

SECTION V**MAINTENANCE AND REPAIR****GENERAL**

1. Keep the controller dry and free of dust, dirt, and debris. No parts require periodic replacement.
2. Periodically turn-off the AC line supply to the controller and check all wire terminations to be sure they are tight.
3. Visually check components for damage due to overheating or breakage. All damaged and/or faulty components must be replaced for satisfactory operation.
4. Maintain the motor according to maintenance instructions supplied by the motor manufacturer.

TROUBLESHOOTING

The following table (Table 5-1) is a general guide for locating and correcting common problems that may occur with a DC drive. Table 5-1 is not intended to cover every contingency. The corrective actions are presented in a logical order. When a corrective action has been completed and the problem still exists, proceed to the next possible cause.

TABLE 5-1. TROUBLESHOOTING

INDICATION	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Motor won't start (See "Inoperative Motor," page 3-3.)	AC line open	Be sure rated AC line voltage is applied to the controller.
	Operator controls inoperative or connected incorrectly	Repair accordingly.
	Controller not reset	Initiate a Stop command and then a Start command.
	Line Voltage Selection Jumper J1 in wrong position	See Step 5 on page 2-4.
	Controller not enabled	Be sure +24 VDC is applied to Terminal TB2-8.
	Loss of speed reference signal	Check for 0 - ± 10 VDC, speed reference signal.
	Controller not adjusted correctly	See Adjustment Instructions, Section IV.
	DIP Switch S3 not set correctly	See Table 4-1, page 4-4.
	Current limit set too low	Turn the FWD CUR LMT and REV CUR LMT potentiometers clockwise.
	Open shunt field winding or wiring to the motor shunt field, causing loss of torque ^a	Check the motor shunt field and associated circuitry for a loose connection or a broken wire. Repair accordingly.
	Motor failure	Repair or replace the motor.
Control board failure	Replace the control board.	
Cont'd on next page		

TABLE 5-1. TROUBLESHOOTING

INDICATION	POSSIBLE CAUSE	CORRECTIVE ACTION
2. Controller fuse blows when AC line power is applied to the controller	Wiring faulty or incorrect	Check all external wiring terminating in the controller. Correct accordingly.
	Circuit, component, or wiring grounded	Remove ground fault.
	Two or more SCR's shorted	Replace shorted SCR's or the control board.
	Varistor RV1 shorted	Replace RV1 or the control board.
	Shunt Field Bridge BR1 shorted ^d	Replace BR1 or the control board.
	Motor shunt field shorted or grounded ^d	Repair or replace the motor.
	Control board failure	Replace the control board.
3. Controller fuse blows when a Start command is initiated	Motor shorted or grounded	Repair or replace the motor.
	Control board failure causing SCR's to turn-on fully	Replace the control board.
	One SCR shorted	Replace shorted SCR.
4. Controller fuse blows while the motor is running	Motor overloaded	Check shunt field current. ^a Low shunt field current causes excessive armature current. If field current is adequate, check for a mechanical overload. If the unloaded motor shaft does not rotate freely, check motor bearings. Also check for a shorted motor armature. Motor overload can also be caused by incorrect gear ratio. Correct accordingly.
	Loose or corroded connection. Wiring faulty, incorrect, or grounded	Check all terminals, connections, and wiring between the line, controller, and motor.
	Motor shorted or grounded	Repair or replace the motor.
	One or more SCR's breaking down (shorting intermittently)	Replace shorted SCR or the control board.
	Control board failure causing SCR false firing or misfiring	Replace the control board.
Cont'd on next page		

TABLE 5-1. TROUBLESHOOTING

INDICATION	POSSIBLE CAUSE	CORRECTIVE ACTION
5. Maximum speed excessive	Maximum speed set too high	Turn the MAX SPD potentiometer counter-clockwise.
	Controller not calibrated correctly	Refer to Steps 4 and 5 on pages 2-4 and 2-5.
	Open shunt field winding or wiring to the motor shunt field ^a	Check the motor shunt field and associated circuitry for a loose connection or a broken wire. Repair accordingly.
	Motor field demagnetized ^b	Replace the motor.
	Tachometer generator faulty or connected incorrectly	Repair accordingly.
6. Motor won't reach top speed	Low line voltage	Check for rated line voltage, $\pm 10\%$, on the controller line terminals.
	Motor overloaded	Check shunt field current. ^a Low shunt field current causes excessive armature current. If field current is adequate, check for a mechanical overload. If the unloaded motor shaft does not rotate freely, check motor bearings. Also check for a shorted motor armature. Motor overload can also be caused by incorrect gear ratio. Correct accordingly.
	Maximum speed set too low	Turn the MAX SPD potentiometer clockwise.
	Current limit set too low	Turn the FWD and REV CUR LMT potentiometers clockwise.
	Wrong shunt wires removed	See Step 4 and Table 2-3, page 2-4.
	Motor field demagnetized ^b	Replace the motor.
	Control board failure	Replace the control board.
Tachometer generator faulty or open tachometer wiring	Repair accordingly.	
Cont'd on next page		

TABLE 5-1. TROUBLESHOOTING

INDICATION	POSSIBLE CAUSE	CORRECTIVE ACTION
7. Unstable speed	AC line voltage fluctuating	Observe line voltage with a voltmeter or oscilloscope. If fluctuations occur, correct condition accordingly.
	Loose or corroded connection. Wiring faulty, incorrect, or grounded	Check all terminals, connections, and wiring between the line, operator controls, controller, and motor.
	Oscillating load connected to the motor	Stabilize the load. Turning the IR COMP potentiometer counterclockwise may minimize oscillations.
	Voltage Selection Jumpers J1, J2, J3 in wrong position	See Step 5 on page 2-5.
	IR compensation not adjusted correctly	See the IR Compensation adjustment instructions on page 4-1.
	Maximum speed not adjusted correctly	See the Maximum Speed adjustment instructions on page 4-2.
	Motor faulty	Check motor brushes. Replace if needed. Repair or replace the motor.
	Tachometer generator or coupling faulty (if used)	Repair accordingly.
8. Line and motor armature current excessive	Motor overloaded	Check shunt field current. ^a Low shunt field current causes excessive armature current. If field current is adequate, check for a mechanical overload. If the unloaded motor shaft does not rotate freely, check motor bearings. Also check for a shorted motor armature. Motor overload can also be caused by incorrect gear ratio. Correct accordingly.
9. Shunt field current ^a too low	Open shunt field winding or wiring to the motor shunt field	Check the motor shunt field and associated circuitry for a loose connection or a broken wire. Repair accordingly.
	Shunt field connected for incorrect voltage	Check motor rating and refer to Table 8-5, page 8-4.
	Shunt Field Bridge BR1 failure	Replace BR1 or the control board.
Cont'd on next page		

TABLE 5-1. TROUBLESHOOTING

INDICATION	POSSIBLE CAUSE	CORRECTIVE ACTION
10. Shunt field current ^a too high	Shunt field connected for incorrect voltage	Check motor rating and refer to Table 8-5, page 8-4.
	Shunt field windings shorted	Measure the shunt field resistance and compare with the motor rating. Repair or replace the motor.
11. Motor thermal guard tripped (if used)	Ventilation insufficient	Remove dirt, dust, and debris from the motor intake and exhaust screens.
	Excessive motor load at low speed	Reduce the load or increase the speed.
	Line and motor armature current excessive	See Indication 8.
	Motor overheating from friction	Check for misalignment. Realign the motor.
	Shorted motor windings or faulty bearings	Repair or replace the motor.

a. Does not apply to permanent-magnet motors.

b. Does not apply to shunt-wound motors.