CONTROL MODULE

Function:

To operate as a safety interlock to control safe starting, operation and shut off of the tractor engine.

Theory of Operation:

The A2 control module contains logic circuitry that controls voltage and ground circuits for the K3 fuel relay (voltage and ground circuits), Y2 fuel solenoid (hold-in voltage) and the K1 start relay (voltage).

Control voltage is provided to the control module by the key switch, seat switch (operator on seat or switch in DEFEAT position), PTO switch (S5 PTO neutral start switch and S7 rear PTO switch on the gear drive tractors)(S8 PTO switch on the hydrostatic drive tractors), and the S4 neutral gear range switch.

The control module has a permanent ground circuit through the 166 Blk wire, X9 connector and 165 and 130 Blk wires to frame ground.

The control module operates with an IF - THEN logic where combinations of voltage inputs (IF's) to the control module produce combinations of output voltages and a ground path (THEN's).

Example (Refer to Condition 3 column in Table 1 on next page):

IF voltage is provided to the control module by the key switch being placed in the RUN position, and IF the seat switch is depressed (operator on seat);
THEN voltage is supplied to the fuel solenoid hold-in coil (holding the fuel solenoid open), and fuel solenoid pull-in coil (for 1 second) providing the requirements to keep the tractor engine running.

To check or test operation of the control module, see:

– "CRANKING CIRCUIT OPERATION" on pag e32.
– "FUEL SUPPLY OPERATION" on page40.
– "ENGINE SHUTOFF CIRCUIT OPERATION – GEAR" on page44, or
– "ENGINE SHUTOFF CIRCUIT OPERATION – HYDRO" on page48.

The control module has 10 wires to the X10 connector.

Inputs:

A (Red) - voltage IN from the key switch with the switch in either the START or RUN position.

B (Org) - voltage IN from the seat switch with the switch in the DEFEAT position (given other operating conditions provide voltage to the seat switch).

C (Yel) - voltage IN from the seat switch with the switch closed (operator ON seat).

D (Blu) - voltage IN from the PTO circuit given that the PTO is in NEUTRAL (gear) or that the PTO switch is in the OFF position (hydro).

E (Brn) - voltage IN from the gear range neutral switch with the switch in the NEUTRAL position (given other operating conditions provide voltage to the gear range neutral switch).

J (Wht) - voltage IN from the fuel relay contacts / fuel shutoff solenoid pull-in coil. This voltage starts the control module internal timer (1 second) which controls the ground circuit path (I) for the fuel relay coil.

Outputs:

F (Pnk) - voltage OUT to the fuel relay coil and fuel shutoff solenoid hold-in coil. This is a timed circuit which is shut off after 0.5 second if the operator rises off the seat or leaves the seat.

G (Grn) - voltage OUT to the start relay coil. Key switch must be in the START position for voltage to be supplied to the start relay contacts.

I (Gry) - ground circuit for the fuel relay coil. This is a timed circuit which when activated provides a ground path for 1 second. The 1 second time allows the fuel relay coil to energize, close the relay contacts and provide voltage to the fuel solenoid pull-in coil.

Ground:

Gnd (Blk) - provides a permanent ground circuit for the control module.

CONTROL MODULE LOGIC TABLE

Table 1: Control Module Logic Chart

CONDITION NUMBER:		1	2	3	4	5	6	7
IF LOGIC CONDITIONS:								
Key Switch (ON or START position)	**A (Red)**	●	●	●	●	●	●	●
Seat Switch PULLED (DEFEAT position)	**B (Org)**						●	●
Seat Switch DEPRESSED (operator ON seat)	**C (Yel)**	●	●	●	●			
PTO switches closed: (NEUTRAL position) - Gear (OFF position) - Hydro	**D (Blu)**	●	●			●		●
Gear Range Switch CLOSED (NEUTRAL position)	**E (Brn)**	●			●	●	●	●
THEN LOGIC CONDITIONS:								
Voltage to Fuel Solenoid Hold-in Coil (* delay time)	**F (Pnk)**	●	●	●	●	0.5 sec.*	●	●
Voltage to Start Relay Coil	**G (Grn)**	●						●
Ground – Fuel Solenoid Pull-in Coil (1 second timed)	**I (Gry)**	●		●	●		●