
TROUBLESHOOTING

TROUBLESHOOTING THE ELECTRONIC CONTROL SYSTEM

Most problems with the electro-hydraulic controls on the bale wagon are due to incorrectly adjusted sensor switch and switch linkages, open power circuits at the solenoid valve, low voltage, or failure to reset the controls.

In case of a malfunction, always make the following quick checks before removing the controller.

1. Check that battery and alternator voltages are in specified ranges. 12 volts with battery only, 13-14.5 volts with engine running.
2. Check adjustment of sensor switches to magnets. The magnets must center on the sensors, and clearance should be 1/32"-1/16" (0.8 mm-1.6 mm). Excessive clearance or misalignment will send a weak signal.
3. Check that the fuses are not blown. Refer to the electrical chart. A blown fuse indicates a short or ground in the appropriate circuit. If it is the 1-amp fuse, look for a ground or short in the sensor circuit. If it is the 15-amp fuse, look for a ground or short in one of the valve power circuits.

NOTE: If the 15-amp fuse blows or 10-amp and 6-amp circuit breakers trip in the controller due to a short circuit in the hydraulic solenoid valve circuit, the alarm will sound for 5 seconds. The display will flash rapidly and all of the controller outputs will be disabled.

If the short circuit is in the cross conveyor forward solenoid, the display will flash "CC" in the first and second table count.

SENSOR TEST

Put the controller in the test mode.

1. Turn the bale wagon key to the on position. Do not start the engine.
2. Make sure the controller is in the wake-up mode by pressing save.
3. Press test to place the controller in test mode. The display will show A———E.
4. To check a sensor and its wiring, place a small magnet on the sensor. The alarm will sound four times if the sensor is working correctly.
5. To exit the test mode, press the start/reset key.

SENSOR CIRCUIT

If an individual sensor circuit checks out defective, remove insulation from the junction of the sensor to the electronic wiring harness. Check the crimped connections. Check the voltage between the power lead (black/red wire on sensor, red) and black wire (ground lead) (5 volts) and between black/red-red, and machine frame (5 volts). Voltage between the power and frame, but not between power and the black wire indicates an open circuit in the black wire. No voltage in either case indicates power lead (black/red) is open.

If the voltage is OK, the sensor is defective.

NOTE: Sensor circuit connections must be carefully crimped and insulated.

SOLENOID CIRCUITS AND SOLENOIDS

The solenoid circuits are the simplest part of the control system. They consist of individual wires from the controller to the solenoids, the solenoid coils and ground wires to the machine frame, and the protection diodes.

1. The solenoid should “click”, also the magnetic field can be detected with the steel blade applied to the magnet whenever it is energized.
2. The solenoids themselves and the valves can be tested as follows: Disconnect the power lead from the solenoid, install a jumper direct from the battery positive terminal to the solenoid. If the engine is started and the hydraulic system turned on, that part of the system will operate. If it does not, there is a problem in the solenoid or in the valve.
3. To check automatic operation of the rolling rack solenoid circuit and valve, first bring the rolling rack forward. Then raise the load rack to about 75°. With the second table controls in “Manual” mode, raise the second table. After it goes past the 50° sensor, the rolling rack valve should open and close twice per second until the second table is to the upper limit, and the rolling rack should slide to the rear of the load rack.

If the rolling rack does not release, check the valve circuit and valve by disconnecting the power lead to the solenoid and using a jumper wire from the battery. If the rolling rack rolls to the rear with the power off the solenoid, either the solenoid valve is stuck open or the rolling rack relief valve is contaminated or incorrectly adjusted.

ELECTRONIC CONTROL

The checks performed for the power supply, sensor circuits and sensors, and for the solenoid circuits and solenoids should enable the mechanic, or an operator with some electrical knowledge, to eliminate these components as sources of operational problems.

Be sure that the magnets move over the sensors when driven by the tables, trip arms, spike shaft, etc.

