Traction
Elevator Controller Manual

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Foreword

G.A.L. has developed this manual with usability and safety in mind. General and specific safety notices and precautions are defined in the manual. However, G.A.L. cannot be responsible for any injury to persons or damage to property (including the elevator equipment) resulting from negligence, misuse of the equipment, misinterpretation of instructions included in this manual, or due to any other cause beyond the control of G.A.L.

Rev. 2 (December 5th 2012)

CONTENTS

The label **WARNING** identifies procedures and practices that may result in personal injury and/or equipment damage if not correctly followed.

The label **NOTE** identifies information intended to be helpful in the described procedure or practice.

WARNING: Installation and wiring must be in accordance with the national electrical code, all local codes, and all elevator safety codes and standards. The 3-phase AC power supply to the equipment must originate from a properly fused disconnect or circuit breaker (not capable of delivering more than 10,000 RMS symmetrical amperes). Improper motor branch circuit protection will void warranty and may create a hazardous condition.

WARNING: Wiring to the controller terminals must be installed in a careful, neat manner. Stranded wire conductors must not have strands left out of the terminals. Leaving strands of wire out of the terminals creates potential shorts. All terminals and cable connectors must be seated properly.

WARNING: Elevator control products must be installed by elevator personnel who have been trained in the construction, maintenance, repair, inspection, and testing of elevator equipment. The elevator personnel must comply with all applicable safety codes and standards.

WARNING: This equipment is an O.E.M. product designed and built to comply with CSA B44.1/ASME A17.5, and the national electrical code, and it must be installed by a qualified contractor. It is the responsibility of the contractor to make sure that the installation is performed safely, and that it complies with all applicable codes.

WARNING: Proper grounding is vitally important to the safe and successful operation of this system. A separate ground wire should be installed from the building earth ground to the earth ground terminal in each controller. Proper conductor size must be utilized for grounding. In order to minimize resistance to ground, the shortest possible route should be used for the ground conductor. See national electrical code article 250-95, or related local applicable code.

WARNING: Use only the correct rated fusing for controller protection. Use of improperly rated fusing will void the warranty.

NOTE: Every precaution, whether or not specifically stated in this document, should be taken when installing, adjusting or servicing any elevator. All safety precautions should be followed to make sure life and limb of the service person and public is not endangered.

NOTE: Keep the control room/control space clean.
Do not install the controller in a dusty area.
Do not install the controller in a carpeted area.
Keep control room/control space temperature between 32 F and 110 F. Avoid condensation on the equipment. Do not install the controller in a hazardous location and where excessive amounts of vapors or chemical fumes may be present.
Make sure that the power supply feeding the elevator controller does not fluctuate more than +/- 1 percent

1.1 Introduction

The GALaxy traction elevator controller is a computer-based system that offers superior performance, flexibility and reliability. It has been designed to save time in installation and troubleshooting, but it is still very important that the field personnel familiarize themselves with this manual before attempting to install the equipment.

Specifications:

Environment:

- 35° F to 110° F ambient
- 12,000 feet altitude
- 95% humidity

Standard Features:

- CSA B44.1-96 ASME A17.1-1996, ASME A17.1-2007 certified
- Inspection Operation (car top and controller)
- Access Operation
- Independent Service
- Fire Service Phase I
- Fire Service Phase I Alternate Return
- Fire Service PhaseIII
- Emergency Power
- Earthquake Service
- On Board Diagnostics LEDs
- On Board LCD Interface
- Motor Protection Timers
- Door Motor Protection Timer
- Field Adjustable Parameters
- Elevator Duty Rated NEMA Motor

Optional Features:

- Selective Rear Doors
- Attendant Service
- Code Blue Hospital Service
- Security
- Remote Diagnostics
- Emergency Power

1.2 Physical Layout of the Controller

1.2.1 Typical Physical Layout

Figure 1.0 shows a typical layout of the GALaxy controller in a standard G.A.L. cabinet. Below, is a brief description of each block:

1. Main Control Board: The 1064 main control board contains input and output devices, controller switches, fuses and field wiring terminal connections.
2. Safety Processor Board: The Safety Processor board uses a microprocessor and a PAL device to implement the independent speed and redundancy checks required for A17.1-2000 compliance. This board has its own LCD interface for parameter adjustment and diagnostics.
3. Main CPU: The TS-5300 computer board is a single board IBM compatible computer. It executes the program and turns on and off the inputs and outputs.
4. LCD Interface: The 1021 LCD Interface board provides a user interface to all

controller adjustment and setup parameters. It also shows diagnostic information.

5. Power Supply: The power supply provides power to the computer and its peripheral boards. It is a 5 volt DC regulated power supply rated at 3 amps with overvoltage, and short circuit protection.
6. Dynamic Braking Resistors: Additional space for dynamic braking resistors and brake resistors.
7. Options: This section of the controller can be used for options such as the Hall Call I/O board, job specific I/O expansion and a digital PI display driver.
8. Transformer: The system transformer is located in the lower part of the cabinet. It is usually a 500VA building power to 120VAC transfer. It is used to convert the building power to a lower voltage for the signals and other controller functions.
9. Contactors: These are various contactors used for the brake, brake cooling, and run control.
10. Drive: Magnetek DSD-412 DC SCR Drive, Magnetek DC Quattro, HPV-600/900/900 PM or KEB Combivert F5.
11. Motor Contactors: DC or AC rated motor contactor sized for each specific job.
12. Ground Terminal: The ground terminal block is where the earth ground is attached.

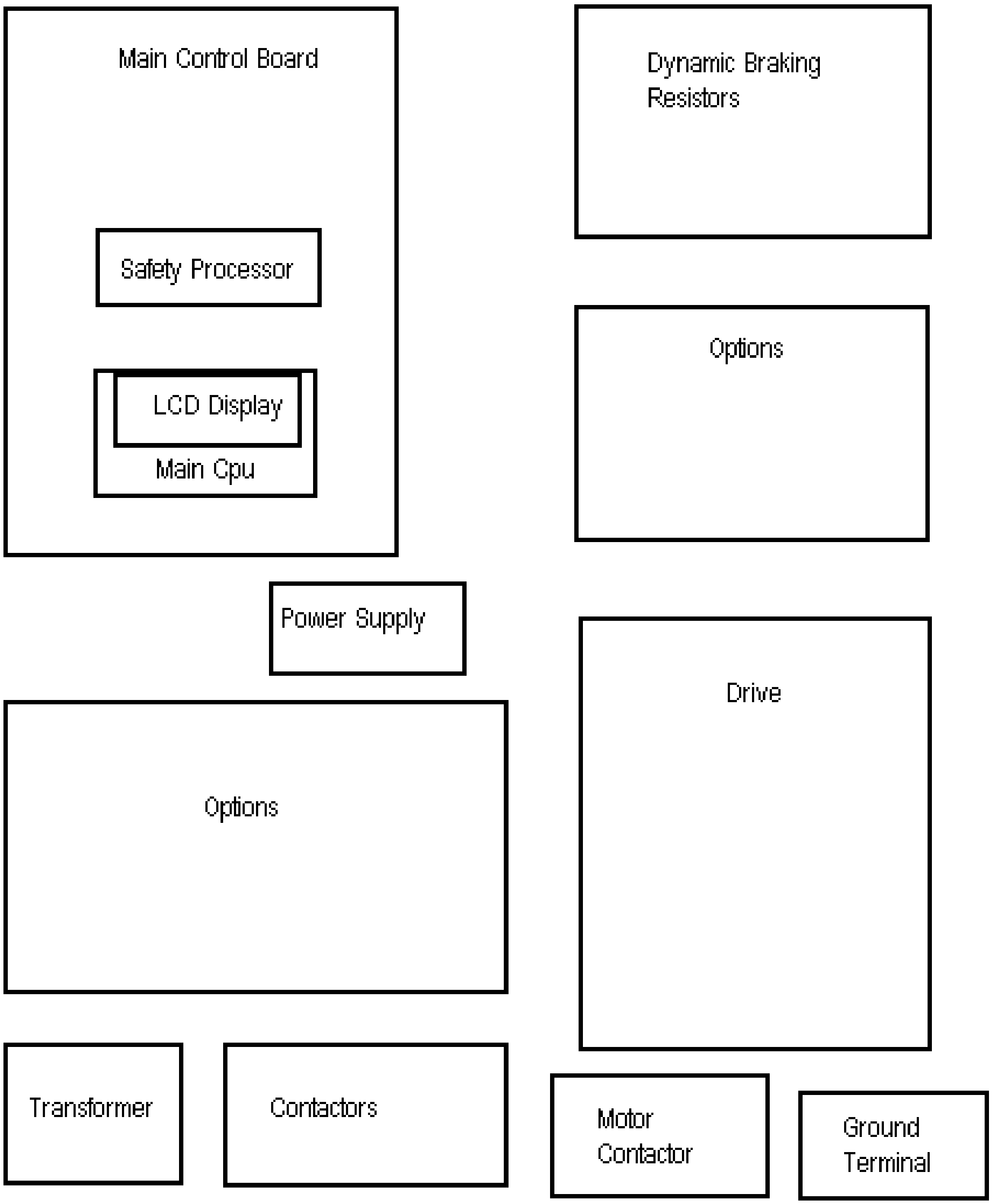


Figure 1.0: Typical Physical Layout

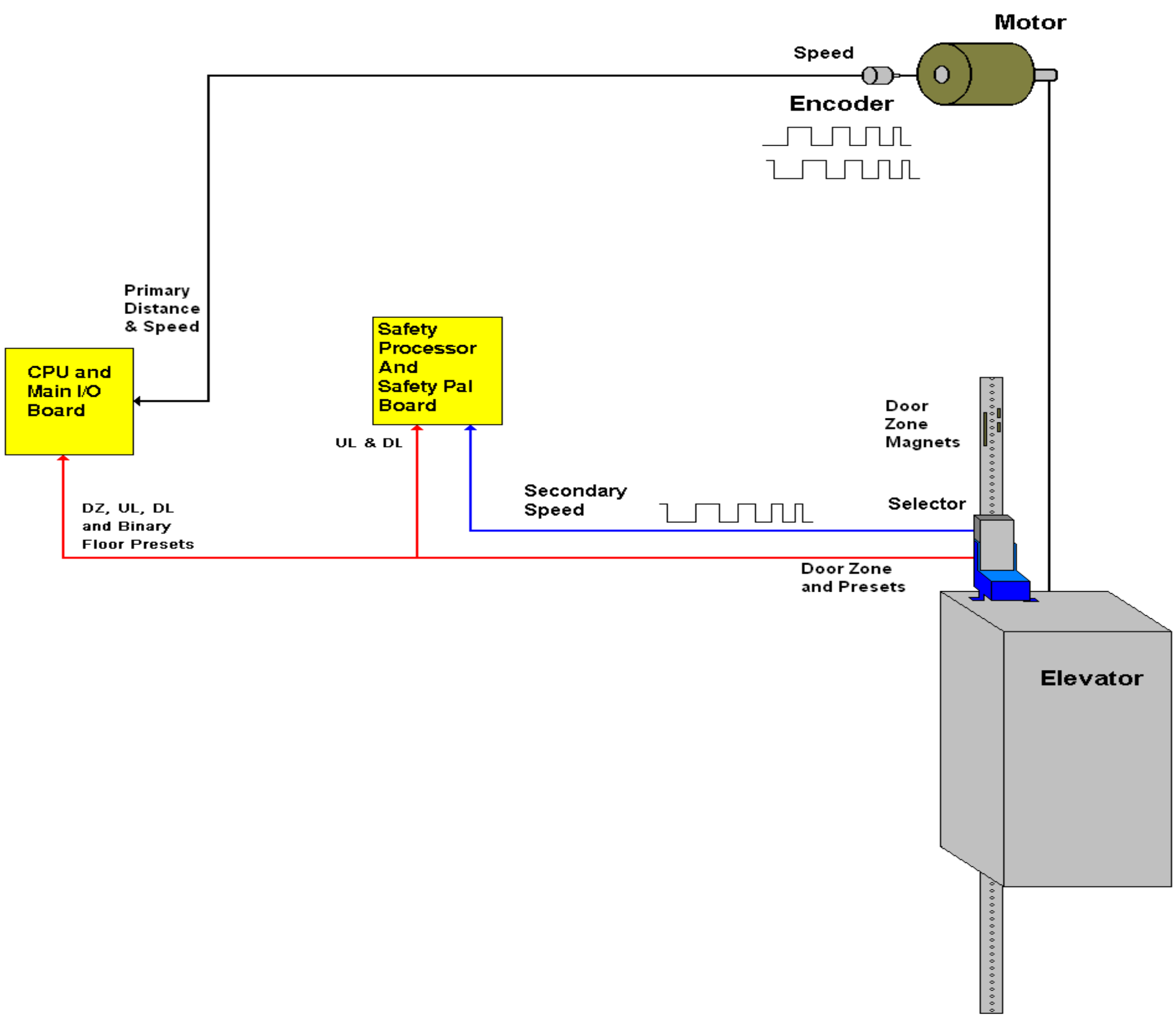
1.3 Selector System

The selector system for the GALaxy controller can be either a tape system or tapeless one.

