This technical manual is written for an experienced technician and contains sections that are specifically for this product. It is a part of a total product support program.

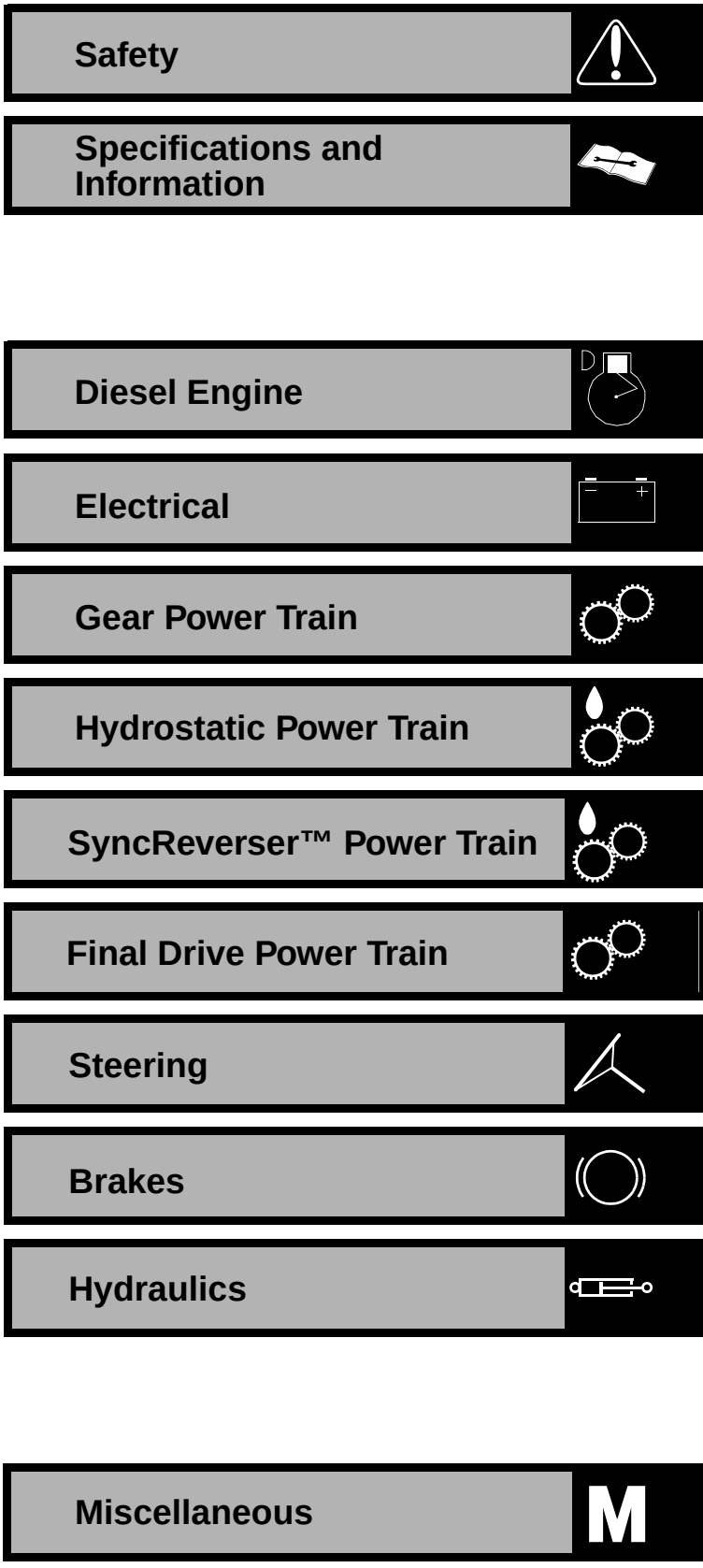
The manual is organized so that all the information on a particular system is kept together. The order of grouping is as follows:

- Table of Contents
- Specifications
- Component Location
- System Schematic
- Theory of Operation
- Troubleshooting Chart
- Diagnostics
- Tests & Adjustments
- Repair

Note: Depending on the particular section or system being covered, not all of the above groups may be used.

Each section will be identified with a symbol rather than a number. The groups and pages within a section will be consecutively numbered.

We appreciate your input on this manual. To help, there are postage paid post cards included at the back. If you find any errors or want to comment on the layout of the manual please fill out one of the cards and mail it back to us.