If the machine still does not function, the problem must be in the control box. There is no way to check the control box in the field other than by the process described of eliminating all the other components of the system as sources of the problem.

ELECTRIC SERVICE CHART

This section contains a step-by-step outline to aid the operator in diagnosing common functional problems that may occur with the electronic control system.

A large percentage of all problems involving the electronic control system is due to poorly adjusted and maintained sensors. Ten solid-state sensors are used to track bale and table movements. These sensors tell the electronics what the machine is doing at any given time. It is imperative that these sensors, their actuating magnets, and all associated linkages be kept in good operation condition. The electronic control system should operate trouble free as long as the information it receives from its sensors is correct.

Use this chart to isolate the cause of a functional difficulty in terms of its origin, either in the control box itself or out on the machine. While all sensors, linkages, wiring and solenoid valves are field serviceable, the control box itself is not.

PROBLEM	POSSIBLE CAUSE	CORRECTION
No display. Display pulsates	15 amp fuse blown. Current overload on one of the nine wires to solenoid valves.	Replace fuse. Check all nine wires for shorts to the machine frame. Check solenoid coils for burned coil. Reset system by pressing "Load Reset" button on front panel. Do not operate in "Manual" until the short is corrected.
General No manual or automatic operation of any electronically controlled function.	10 amp circuit breaker blown. No oil flow to solenoid valves. Low supply voltage from vehicle electrical system.	Correct cause. Check hydraulic system. Check battery voltage with machine running. Minimum voltage 11 volts.
First table count will not advance automatically.	First table limit sensor maladjusted. First table limit sensor magnet is gone.	Check sensor and linkage for proper adjustment. Replace magnet.
Second table count will not advance automatically.	Second table limit sensor maladjusted. Second table down sensor maladjusted. Second table magnet gone.	Check adjustment. Check adjustment. Replace magnet.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Cross Conveyor Cross conveyor does not run in either direction.	No oil flow. Spool valve stuck. Bale loader down sensor linkage is bent.	Check hydraulic system for normal operation. See that no other function is by-passing. Check for magnetism on the end of each solenoid at the cross conveyor valve. If energized, oil should be flowing. Check and adjust linkage.
Cross conveyor does not reverse, but first table operates automatically.	Right side sensor linkage stuck down. Right side sensor linkage maladjusted. Right side sensor magnet gone. Bale length too long.	Free and lubricate linkage. Check adjustments. Replace magnet. Bales should be 44" to 46".
Cross conveyor does not reverse and first table does not operate automatically.	Left side sensor maladjusted. Left side sensor magnet is gone.	Check adjustment. Replace magnet.
Cross conveyor runs forward and reverse but pushes bale back into bale loader.	Right side sensor maladjusted.	Check adjustment.
Cross conveyor reverses with only one bale on first table.	First table delay latch sticking, binding, stuck down or bent.	Check adjustment and operation of delay latch.
Spikes Spikes do not operate manually or automatically.	No oil flow. Valve spool sticking. Open circuit.	Check hydraulic system. Actuate manual button. If magnetism is evident on either end of spike valve and no oil flows, the valve is sticking. Check wiring to valve.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Spikes go into "bypass" when driving up or down. Spikes UP and DOWN messages are visible on display at the same time.	Maladjusted spike sensor, either up or down. Spikes magnet gone.	Check adjustments. Replace magnet.
Spikes drive "up" or "down" partially.	Maladjusted spike sensor.	Check adjustments.
First Table No delivery flat or edge in automatic but manual delivery is normal.	Bale loader down sensor maladjusted. Second table down sensor maladjusted or magnet gone. Second table not down. Second table full of bales. Right side sensor binding or maladjusted.	Check adjustment. Check adjustments and magnet. Lower second table. Allow second table to deliver bales. Check right side sensor adjustment.
No delivery flat or edge in both automatic and manual modes.	No oil flow. Solenoid valve sticking. Dump valve sticking. Open circuit.	Check hydraulic system. Check both ends of the first table solenoid valve for magnetism while actuating the first table automatically. Valve is stuck if no oil flows while coil is energized. Check as above, except this valve should close when energized. Check wiring to all first table valves.
First table delivers up and sticks up, but does not bypass.	Dump valve sticking.	Check dump valve.
Auxiliary first table goes up but primary first table will not deliver bale flat.	First table relief valve adjusted too high.	Reduce relief valve pressure.
First table goes up and bypasses.	First table limit sensor maladjusted. Magnet gone.	Check adjustment. Check for magnet.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Second Table No delivery in either manual or automatic mode.	No oil flow. Solenoid valve not shifting. Open circuit.	Check hydraulics. Actuate valve automatically and check rear coil for magnetism. If energized, oil should flow if valve is not sticking. Check wiring to valve.
Second table goes up and bypasses.	Second table limit sensor maladjusted. Second table limit sensor magnet gone.	Check adjustments. Check magnet.
Second table goes up and shuts off but does not come down.	Second table valve sticking. Open circuit. Air check in cylinder is bad.	Check front end of second table solenoid valve for magnetism. If energized, table should come down. If not, valve may be stuck. Check valve. Check wiring to valve. Replace air check.