1.3.1 Tape Selector System

The tape system uses a perforated steel tape that is hung the length of the Hoistway. A set of magnets are placed on the tape at each floor having one 8" magnet as the door zone magnet and one to five smaller 2" magnets as binary position preset magnets. The selector is mounted on the car and is guided along the tape by nylon guides to keep the tape and magnets the proper distance from the selector sensors. The controller uses the door zone magnet to determine the elevator's level position relative to the floor. At the dead level position, the binary preset inputs are read in order to verify that the car is at the correct floor. A block diagram of the tape system is shown in Figure 1.1.

Figure 1.1: Tape Selector



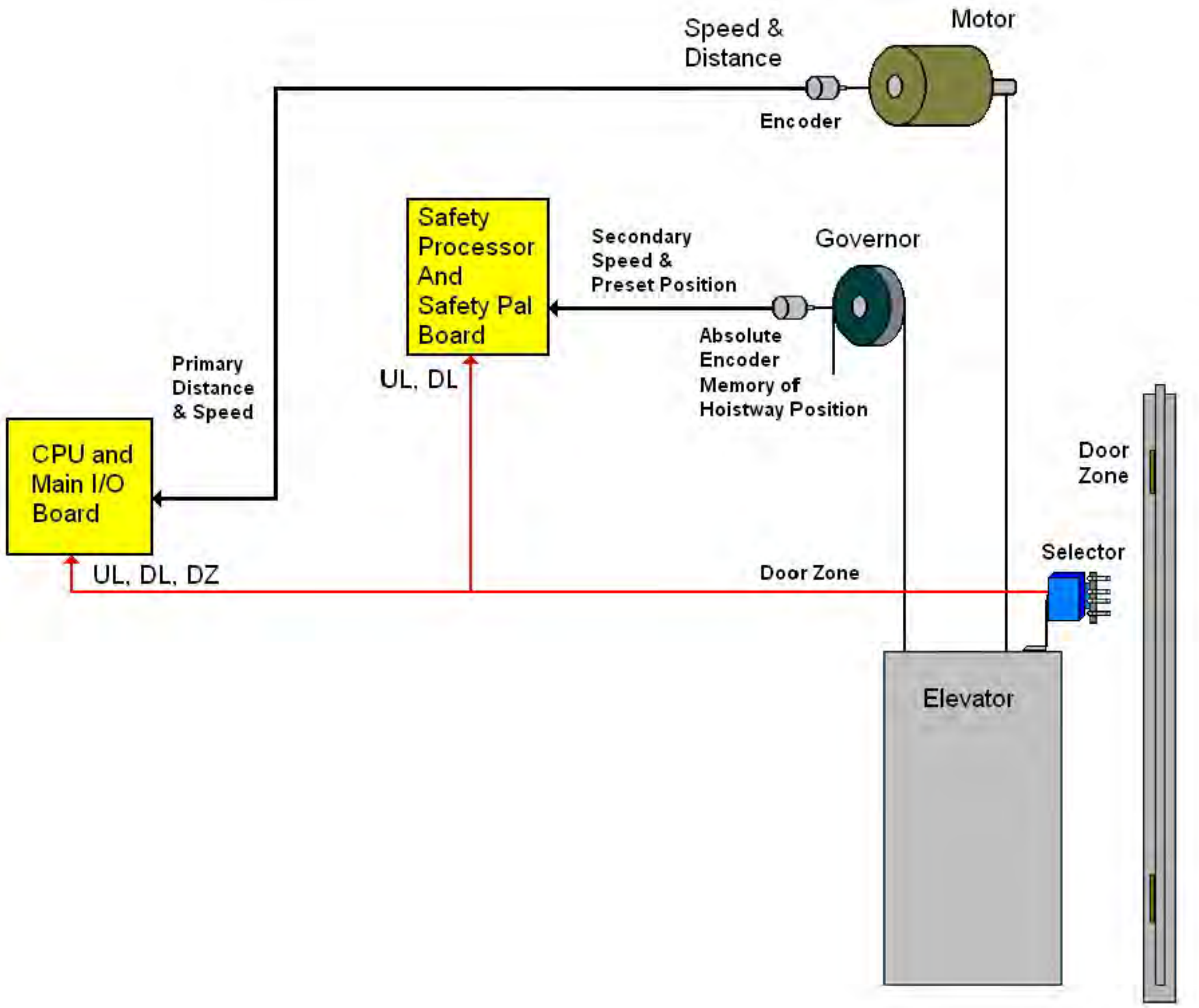


Figure 1.2: Tapeless System

1.3.3. Tapeless System

The tapeless system uses an absolute encoder mounted on the governor and a four sensor selector on the car top to read the door zone magnet for each floor. The door zone magnets are placed in the corner of the rail.

There are two configurations of the tapeless system; 485 configuration and CAN Open configuration. The 485 configuration uses the governor mounted encoder for secondary speed feedback and for absolute position of the car. The CAN Open configuration uses the governor mounted encoder for the primary speed feedback and position of the car. The encoder is coupled to a rotating shaft on the governor. If the governor on the job does not have a rotating shaft, it must be replaced with one that does.

The door zone sensors are used for exact floor position on stop and re-leveling the car. A block diagram of the tapeless selector system is shown in Figure 1.2.

1.3.3. Secondary Speed Feedback

With a tape system, the tape is perforated with 3/8 inch holes every 3/8 of an inch. A sensor is mounted on the selector to provide a secondary speed feedback to the Safety Processor Board. With the 485 tapeless system, the Safety Processor receives position information from the absolute encoder and uses the change in position to calculate velocity. With the CAN open tapeless system, the Safety Processor receives position information from the machine mounted incremental encoder and uses the change in position to calculate velocity. With all three methods, the Safety Processor uses this velocity to verify that the car is traveling at a safe speed when slowdown limits are activated, when the car doors are open and when running on inspection. There are two type of inputs used to verify the car speed at the terminal landing. The "UT & DT" slowdown limits are always used to verify the velocity of the car at the terminal landings. The emergency slowdown limits "UTS & DTS" are used on traction cars greater than 200 fpm, traction cars with reduced stroke buffers and all hydro cars. Traction cars less than 200 fpm read the "UTS & DTS" velocity values but will not shut the car down from the velocity check. For all control systems, the "UT & DT" limits are used to verify the operation of "UTS & DTS" and vice versa.

1.4 Modes of Operation

1.4.1 Operating Sequence

Normal elevator operation, Automatic Mode, is selective-collective. When the elevator is traveling upwards to answer calls, all up hall calls at floors above the car are answered in the order reached by the car, regardless of the order in which the calls were registered. Upon reaching each landing with a car call or hall call registered, the car and hall doors at that floor are automatically opened.

The doors stay opened for a dwell time that is field adjustable. There are three different dwell times depending on whether it is a lobby call, car call, or hall call. The door will close before the set dwell time has elapsed if a passenger presses the door close button. The door will reopen before it is fully closed if the door open button is pressed, if a passenger pushes on the safety edge, if the photo-eye light beam is interrupted, or if a call for that floor in the direction of travel is pushed. The door will close when the door opening condition is eliminated. When the door has fully closed, the calls are answered.

When all up hall calls and car calls above the car have been answered, the elevator reverses direction and travels downward to answer car calls and down hall calls placed below the car. The calls are answered as previously described for up calls. When all calls below a down car are answered, the car reverses direction to repeat the cycle. In short, an elevator traveling up will bypass down hall calls, and an elevator traveling down will bypass up hall calls.

In buildings with more than one elevator grouped together, the actual time of arrival, "real time", is used to estimate how long each elevator will take to answer a hall call. The elevator that can respond the fastest takes the call. Real time based dispatching permits the controllers to quickly respond to actual demand for elevator service. Some of the criteria used to estimate the time of arrival are listed below:

- Actual elevator floor to floor runs times.

- Actual run time to the floor whether it is a multi-floor run or a one floor run.
- Whether the elevator is in or out of service.
- Whether the elevator is in load weigh bypass mode.
- The direction and position of each elevator in the group.
- The average door cycle time at each stop.
- Status of each elevator, accelerating, full speed, decelerating, actual time in motion.
- Number of stops required due to car calls.
- Number of stops required due to previously assigned hall calls.
- System demand.

The above performance criteria is continuously measured and stored for improved accuracy in the dispatching algorithm. All of the above data is continuously scanned and the hall calls are reassigned if the conditions change and another car can respond faster. The ability to measure actual hall waiting time virtually eliminates long waiting and improves the average hall call waiting intervals throughout the building.

1.4.2 Reset Mode

Reset mode is initiated when the elevator power is first turned on, or when the system is reset. When the reset mode is initiated, the controller program is automatically loaded, and internal tests are run to ensure that both the car and controller are electrically operational before putting the car into service. The car will not move until reset mode is completed. Some of the internal tests that the controller performs are as follows: is the safety string made up; is the elevator on inspection operation; is the door close limit open; are the interlocks made up; is hoistway position correct. If all the safeties are made up, and the elevator is on automatic operation, and it is at floor level, the elevator will go into automatic mode. If the elevator is not at floor level, it will run slow speed down to the nearest floor, level into the floor, and reset the floor position count.

1.4.3 Safety String Open Mode

Safety string open mode is initiated when a safety is open. Some of the safeties are listed below:

- Reverse phase relay.
- Top final
- Bottom final
- Pit switch
- Car top stop switch
- Governor overspeed switch
- Safety operated switch
- Drive Ready relay

When the safety string is made back up, the elevator will go back to reset mode.

1.4.4 Controller Inspection Mode

The controller inspection mode is initiated by placing the “INS” switch on the 1064 board in the inspection position (down). Controller inspection mode permits operation of the car from the machine room. This mode performs the following operations:

- Enables the controller inspection “ENABLE”, “UP” and “DOWN” push buttons
- Door locks are active and must be closed to move the car.
- Pressing the controller “ENABLE” and “UP” push-button causes elevator to move at inspection speed in the up direction.
- Pressing the controller “ENABLE” and “DOWN” pushbutton causes the elevator to move at inspection speed in the down direction.

1.4.5 Car Top Inspection Mode

This inspection mode is initiated by placing the inspection switch on top of the car in the inspection position. Inspection mode permits operation of the car from the car top inspection station. This mode performs the following operations:

- Disables access top and access bottom hall switches.
- Disables the controller "ENABLE", "UP" and "DOWN" push buttons.
- Door locks are active and must be closed to move the car.
- Enables the car top inspection station "SAFE", "UP" and "DOWN" push buttons
- Pressing the inspection station "UP" and "SAFE” push buttons causes the elevator to move at inspection speed in the up direction.
- Pressing the inspection station "DOWN" and "SAFE" push buttons causes the elevator to move at inspection speed in the down direction.

