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.

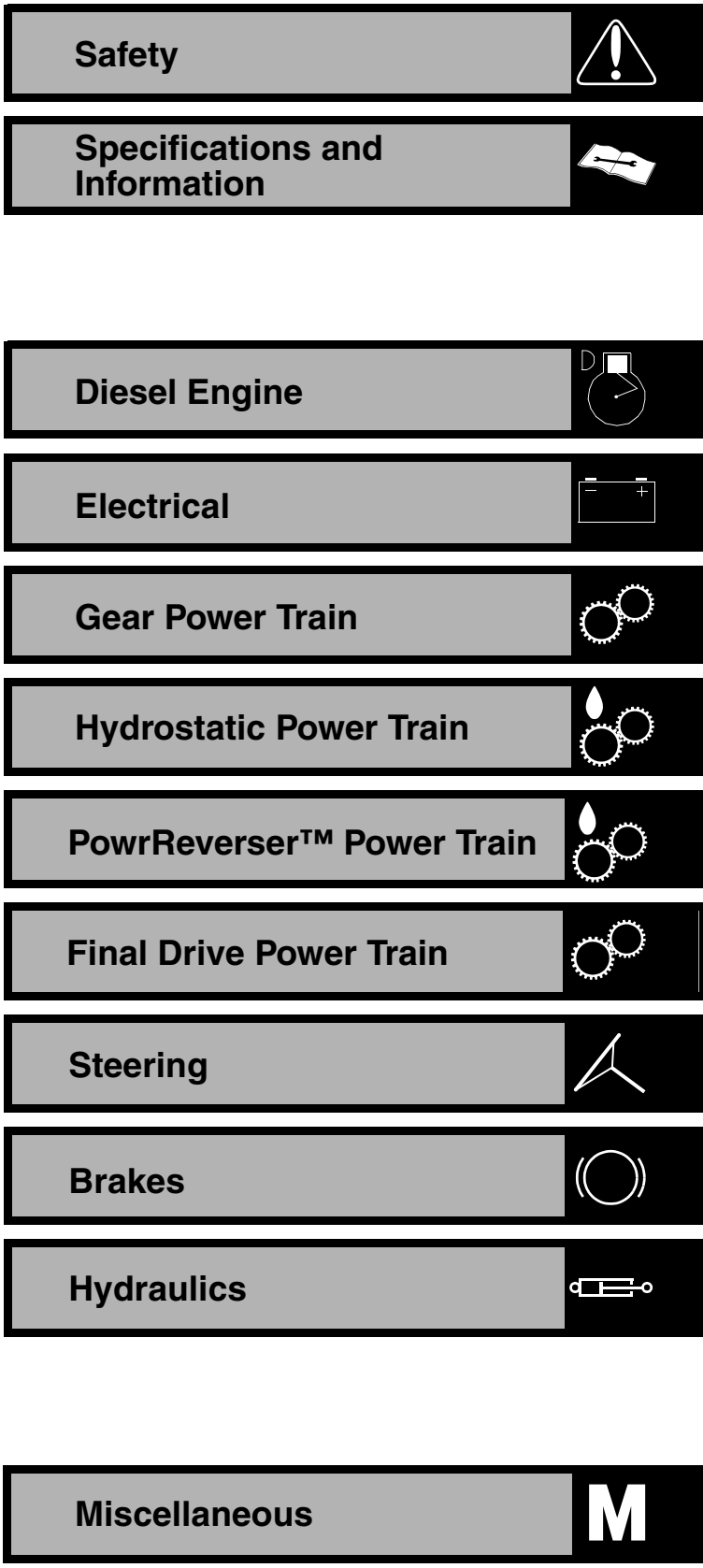
The manual is organized so that all the information on a particular system is kept together. The order of grouping is as follows:

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

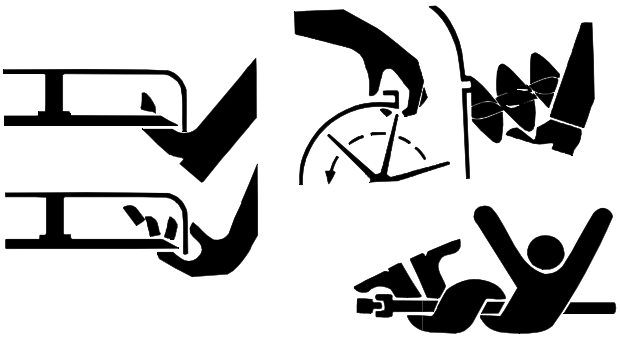
Note: Depending on the particular section or system being covered, not all of the above groups may be used.

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.



AVOID INJURY FROM ROTATING BLADES, AUGERS AND PTO SHAFTS



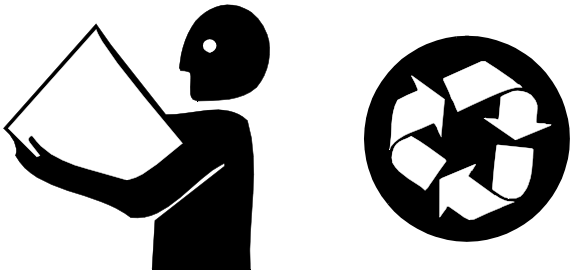
Keep hands and feet away while machine is running. Shut off power to service, lubricate or remove mower blades, augers or PTO shafts.

SERVICE COOLING SYSTEM SAFELY

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off machine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

HANDLE CHEMICAL PRODUCTS SAFELY



Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques. Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

Dispose of Waste Properly

Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries. Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them. Do not pour waste onto the ground, down a drain, or into any water source. Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.

LIVE WITH SAFETY

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

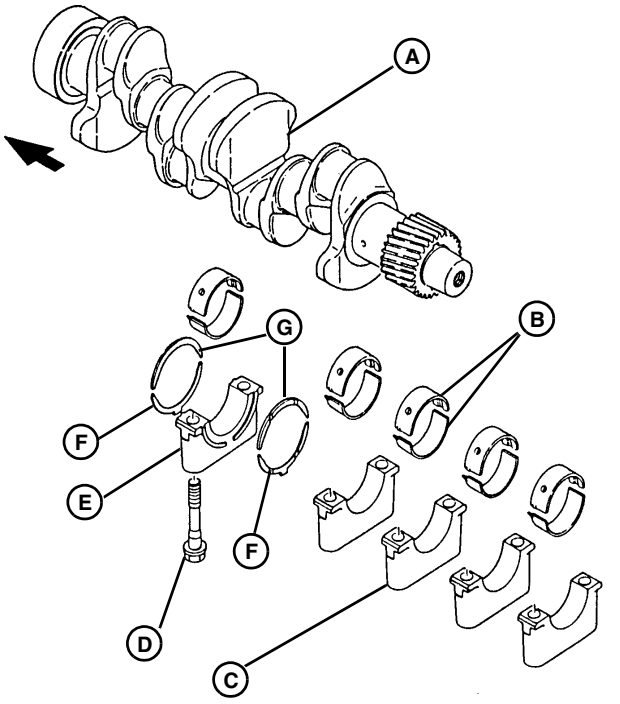
CRANKSHAFT AND MAIN BEARINGS

Removal:

1. Check the crankshaft end play. (See "CRANKSHAFT END PLAY CHECK" on page 18.)
2. Remove the rear oil seal. (See "CRANKSHAFT REAR OIL SEAL" on page 44.)
3. Remove the flywheel housing. (See "FLYWHEEL HOUSING" on page 48.)
4. Remove the crankcase extension housing. (See "CRANKCASE EXTENSION HOUSING" on page 43.)
5. Remove the timing gear cover mounting plate. (See "TIMING GEAR COVER" on page 52.)
6. Check the crankshaft rod and main bearing clearance. (See "CONNECTING ROD BEARING CLEARANCE CHECK" on page 17, and "CRANKSHAFT MAIN BEARING CLEARANCE CHECK" on page 18.)

IMPORTANT: Connecting rod end caps must be installed on the same connecting rods from which they were removed. Note alignment marks on caps and rods.