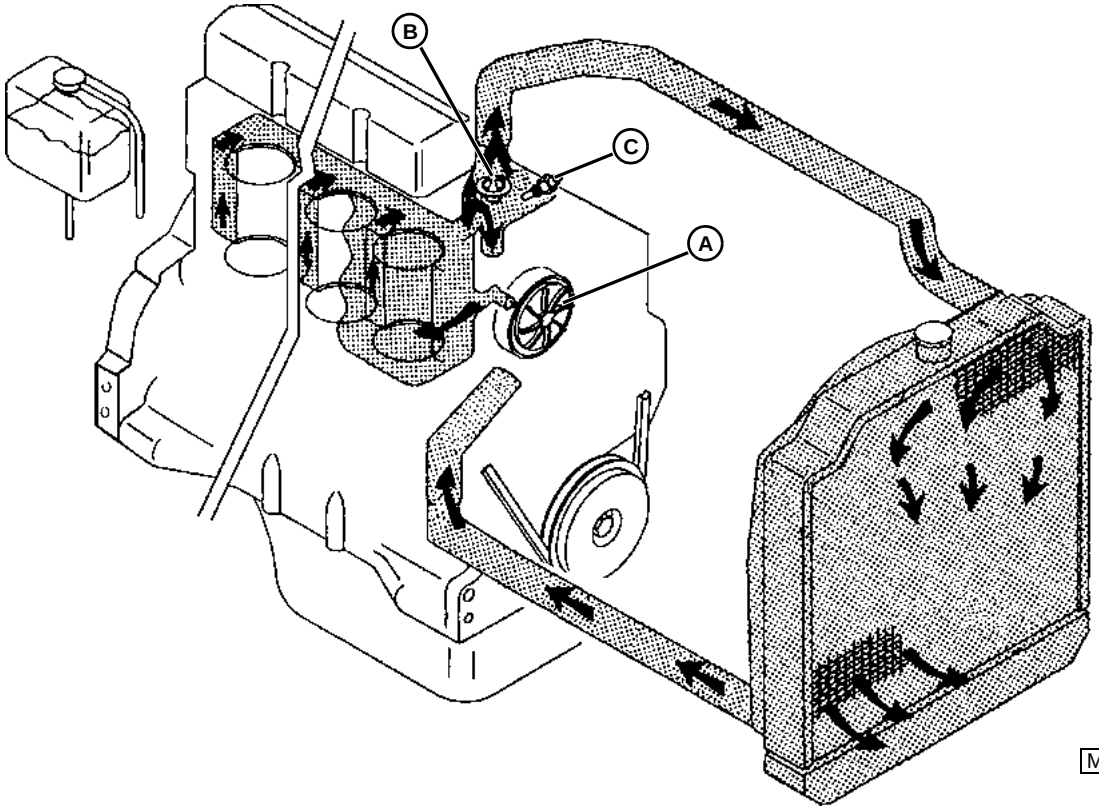


GENERAL VEHICLE SPECIFICATIONS* – 4300

	4300 CST	4300 SRT	4300 HST
ENGINE			
Make	John Deere/Yanmar	John Deere/Yanmar	John Deere/Yanmar
Model	3TNE84	3TNE84	3TNE84
Type	4-cycle Diesel	4-cycle Diesel	4-cycle Diesel
Bore and Stroke	84x90 mm (3.31x3.54 in.)	84x90 mm (3.31x3.54 in.)	84x90 mm (3.31x3.54 in.)
Cylinders	3	3	3
Valves	Overhead Valves	Overhead Valves	Overhead Valves
Displacement	1496 cm^3 (91.3 cu in.)	1496 cm^3 (91.3 cu in.)	1496 cm^3 (91.3 cu in.)
Compression Ratio	18.0:1	18.0:1	18.0:1
Gross Engine Power	24.0 kW (32.2 hp)	24.0 kW (32.2 hp)	24.0 kW (32.2 hp)
Torque (at rated speed)	78.5 N•m (57.9 lb-ft)	78.5 N•m (57.9 lb-ft)	78.5 N•m (57.9 lb-ft)
Torque (max. @ 1700 rpm)	99.1 N•m (73.1 lb-ft)	99.1 N•m (73.1 lb-ft)	99.1 N•m (73.1 lb-ft)
Lubrication	Full pressure	Full pressure	Full pressure
Oil filter	Standard Single Element	Standard Single Element	Standard Single Element
Oil Capacity (w/filter)	4.3 L (4.6 qt)	4.3 L (4.6 qt)	4.3 L (4.6 qt)
Engine Rated Speed	2700 rpm	2700 rpm	2700 rpm
Engine Slow Idle Speed	950 ± 50 rpm	950 ± 50 rpm	1000 ± 50 rpm
Engine Fast Idle Speed	2920 ± 25 rpm	2920 ± 25 rpm	2920 ± 25 rpm
Cooling system	Liquid w/Pump & Radiator	Liquid w/Pump & Radiator	Liquid w/Pump & Radiator
Air cleaner	Dry-Type w/Safety Element	Dry-Type w/Safety Element	Dry-Type w/Safety Element
ELECTRICAL			
Volts	12 VDC	12 VDC	12 VDC
Battery Rating	45 amp-hr	45 amp-hr	45 amp-hr
Battery Size - 12V (CCA)	500 Cold Cranking Amps	500 Cold Cranking Amps	500 Cold Cranking Amps
Alternator	40 amp	40 amp	40 amp
Regulator	Internal, Current Limiting	Internal, Current Limiting	Internal, Current Limiting
Starting Motor	1.4 kW (1.88 hp)	1.4 kW (1.88 hp)	1.4 kW (1.88 hp)
Headlights	37.5 W Halogen Bulb	37.5 W Halogen Bulb	37.5 W Halogen Bulb
Tail Lights	5 W Bayonet Base	5 W Bayonet Base	5 W Bayonet Base
Hazard Lights	Type 1156	Type 1156	Type 1156
Instrument Panel Lamps	1.7 W Bayonet Base	1.7 W Bayonet Base	1.7 W Bayonet Base

*Specifications and design subject to change without notice.

COOLING SYSTEM OPERATION



Function:

The coolant pump (A) circulates coolant through the cooling system, drawing hot coolant from the engine block, circulating it through the radiator for cooling.

Theory of Operation:

The pressurized cooling system includes the radiator, water pump, fan and thermostat (B).

During the warm-up period, the thermostat remains closed and the impeller type coolant pump draws coolant from the bypass tube. Coolant from the pump flows to the cylinder block water jacket and up through the cylinder head providing a fast warm-up.

Once the engine has reached operating temperature, the thermostat opens and coolant is pumped from the bottom of the radiator via the lower radiator hose into the cylinder block. Here it circulates through the block and around the cylinders.

From the block, coolant is then directed through the cylinder head, and into thermostat housing.

With the thermostat open, warm engine coolant passes through the housing into the top of the radiator where it is circulated to dissipate heat.

When coolant system pressure exceeds **48 kPa (7 psi)**, a valve in the radiator cap opens to allow coolant to discharge into the coolant recovery tank.

When temperature is reduced, a vacuum is produced in the radiator and coolant is drawn back out of the coolant recovery tank through a valve in the radiator cap.

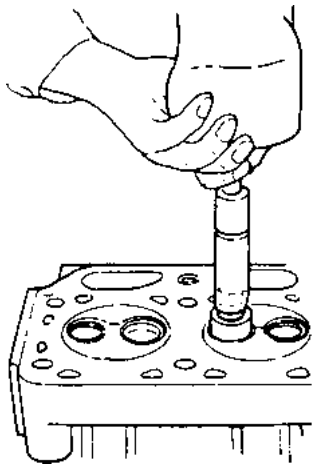
A coolant temperature sensor (C) informs the operator of the engine coolant temperature and warns of a high temperature condition by lighting a lamp.

Start To Open . . . . . .69.5 - 72.5° C (157 - 163° F)
Fully Opened . . . . . .85° C (185° F)

GRIND VALVE SEATS

NOTE: LIGHTLY grind the valve seats for only a few seconds to avoid excessive valve seat width.

1. Grind the intake valve seat using a 30° seat grinder and the exhaust valve seat using a 45° seat grinder. Follow the tool manufacturers instructions.



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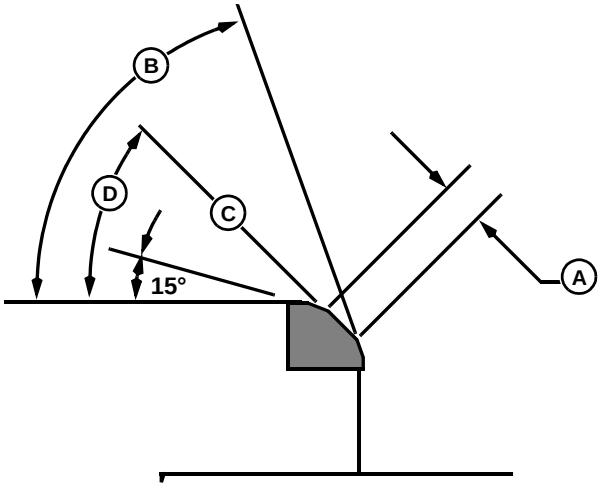
2. Measure the valve seat width after grinding.

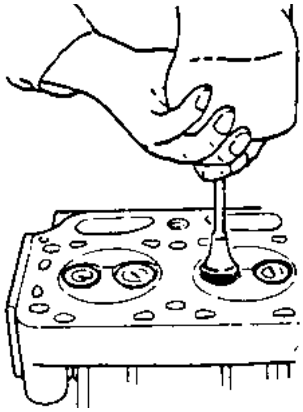


3. If the seat width (A) is too wide after grinding, grind the lower seat surface (B) using a 70° seat grinder until the seat width is close to specifications.
4. Grind the upper seat surface (C) using a 15° seat grinder until the seat width is narrowed to specifications.
5. If the valve seats (D) are ground, measure valve recession. (See “CYLINDER HEAD AND VALVES DISASSEMBLY AND ASSEMBLY”) Check the contact pattern between the seat and valve with bluing dye.
6. Lap the valves. (See “LAP VALVES”).

If the valve recession exceeds the maximum specifications or the seats cannot be reconditioned, replace the valves or the cylinder head.

LAP VALVES

NOTE: Use a rubber type lapping tool for valves without a lapping tool groove slit.



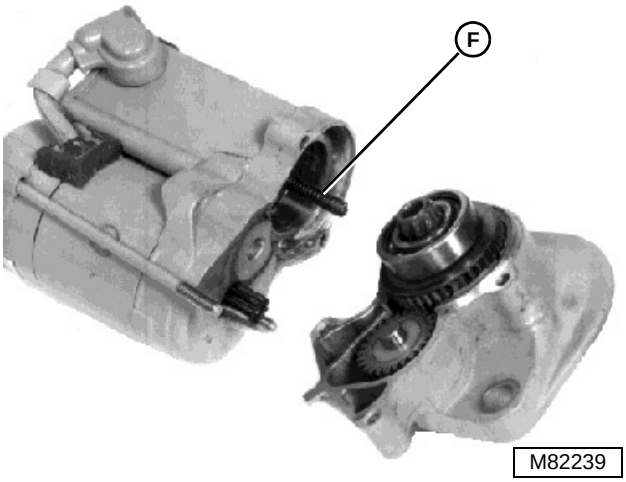
M82041A

If the seat does not make proper contact, lap the valve into the seat:

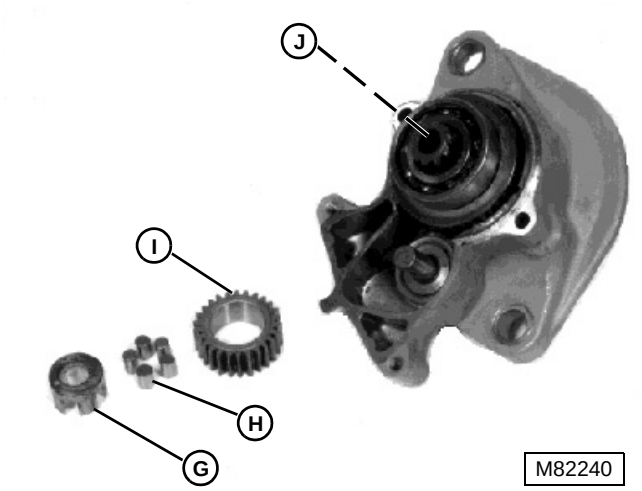
1. Apply a small amount of fine lapping compound to the face of the valve.
2. Turn the valve to lap the valve to the seat.
3. Lift the valve from the seat every 8 to 10 strokes. Lap until a uniform ring appears around the surface of the valve face.
4. Wash all parts in solvent to remove lapping compound. Dry all parts.
5. Check the position of the lap mark on the valve face. Lap marks must be on or near the center of the valve face.

