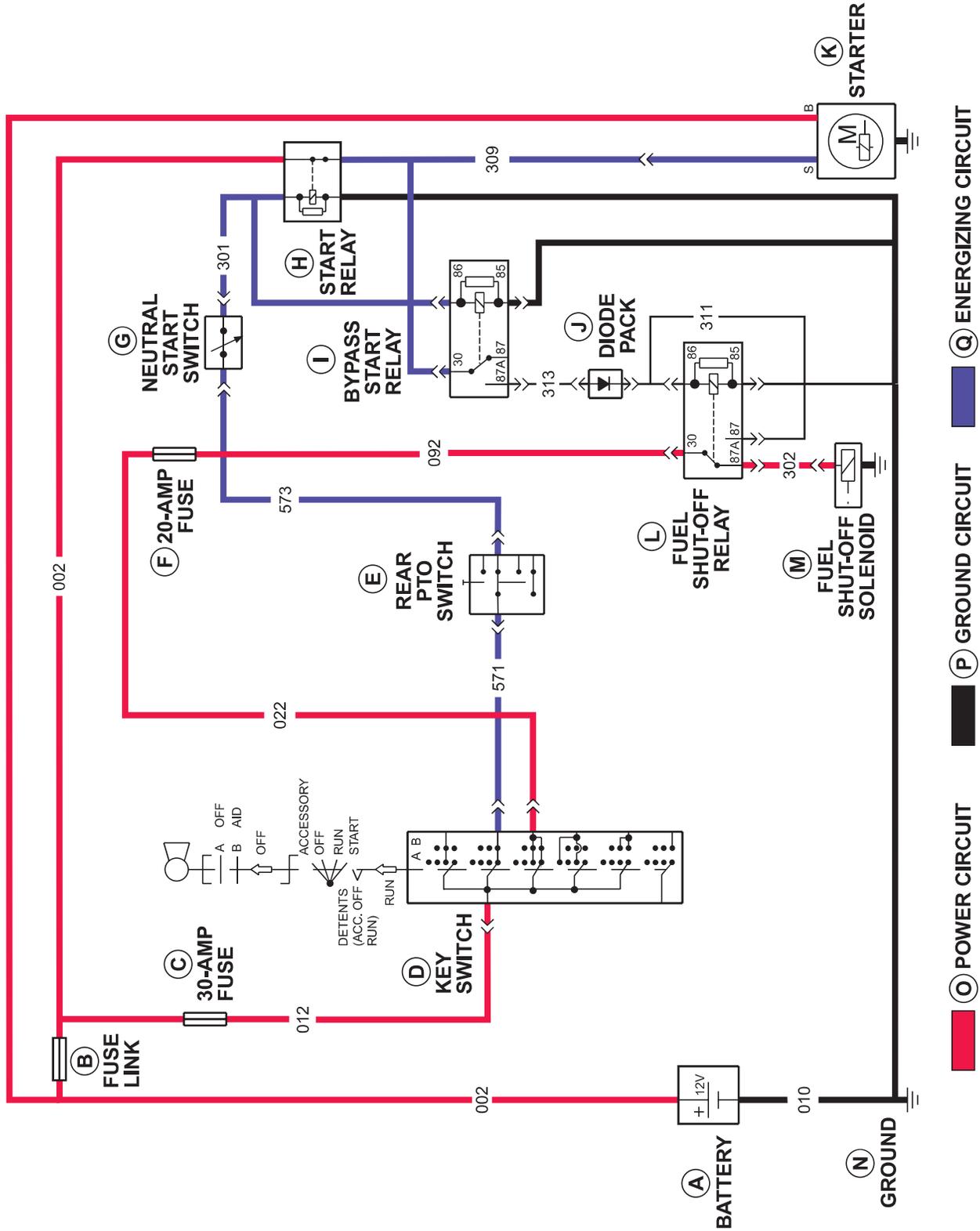


Starting System Operation—Normal



— (O) POWER CIRCUIT
 — (P) GROUND CIRCUIT
 — (Q) ENERGIZING CIRCUIT

STARTING SYSTEM OPERATION — NORMAL

LVC4541

LVC4541 -19-06JAN00

Slide LVC4541

Continued on next page

AG.OUO1023,369 -19-09NOV99-1/2

240
10
4

Theory of Operation

A—Battery
B—Fuse Link
C—30-Amp Fuse
D—Key Switch
E—Rear PTO Switch

F—20-Amp Fuse
G—Park position Start Switch
H—Start Relay
I—Bypass Start Relay

J—Diode Pack
K—Starter
L—Fuel Shut-Off Relay
M—Fuel Shut-Off Solenoid

N—Ground
O—Power Circuit
P—Ground Circuit
Q—Energizing Circuit

FUNCTION:

The starting system converts electrical energy into the mechanical force necessary to crank the engine. A safety interlock system composed of switches and relays prevents bypass starting.