1.4.6 Access Mode

The access mode is initiated by placing the key operated access switch located in the car operating panel to the on position. Access mode allows entrance into the Hoistway by qualified and authorized elevator personnel for equipment inspection and service. Access to the top of the car is possible from the top landing, and access to the pit is possible from the bottom landing. Enabling this mode permits the following operation:

- Enables the access key switches at the top and bottom landing in the entrance door jambs.
- Bypasses the gate switch to allow car movement with the car door open.
- Bypasses the top or bottom landing hall door lock, depending on which terminal access switch is being keyed.
- Turning the access key switch to the up position causes the elevator to move at inspection speed in the up direction.
- Turning the access key switch to the down position causes the elevator to move at inspection speed in the down direction.

1.4.7 Independent Service Mode

The independent service mode is initiated by placing the key operated independent switch located in the car operating panel to the on position, or by placing the controller toggle switch “IND” to the down position. Independent mode permits operation of the car with an operator. This mode performs the following operations:

- Hall initiated calls are ignored.
- Hall lanterns and gongs are disabled.
- The doors open automatically and stay open until closed by the operator.
- Closing the doors requires constant pressure on the door close button.
- When the car door is closed, the car answers the nearest car initiated call in the direction of travel.

1.4.8 Load Weighing Bypass Mode

The load weighing bypass mode is initiated when the car is loaded to a predetermined percentage of full capacity, by closing a connection between terminals “LC” and “LW” or from serial communication from a load weighing device. Load weigh bypass mode allows the car to answer car calls and lighten the load before answering any more hall calls. This mode performs the following operations:

- Hall initiated calls are ignored.
- All other elevator functions operate as if on full automatic service.

1.4.9 Attendant Service Mode

The attendant service mode is initiated by placing the key operated attendant switch located in the car operating panel to the on position. Attendant mode permits operation of the car with an attendant. This mode performs the following operations:

- The doors open automatically and stay open until closed by the attendant.
- Closing the doors requires a momentary pressure on the door close button, or the up or down buttons located in the car operating panel.
- Hall initiated calls are answered unless there is constant pressure on the bypass button.
- Hall lanterns and gongs are enabled.
- The direction of preference can be specified by momentary pressure on the up or down buttons located in the car operating panel.

1.4.10 Code Blue Hospital Service Mode

Code blue hospital service mode is initiated by turning one of the code blue switches, located at each floor where medical emergency service is required, to the on position. A car is selected to respond to the code blue call. That car will perform the following:

- Cancel all car calls
- Any hall calls previously assigned will be transferred to another car.
- If traveling toward the code blue call, it will proceed nonstop to the code blue call floor.

- If traveling away from the code blue call, it will slow down and stop at the nearest floor, maintain doors closed, reverse direction and proceed nonstop to the code blue call floor.
- If at a floor other than the code blue call floor, the elevator will close the doors and proceed nonstop to the code blue call floor.
- Once at the code blue call floor, the doors will open and remain open.
- The code blue in car switch located in the car operating panel must then be turned to the on position. If the code blue in car switch is not turned to the on position within 60 seconds from the time the doors reach full open on the code blue call floor, the car will revert back to normal operation.
- Upon activation of the key switch, it will allow the car to accept a car call for any floor, close the doors, and proceed nonstop to the floor desired.
- The return of the code blue in car key switch to the normal position will restore the car to normal service.

1.4.11 Fire Service Phase I Mode

Fire service phase I is initiated when the primary smoke sensor is activated or the fire key switch located in the hall station on the primary return floor is turned to the on position. The primary return floor is usually the lobby floor, but could be another landing if it better serves the needs of emergency personnel when fighting a fire or performing rescues. When fire service phase I is enabled:

- The fire emergency return light illuminates and the fire buzzer sounds.
- The emergency stop switch is disabled when the door closes.
- The car travels to the primary return floor without answering any calls, then parks with the door open. The fire buzzer turns off, but the fire emergency return light stays illuminated.
- If the car is at a landing with the doors open, the doors will close, and the car will return non-stop to the primary return floor.
- If the car is traveling away from the primary return floor, the car will stop at the next landing, and then go immediately to the primary return floor.
- Turning the fire service key switch to the bypass position will restore the elevator to normal service.
- The elevator will perform per ASME A17.1 requirement 2.27.3 unless otherwise specified.

1.4.12 Fire Service Phase I Alternate Return Mode

Fire service phase I alternate return is initiated when the smoke sensor in front of the elevator at the primary return floor is activated. When fire service phase I alternate return is enabled:

- The fire emergency return light illuminates and the fire buzzer sounds.
- The emergency stop switch is disabled when the door closes.
- The car travels to the alternate return floor without answering any calls, then parks with the door open. The fire buzzer turns off, but the fire emergency return light stays illuminated.
- If the car is at a landing with the doors open, the doors will close, and the car will return nonstop to the alternate return floor. If the car is traveling away from the alternate return floor, the car will stop at the next landing, and then go immediately to the alternate return floor.
- Turning the fire service key switch to the bypass position will restore the elevator to normal service.
- The elevator will perform per ASME A17.1 requirement 2.27.3 unless otherwise specified.

1.4.13 Fire Service Phase II Mode

To initiate fire service phase II, the car must first have been placed in fire service phase I, and, as a result, be parked at the designated level with the door fully open. Following that, the key operated fire service phase II switch, located in the car operating panel must be placed in the on position. Fire service phase II permits operation of the car by a fire fighter. This mode performs operations in accordance with ASME A17.1 requirement 2.27.3 as follows:

- The doors close only with constant pressure on the door close button, after they have been fully opened.
- The doors open only with constant pressure on the door open button, after they have been fully closed.
- Hall lanterns and gongs are disabled.
  Safety edge and electric eye are disabled
- All registered car calls can be canceled with momentary pressure on the call cancel button located in the car operating panel.
- All hall calls are disabled.
- To remove the car from fire service phase II the car must be at the fire return landing with the doors in the full open position and the phase II switch turned to the off position.
- See ASME A17.1 requirement 2.27.3 for specific operation of fire service phase II.

1.4.14 Emergency Power

Emergency power is initiated when a connection is made between terminals “HC” and “EMP”. This mode performs the following operations:

- All cars are returned to the bottom floor one at a time, and remain there with their doors open.
- If a car is selected to run it will go back into normal operation.
- Removing the connection between terminals “HC” and “EMP” will remove the cars from emergency power operation.

1.4.15 Earthquake Mode

Earthquake mode is initiated upon activation of a seismic switch or counterweight derailment switch. This mode performs the following operations:

- If in motion, and the seismic switch is activated, the car will decelerate into slow speed, proceed to the nearest available floor, open the doors and shut down.
- If in motion, and the counterweight derailment switch is activated, and the car is moving away from the counterweight, then the car will decelerate into slow speed, and proceed to the nearest available floor, open the doors and shut down.
- If in motion, and the counterweight derailment switch is activated, and the car is moving toward the counterweight, then the car will perform an emergency stop, then move at slow speed away from the counterweight to the nearest available floor. After stopping at the nearest floor, the doors will open and the car will shut down.

1.4.16 Stalled Mode

Stalled mode is initiated when the elevator has been in run mode longer than the field adjustable anti-stall timer. This mode performs the following operations:

- Shuts down the elevator.
- Does not allow the elevator to restart until elevator is put on inspection or main line switch is cycled.
- The door open button remains active.

1.4.17 Automatic Mode

Since this is the normal operating mode, the controller automatically enters this mode if none of the previously described modes are activated, and if no fault is detected. The following operations are performed in automatic mode:

- The car operates in selective-collective control sequence when answering calls.
- Hall calls and car calls are functional.
- Hall lanterns and gongs are operational.
- Simplex Cars Park at the last call answered unless simplex lobby parking has been enabled in the program. In a multi-car group, a car is always parked at the lobby if no other demand exists.
- The doors remain closed when the car is parked.

Section 2 - Product Description

2.1 General Information

This section provides basic guidelines and recommendations for the proper installation of the controller equipment. These guidelines should be used as general instructions. They are not intended to usurp local codes and regulations.

2.2 Site Selection

When choosing the installation site of the controller, several factors should be considered. If at all possible, the controller should be installed in a location where the mechanic has a good view of the machine when he is standing in front of the controller. There should be no obstructions around the controller that would prevent proper routing of necessary conduits entering the controller. The controller doors should have enough room to fully open and close. All clearances, working space, lighting, and guarding should comply with governing codes.

2.3 Environmental Considerations

The standard controller package is provided with a NEMA 1 enclosure. This type of controller should be installed in a clean and dry environment. Ideally, the equipment room should be temperature controlled between 70 and 90 degrees F. However, control equipment will function properly within an ambient temperature range of 32 to 110 degrees F. If temperatures remain at the upper and lower extremes of this range for an extended period of time, the life expectancy of the control equipment may be shortened. If wet, dusty, or corrosive environments are expected, then optional non-standard enclosures can be provided. For example NEMA 4, NEMA 12, or NEMA 4X.

The control system is designed to have a high immunity to electrical noise, radio frequency radiation, and magnetic interference. However, high levels of these items could cause interference with certain parts of the control system.

The power supply feeding the controller should have a fluctuation of no greater than + or - 10%.

2.4 Wiring Guidelines and Instructions

2.4.1 The Wiring Prints

A complete set of wiring schematics will be provided for each job. Each set of wiring schematics is job specific. The job name and number will be listed in the bottom right corner of each page of the print.

2.4.2 Ground Wiring

Proper grounding of the power supply, controller, elevator car, and hoistway is required. Separate conductors should be run for EG (earth ground) and GND terminals. These terminals and conductors are detailed on the wiring schematics.

2.4.3 Hoistway Wiring

All hoistway wiring is detailed on the wiring schematics. The number of hoistway conductors is calculated and listed per job on the wiring schematics. A job specific "pull sheet" is also provided with the wiring schematics.

2.4.4 Elevator Car Wiring

All elevator car wiring is detailed on the wiring schematics. The number of traveling cable conductors is calculated and listed per job on the wiring schematics. A job specific "pull sheet" is also provided with the wiring schematics.

2.4.5 Machine Room Wiring

All machine room wiring is detailed on the wiring schematics. All wire sizes are listed for main power supply, motor wiring, brake wiring (traction only), and field wiring.

2.4.6 Wiring to Top of Car Selector

The car top selector is wired according to the schematics for the job. When using tape selector system, special attention should be given to wiring the pulse sensor on the selector since the output on this device uses +15VDC. Terminal PPS on the selector is wired to PPS on the controller and selector terminal PP/US is wired to PP on the controller.

2.5 Slowdown Limits

There are two sets of slowdown switches used, the UT/DT switches (including UT1, UT2, UT3, DT1, DT2, DT3) and the UTS/DTS switches. UT, UT1, UT2, UT3 & DT, DT1, DT2, DT3 are used to clamp the speed command to the drive at the terminal landings independent of the control of the CPU.

UTS & DTS are emergency slowdown limit switches used on cars with a top speed greater than 200 fpm or having reduced stroke buffers. These switches are used as the slowdown speed verification points by the Safety Processor board. If the car hits the limit at a speed greater than the preset speed parameter, power is immediately removed from the motor and brake for an emergency stop independent of the main CPU.

The UT & DT limit switches are also used as speed verification points by the Safety Processor board. When the limit is first activated, the Safety Processor counts an adjustable number of pulse counts from the activation point to determine the velocity trip point. Since cars with only one slowdown limit would activate the limit at high speed when performing a recovery run, the extra pulse counts from allows the car to slow down before the trip point is reached.

The Safety Processor board uses the UT & DT limits to verify the operation of the UTS & DTS limits. The pulse input is also verified while running on automatic.