MEASURE PISTON-TO-CYLINDER HEAD CLEARANCE

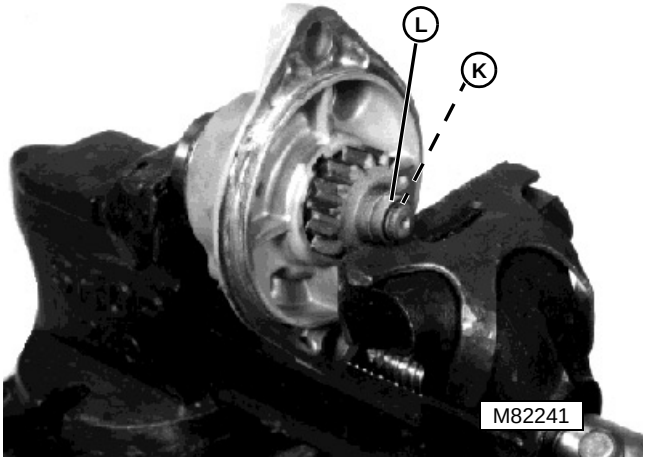
1. Place three **10 mm (0.4 in.)** long pieces of **1.5 mm (0.06 in.)** diameter soft wire in three positions on the flat part of the piston head.
2. Install the cylinder head and old gasket. Install cylinder head bolts and tighten in proper sequence. (See “CYLINDER HEAD AND VALVES REMOVAL AND INSTALLATION”).
3. Slowly turn the crankshaft one complete revolution.
4. Remove the cylinder head and gasket.



4. Remove the plunger spring (F).



5. Remove the retainer (G), five rollers (H), and pinion gear (I).
6. Remove the steel ball (J).

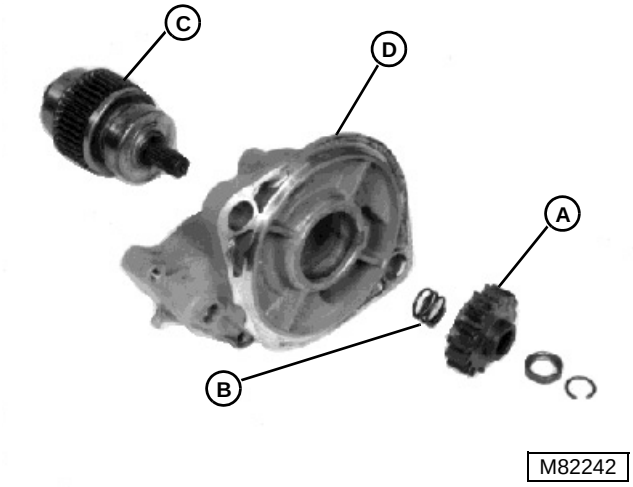


7. Put the clutch housing assembly into a soft-jawed vice, as shown.
8. Tighten the vise slowly, until the drive gear compresses.
9. Remove the circlip (K) and retainer (L).

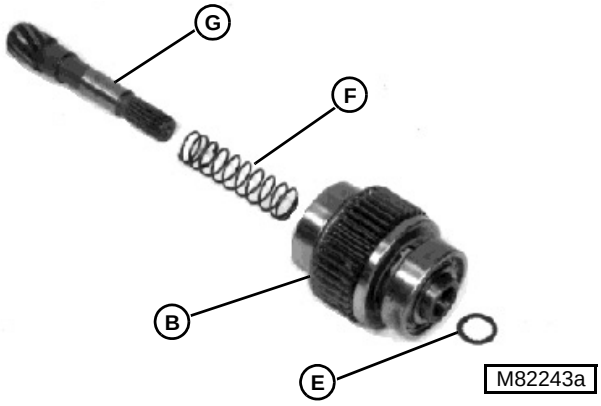
CAUTION

The shaft could be propelled from the clutch unit with considerable force if the spring is not allowed to extend fully while in the vise!.

10. While holding the clutch assembly, slowly open the vise until all spring compression is relieved.



11. Remove the drive gear (A), spring (B), and clutch (C) assembly from the housing (D).

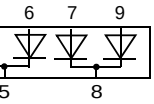


12. Remove the toothed washer (E), spring (F), and clutch shaft (G).
13. Inspect all parts for wear or damage.

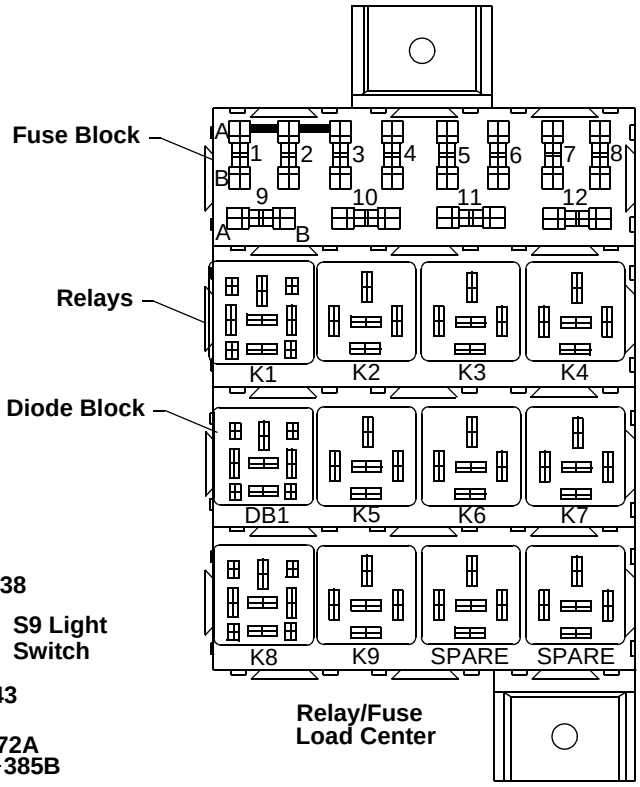
Assembly:

Assembly is done in the reverse order of disassembly.