INSTALLATION INSTRUCTIONS

PROGRAMMABLE CONTROL ADAPTER KIT

Qty.	Part No.	Description	Reference
8	591182	Plastic band	
1	591761	Wire assembly	A, Figure 2-6
2	598691	Solenoid coil 12V	B, Figure 2-8
6	598692	Solenoid coil 12V	A, Figure 2-8
2	598693	Solenoid coil 12V	B, Figure 2-6
2	707796	Spring	C, Figure 2-2
1	849530	Bracket	B, Figure 2-2
1	849531	Bracket	A, Figure 2-2
1	849533	Bracket	A, Figure 2-4
1	9619981	Wire assembly	C, Figure 2-7
28	9620123	Terminals	
1	9620124	Connector	A, Figure 2-7
1	9620125	Clamp	B, Figure 2-7
1	602040	Wire	C, Figure 2-5
1	9620005	Wire	D, Figure 2-4, 2-7

HARDWARE

Qty.	Part No.	Description
2	80701	¼" flat washer
2	84060	¼" locknut
2	87141	¼" x 1¼" cap screw
2	87825	#10 nut
2	88986	#10 1½" round-head machine screw
4	244244	¼" x ¾" truss-head machine screw
2	280154	#6 x ½" self-tapping screws
2	280254	#10 internal tooth lock washer
4	523282	¼" flange nut