The distance that the limits are placed from the terminal landing depends on the speed of the car. Table 1 shows the slowdown limit locations with respect to contract speed. All distances are show in inches.

2.6 Normal and Final Limit Switches

The up and down directional limit switches UN & DN should be set to open two inches past the terminal floor levels. The top and bottom final limit switches should be set to open four inches past the terminal floor levels.

FPM FPM	UT/ DT	UT1/	UT2/	UT3/	UT4/	UT5/	UT6/	UT7/	UTS/	UTS/ DTS (Reduce d Stroke
50	10”								Not Used	8”
100	21”								Not Used	17”
150	31”								Not Used	28”
200	41”								Not Used	39”
250	52”								36”	36”
300	31”	62”							40”	40”
350	40”	80”							52”	52”
400	50”	99”							66”	66”
450	60”	120”							81”	81”
500	71”	143”							98”	98”
600	65”	130”	195”						137”	137”
700	85”	170”	255”						181”	181”
800	80”	160”	240”	320”					232”	232”
900	98”	196”	293”	391”					289”	289”
1000	93”	187”	280”	374”	467”				353”	353”
1100	110”	219”	329”	439”	548”				380”	380”
1200	106”	211”	317”	422”	528”	633”			448”	448”
1300	103”	206”	310”	413”	516”	619”	723”		521”	521”
1400	102”	204”	306”	408”	510”	612”	714”	816”	600”	600”

Table 1: Slowdown Distances from Terminal Landings

2.7 Selector Installation

2.7.1 Tape Selector Installation

The tape is installed by first attaching it at the top of the hoistway approximately 12 inches from the rail, see Figure 2.0. The tape is then unreeled from the top of the car while running down on inspection. At the bottom of the hoistway it is attached with a spring to provide proper tension on the tape. The selector is then mounted on the top of the car and is coupled to the tape by the nylon guides. Figure 2.1 shows a typical mounting of the selector to the crosshead. Figure 2.2 shows the new selector board (PCB-1011BN).

To install the floor magnets, the car is placed exactly level at the desired floor. The tape is then marked at the top left of the selector through a factory cut guide hole. The car is moved below the floor in order to gain access to the section of tape that was marked while the car was at floor level. A door zone template, provided by G.A.L., is placed at the mark and the door zone and binary preset magnets are placed in the appropriate locations in the template. The template is then removed from the tape, and the process is repeated for each floor level. The location of each magnet is shown in Figure 2.3. & Figure 2.4.

Floor	BP32	BP16	BP8	BP4	BP2	BP1
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
4	0	0	0	1	0	0
5	0	0	0	1	0	1
6	0	0	0	1	1	0
7	0	0	0	1	1	1
8	0	0	1	0	0	0
9	0	0	1	0	0	1
10	0	0	1	0	1	0
11	0	0	1	0	1	1
12	0	0	1	1	0	0
13	0	0	1	1	0	1
14	0	0	1	1	1	0
15	0	0	1	1	1	1
16	0	1	0	0	0	0
17	0	1	0	0	0	1
18	0	1	0	0	1	0
19	0	1	0	0	1	1
20	0	1	0	1	0	0
21	0	1	0	1	0	1
22	0	1	0	1	1	0
23	0	1	0	1	1	1
24	0	1	1	0	0	0
25	0	1	1	0	0	1
26	0	1	1	0	1	0
27	0	1	1	0	1	1
28	0	1	1	1	0	0
29	0	1	1	1	0	0
30	0	1	1	1	1	0
31	0	1	1	1	1	1
32	1	0	0	0	0	0
33	1	0	0	0	0	1
34	1	0	0	0	1	0
35	1	0	0	0	1	1
36	1	0	0	1	0	0
37	1	0	0	1	0	1
38	1	0	0	1	1	0
39	1	0	0	1	1	1
40	1	0	1	0	0	0
41	1	0	1	0	0	1
42	1	0	1	0	1	0
43	1	0	1	0	1	1
44	1	0	1	1	0	0

Floor	BP32	BP16	BP8	BP4	BP2	BP1
45	1	0	1	1	0	1
46	1	0	1	1	1	0
47	1	0	1	1	1	1
48	1	1	0	0	0	0
49	1	1	0	0	0	1
50	1	1	0	0	1	0
51	1	1	0	0	1	1
52	1	1	0	1	0	0
53	1	1	0	1	0	1
54	1	1	0	1	1	0
55	1	1	0	1	1	1
56	1	1	1	0	0	0
57	1	1	1	0	0	1
58	1	1	1	0	1	0
59	1	1	1	0	1	1
60	1	1	1	1	0	0
61	1	1	1	1	0	1
62	1	1	1	1	1	0
63	1	1	1	1	1	1

T**able 2: Binary Preset Magnets**

Table 2 shows which binary preset magnets areused for each floor. A “1” in the table indicates that a magnet is used and a “0” indicates no magnet.

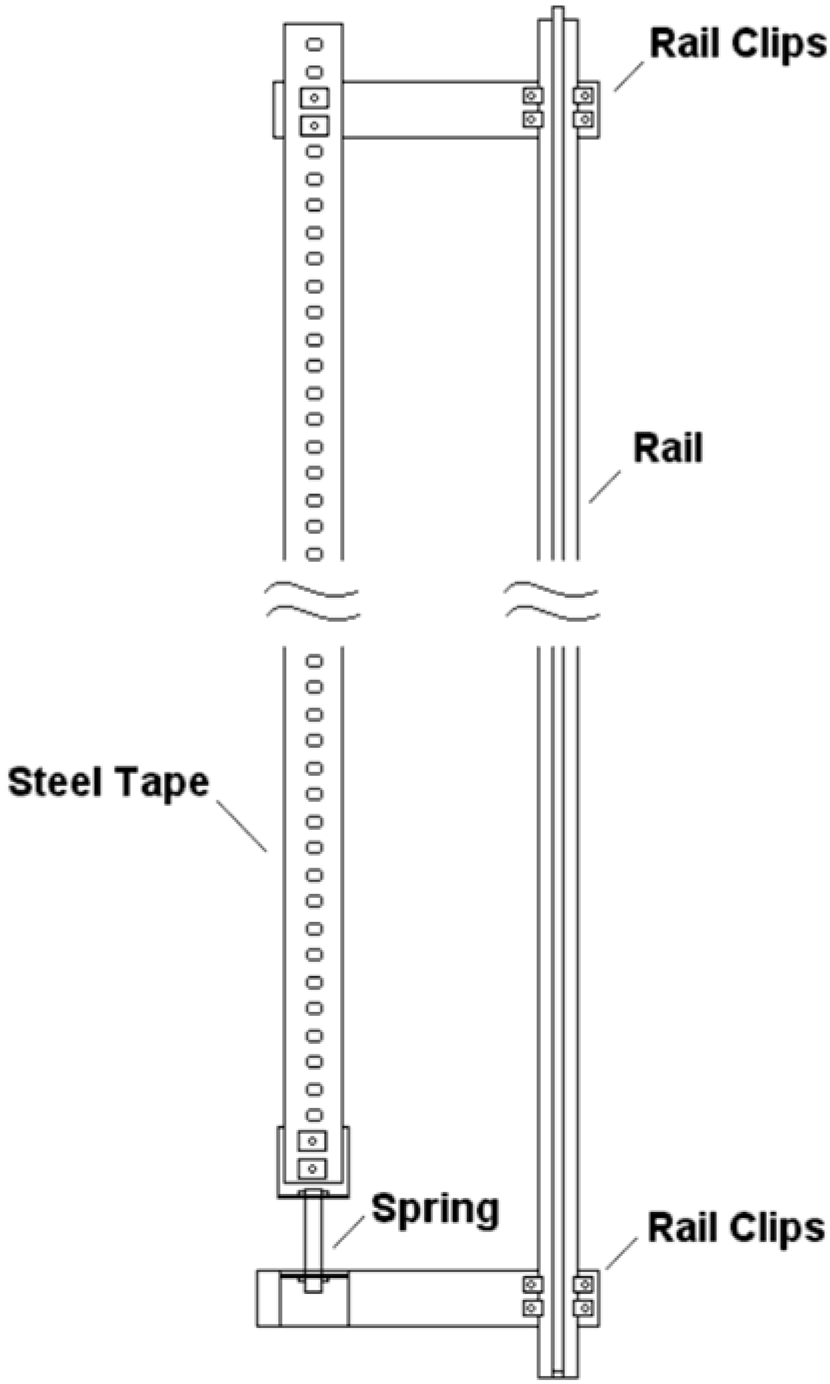


Figure 2.0: Typical Tape Mounting

PARTS LIST		
ITEM	QTY	DESCRIPTION
1	1	ASSEMBLY, GALAXY STEEL TAPE READER 2-15 FLRS
2	2	ANGLE,POSITION DETECTION MOUNTING
4	1	PLATES ASSY,TENSION SPRG/THD ROD/BRKTS
5	1	KIT, GALAXY SELECTOR RAIL
5.1	12	SCREW, 3/8-16 X 1" HEX HD STEEL TAP PLTD
5.2	12	WASHER, 3/8" ID EXTERNAL STAR-LOCK
5.3	12	NUT, 3/8-16 X .688" WD X .234" HGHT PLATED
5.4	12	WASHER, .375" ID X .875" OD X .090" THK
5.5	2	BRACKET, ELEVATOR RAIL MOUNTING
5.6	4	RAIL CLIP (HW OR NEW STYLE??
5.7	4	SCREW,1/2-13 X 2" HEX HD STEEL TAP
5.8	4	WASHER,1/2" ID FL STL 1/16" THK-1 3/8 OD
5.9	4	NUT,1/2-13 x 7/8" HEX "JAM" HEAVY STEEL