4	5	6	7	8	9
A/539B	521	518A	010D/010E	302A	– – –

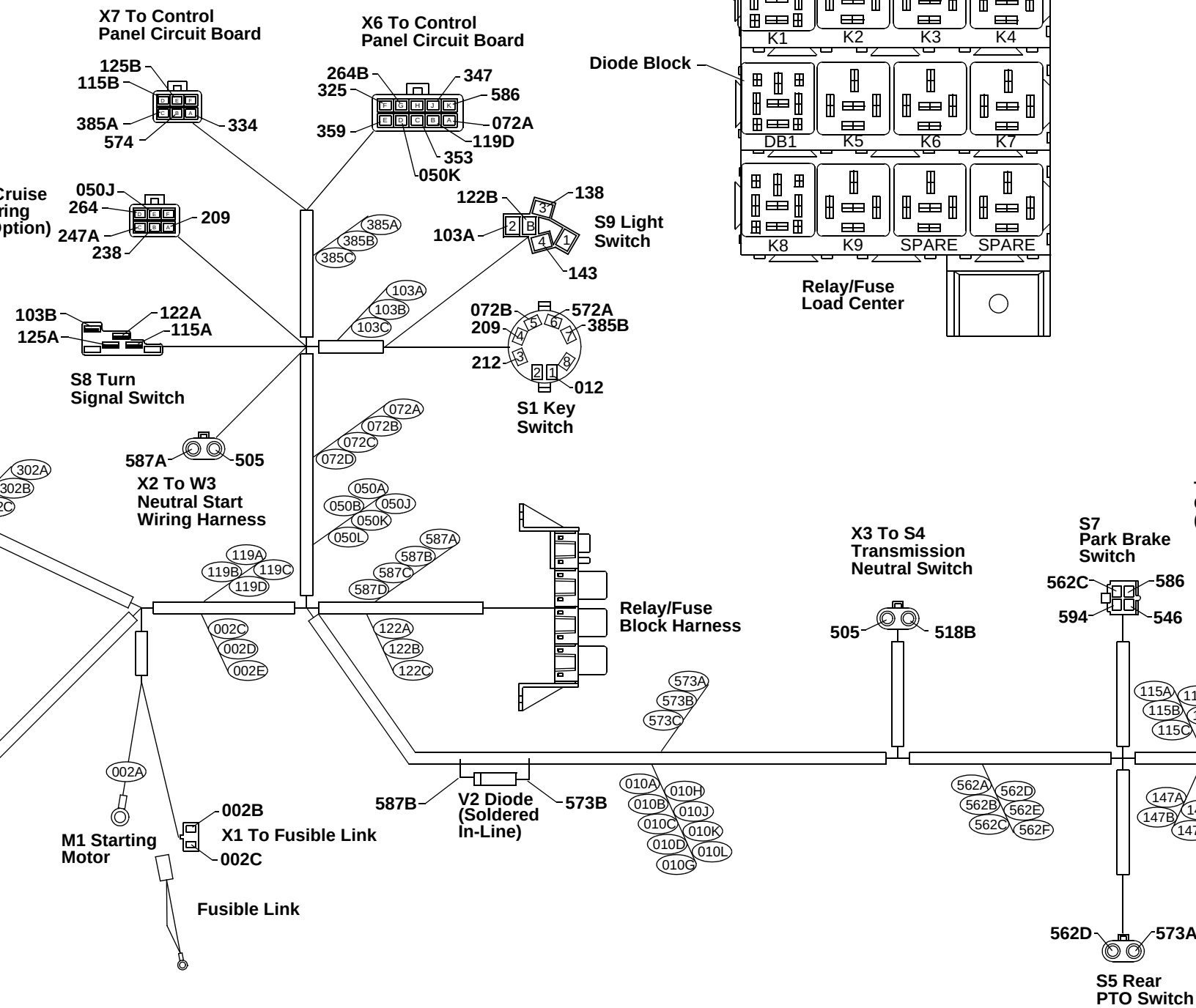


k

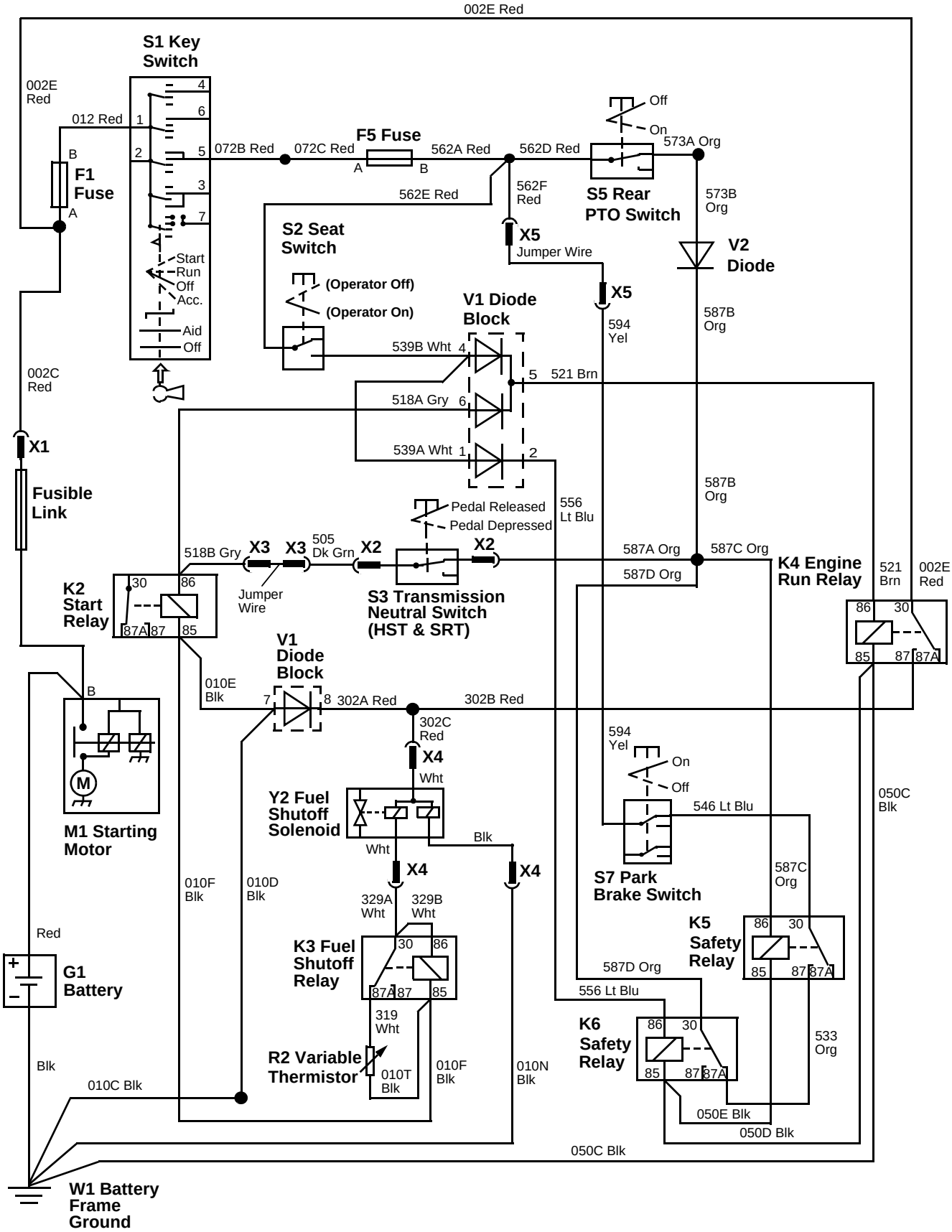


Rela
Layo

Relay
Schema



ENGINE SHUTOFF CIRCUIT ELECTRICAL SCHEMATIC



SE1 - STARTING	SE2 - IGNITION

BATTERY TEST

CAUTION

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into the eyes.

Avoid the hazard by:

1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoid spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 15—30 minutes. Get medical attention immediately.

If acid is swallowed:

1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 1.9 L (2 qts.).
3. Get medical attention immediately.

Reason:

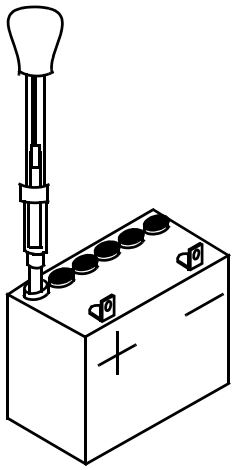
To check condition of battery and determine battery voltage.

Equipment:

- Hydrometer
- Voltmeter or JTO5685 Battery Tester

Procedure:

1. Park machine on level surface.
2. Disengage PTO.
3. Turn key switch to OFF position.
4. Engage park brake.
5. Raise hood.
6. Clean cable ends, battery terminals and top of battery.
7. Remove battery.
8. Inspect battery terminals and case for breakage or cracks.
9. Check electrolyte level in each battery cell. Add clean, soft water as needed. If water is added, charge battery for **20 minutes at 10 amps**.
10. Remove surface charge by placing a small load on the battery for 15 seconds.