7. Remove the connecting rod bolts and end caps.
8. Push the pistons and connecting rods away from crankshaft.



M82059A

IMPORTANT: Main bearing caps must be installed on the same main bearings from which they were removed.

9. Remove the main bearing bolts (D), caps (C, E) and cap thrust bearing (F).
10. Remove the crankshaft (A).
11. Remove the block thrust bearing (G) and main bearing inserts (B).
12. Inspect all parts for wear or damage.

Installation:

- Apply clean engine oil on all parts during installation.

IMPORTANT: Do not touch bearing insert surfaces. Oil and acid from your finger will corrode the bearing surface.

1. Install grooved bearing inserts in crankshaft bearing bores, aligning tangs with slots in bores.
2. Install block thrust bearings with oil grooves facing away from engine block.
3. Install crankshaft.
4. Install smooth bearing inserts in main bearing caps, aligning tangs with slots in caps.

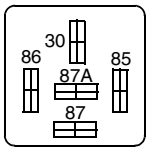
NOTE: Main bearing caps have "raised arrows" that are stamped with numbers. Both correspond to their location on the engine block. Install all bearing caps with the "arrow" toward the flywheel end. Install bearing caps beginning with thrust bearing cap (no number), number 1, then 2, etc. The main bearing cap at gear train end does not have a number.

5. Install cap thrust bearings, with oil grooves facing away from cap, in the number "1" main bearing cap.
6. Install the main bearing caps in their original locations with arrows pointing toward flywheel side of engine.

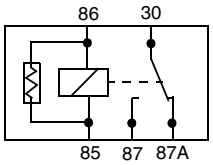
IMPORTANT: DO NOT use high speed power tools or air wrenches to tighten main bearing bolts.

7. Dip entire main bearing bolts in clean engine oil. Install bolts and tighten. DO NOT tighten to specifications.
8. Using a soft-faced hammer, tap the front end of the crankshaft then the rear end of the crankshaft to align the thrust bearings.
9. Tighten main bearing cap bolts to **96 - 100 N•m (71 - 74 lb-ft)**. When tightening, start at center main bearing cap and work your way out, alternating to the ends. Turn crankshaft by hand. If it does not turn easily, disassemble the parts and find the cause.