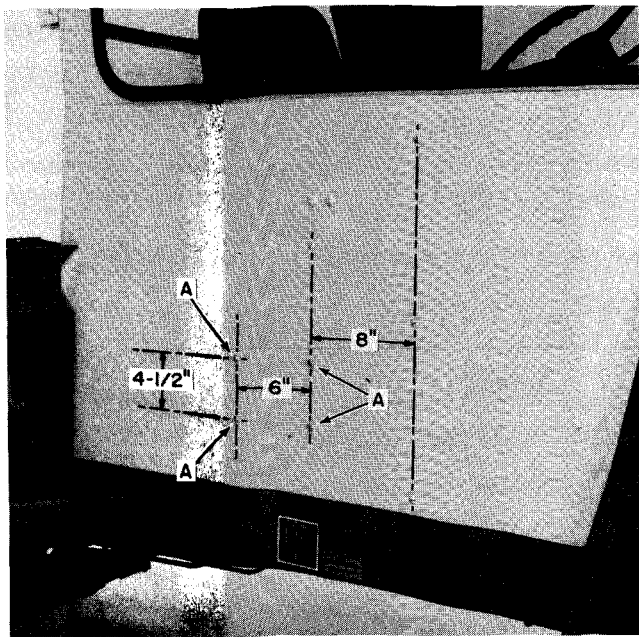


FIGURE 2-1

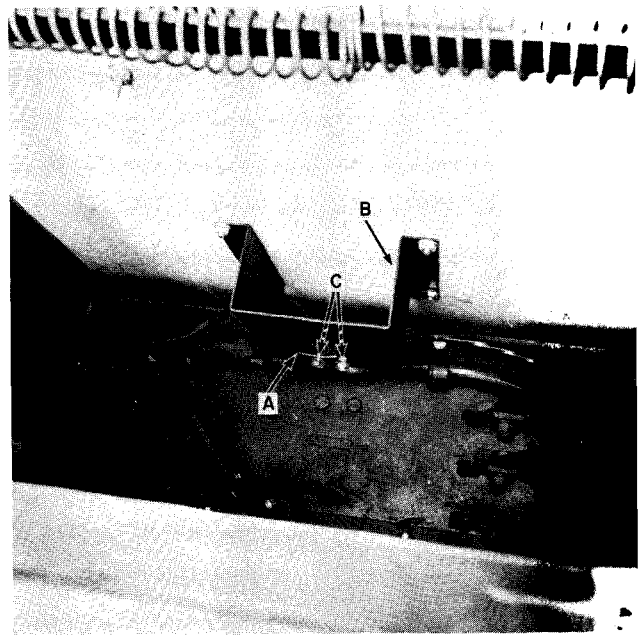


FIGURE 2-2

INSTALLATION

1. Remove the old controller.
2. Remove and discard the old controller mounting channels and guides.
3. Drill four $9/32$ " holes in the right cab wall as shown at A, Figure 2-1.
4. Fasten the spade bracket, A, Figure 2-2, to the mounting bracket, B, with two $1/4$ " x $1/4$ " cap screws, flat washers and locknuts. Install a spring on each mounting bolt at C.
5. Fasten mounting bracket, B, Figure 2-2, as shown using four $1/4$ " x $3/4$ " truss-head machine screws and flange nuts.
6. Drill two $7/32$ " holes at A, Figure 2-3, in the console. File notches on both sides of the opening as shown at B, Figure 2-3.

