

Table 3 TROUBLESHOOTING CHART

LED CODE	PROGRAMMER LCD DISPLAY	EXPLANATION	POSSIBLE CAUSE
1,1	THERMAL CUTBACK	over-/under-temperature cutback	1. Temperature >92°C or < -25°C. 2. Excessive load on vehicle. 3. Operation in extreme environments. 4. Electromagnetic brake not releasing.
1,2	THROTTLE FAULT 1	throttle fault	1. Throttle input wire open or shorted. 2. Throttle pot defective. 3. Wrong throttle type selected.
1,3	SPD LIMIT POT FAULT	speed limit pot fault	1. Speed limit pot wire(s) broken or shorted. 2. Broken speed limit pot.
1,4	LOW BATTERY VOLTAGE	battery voltage too low	1. Battery voltage <17 volts. 2. Bad connection at battery or controller.
1,5	OVERVOLTAGE	battery voltage too high	1. Battery voltage >36 volts. 2. Vehicle operating with charger attached. 3. Intermittent battery connection.
2,1	MAIN OFF FAULT	main contactor driver Off fault	1. Main contactor driver failed open.
2,3	MAIN CONT FLTS	main contactor fault	1. Main contactor welded or stuck open. 2. Main contactor driver fault. 3. Brake coil resistance too high.
2,4	MAIN ON FAULT	main contactor driver On fault	1. Main contactor driver failed closed.
3,1	PROC/WIRING FAULT	HPD fault present for >10 sec.	1. Misadjusted throttle. 2. Broken throttle pot or throttle mechanism.
3,2	BRAKE ON FAULT	brake On fault	1. Electromagnetic brake driver shorted. 2. Electromagnetic brake coil open.
3,3	PRECHARGE FAULT	precharge fault	1. Low battery voltage. 2. KSI and throttle turned on at same time.
3,4	BRAKE OFF FAULT	brake Off fault	1. Electromagnetic brake driver open. 2. Electromagnetic brake coil shorted.
3,5	HPD	HPD (High Pedal Disable) fault	1. Improper sequence of throttle and KSI, push, or inhibit inputs. 2. Misadjusted throttle pot.
4,1	CURRENT SENSE FAULT	current sense fault	1. Short in motor or in motor wiring. 2. Controller failure. *
4,2	HW FAILSAFE	motor voltage fault (hardware failsafe)	1. Motor voltage does not correspond to throttle request. 2. Short in motor or in motor wiring. 3. Controller failure. *
4,3	EEPROM FAULT	EEPROM fault	1. EEPROM failure or fault.
4,4	POWER SECTION FAULT	power section fault	1. EEPROM failure or fault. 2. Short in motor or in motor wiring. 3. Controller failure. *

* Jack up vehicle and retest to confirm diagnosis. Clean connections, inspect system wiring, and retest.

Table 2 STATUS LED FAULT CODES

LED CODES		EXPLANATION	
<i>LED off</i>	████████	no power or defective controller controller operational; no faults	
<i>solid on</i>	□□□□□□		
1,1	□ □	thermal cutback fault	
1,2	□ □□	throttle fault	
1,3	□ □□□	speed limit pot fault	
1,4	□ □□□□	undervoltage fault	
1,5	□ □□□□□	overvoltage fault	
2,1	□□ □	main contactor driver Off fault	
2,3	□□ □□	main contactor fault	
2,4	□□ □□□	main contactor driver On fault	
*	3,1	□□□ □	HPD fault present for >10 seconds
	3,2	□□□ □□	brake On fault
	3,3	□□□ □□□	precharge fault
	3,4	□□□ □□□□	brake Off fault
	3,5	□□□ □□□□□	HPD (High Pedal Disable) fault
*	4,1	□□□□ □	current sense fault
*	4,2	□□□□ □□	motor voltage fault (hardware failsafe)
* †	4,3	□□□□ □□□	EEPROM fault
*	4,4	□□□□ □□□□	power section fault
<p>* = Must cycle keyswitch to clear. † = Must use programmer to clear, as follows: select Program Menu, alter data value of any parameter, cycle keyswitch.</p>			
NOTE: Only one fault is indicated at a time, and faults are not queued up.			

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DIAGNOSTICS AND TROUBLESHOOTING

The 1210 controller provides diagnostics information to assist technicians in troubleshooting drive system problems. The diagnostics information can be obtained in two ways: reading the appropriate display on the handheld programmer or observing the fault codes issued by the status LED.

PROGRAMMER DIAGNOSTICS

The handheld programmer presents complete diagnostic information in plain language. Faults are displayed in the Diagnostics Menu, and the status of the controller inputs/outputs is displayed in the Test Menu.

Additionally, the Diagnostics History Menu provides a list of the faults that have occurred since the history file was last cleared. Checking (and clearing) the history file is recommended each time the vehicle is brought in for maintenance.

Refer to the troubleshooting chart (Table 3) for suggestions about possible causes of the various faults.

For information on 1311 programmer operation, see Appendix B.

LED DIAGNOSTICS

During normal operation, with no faults present, the status LED is steadily on. If the controller detects a fault, the status LED provides two types of information. First, it displays a slow flash (2 Hz) or a fast flash (4 Hz) to indicate the severity of the fault. Slow-flash faults are self-clearing; as soon as the fault is corrected, the vehicle will operate normally. Fast-flash faults (“*” in Table 2) are considered to be more serious in nature and require that the keyswitch be cycled to resume operation after the fault is corrected.

After the severity indication has been active for 10 seconds, the status LED flashes a 2-digit fault identification code continuously until the fault is corrected. For example, code “1,4”—low battery voltage—appears as:

□ □ □ □ □	□ □ □ □ □	□ □ □ □ □
(1 , 4)	(1 , 4)	(1 , 4)

The codes are listed in Table 2. Refer to the troubleshooting chart (Table 3) for suggestions about possible causes of the various faults.