RELAY WIRE CONNECTIONS



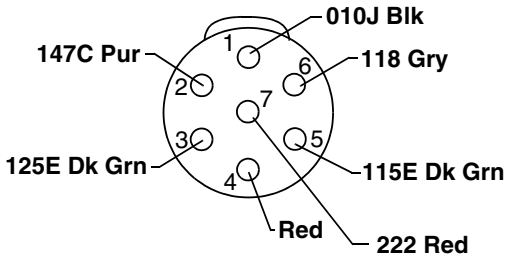
Relay Socket Layout

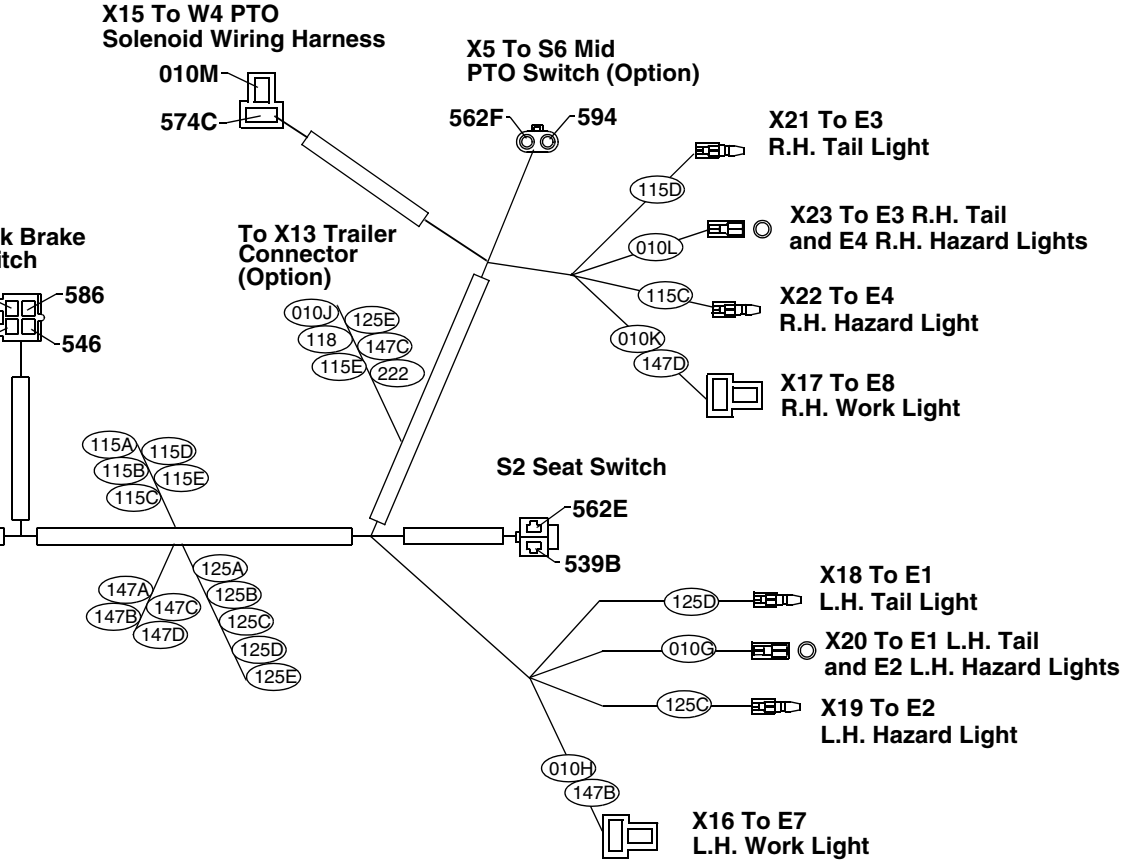


Relay Schematic

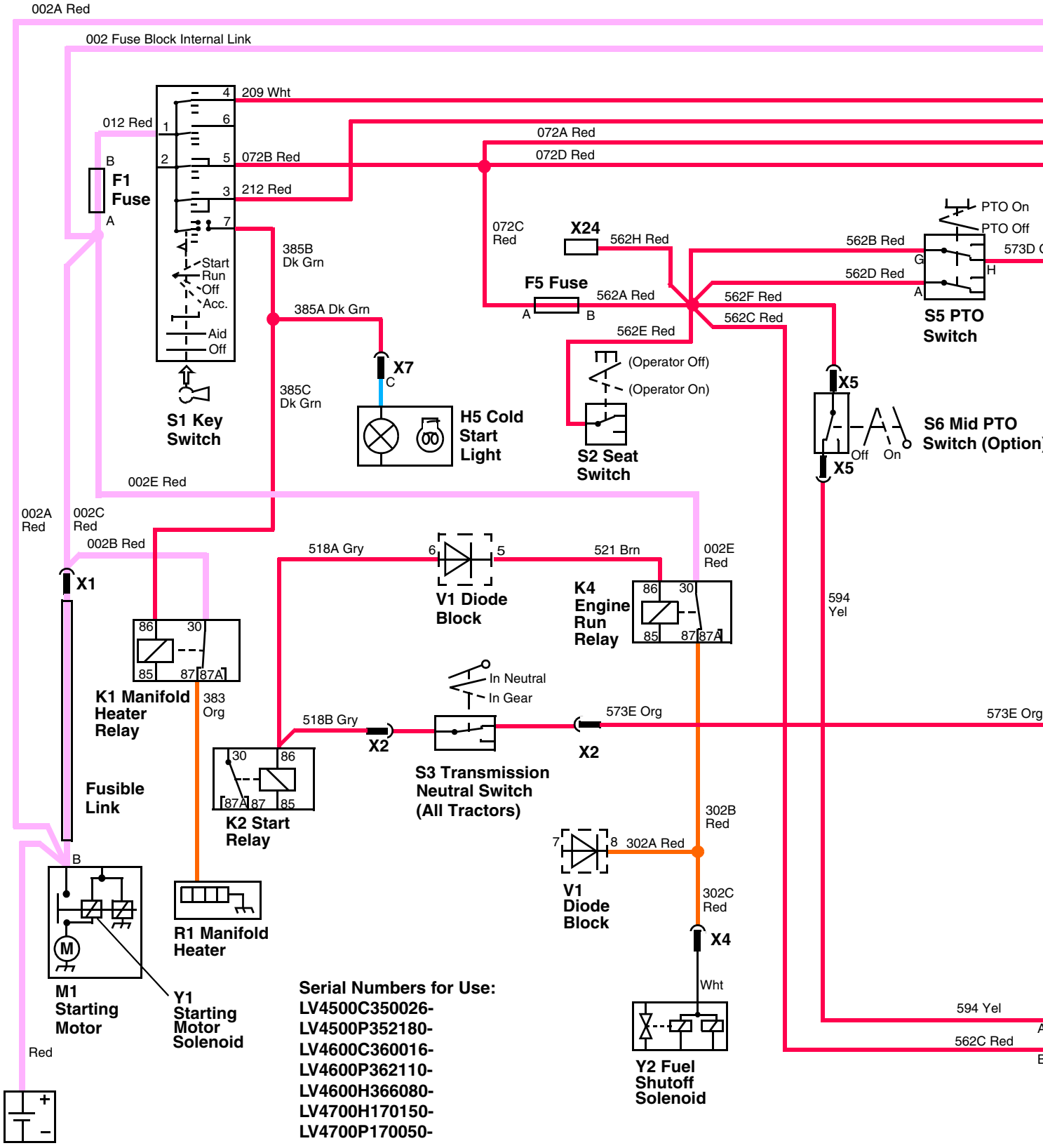
#	86	85	30	87	87A
K1	385C	050B / 050C	002B	383	- -
K2	518A / 518B	010E / 010F	572A / 572B	309	- -
K3	329B	010F / 010T	329A / 329B	- -	319
K4	521	050C / 050D	002E	302B	- -
K5	573A	050D / 050E	546	533	- -
K6	556	050E / 050F	573B	- -	533
K7	212	050F / 050G	252	222	- -
K8	238	050G	264A / 264B	247	- -

X13 Trailer Connector (Option) (from rear)





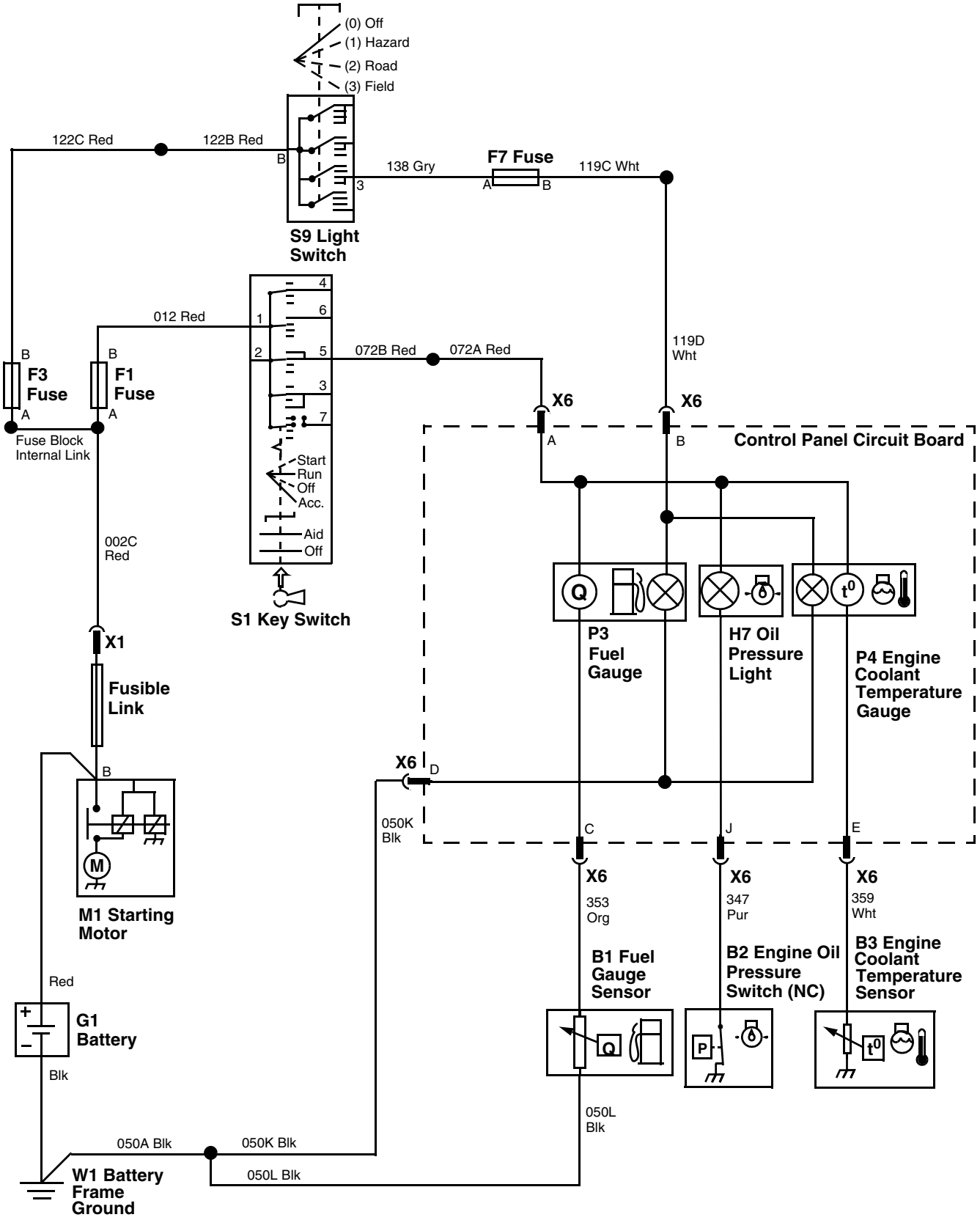
POWER CIRCUIT - RUN / AID (NEW)



Unswitched Power — Switched Power — Secondary Switched Power

SE1 - STARTING	SE2 - IGNITION	SE

CONTROL PANEL GAUGES ELECTRICAL SCHEMATIC



SE2 - IGNITION	SE5 - INSTRUMENTATION

CHARGE BATTERY

Reason:

To increase battery charge after the battery has been discharged.

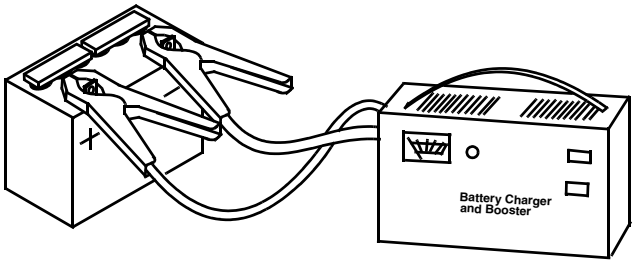
Equipment:

- Battery charger (variable rate).

Procedure:

NOTE: See BATTERY TEST in this group before charging battery.

1. Park machine on level surface.
2. Disengage PTO.
3. Turn key switch to OFF position.
4. Engage park brake.
5. Raise hood.
6. Remove engine side covers.
7. Clean cable ends, battery terminals and top of battery.
8. Remove battery. Check water level in each cell.
9. Connect variable rate charger to battery.
10. Start charger at SLOW rate. Increase charge rate ONE setting at a time. Check charger ammeter after 1 minute at each setting. Maintain 10 amp charge rate. Use boost setting as necessary.
11. Check if battery is accepting 10 amp charge rate after 10 minutes at boost setting.