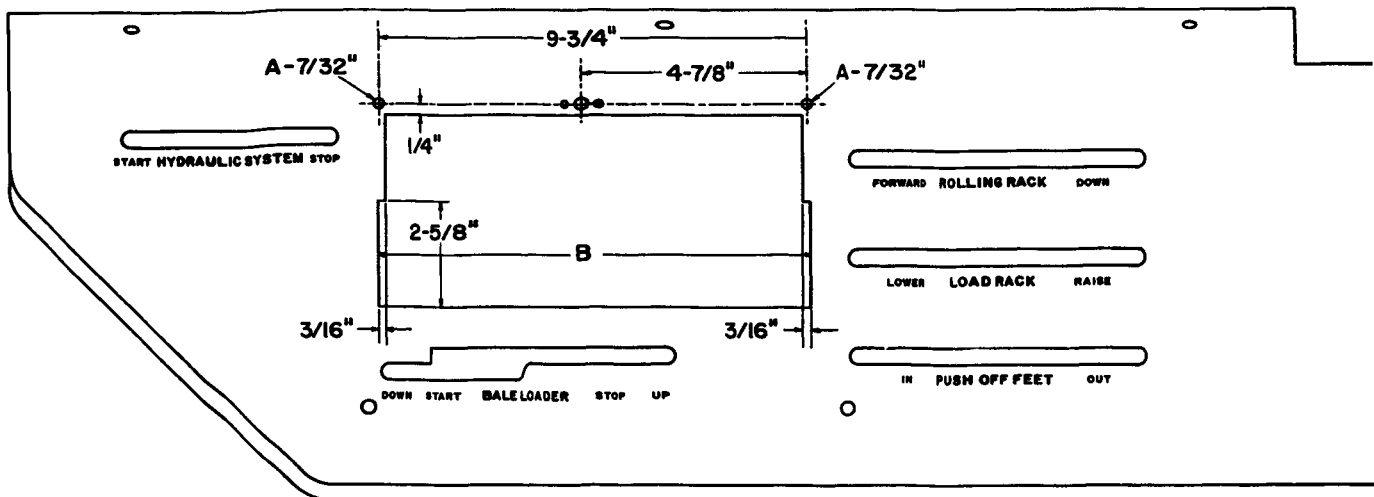


FIGURE 2-3

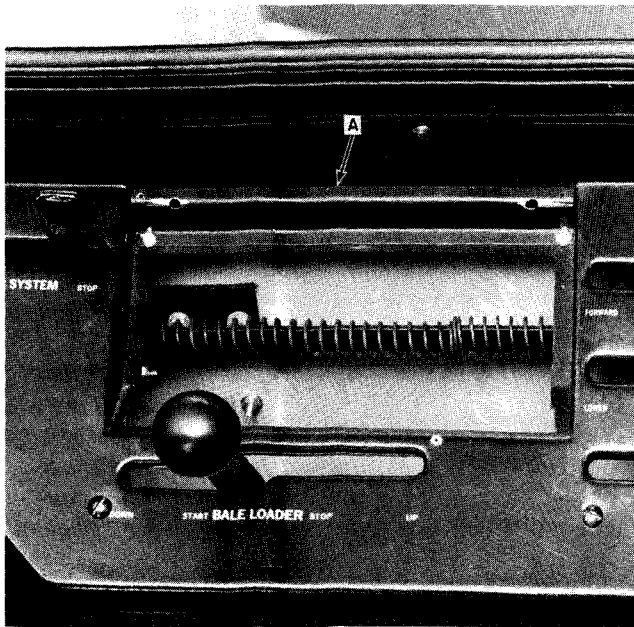


FIGURE 2-4

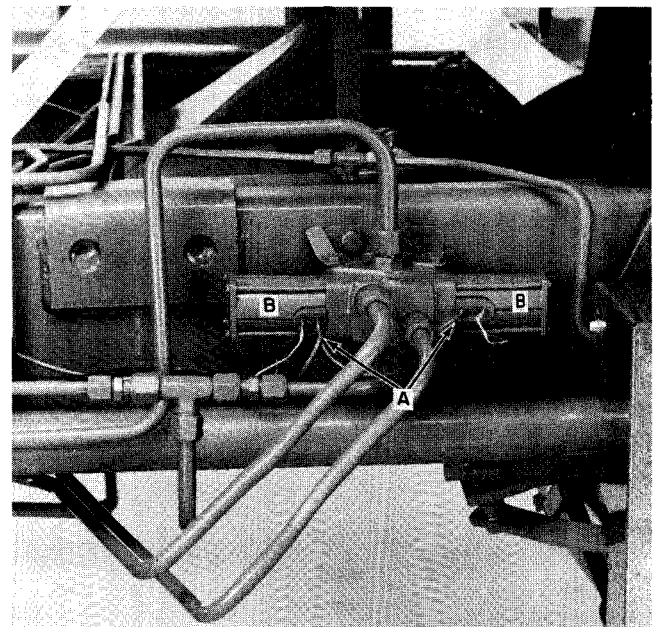


FIGURE 2-6

7. Install bracket, A, Figure 2-4, as shown using two #10 x 1/2 truss-head machine screws, lock washers, and nuts.
8. Disconnect the three count retainer wires (black) at A, Figure 2-5, and remove the count retainer, B.
9. Add jumper wire, C, Figure 2-5, from the hot side of the 15-amp fuse block to the hot side of the 1-amp fuse block.
10. Add the red/light-blue wire, D, Figure 2-5, to the protected side of the left fuse (15-amp) in the left fuse block. Route the wire along the main harness to the side console. Use the plastic ties provided to fasten the wire to the harness.
11. Replace the ground wire, A, Figure 2-6, with the new wire assembly. Route the wire along the wire harness to the right frame channel. Connect the #9619981 wire assembly to that wire and route the wire into the right console. Fasten the wires to the harness with the plastic ties provided.