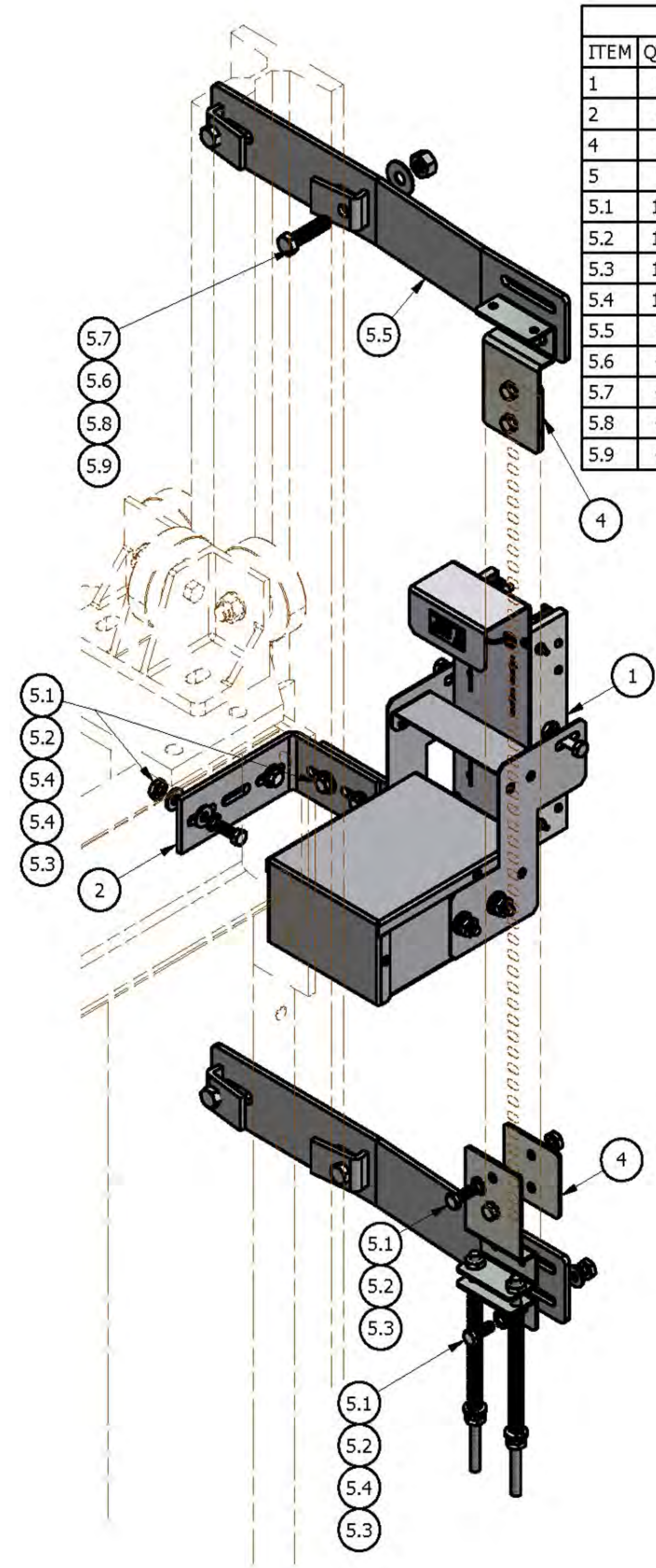


Figure 2.1: Typical Mounting of Selector

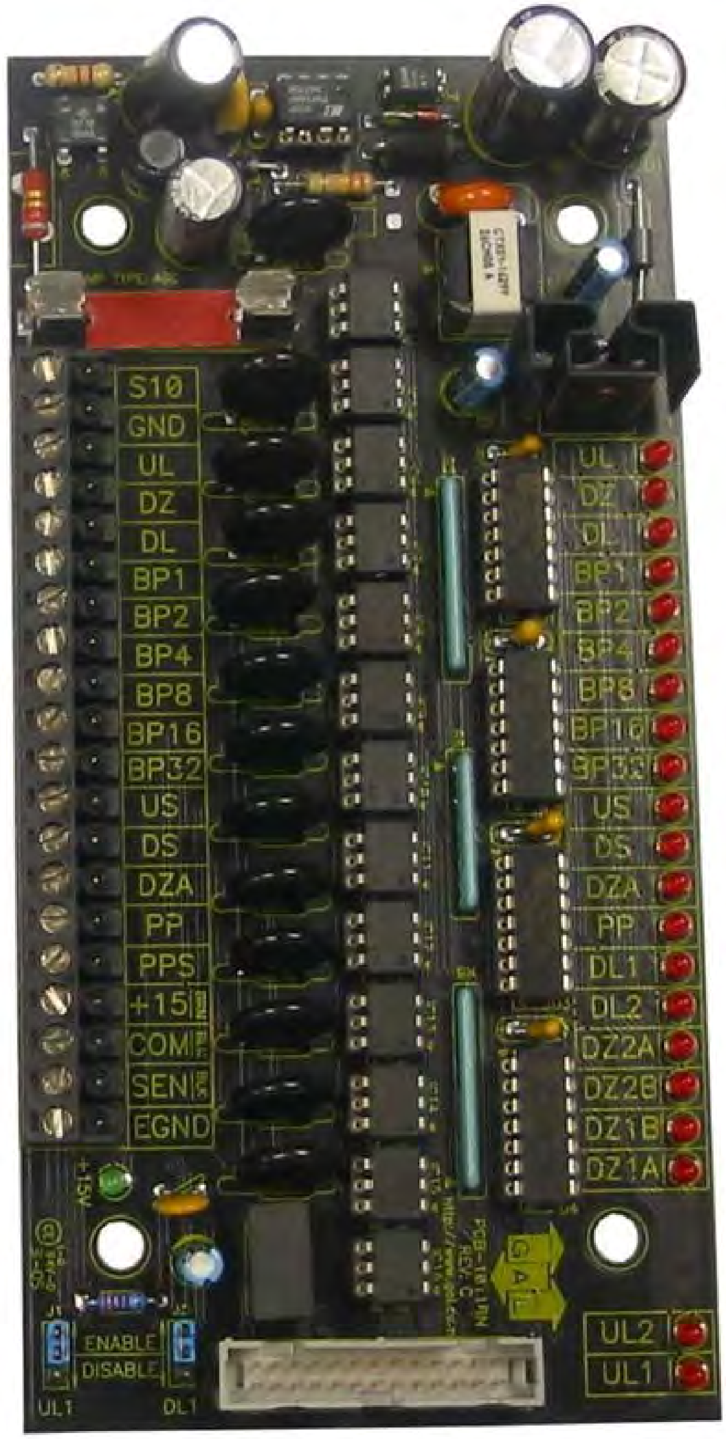
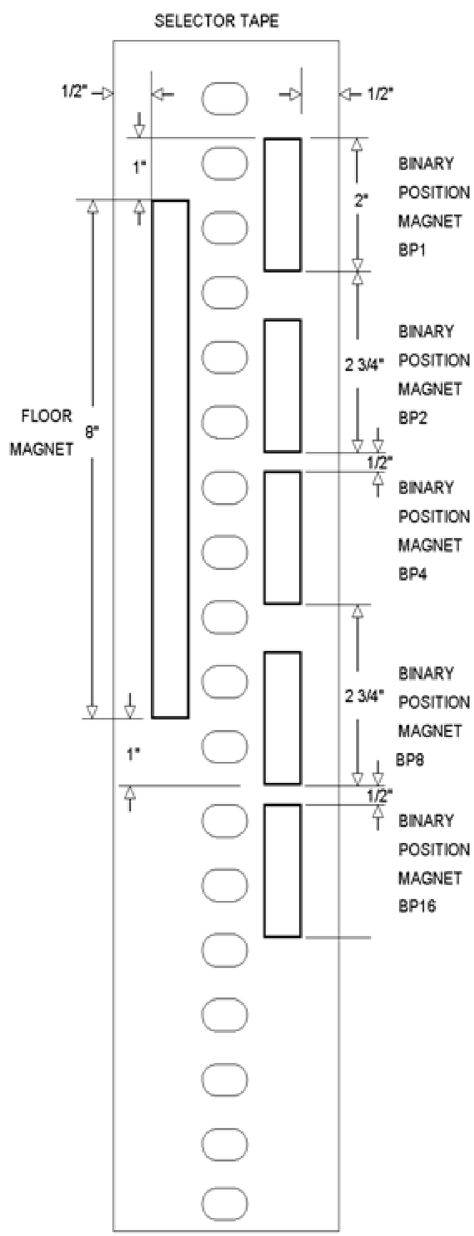


Figure 2.2: Selector Board 1011BN

Figure 2.3: Selector Tape Layout

Figure 2.4: Magnets



2.7.2 Tapeless Selector Installation

Installation of the tapeless selector begins with replacing the existing governor if it does not have a rotating shaft to one that does. Mount the encoder on the governor and connect the encoder cable to the Safety Processor Board as per the job prints.

Mount the selector box on top the car with the provided brackets, see figures 2.5 and 2.5A and 2.6.

The magnets will be placed in the corner of the rail. The door zone sensors will face the magnet and make a 45 degree angle with the face of the rail.

Use the template to position the selector head the correct distance from the rail, see figure 2.5 and 2.5a and 2.6. The mounting screws on the selector box and on the brackets are slotted to make the necessary alignments.

Figure 2.5: Tapeless Selector Mounted on Crosshead

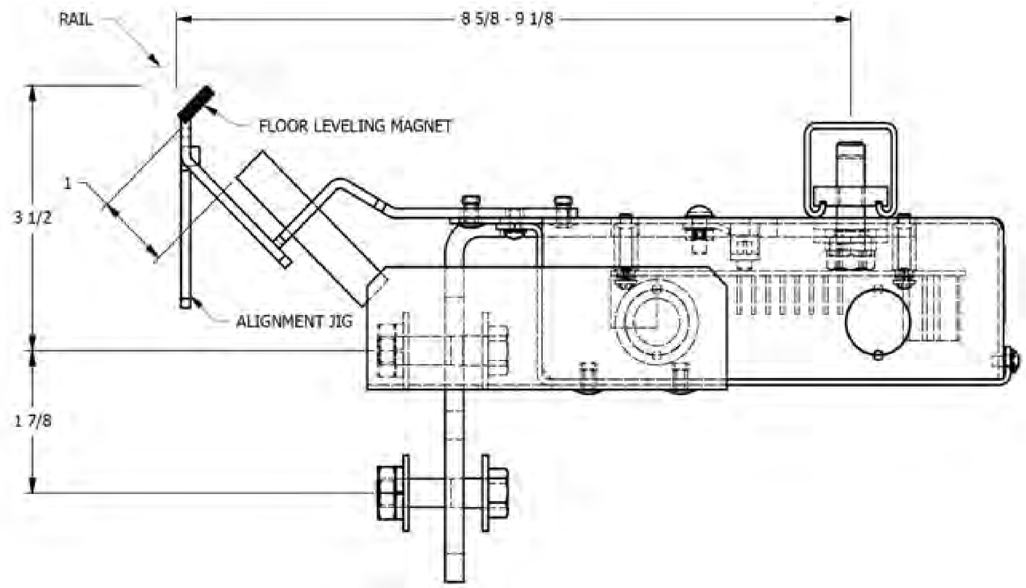
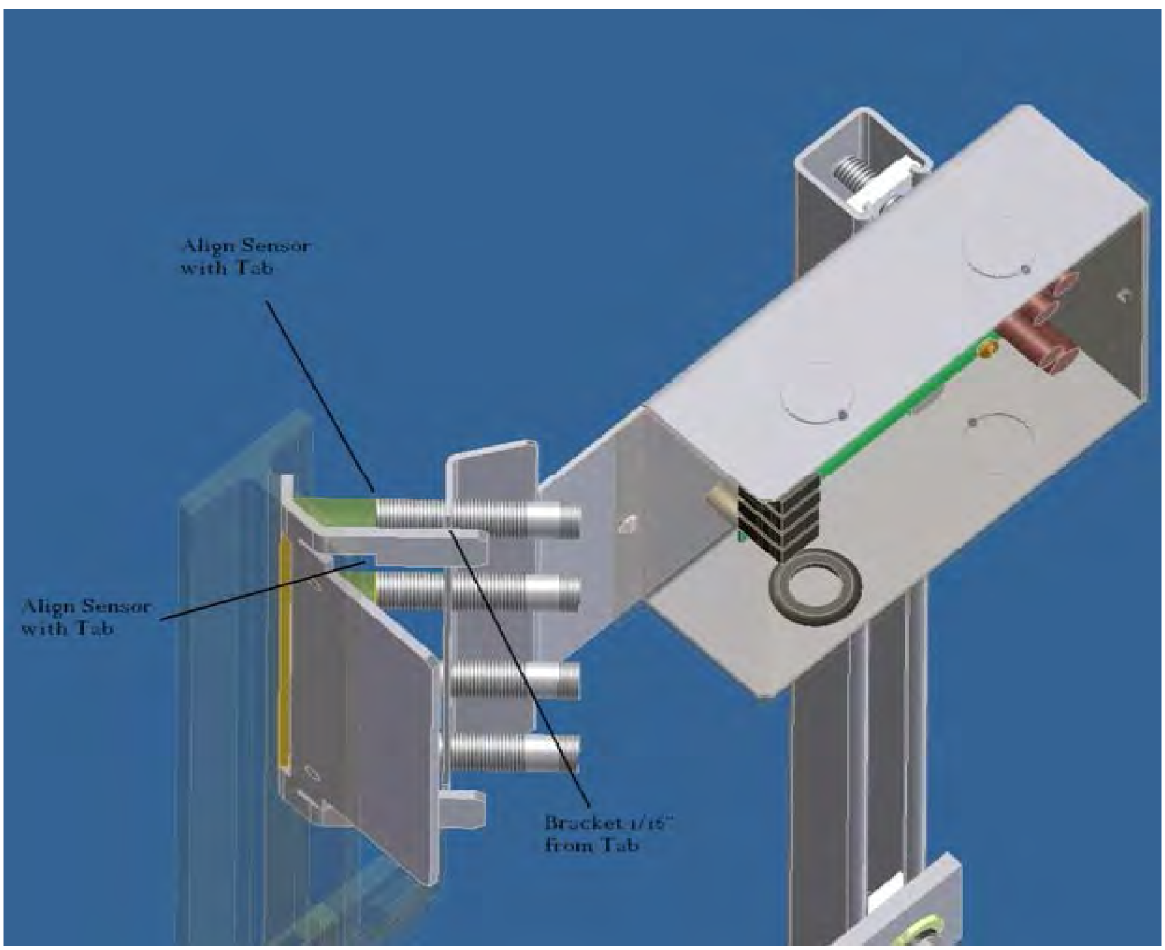
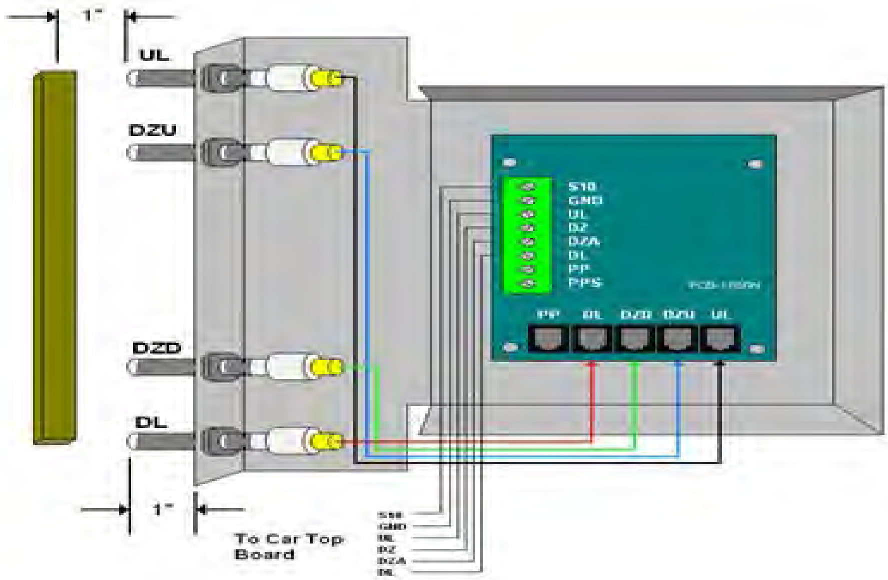