Results:

- If battery WILL NOT accept 10 amp charge after 10 minutes at boost setting, replace battery.
- If battery is accepting 10 amp charge after 10 minutes at boost setting, and battery did NOT need water, go to Steps 12 and 13.
- If battery is accepting 10 amp charge after 10 minutes at boost setting, but battery DID need water or all cells were BELOW 1.175, go to Steps 10 and 11.

12. Set charger at 15 – 25 amps.

IMPORTANT: Decrease charge rate if battery gases or bubbles excessively or becomes too warm to touch.

13. Check specific gravity after 30 minutes (60 minutes for maintenance-free battery).

Results:

- If MORE THAN 50 point variation between cells, replace battery.
- If LESS THAN 50 point variation between cells, go to Step 14.

NOTE: If battery was discharged at slow or unknown rate, charge battery at 10-15 amps for 6-12 hours. (Maintenance-free battery: 4-8 hours).

14. Continue to charge battery until specific gravity is **1.230 – 1.265 points at 26.7°C (80°F).**
15. Load test battery.
16. Install battery.

LOAD TEST BATTERY

Reason:

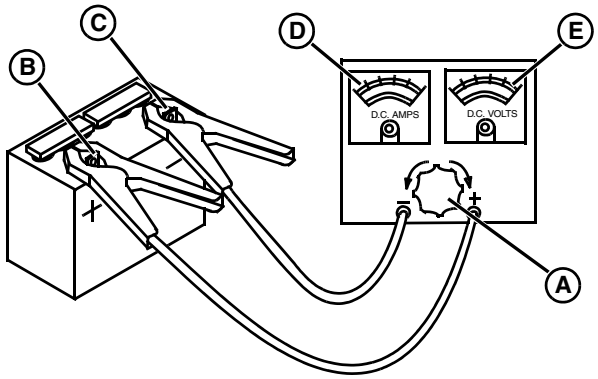
To check condition of battery under load.

Equipment:

- JTO5685 Battery Tester

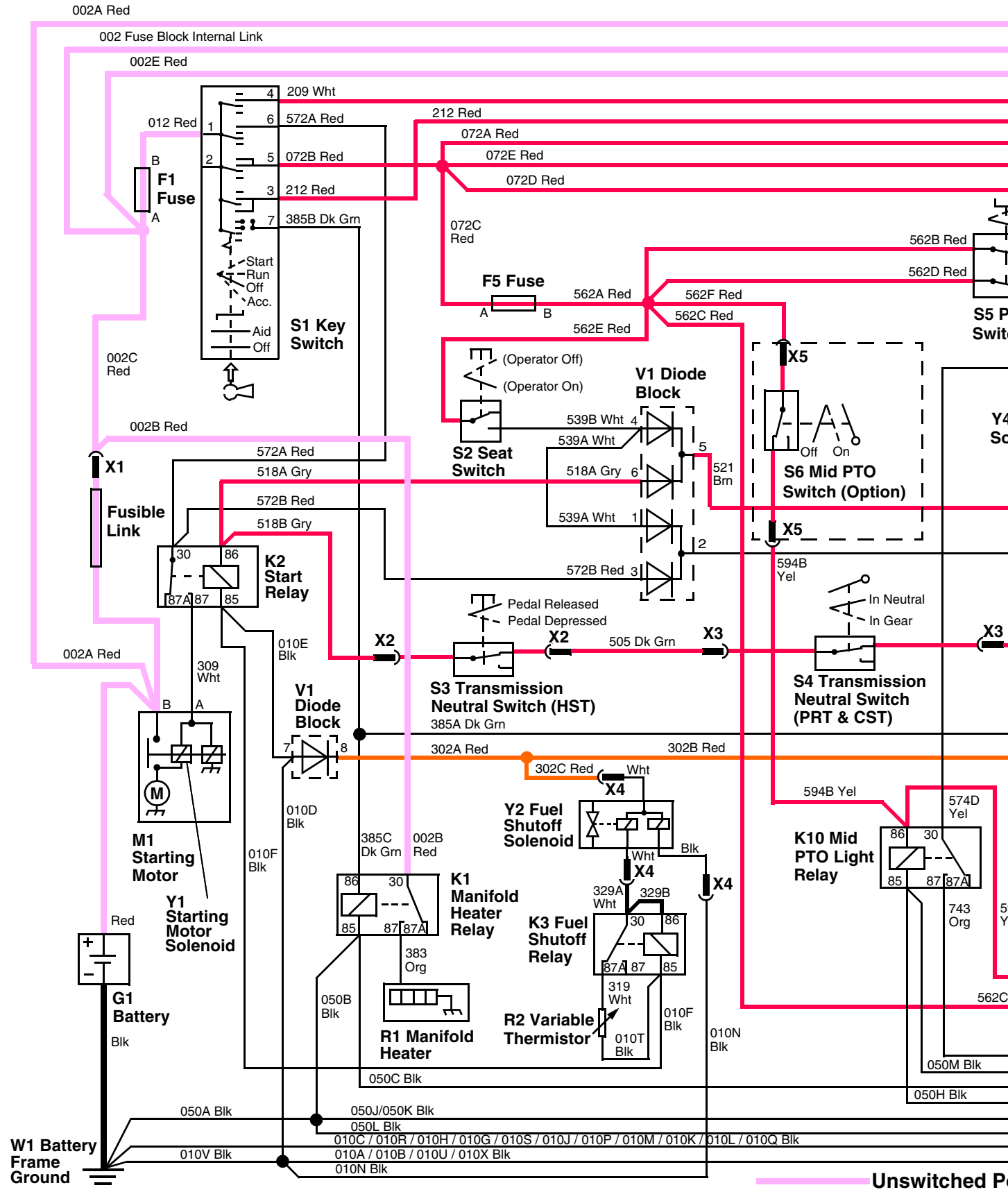
Procedure:

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.



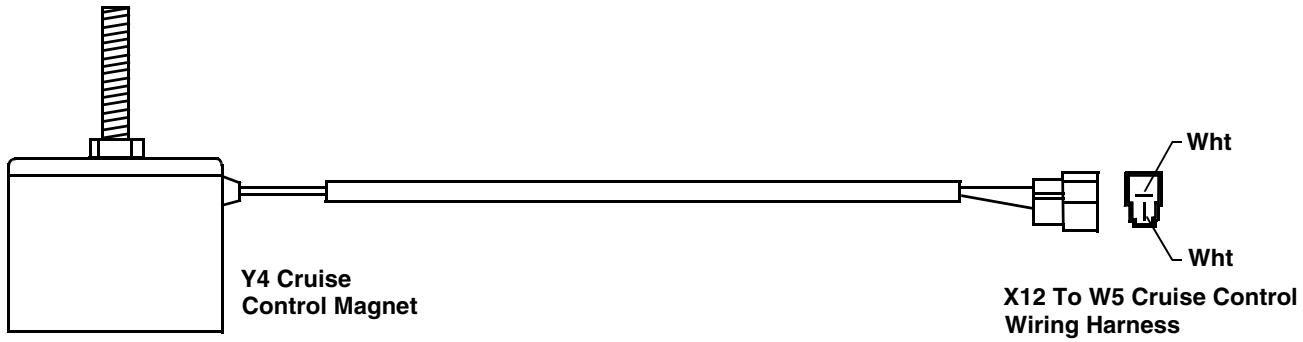
8. Turn load knob (A) counterclockwise to OFF