11. Use an hydrometer to check for a **minimum specific gravity of 1.265 with less than 50 point variation in each cell at full charge at 26.7°C (80°F).**

Results:

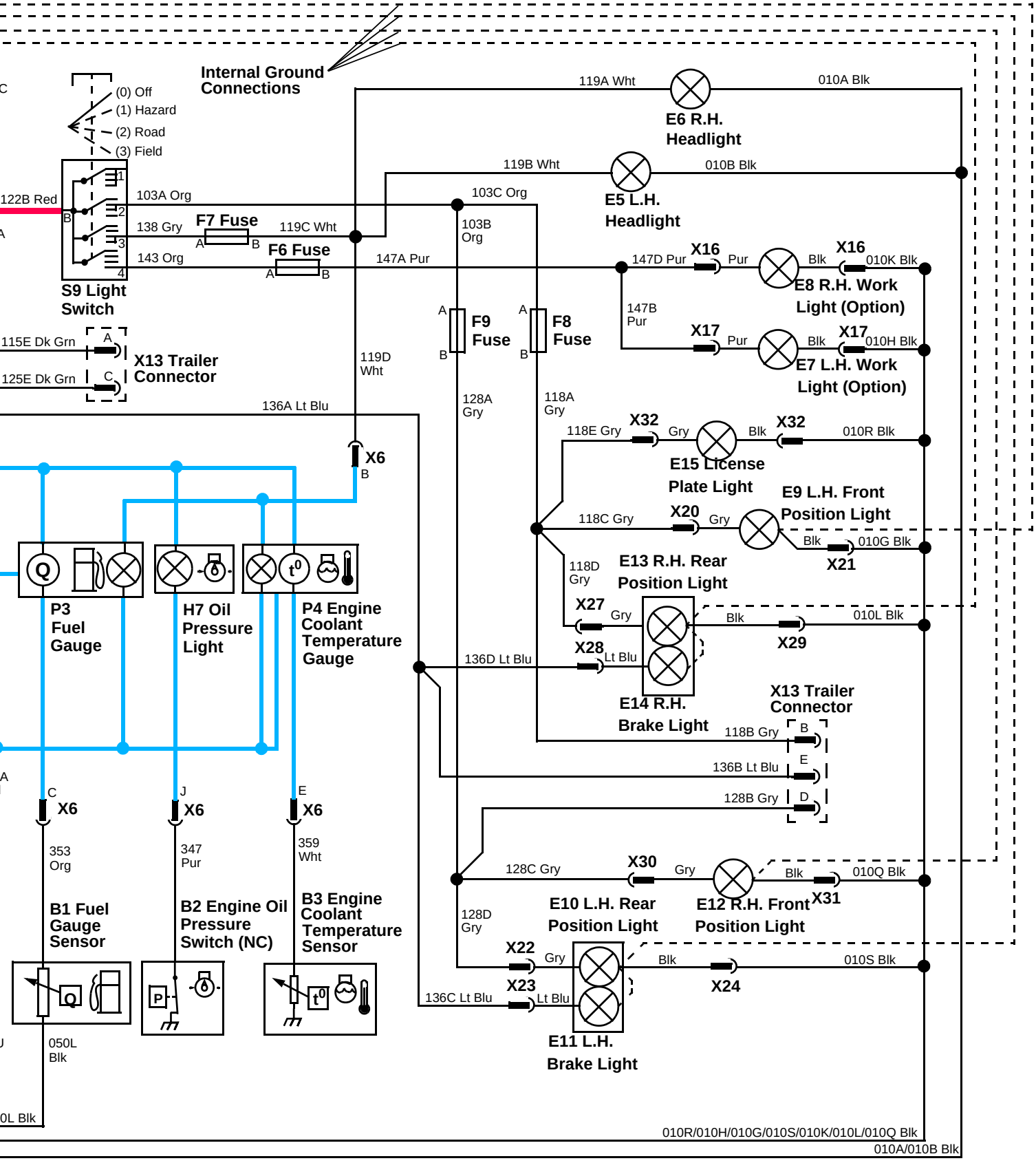
- If all cells are less than 1.175, charge battery at 10 amp rate.
- If all cells are less than 1.225 with less than 50 point variation, charge battery at 10 amp.
- If all cells are more than 1.225 with less than 50 point variation, load test battery.
- If more than 50 point variation between cells, replace battery.

12. Use a voltmeter or JTO5685 Battery Tester to check for a **minimum battery voltage of 12.4 VDC**.

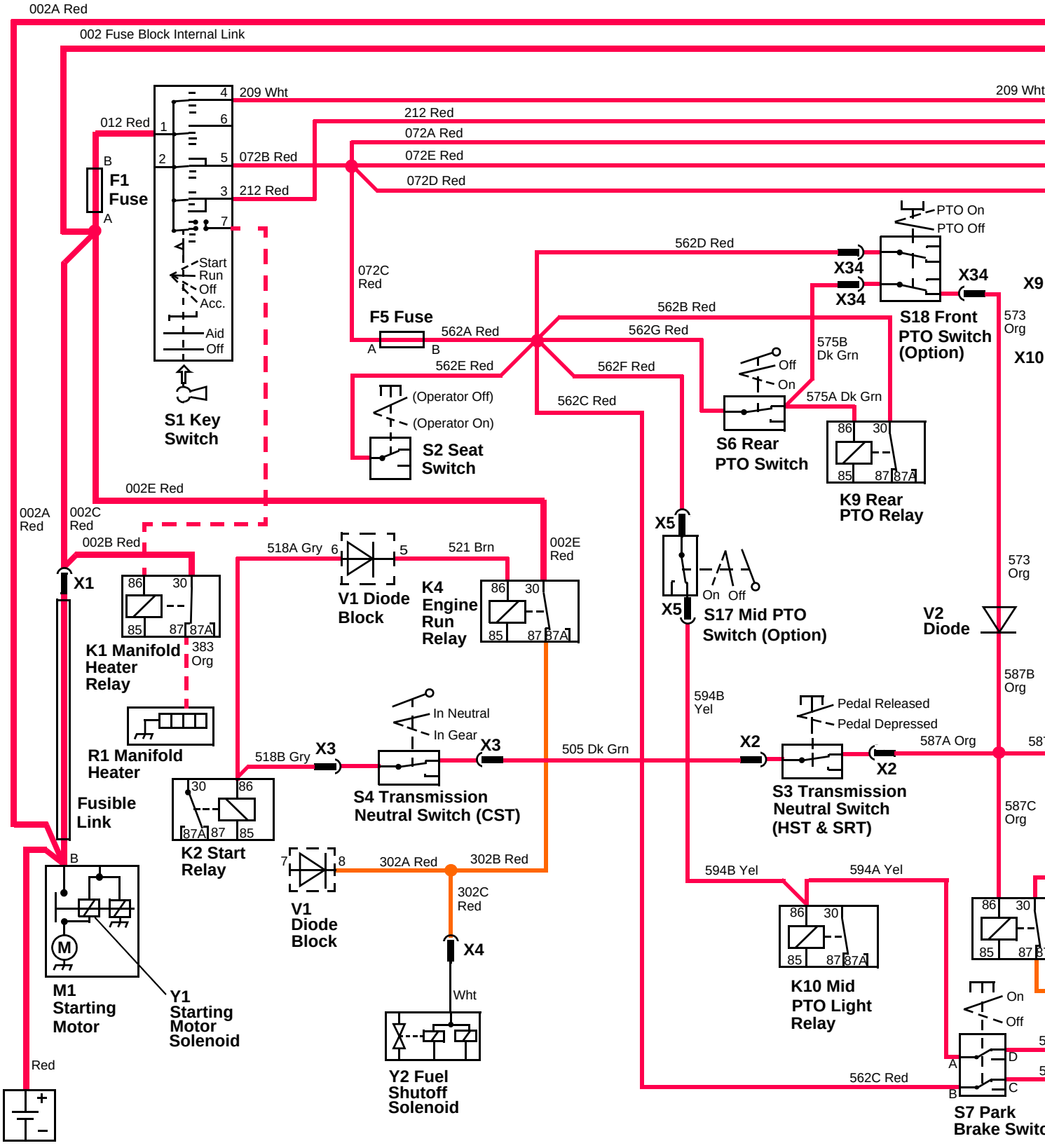
Results:

- If battery voltage is less than 12.4 VDC, charge battery.
- If battery voltage is more than 12.4 VDC, test specific gravity. (See Step 12.)