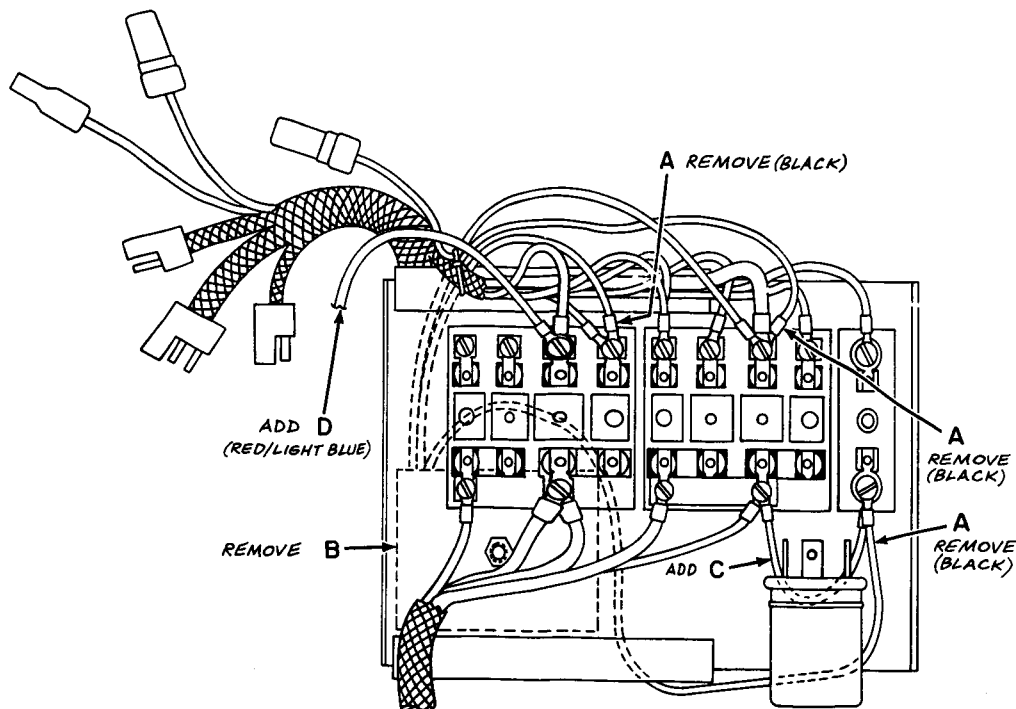


FIGURE 2-5

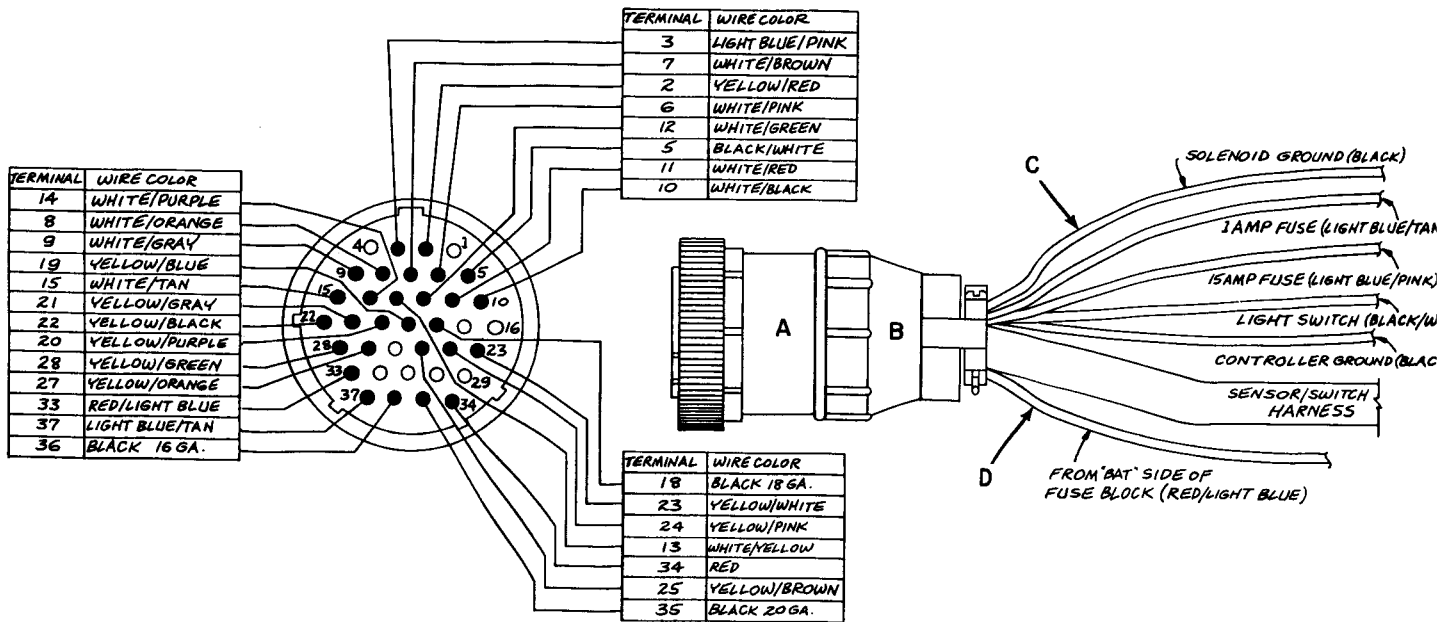


FIGURE 2-7

12. Cut off the spade terminals from the controller end of the wire harness. Install the new terminals provided on the wires.
13. Install the wires in the connector as shown in Figure 2-7.
14. Replace the two second table solenoids (9V), B, Figure 2-6, with the new 12-volt solenoids provided (Racine hydraulics).
15. Replace the six solenoids (9V), A, Figure 2-8, with the new 12-volt solenoids provided (Fluid Power Systems).
16. Replace the first table dump and rolling rack dump solenoids (9V), B, Figure 2-8, with the new 12-volt solenoids provided.
17. Attach the new connector to the controller and install the controller in the console. The bottom lip of the controller should slip between the spade bracket, A, Figure 2-2, and mounting bracket, B. Retain the controller with two #6 x 1/2" self-tapping screws at A, Figure 2-9.