MAIN ELECTRICAL SCHEMATIC – 4500 / 4600 / 4700

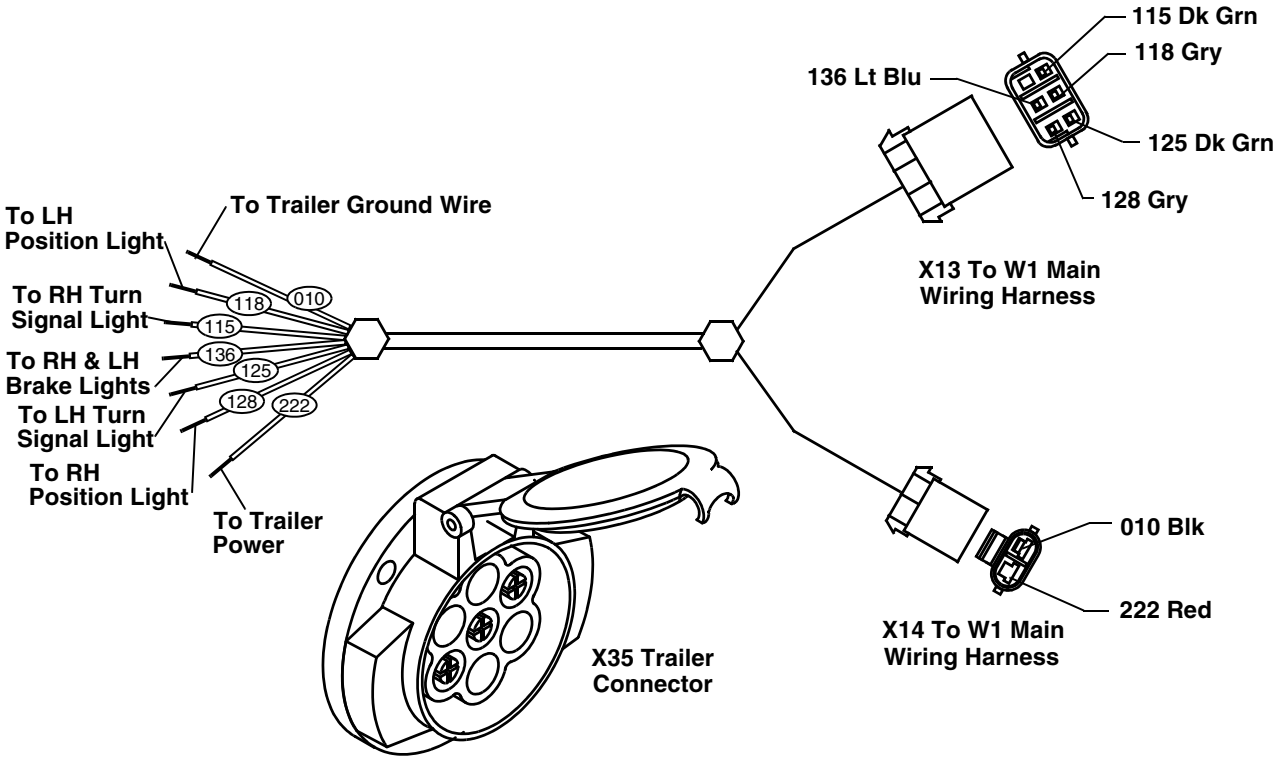


SE1 - STARTING	

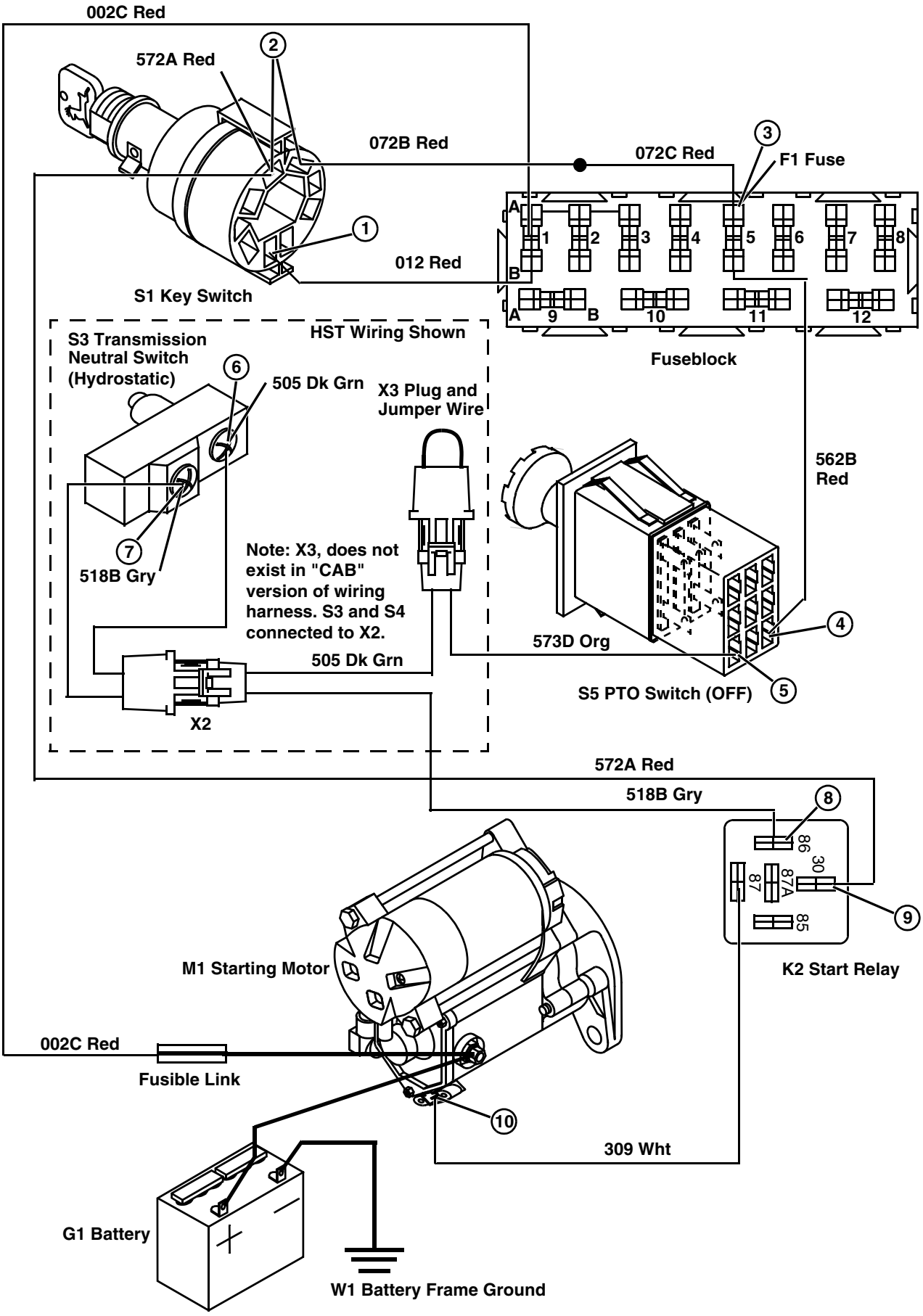
W6 CRUISE CONTROL MAGNET WIRING HARNESS

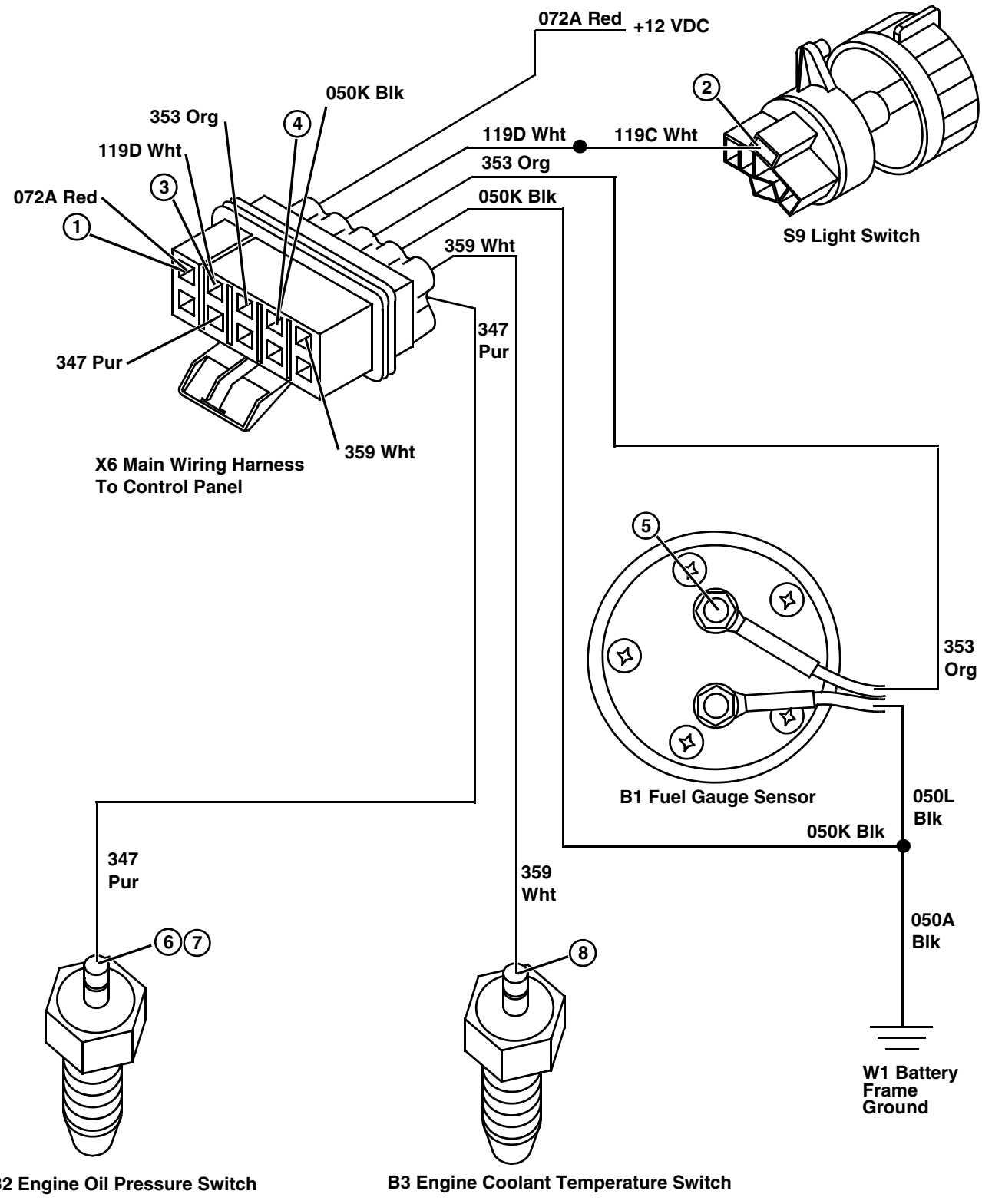


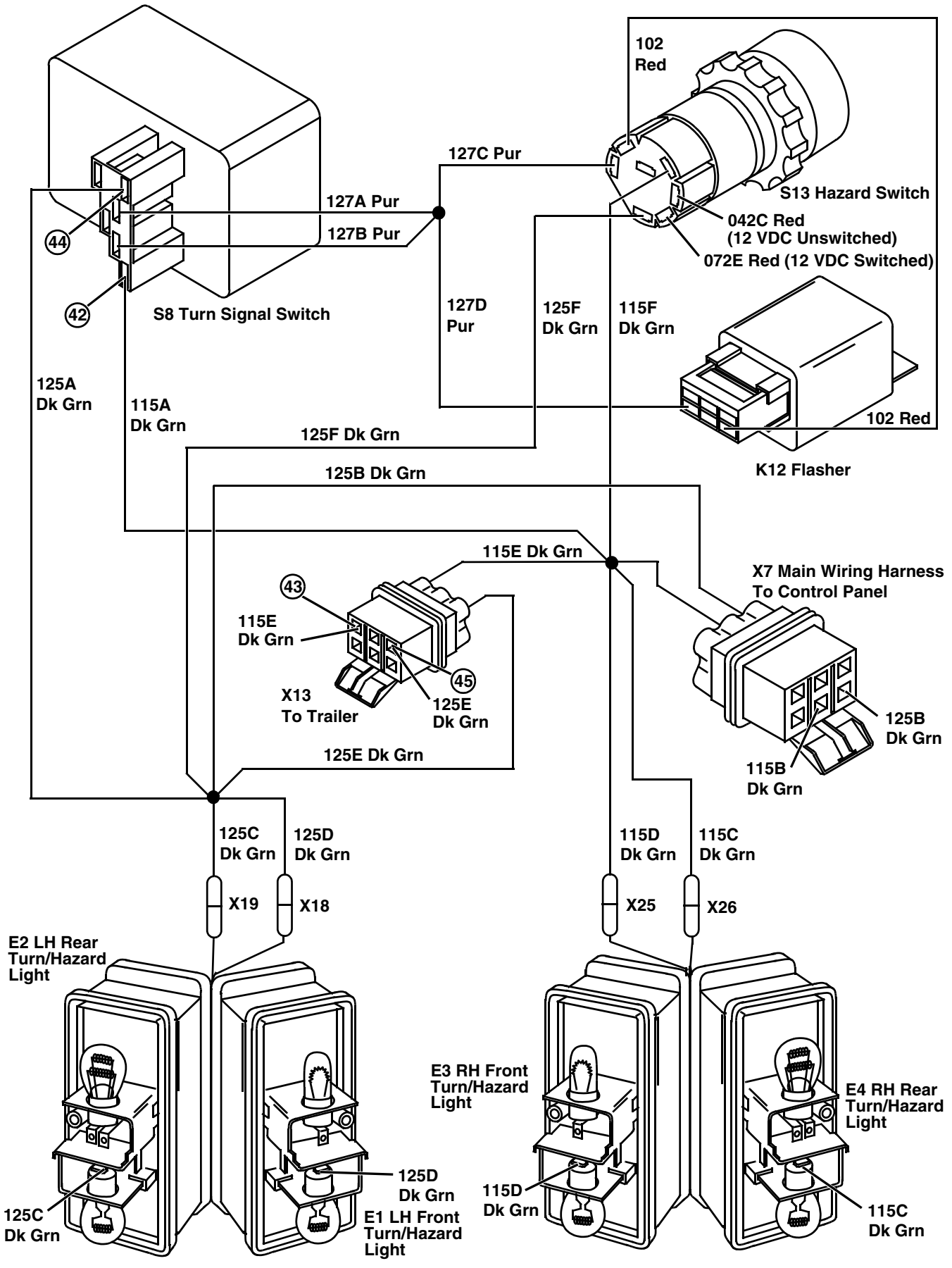
W7 TRAILER CONNECTOR WIRING HARNESS

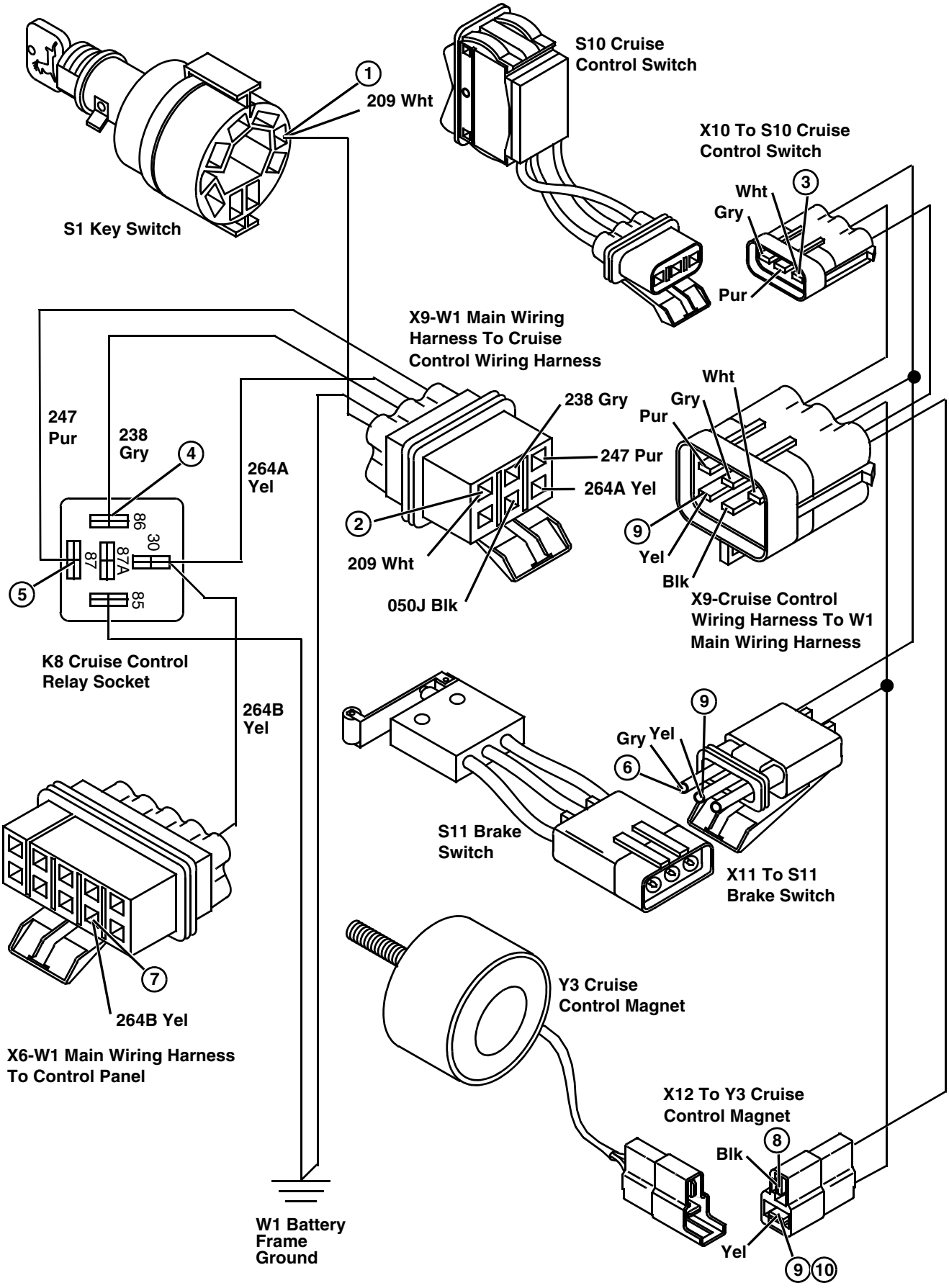


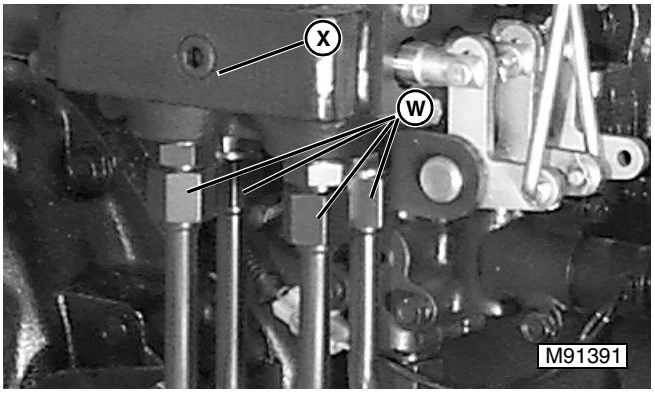
Circuit Number	Wire Size	Color	Termination Points	Main Harness Connection
010	3.0	Blk	X35 - Pin 3, Ground Wire Socket	X14 (to 010J Blk)
115	1.0	Dk Grn	X35 - Pin 4, RHTurn Signal Light Socket	X13 (to 115E Dk Grn)
118	1.0	Gry	X35 - Pin 5, LH Position Light Pin	X13 (to 118B Gry)
125	1.0	Dk Grn	X35 - Pin 1, LHTurn Signal Light Pin	X13 (to 125E Dk Grn)
128	1.0	Gry	X35 - Pin 7, RH Position Light Pin	X13 (to 128B Gry)