13. Install battery.

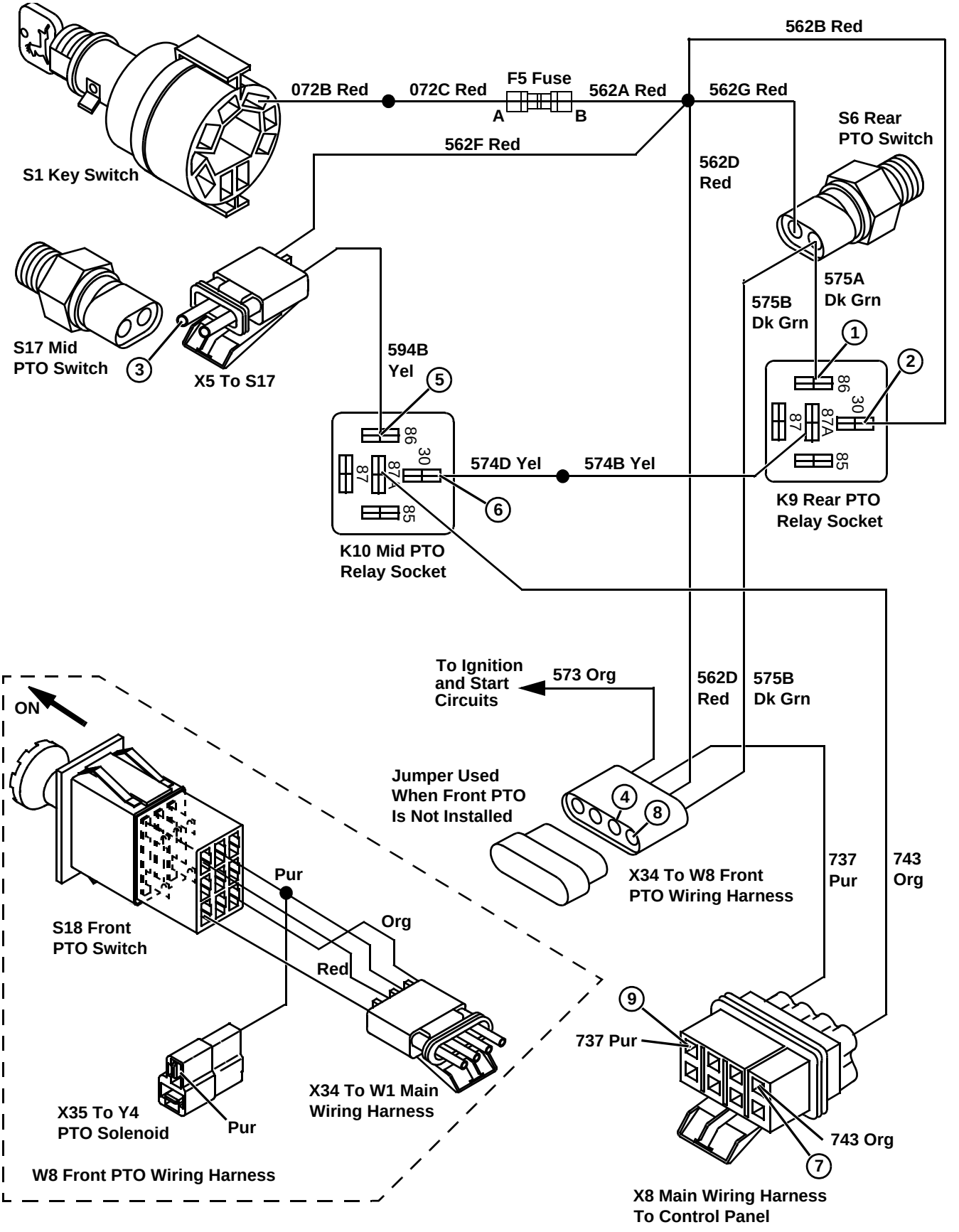

Internal Ground Connections
(0) Off
(1) Hazard
(2) Road
(3) Field
S9 Light Switch
122B Red
103A Org
138 Gry
143 Org
F7 Fuse
F6 Fuse
119C Wht
103C Org
103B Org
147A Pur
119A Wht
010A Blk
E6 R.H. Headlight
119B Wht
010B Blk
E5 L.H. Headlight
147D Pur
X16
Pur
Blk
010K Blk
E8 R.H. Work Light (Option)
147B Pur
X17
010H Blk
E7 L.H. Work Light (Option)
F9 Fuse
F8 Fuse
115E Dk Grn
125E Dk Grn
X13 Trailer Connector
119D Wht
128A Gry
118A Gry
136A Lt Blu
X6
118E Gry
X32
010R Blk
E15 License Plate Light
E9 L.H. Front Position Light
118C Gry
X20
X21
010G Blk
118D Gry
E13 R.H. Rear Position Light
X27
X28
X29
010L Blk
Lt Blu
136D Lt Blu
E14 R.H. Brake Light
X13 Trailer Connector
118B Gry
136B Lt Blu
128B Gry
P3 Fuel Gauge
H7 Oil Pressure Light
P4 Engine Coolant Temperature Gauge
353 Org
347 Pur
359 Wht
B1 Fuel Gauge Sensor
B2 Engine Oil Pressure Switch (NC)
B3 Engine Coolant Temperature Sensor
050L Blk
128C Gry
X30
X31
010Q Blk
E10 L.H. Rear Position Light
E12 R.H. Front Position Light
128D Gry
X22
X23
X24
010S Blk
136C Lt Blu
E11 L.H. Brake Light
010R/010H/010G/010S/010K/010L/010Q Blk
010A/010B Blk