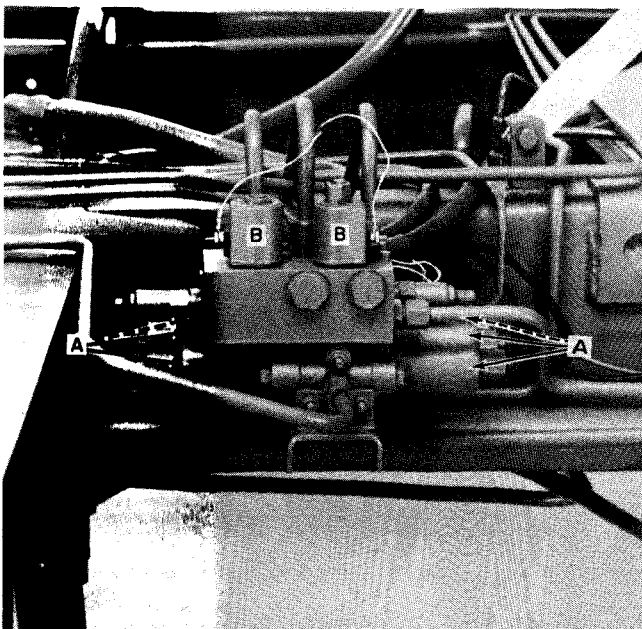


FIGURE 2-8

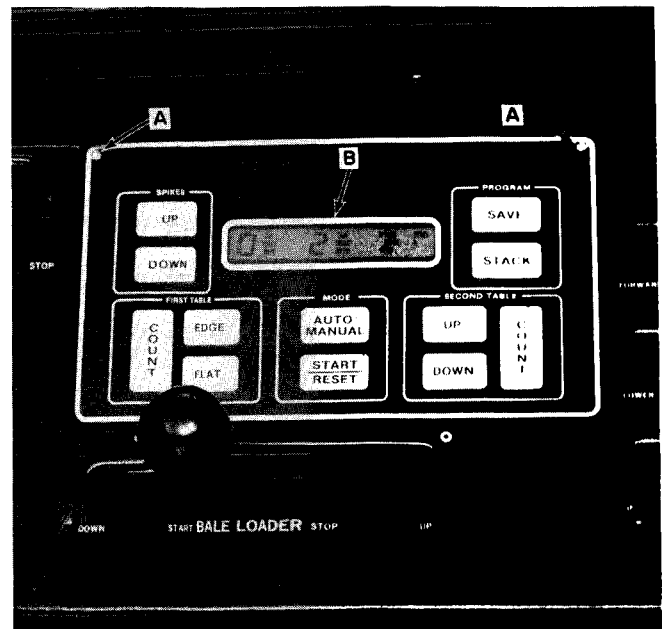


FIGURE 2-9

TEST THE CONTROLLER

1. Turn the bale wagon key to the on position. A display, B, Figure 2-9, should appear. If there is no display, check the wiring from the fuse block for proper hookup.
2. If there is a display, test the sensors as outlined in "Troubleshooting."
3. Test manual operation.
 - a. Shift the transmission to neutral and engage the parking brake.
 - b. Start the engine and engage the hydraulics.
 - c. Put the controller in manual operation.

Do the following:

Press: start/reset to start cross conveyor

Second table up

Second table done

First table edge

First table flat

Spikes up

Spikes down

If the bale wagon does not function correctly, check the connector for proper wiring, hydraulic valve operation, hydraulic pressure.

4. Test automatic operation.



CAUTION: WHEN TROUBLESHOOTING THE BALE WAGON, EXTREME CARE MUST BE TAKEN. MANY CHECKS WILL REQUIRE ACTIVATING SENSORS WHILE THE HYDRAULIC POWER IS ON. ON A MALFUNCTIONING MACHINE, ONE MUST BE ALERT FOR ABNORMAL MACHINE REACTIONS AT ALL TIMES.

- a. Put the controller in automatic mode. Select stack pattern, A. Change the first table count to 4 and the second table to "0". Push "reset". Operate left side trip. The cross conveyor should reverse. Operate right side trip. The first table will deliver on edge. Then the second table will deliver to the load rack. The rolling rack should release until the second table reaches the top sensor.
- b. Change first table count to 1. Change second table count to 2. Press reset. The spikes should raise.
- c. Change first table count to 3. Press reset. Second table should raise to 50° limit switch. The spikes should lower.

If the system does not operate correctly, the sensor wires are incorrectly installed in the connector.

INTERLOCK TESTING

In Automatic Mode (Stack Pattern, A)

1. Raise the loader part way. Change the first table count to "0" and the second table count to zero. Press reset. Operate the left side trip. The cross conveyor should not reverse.
2. Lower the loader. Raise the second table up and install the second table prop. Put the controller in automatic operation and press reset. Activate the left side trip and then the right side trip. The first table should not deliver.

If the interlocks do not operate correctly, inspect the connector for proper wiring and the sensor assemblies.