Figure 2.5A: Tapeless Selector Magnet Placement

Figure 2.6: Door zone template used to set selector distance





Figures 2.7: Sensor Orientation and Wiring

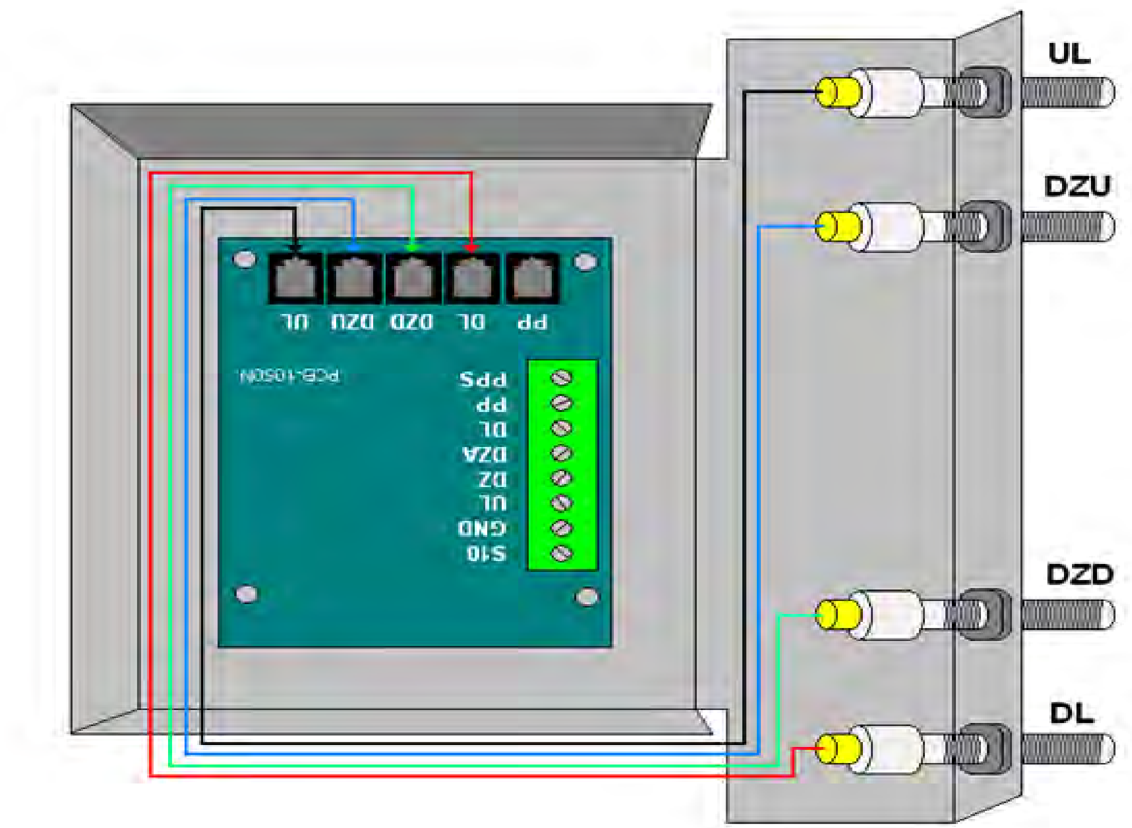


Figure 2.8: Sensor Orientation Upside Down

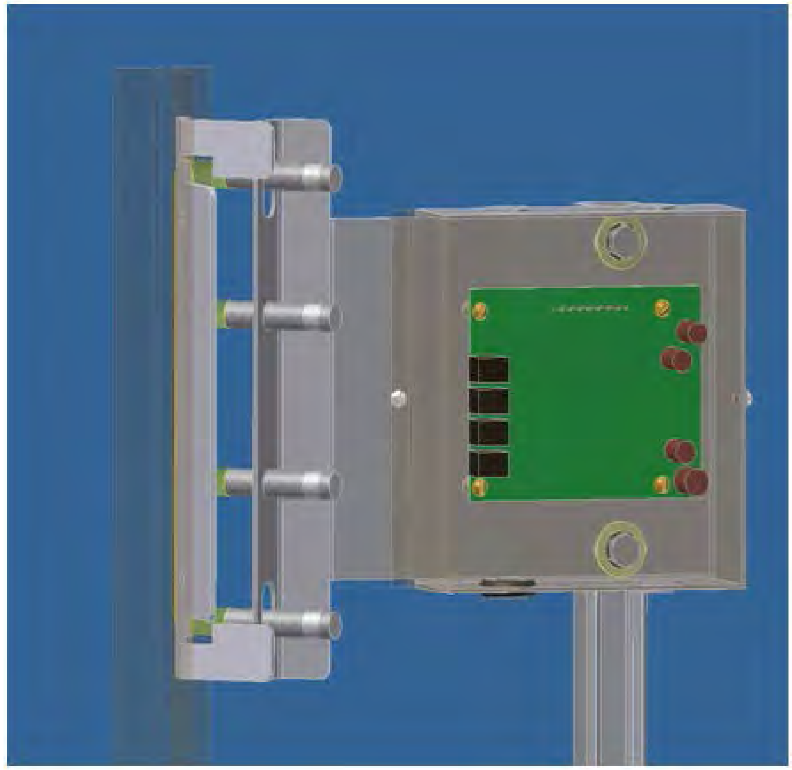
The selector head can be mounted with a left or right vertical orientation. Each of the sensor wires are individually plugged into the selector board according to the orientation of how the box is mounted. The sensors are wired with UL at the top then DZU, DZD and finally DL at the bottom, see Figure 2.7. If the box has to be mounted upside down (having the PC board upside down) simply re-wire the sensors in the order listed above always starting with the top sensor as UL, see figure 2.8. Since the PC board mounting holes are symmetrical, the board can be rotated to the right side up position. With the selector and car top box mounted on the car top, wire the selector board to the car top board. The UL and DL sensors are mounted in slotted holes to allow fine adjustment of the "floor level zone" after the elevator is running on automatic operation. However, these sensors should be set in the middle of the adjustment slot as a starting point prior to final adjustment.

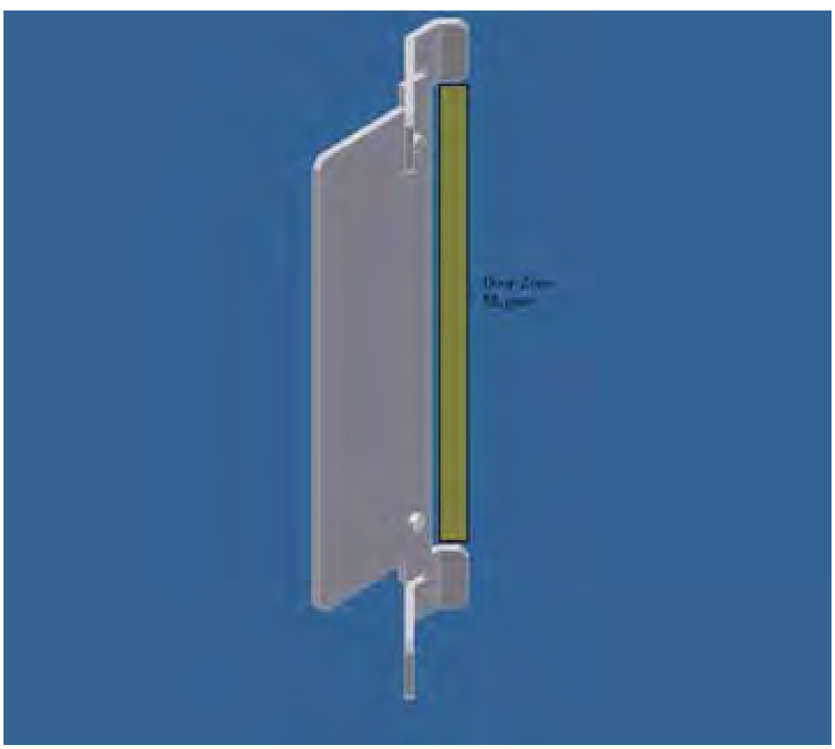
After the selector installation is complete and the car is running on inspection, door zone magnets can be placed at each floor. With the car dead level at the floor, place the template in the corner of the rail with the tab lined up with top of the selector door zone sensor bracket see figure 2.9.

Make a mark across the flat edge of the template.

Move the car down then place the template on the rail and align the position mark. Place the magnet in the slot and remove the template. It is important to limit the side-to-side movement of the car to 1/4" between the rails to maintain consistent floor levels. After final adjustment, magnets should be secured with an adequate amount of adhesive caulk in order to prevent movement.

Figures 2.9: Door zone template





Section 3 - Adjustment of the GALaxy controller - DSD 412 Drive

In order to obtain a running platform in "car top inspection", see the "Quick Start-up Guide for GALaxy Controller DSD-412 DC Drive with Distance Feedback". This procedure should be used only for installation purposes. When installation of all equipment is complete, and unit is ready for adjustment, proceed to section 3.1 and follow instructions.

3.1 General Information

Before adjustment begins the following items must be completed.