POWER CIRCUIT ELECTRICAL SCHEMATIC - RUN / AID

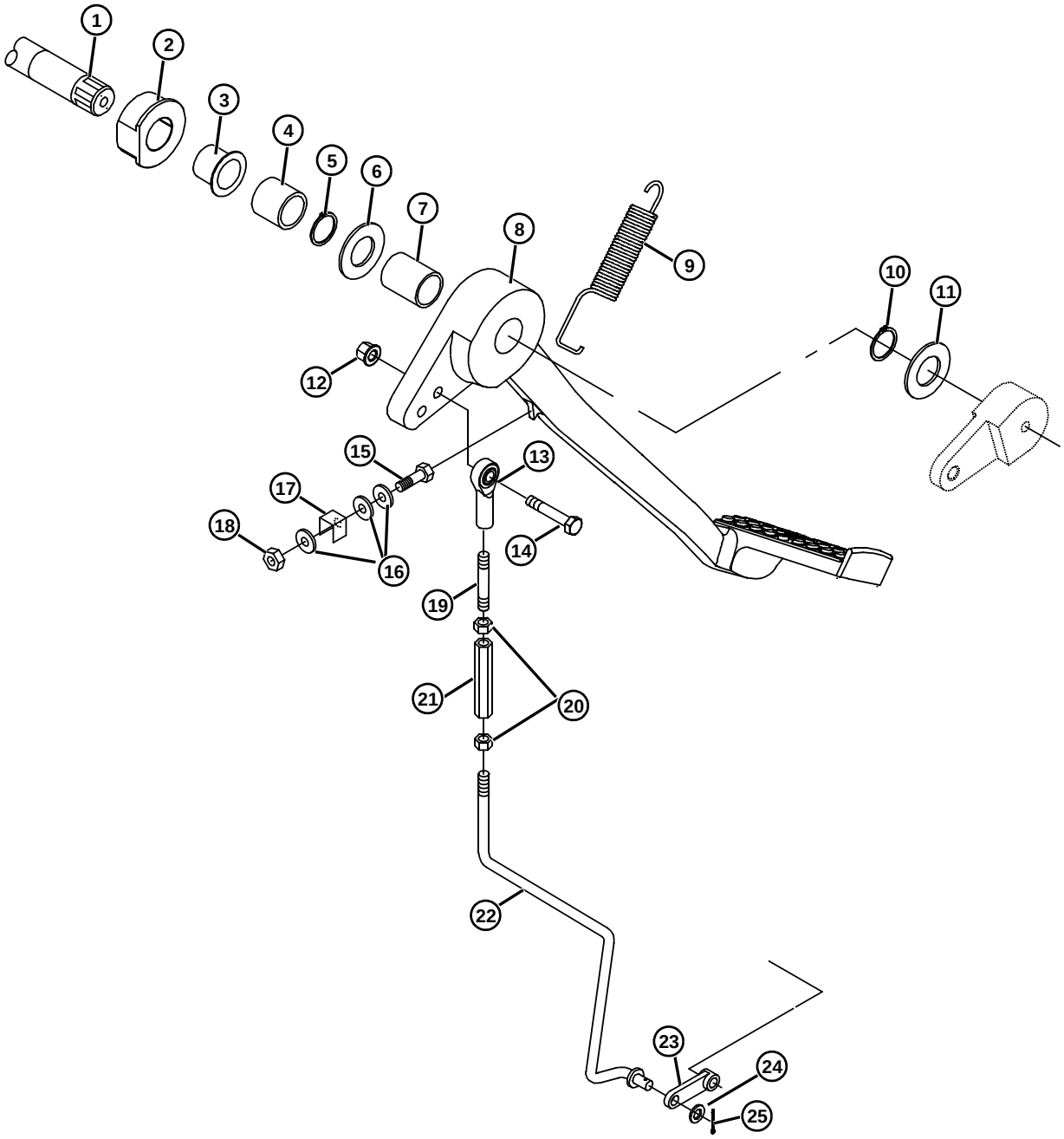


Unswitched Power — Switched Power — Secondary Switched Power

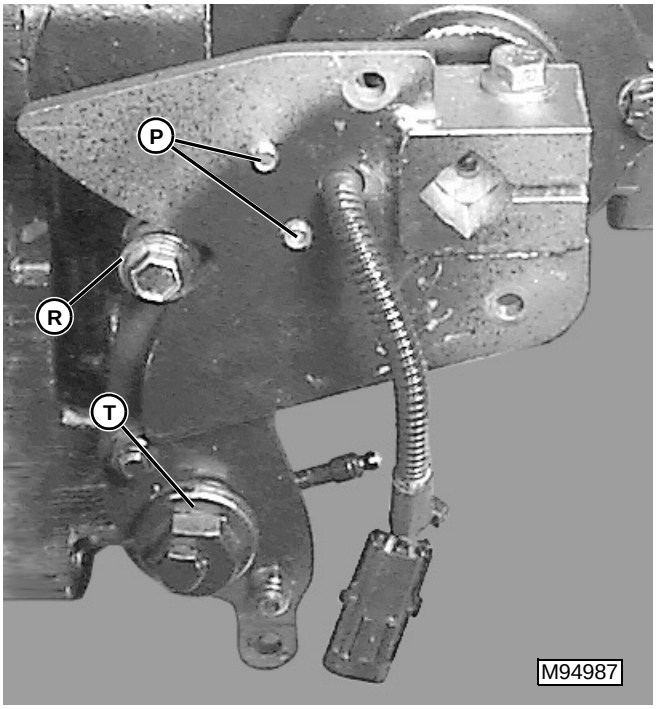
SE1 - STARTING	SE2 - IGNITION

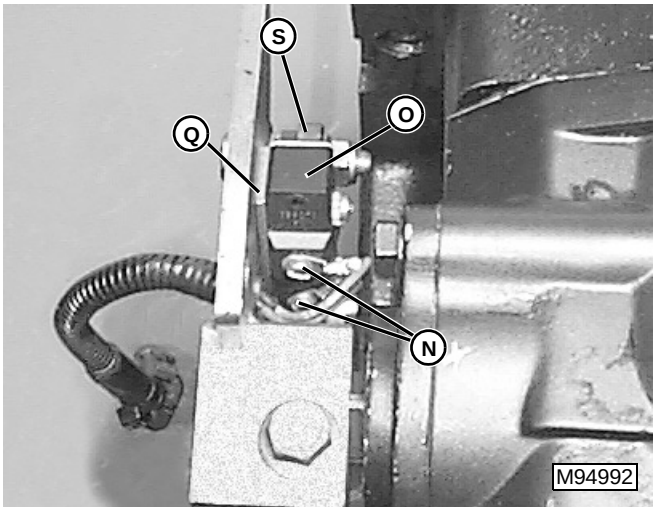

562B Red
072B Red
072C Red
F5 Fuse
A
B
562A Red
562G Red
S6 Rear
PTO Switch
562F Red
562D
Red
S1 Key Switch
575A
Dk Grn
575B
Dk Grn
S17 Mid
PTO Switch
3
X5 To S17
594B
Yel
5
1
2
86
30
87
87A
85
574D Yel
574B Yel
6
K9 Rear PTO
Relay Socket
K10 Mid PTO
Relay Socket
To Ignition
and Start
Circuits
573 Org
562D
Red
575B
Dk Grn
ON
Jumper Used
When Front PTO
Is Not Installed
4
8
737
Pur
743
Org
X34 To W8 Front
PTO Wiring Harness
Pur
S18 Front
PTO Switch
Org
Red
9
737 Pur
X34 To W1 Main
Wiring Harness
X35 To Y4
PTO Solenoid
Pur
743 Org
7
W8 Front PTO Wiring Harness
X8 Main Wiring Harness
To Control Panel

CLUTCH PEDAL AND LINKAGE



1. Shaft
2. Bearing
3. Bushing
4. Spacer
5. Snap Ring
6. Thrust Washer
7. Bushing
8. Pedal
9. Clutch Spring
10. Snap Ring
11. Thrust Washer
12. Lock Nut
13. Spherical Rod End
14. Cap Screw
15. Cap Screw (Stop)
16. Washer
17. Bracket
18. Lock Nut
19. Rod
20. Nut
21. Turnbuckle
22. Rod
23. Lever
24. Washer
25. Cotter Pin





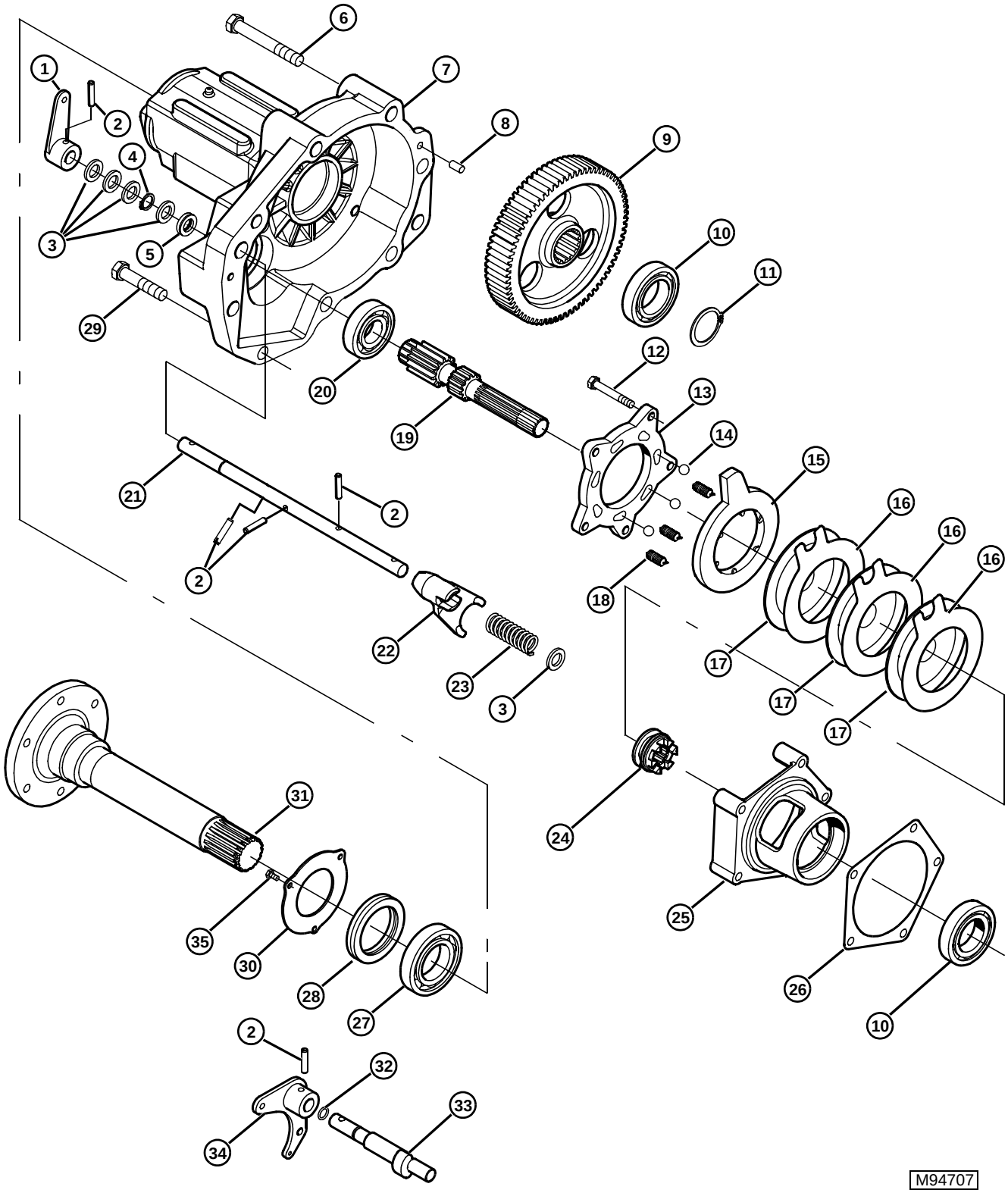
10. Remove two screws (N) and disconnect wiring harness from neutral switch (O).
11. Remove two cap screws (P), lock nuts, and spacer (Q), and remove neutral switch.
12. Inspect cam follower (R), neutral switch roller (S), and neutral return lever pivot (T) for smooth operation. Lubricate or replace parts as needed.

