHIL13CT 00299A 1

3. Disconnect the relay connector **(2)** from the tractor wire harness.
4. Remove retaining bolt **(3)** from relay mounting tab and remove relay **(4)** from the tractor.



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Next operation:
Water-In-Fuel sensor - Test - Fuel filter sensor relay (55.010)

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Work light Front - Troubleshooting

Problem	Possible Cause	Correction
Inoperative work lights	Blown #7 15-amp fuse	Replace 15-amp fuse
	Blown #8 15-amp fuse	Replace 15-amp fuse
	Blown #9 10-amp fuse	Replace 10-amp fuse
	Faulty combination light switch	Test switch, replace if necessary
	Faulty head light relay	Test relay, replace if necessary
	Failure of lamp diode	Test diode, replace if necessary
	Improper ground	Check ground location, for clean contact area

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