136	1.0	Lt Blu	X35 - Pin 6, LH and RH Brake Lights Socket	X13 (to 136B Lt Blu)
222	2.0	Red	X35 - Pin 2, Power Wire Socket (Accessory)	X14 (to 222 Red)


002C Red
572A Red
2
072B Red
072C Red
3
F1 Fuse
1
012 Red
S1 Key Switch
A
B
1 2 3 4 5 6 7 8
A 9 B 10 11 12
Fuseblock
HST Wiring Shown
S3 Transmission Neutral Switch (Hydrostatic)
6
505 Dk Grn
X3 Plug and Jumper Wire
562B Red
7
518B Gry
Note: X3, does not exist in "CAB" version of wiring harness. S3 and S4 connected to X2.
573D Org
4
505 Dk Grn
5
S5 PTO Switch (OFF)
X2
572A Red
518B Gry
8
86
30
87
87A
85
9
K2 Start Relay
M1 Starting Motor
002C Red
Fusible Link
10
309 Wht
G1 Battery
W1 Battery Frame Ground

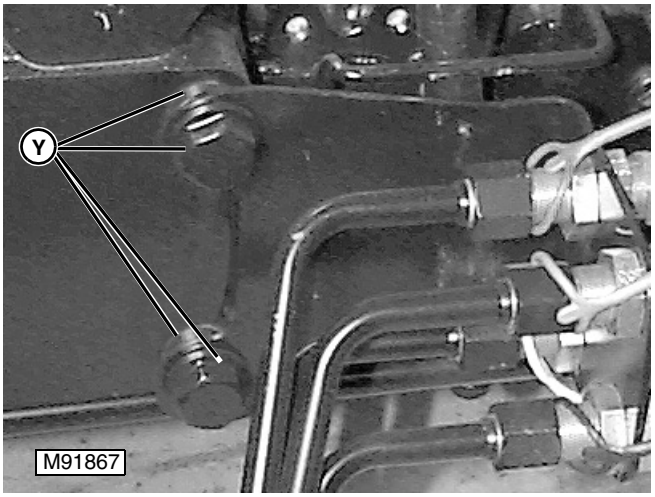

072A Red
+12 VDC
050K Blk
353 Org
119D Wht
072A Red
119D Wht
119C Wht
353 Org
050K Blk
359 Wht
347 Pur
347 Pur
359 Wht