1. All field wiring and safety circuits installed
2. Temporary jumpers from terminal HC to terminals MES & ALT
3. All hoistway limit switches installed
4. All car and hoistway doors and interlocks installed and pre-adjusted
5. Selector installed and magnets pre-adjusted
6. Familiarize yourself with all wiring schematics
7. Familiarize yourself with the DSD-412 SCR drive, drive manual, parameter adjustment, etc.
8. Motor encoder should be properly installed and wired.
9. Car should be properly counterbalanced.
10. Initial Power-up

3.2.1 Check Main Line Voltage

With the main-line disconnect in the off position, check the line-side voltage with a volt meter to insure the voltage matches the controller name tag “Input Power” voltage. Check to insure all three phases are present. If voltage is not correct or all three phases are not present, do not proceed until corrected.

3.2.2 SCR Drive Motor Field Current

Verify that the rated motor field current is set properly on the SCR drive unit by first checking the name plate field current on the hoist motor. Compare the name plate field current with the setting of the S1 dip switch on the SCR drive unit, and verify that the setting is correct.

3.2.3 Set Toggle Switches

Set all toggle switches on the 1064 board as follows:

- DOOR LOCKS "OFF"
- IND - "IND"
- AUTO DOOR - "OFF"
- STOP - "STOP"
- INSPECTION - "INSP"

3.2.4 Make Sure the Car Is Safe

Verify that all elevator doors are closed and that all safety circuits are functional.

3.2.5 Check Controller Voltage

Turn the main-line disconnect to the on position. Check the voltage at L1, L2, and L3 on the SCR drive. Verify that all three phases are present. Check the voltage at fuses L1, L2, and L3 (if present) on controller. If correct, check the voltage at terminal LIN with respect to GND. The voltage should read 120VAC. If correct, check the voltage at terminals S10, LC, & HC with respect to GND. All should read 120VAC. If not, check wiring diagram to determine the problem before continuing.

3.2.6 Verify the Main CPU is Operating

Check to make sure that the "axy" of GALaxy on the 1021 LCD interface display is blinking. If the "axy" is blinking, continue to the next step. If not, check voltage at terminals 5V to 0V on the 1064 board to insure 5VDC. If 5VDC is present and the "axy" on the 1021 LCD interface is not blinking, then contact factory.

3.2.7 Preset Adjustable Variables on Safety Processor Board and Main CPU

The 1066 LCD interface (safety processor board) and the 1021 LDC interface (main CPU) are normally preset prior to leaving the factory. However, it is prudent to check the setup values for the proper settings. Refer to section 13 of this manual for the operation of the 1066 LCD interface, and refer to section 10 for operation of the 1021 LCD interface. The following adjustment variables must be set properly:

1066 LCD interface "Adj Var" menu:

- Top Spd (contract speed)
- Enc RPM (if Fdbk Typ=0, not applicable)(if Fdbk Typ=1, set to rpm of governor)(if Fdbk Typ=4, set to value of Function #11 in DSD 412 drive, MOTOR RPM)
- Enc PPR (if Fdbk Typ=0, not applicable)(if Fdbk Typ=1, set to 8192)(if Fdbk Typ=4, set to PPR of machine/motor encoder)
- Fdbk Typ (0=tape, 1=enc, ,4=InEnc
- Ctrl Typ (2=Tract DF)
- 2 Stop (0=Mult, 1=2 stop)
- RearDoor (0=Front only, 1=Rear)
- UTS Vel (Set to top speed)
- DTS Vel (Set to top speed)
- INS Vel (Set to 140)
- LEV Vel (Set to 140)
- UT Vel (Set to 500)
- DT Vel (Set to 500)
- UL Vel (Set to 160 if Non-DF)
- DL Vel (Set to 160 if Non-DF)
- SoftStop (Set to 1)

NOTE: The velocity values for the terminal limit switches above are only temporary settings until car is running high speed. In the final adjustment procedure, these variables must be set according to the procedures in section 3.5.6.

1021 LCD interface "Adjustable Variables" menu, "Car Motion" sub-menu:

- Top Speed (set to contract speed)
- Inspect Speed (set to 25 fpm)
- Encoder PPR (set to machine/motor encoder PPR)
- Encoder RPM (if tape selector, set to value of Function #11 in DSD 412 drive, MOTOR RPM), (if 485 tapeless selector, set to value of Function #11 in DSD 412 drive, MOTOR RPM), (if CAN open tapeless selector, set to governor rpm)

NOTE: See section 3.3.11 for determining governor rpm.

3.2.8 Place Stop Switch in Run Position

Flip the “STOP” toggle switch on the 1064 board to the up position. Verify that input LED’s for “LC, HC, DN, UN, SS, GTS, RDY and CS” are all on. If not, then correct field wiring.

3.2.9 Hoist Motor Data

At this time the hoist motor data must be entered into the SCR drive. The following functions must be entered or verified using the drive display unit (SCDU). Follow the instructions in the SCR drive manual to enter the following data for each function:

- Function #3 - RATED ARM AMP (from machine/motor nameplate)
- Function #7 - RATED ARM V (from machine/motor nameplate)
- Function #10 - ENCODER P/R (PPR of encoder on machine/motor)
- Function #11 - MOTOR RPM (from machine/motor nameplate)

NOTE: The MOTOR RPM value may need to be fine-tuned to provide the correct rpm to run the machine/motor at controller demanded speed.

- Function #17 - RATED FT/MIN (from controller data)
- Function #21 - ACC RATE FT/SEC2 (~ 4.2)
- Function #40 - RESPONSE (~ 6.0)
- Function #41 - SYSTEM INERTIA (~ 2.5)
- Function #49 - WEAK FIELD AMP (from controller data)
- Function #50 - FULL FIELD AMP (from controller data)
- Function #52 - RATED FIELD VDC (from controller data)
- Function #53 - STANDING FIELD AMP (from controller data)
- Function #56 - FIELD STRENGTH SPEED (~ 75)
- Function #57 - FIELD WEAKEN SPEED (~ 75)

• Function #994 - to save data just entered

After Function #994 has been performed successfully, then proceed to the next step.

3.2.10 SCR Drive Self-Tune

To have the SCR drive unit learn the parameters of the hoist motor the drive self-tune must be performed. Remove the drive reset “RST” wire from TB1 pin 49 of the drive. Turn on the main disconnect. Perform a FUNCTION #997 (see SCR drive manual) to self-tune the hoist motor. During this test, the “MC” contactor will energize for short period of time. After the self-tune is performed correctly, “PASS” will appear on the drive unit display. If a fault appears on the drive unit display, the problem must be corrected and the self-tune performed again. If the self-tune is successful, then the following FUNCTIONS must be viewed and recorded.

Function #613

Function #614

Function #615

The value of Function #613 should be manually entered into Function #4 - ARM OHMS.

The value of Function #614 should be manually entered into Function #6 - ARM L.

The value of Function #615 should be manually entered into Function #51 - FIELD L/R.

3.2.11 Pre-set the Digital Speed Clamps

Pre-set the software digital speed clamps from the 1021 LCD interface under the “Elevator Setup Menu”. The submenus for the clamp speeds are as follows:

Set INS/Leveling Clamp

Set DT/UT Slowdown Clamp Set DT1/UT1 Slowdown Clamp Set DT2/UT2 Slowdown Clamp Set DT3/UT3 Slowdown Clamp Set DTS/UTS Slowdown Clamp

Set the speed for Ins/Leveling for 140 fpm and all the remaining slowdown limit speeds to the contract speed of the car. Please note that the displayed value of “Clamp Speed” is the value the clamp should be set to. The slowdown limit “Clamp Speed:” will show 0000 until the car is run into the limits and the speed is recorded. Please refer to the 1021 LCD Interface section for the Elevator Setup Menu.

NOTE: The values of the clamp speed velocities above are only temporary settings until the car is running high speed. In the final adjustment procedure, these values must be set according to the procedures in section 3.5.7.

3.3 Run the Car on Inspection

3.3.1 Ready to Run On Inspection

The car should be ready to run on inspection if all is wired correctly. Select the “Elevator Status” on the 1021 LCD interface. The display should show “Out of Service” on the first line and “Inspection Mode” on the second. The

1066 LCD interface will display one of the following types of inspection:

• “MR INS” (Motor Room)

• “CT INS” (Car Top)

• “ACCESS” (Access)

• “IC INS” (In Car)

• “AUTO” (Not on Inspection)

To run the car from the motor room, “MR INS” should be displayed.

The “inspection string” consists of contacts from the inspection switches and the gate and lock bypass switches in series. One and only one of the five inspection inputs should be on for the car to run. Starting from the car top inspection input, the five inspection inputs are, “INS” for car top, “ACC” for access, “ICI” for in-car, “MRI” for motor room, and “AUTO” for automatic (no inspection). The inspection string circuit is shown in Figure 3.1.

Note that any one of the following conditions will cause an inspection error:

• More than one inspection input is on

• No inspection input is on

• Gate or Lock bypass switch is open and the car is not on car top inspection

If the controller is not on motor room inspection at this point, then verify all switch positions and wiring before proceeding.

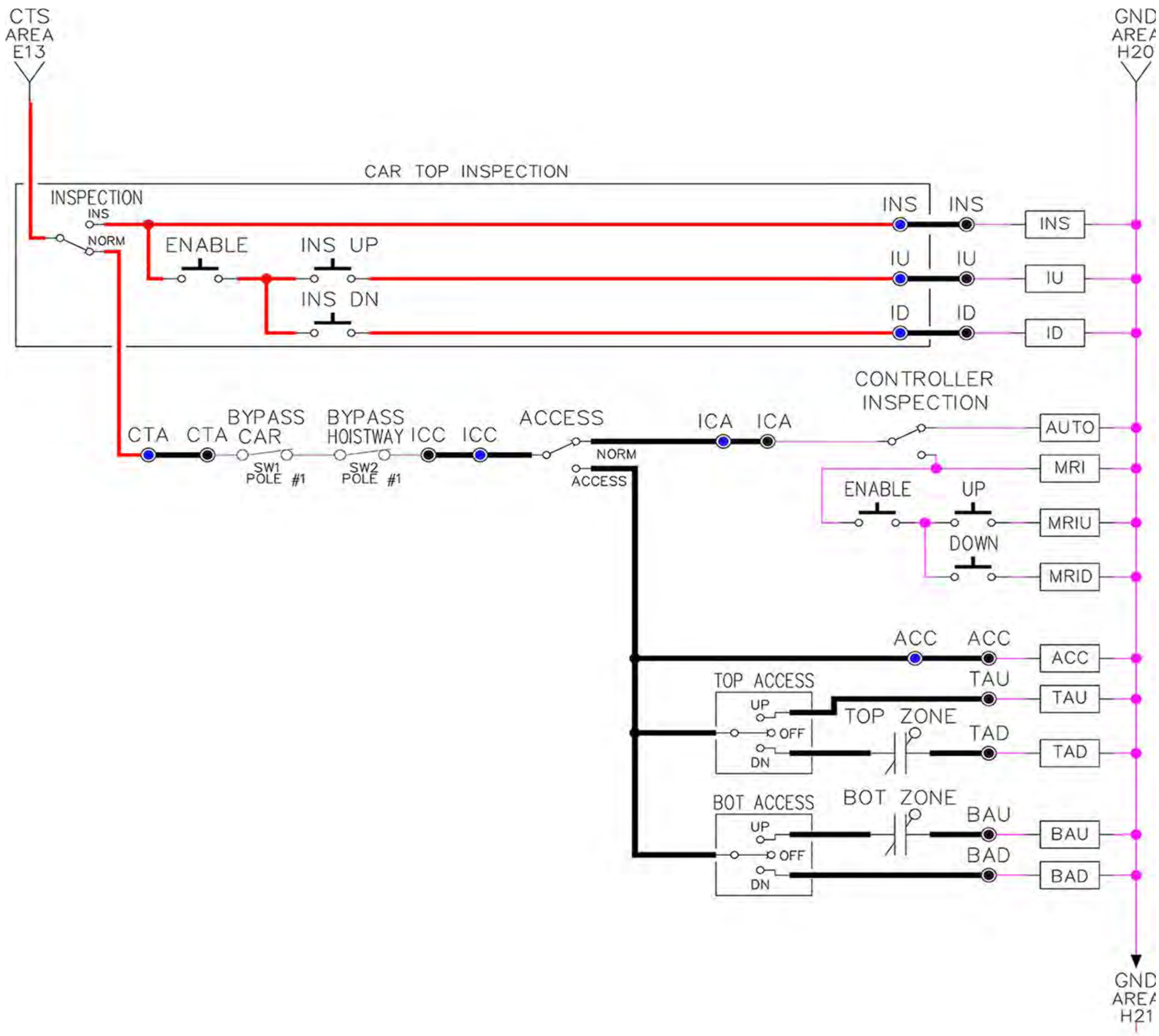


Figure 3.1: Inspection String Circuit

3.3.2 Adjust the Brake Voltage

Momentarily push the inspection UP or DOWN push button on the 1064 board while checking the DC brake voltage with a meter. If the voltage is not correct, it must be adjusted according to the following procedures.