MAJOR COMPONENTS:

- 30-Amp Fuse
- 20-Amp Fuse
- Key Switch
- Rear PTO Switch
- Park position Start Switch
- Start Relay
- Bypass Start Relay
- Fuel Shut-Off Relay
- Fuel Shut-Off Solenoid
- Starter

THEORY OF OPERATION:

When key switch (D) is turned to start position, current flows through 30-amp fuse (C), through contacts of key switch and out circuit 571. Current then flows through

rear PTO switch (E), circuit 573, and through Park position start switch (G). Current leaving the Park position start switch travels on circuit 301 to both the start (H) and bypass start (I) relays.

Current passing through start relay windings creates a magnetic field, which closes relay contacts. This connects circuit 002 to 309, providing a current path to the starter S terminal. The starter (K) then cranks the engine.

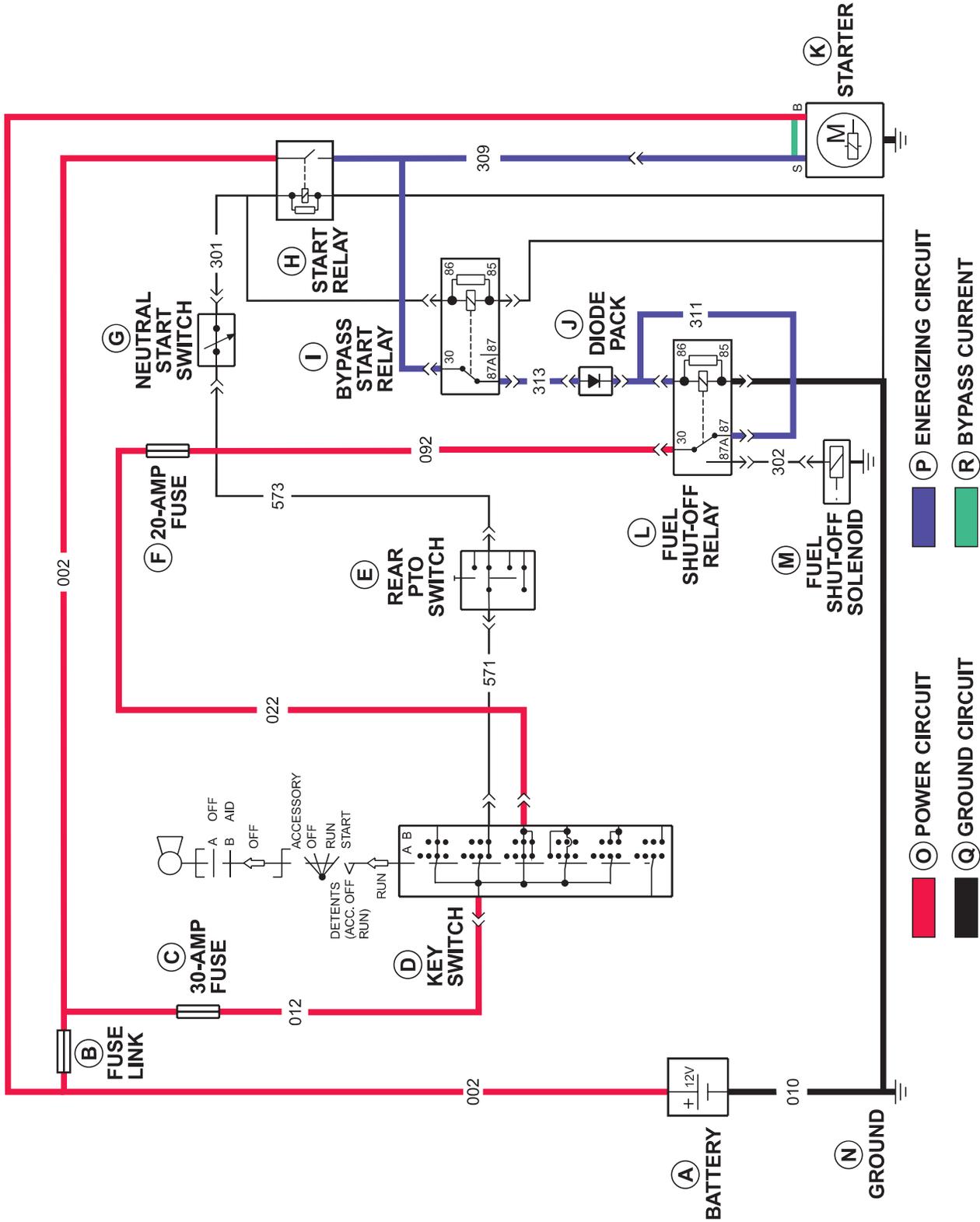
At the same time, current travels to the bypass start relay on circuits 301 and 309. Current through circuit 301 creates a magnetic field in the windings of the bypass start relay which pulls its relay blade into contact with terminal 87. Current flow then stops on circuit 309 because of an open circuit between relay terminals 30 and 87A.