X6 Main Wiring Harness
To Control Panel
S9 Light Switch
353 Org
B1 Fuel Gauge Sensor
050L Blk
050K Blk
347 Pur
359 Wht
050A Blk
W1 Battery Frame Ground
B2 Engine Oil Pressure Switch
B3 Engine Coolant Temperature Switch


102
Red
127C Pur
S13 Hazard Switch
127A Pur
127B Pur
042C Red
(12 VDC Unswitched)
072E Red (12 VDC Switched)
44
42
S8 Turn Signal Switch
127D
Pur
125F
Dk Grn
115F
Dk Grn
125A
Dk Grn
115A
Dk Grn
102 Red
125F Dk Grn
K12 Flasher
125B Dk Grn
115E Dk Grn
X7 Main Wiring Harness
To Control Panel
43
115E
Dk Grn
45
X13
To Trailer
125E
Dk Grn
125B
Dk Grn
115B
Dk Grn
125E Dk Grn
125C
Dk Grn
125D
Dk Grn
115D
Dk Grn
115C
Dk Grn
X19
X18
X25
X26
E2 LH Rear
Turn/Hazard
Light
E3 RH Front
Turn/Hazard
Light
E4 RH Rear
Turn/Hazard
Light
125D
Dk Grn
125C
Dk Grn
E1 LH Front
Turn/Hazard
Light
115D
Dk Grn
115C
Dk Grn