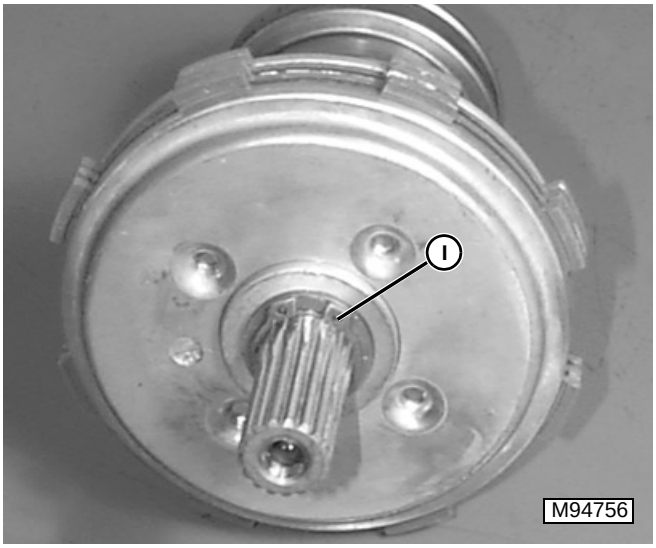
Assembly:

Assembly is the reverse of disassembly.

- Inspect all components for wear, damage, and smooth operation. Replace as needed.
- Install new nylon lock nuts where removed. Old lock nuts may become loose over time.

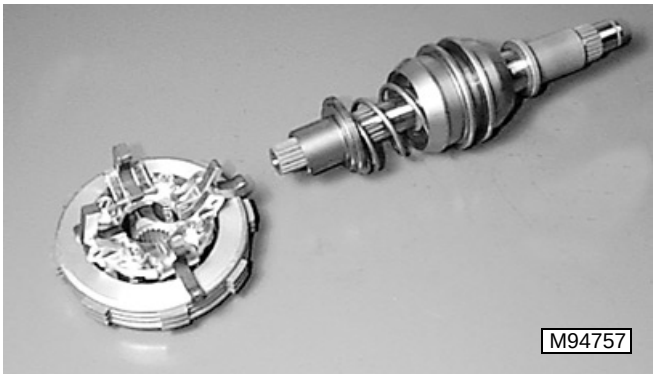
AXLE SHAFT AND BRAKE - RIGHT



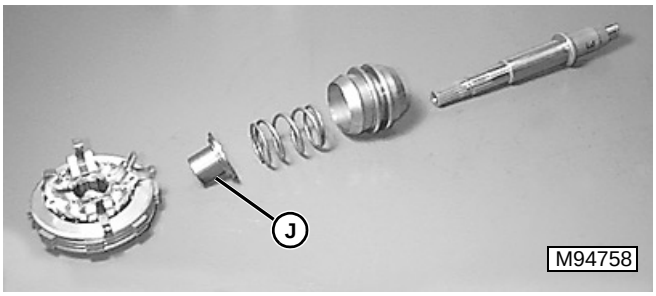


NOTE: Shift collar spring is slightly compressed. If snap ring is hard to remove, push down on brake to compress spring slightly before removing snap ring.

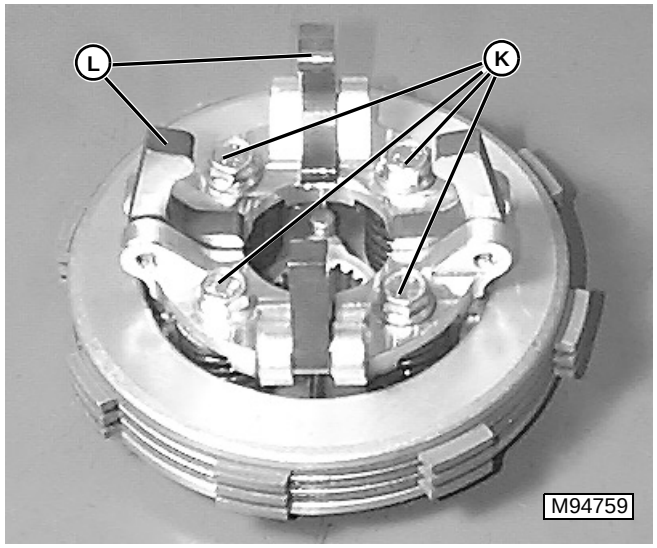
17. Remove snap ring (I) retaining brake to shaft.
18. Remove washer.



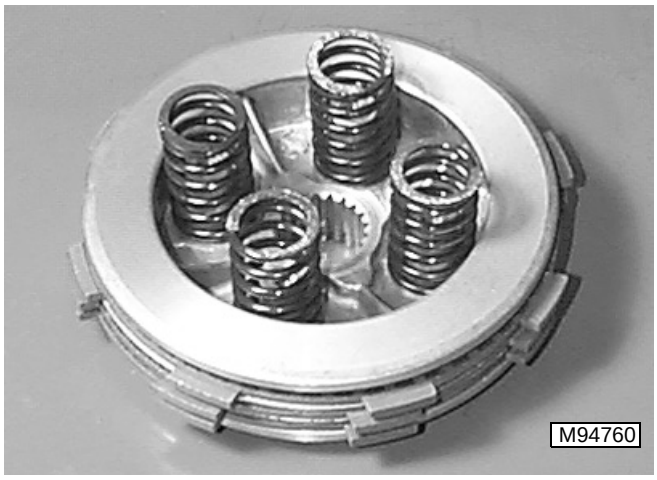
19. Remove brake assembly from shaft.



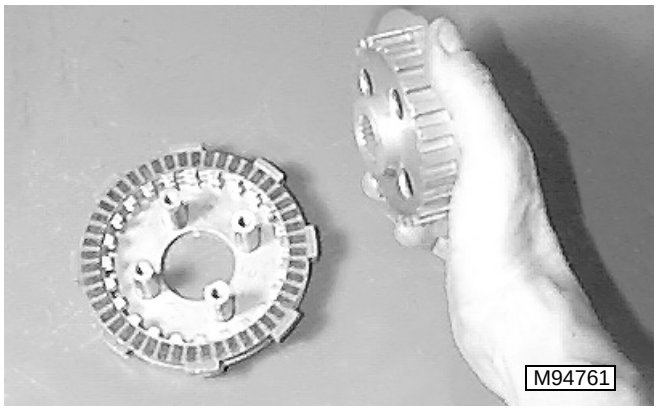
20. Remove spring retainer (J), spring, and shift collar.



21. Remove four cap screws (K) retaining brake lifter to brake assembly. Remove brake lifter.
22. Inspect levers (L) for smooth operation, damage, or wear. If necessary, replace brake lifter assembly.



23. Remove four springs.



24. Remove hub.