During normal operation, fuel shut-off relay (L) remains inactive. However, circuits 302 and 092 are connected through normally-closed relay contacts between terminals 30 and 87A. This energizes the fuel shut-off solenoid (M) and allows fuel flow through the fuel injection pump.

240
10
5

AG,OOU1023,369 -19-09NOV99-2/2

Starting System Operation—Bypass Attempt



- (O) POWER CIRCUIT
- (Q) GROUND CIRCUIT
- (P) ENERGIZING CIRCUIT
- (R) BYPASS CURRENT

STARTING SYSTEM OPERATION — BYPASS ATTEMPT

LVC4542

LVC4542 -19-06JAN00

Slide LVC4542

Continued on next page

AG.OUO1023.370 -19-09NOV99-1/2

Theory of Operation

A—Battery
B—Fuse Link
C—30-Amp Fuse
D—Key Switch
E—Rear PTO Switch

F—20-Amp Fuse
G—Park position Start Switch
H—Start Relay
I—Bypass Start Relay
J—Diode Pack

K—Starter
L—Fuel Shut-Off Relay
M—Fuel Shut-Off Solenoid
N—Ground

O—Power Circuit
P—Energizing Circuit
Q—Ground Circuit
R—Bypass Current

FUNCTION:

Prevents the engine from starting in the event starting circuit is bypassed.

MAJOR COMPONENTS:

- 30-Amp Fuse
- 20-Amp Fuse
- Key Switch
- Rear PTO Switch
- Park position Start Switch
- Start Relay
- Bypass Start Relay
- Fuel Shut-Off Relay
- Fuel Shut-Off Solenoid
- Starter

THEORY OF OPERATION:

When starting circuit is bypassed by jumping terminals S and B at starter (K), current flows on circuit 309 to

bypass start relay (I). Current travels across normally-closed contacts of relay between terminals 30 and 87A and out to circuit 313. Current continues to flow through diode pack (J) and circuit 311 to terminals 86 and 87 of fuel shut-off relay (L).