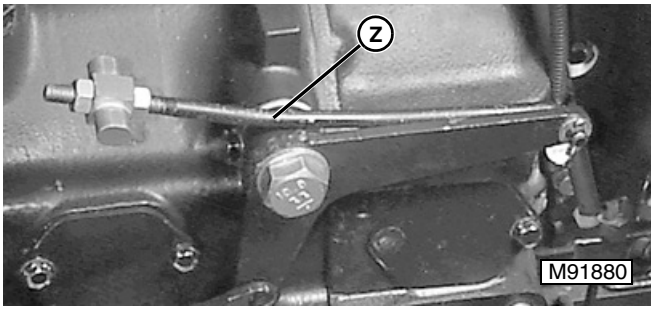

S1 Key Switch
1
209 Wht
S10 Cruise Control Switch
X10 To S10 Cruise Control Switch
Wht
Gry
Pur
3
X9-W1 Main Wiring Harness To Cruise Control Wiring Harness
247 Pur
238 Gry
4
264A Yel
86
30
87
87A
85
5
K8 Cruise Control Relay Socket
238 Gry
247 Pur
264A Yel
2
209 Wht
050J Blk
Wht
Gry
Pur
9
Yel
Blk
X9-Cruise Control Wiring Harness To W1 Main Wiring Harness
264B Yel
9
Gry
Yel
6
S11 Brake Switch
X11 To S11 Brake Switch
7
264B Yel
X6-W1 Main Wiring Harness To Control Panel
Y3 Cruise Control Magnet
X12 To Y3 Cruise Control Magnet
8
Blk
Yel
9
10
W1 Battery Frame Ground



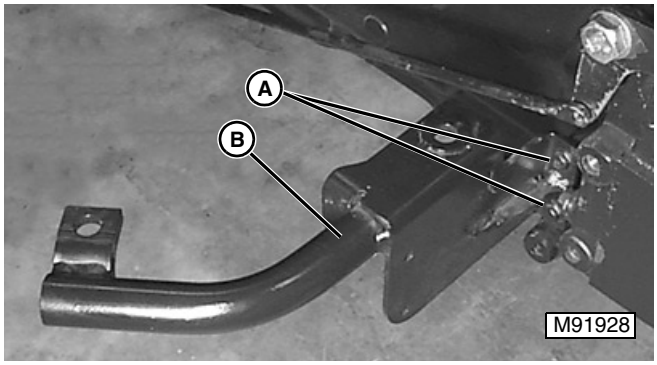
29. If equipped, disconnect four work port tubes (W) from SCV (X).



30. Remove cap screws and spacers (Y) that attach tube support bracket to frame. Remove tube support bracket and tubes as an assembly.

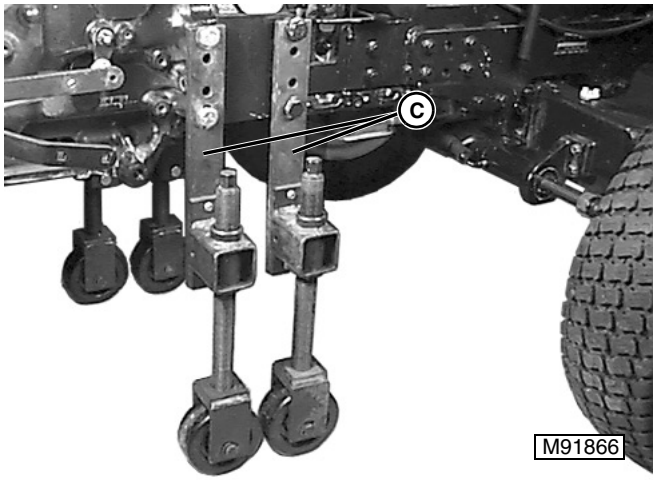


31. If not already removed, lay upper brake rods (Z) across bellcrank pivot to prevent them from becoming damaged when separating tractor sections.



32. Remove two cap screws (A) and RH operator's platform support (B).

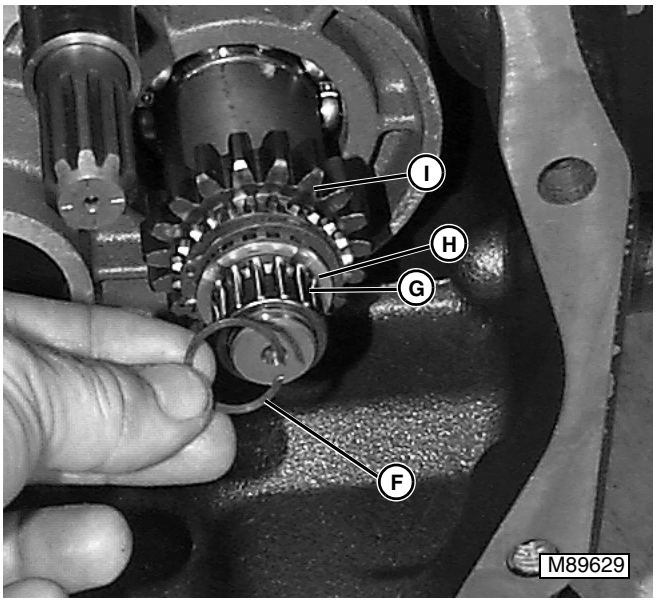
Split the Tractor:



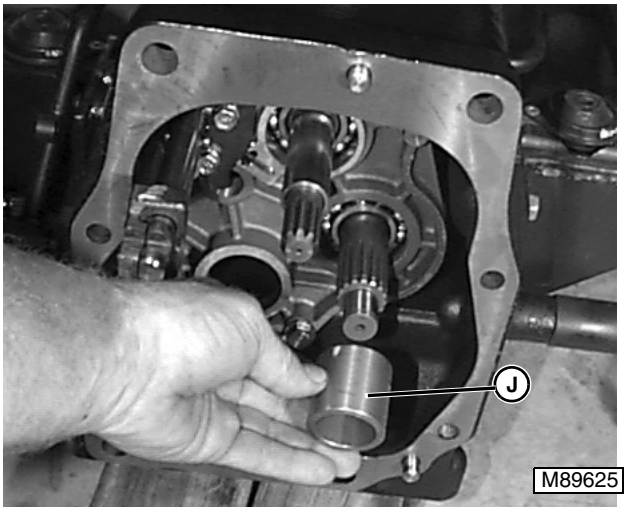
1. Using cap screws supplied with the splitting stands, secure JTO 7335 splitting stands (C) to the tunnel sections.
2. Adjust splitting stands so that wheels contact the floor, and are parallel to the tractor wheels.
3. Remove nine cap screws and lock washers attaching tunnel section to engine section of tractor. Note length and locations of cap screws when removing.
4. Release park brake and place gear shift in NEUTRAL.

IMPORTANT: Check for, and disconnect any additional accessory wires or hydraulic tubes connecting rear half to front half before splitting tractor.

5. If necessary, use a pry bar to separate the two tractor sections. Lift the steering support slightly to clear the front flange of the tunnel. Split the tractor by rolling the two sections apart.



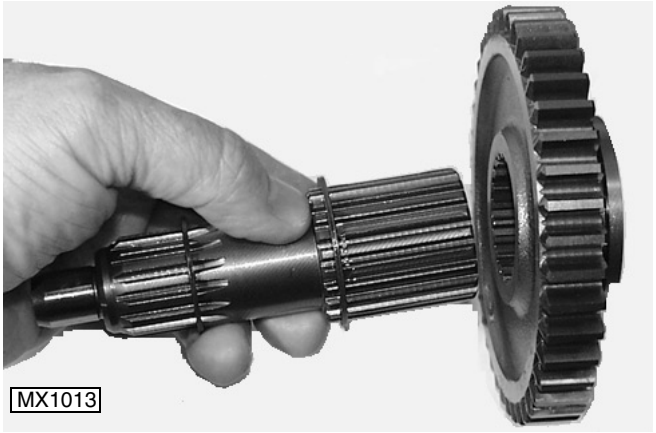
1. Remove C- clip (F), bearing (G), washer (H), and gear (I).



2. Remove spacer (J) from gear shaft.
3. Inspect all parts, replace as needed.

4. Pry or press bearing off of connecting shaft.

5. Slide 42T gear from shaft. Inspect all parts for wear or damage. Replace as required.



6. Slide 41T gear from stub shaft. Inspect all parts for wear or damage. replace as required.