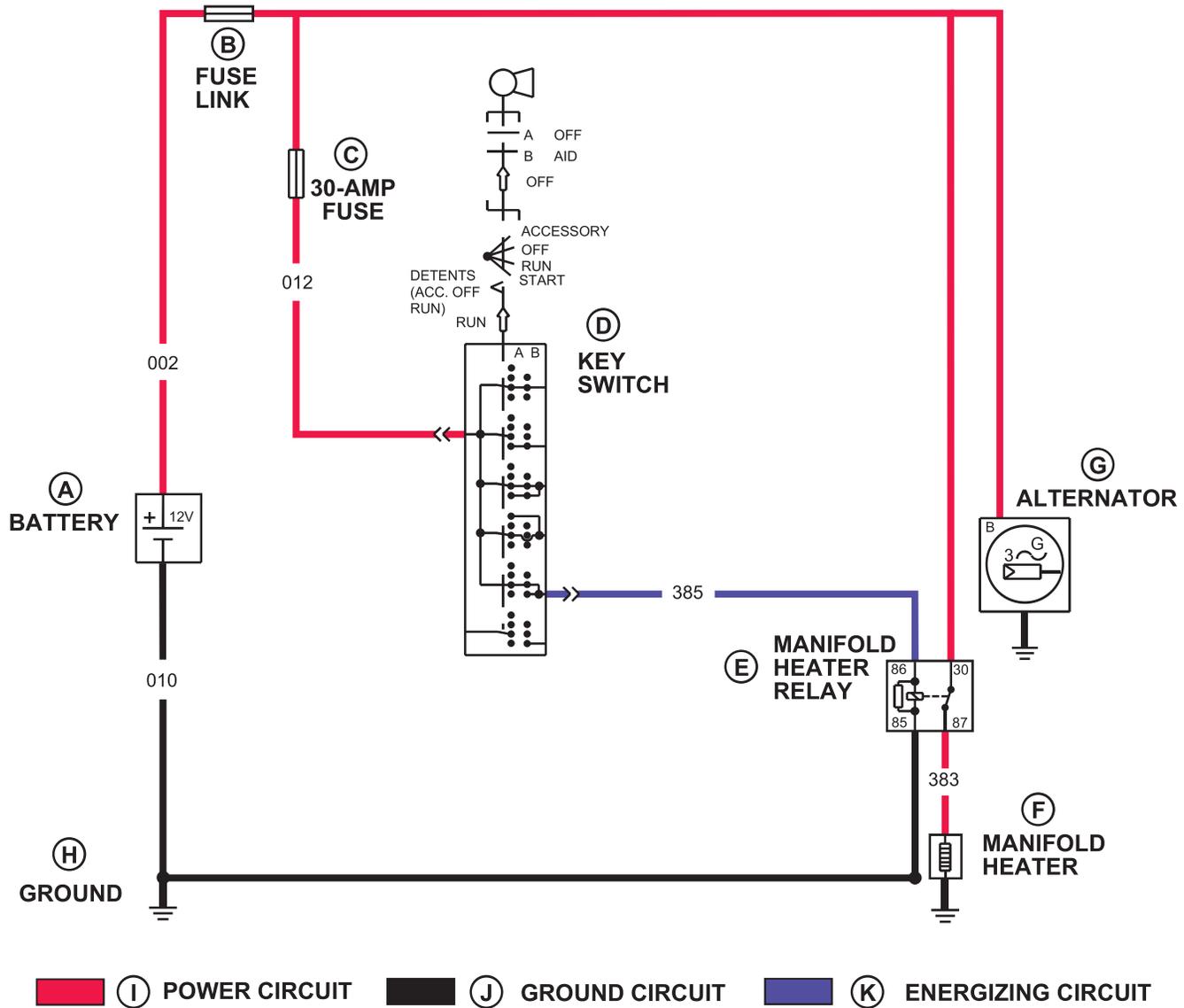
After entering terminal 86, current flow creates a magnetic field in the relay windings which draws relay blade into contact with terminal 87. This interrupts current flow between circuits 092 and 302 that normally occurs with key switch (D) in the run position. At this time, the fuel shut-off solenoid (M) disengages and stops fuel flow through the injection pump, preventing engine starting.

A jumper circuit connected to terminal 87 and circuit 311 locks the relay in this position as long as key switch is in the on position. Diode pack prevents current from returning and engaging starter.

240
10
7

AG,OUO1023,370 -19-09NOV99-2/2

Manifold Heater System Operation



LVC4592

OPTIONAL MANIFOLD HEATER SYSTEM OPERATION

Slide LVC4592

A—Battery
B—Fuse Link
C—30-Amp Fuse

D—Key Switch
E—Manifold Heater Relay
F—Manifold Heater

G—Alternator
H—Ground
I—Power Circuit

J—Ground Circuit
K—Energizing Circuit

FUNCTION:

Heats air entering engine to aid cold-weather starting.

MAJOR COMPONENTS:

- 30-Amp Fuse
- Key Switch
- Manifold Heater Relay
- Manifold Heater

Continued on next page

AG.OUO1023,371 -19-09NOV99-1/2

Theory of Operation

THEORY OF OPERATION:

System is controlled by operator only. No automatic control is used. When operator pushes in on key in run or start position, current flows through 30-amp fuse (C) and across starting aid contacts of key switch (D).

Current exits key switch on circuit 385 and travels to terminal 86 of manifold heater relay (E). As current passes through windings of relay, a magnetic field develops which pulls relay contacts and connects terminals 30 and 87. Current then passes from battery through circuit 002 and to manifold heater (F).

AG,OUO1023,371 -19-09NOV99-2/2

240
10
9