If the controller utilizes an electronic brake board 1047 or 1051, then the brake voltage is adjusted through the 1021 LCD interface, "Car Brake" sub-menu. If the controller utilizes resistors and rectifiers for the brake coil circuit, then the brake voltage is adjusted by moving the adjustable tap on the brake resistor.

NOTE: Remove power before adjusting the resistor taps.

To adjust the brake voltage when using and electronic brake board, navigate to the "Adjustable Variables" menu, "Car Brake" and adjust "Brake Pick Volt", "Brake Hold Volt" and "Brk AC L-L Volt" to the proper values. Make sure that the brake is lifting and setting properly before proceeding.

3.3.3 Check the Run Direction

Momentarily push the inspection “UP” or “DOWN” push button on the 1064 board. One of the following should take place:

The elevator will run controlled, in the correct direction (up for “UP” button, down for “DOWN” button) with no drive faults. If so proceed to “Check Inspection Speed”.

The elevator will run controlled, but in the wrong direction (down for “UP” button, up of “DOWN” button) with no drive faults. If so proceed to section “Car Runs in the Wrong Direction”.

The elevator will try to run, but immediately trip on a drive fault #99. If so proceed to section “Drive Trips Immediately”.

3.3.4 Car Runs In the Wrong Direction

If the elevator runs controlled but in the wrong direction, with no drive faults, then turn off the main disconnect, swap the hoist motor field wires.

Also swap the encoder direction by swapping the wires or if an encoder isolation board (1022N) is used, move J5 and J6 on the encoder board. Refer to the jumper diagram on the board.

To change the encoder direction at the drive, swap the following wires:

A+ (TB3-2) with B+ (TB3-4)

A- (TB3-3) with B- (TB3-5)

Turn the main disconnect on, run the elevator on inspection again, and it should run controlled and in the correct direction. If so proceed to “Check Inspection Speed”. If not contact the factory.

3.3.5 Drive Trips Immediately

If the elevator tries to run, but immediately trips on a drive fault #99, then turn off the main disconnect, and swap the encoder direction by swapping the wires or if an encoder isolation board (1022N) is used, move J5 and J6 on the encoder board. Refer to the jumper diagram on the board.

To change the encoder direction at the drive, swap the following wires:

A+ (TB3-2) with B+ (TB3-4)

A- (TB3-3) with B- (TB3-5)

Turn on the main disconnect and run the elevator on inspection again. If the elevator runs controlled and in the correct direction, proceed to next section.

If the elevator runs controlled but in the wrong direction, the go back and follow the directions in the “Car Runs the Wrong Direction” section.

If the car still trips immediately on a drive fault #99, then contact the factory.

3.3.6 Check Inspection Speed

With a hand held tachometer, check the speed of the elevator while running on inspection. The elevator should be running at 25 FPM. Also run the elevator while monitoring Function #600 on the SCR drive display. This parameter should also read 25 FPM. If speed is not correct, re-check drive data in FUNCTION #10 and FUNCTION #11.

From the 1021 LCD interface select the "Elevator Status" menu, navigate until the display shows "Dmd" and "Vel". While running on inspection, monitor the controller demand speed "Dmd", and the speed feedback "Vel". These values should both display 25. **If the demand and feedback on the 1021 LCD interface is incorrect, check the Encoder RPM and PPR parameters from the “Adjustable Variables” menu. These variables should be set according to the procedures in section 3.2.7.**

If the speed on the hand held tachometer and on "Dmd" and "Vel" all read approximately 25 fpm (within +/-2 fpm) continue to the next step. If not, contact the factory.

3.3.7 Verify Controller Encoder Direction

From the 1021 LCD interface "Elevator Status" menu, navigate to display "Dir" and "DP". While moving the car on inspection, monitor "Dir" (direction) and "DP" (pulse counts). "Dir" should display "Up" when the car is moving up, and "Dn" when the car is moving down. The value of "Dp" should increment when the car is moving up, and should decrement when the car is moving down.

If the direction is wrong or the pulse counts change in the wrong direction, then the encoder direction to the controller must be changed. If an encoder isolation board (1022N) is used, move J1 and J2 on the encoder board. Refer to the jumper diagram on the board.

If no encoder isolation board is used, the A+ and A- encoder wires from the drive must be swapped. Note that the motor encoder wires are daisy chained from the encoder to the drive and then from the drive to the controller encoder board. Only the A+ and A- wires from the drive to the controller board must be swapped. The wires from the encoder to the drive must remain on the same terminal locations on the drive.

If the encoder is counting properly continue to the next step. If not, contact the factory.

3.3.8 Verify Selector and Slowdown Inputs

Run the elevator up on inspection until it stops on the up normal limit. The up and down normal limits should be set two inches above and below the terminal floors respectively. Verify the selector inputs are being set properly on the controller by running the elevator down until it stops on the down normal limit.

As the car approaches floor level going down, “DL” turns on first, then “DZ” and then finally “UL”. At floor level, “UL, DL, and DZ” inputs should all be on at the same time. Leaving the floor going down “DL” will turn off first, then “DZ” and last “UL”.

Also verify that the up and down terminal slowdown limits inputs “UT, UTS, DT & DTS” are breaking at the proper distances as shown in the slowdown table 2.0. “UT, UTS, DT & DTS” turn off when active.

3.3.9 Verify Car Speed on Safety Processor Board

Run the car in either direction or check the car speed on the 1066 LCD interface. The speed shown should match the car’s actual speed. If the speed does not match and the secondary feedback comes from pulses from the tape go to “Correct Car Speed When Using a Tape”. If using 485 tapeless, go to "Correct Car Speed When Using 485 tapeless". If using CAN Open tapeless, go to "Correct Car Speed When Using CAN Open tapeless". If the correct speed is shown proceed to the “Learn the Hoistway” section 3.4.

3.3.10 Correct Car Speed When Using a Tape Installed In Hoistway

The tape has holes every 3/8” that are 3/8” in diameter. On the selector unit adjust the PP sensor closer to the tape until the orange LED at the end of the sensor turns on. Then turn the sensor inwards another 1/8” and lock in the sensor. While running on top of car inspection verify that the orange LED at the end of the PP sensor turns on and off as it passes by the holes on the tape. The safety processor measures the time between each pulse to calculate the velocity. If the velocity is not displayed correctly first make sure that the feedback type in the safety processor board adjustable variable is set to 0 for a tape application. Next, while the car is running, make sure that the PULSE LED on this board is pulsing. As the car increases in speed the LED will glow solid on. If the LED does not pulse, try swapping the wires at the PPS and PP terminals. If the LED still does not work, contact the factory. If the correct speed is shown proceed to “Learn the Hoistway”.

3.3.11 Correct Car Speed When Using 485 Tapeless System

When using the 485 tapeless system, the secondary speed feedback comes from the encoder mounted on the governor. The 1066 board uses a serial interface to a Turck absolute encoder, part # T8.5882.3FB8.3001.

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 1", and set the "Enc PPR = 8192". The "Enc RPM" value must be calculated as described below. To calculate the RPM, divide the contract speed of the car by the distance traveled in one revolution with the governor as shown below:

RPM = Speed fpm/ (diameter GOV * pi)

For a 1 ft. diameter governor:

RPM = 350/ (1*pi) = 350/3.1415 = 111.4

For a 16 in diameter governor (16/12 = 1.33ft)
RPM = 350/ (1.33* 3.1415) = 350/4.188 = 83.5

3.3.12 Correct Car Speed When Using CAN Open Tapeless System

When using the CAN Open tapeless system, the secondary speed feedback comes from the incremental encoder mounted on the machine/motor.

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 4", and set the "Enc PPR" equal to the PPR of the machine/motor-mounted incremental encoder, and set the "Enc RPM" to the rpm of the machine/motor at contract speed.

On the 1066 LCD interface, navigate to the "Pls Cnt" menu. While running the elevator on inspection, verify that the pulse count value increments when running up and decrements when running down. The "Pls Cnt" value can be considerably out of range but will automatically correct during the "Learn Hoistway" procedure. To reverse the direction of pulse counting, navigate on the 1066 LCD interface to the "Adj Var" menu, "Enc Dir" and set to "0" for clockwise or "1" for counter-clockwise.

Navigate on the 1066 LCD interface to the "Car Spd" menu. Monitor the "Car Spd" while running the car at a known inspection speed. The value displayed should match the actual car speed measured with a hand held tachometer. If not, re-check the values set in "Enc RPM" and "Enc PPR" in the 1066 LCD interface. If the speed is correct, proceed to "Learn the Hoistway" section 3.4.

3.4 Learn the Hoistway

Run the elevator down on inspection until it stops on the down normal limit switch. Verify that the “DN and DL” input LED’s are both off and that the "UL" and "DZ" LED's are on. From the 1021 LCD interface navigate to the "Elevator Setup" menu, "Learn Hoistway". The learn procedure can be performed automatically by choosing "Auto" from the menu items, or performed manually by choosing "Insp" from the menu items. After choosing the learn method, follow the instructions displayed on 1021 LCD interface.

In general, the car will run up from the "down normal limit" to the "up normal limit" at 30 fpm. During this learn run, the DP count for each floor level and each limit switch will be stored in memory.

NOTE: The car must run the entire hoistway without stopping.

As the elevator moves up the hoistway, navigate to the "Hoistway Tables" menu, "Disp/Mod Hoistway Table", and verify that the "DP" count is incrementing as the elevator moves up. Also as the elevator passes each floor, the pulse count and distance for that floor should change and be stored. Verify that the floor distances are valid. The pulse count for the terminal slowdowns will also be stored. The elevator will stop when it reaches the up normal limit. Follow the instructions on the 1021 LCD interface by putting the car on inspection, and then the message "Hoistway Learn Complete" should be displayed.

Move the elevator on inspection until the “DZ and DL” LED’s are on. Set the "INS" switch on the 1064 board to the "NORMAL" position and the elevator should level down to floor level at the top floor. If so, proceed to final adjustment.

If the car levels down but does not run, then check “Elevator Status” and “View Fault Log” on the 1021 LCD interface for any fault information. Correct items causing faults and perform hoistway learn again. After problem is corrected, and a successful hoistway learn is performed, proceed to final adjustment.

3.5 Final Adjustment

3.5.1 Automatic Run

The elevator should now be sitting idle at the top floor. The "AUTO DOOR" switch should be set to the "OFF" position and the "IND" switch should be set to the "IND" position. If the learn procedure was successful the elevator should be ready to make an automatic run.

The default parameter settings for the ride quality should be adequate for an initial run. From the 1021 LCD interface navigate to the "Set Calls and Lockouts" menu, "Setup Car Calls" and enter a car call. The elevator should run to answer the call. When the elevator levels in and stops at the floor, the doors will remain closed.

The acceleration and deceleration of the car should be smooth and stepless regardless of the distance of the run. If the elevator does not function as described above, then the problem should be analyzed before proceeding.

3.5.2 Fine Tune the Ride Quality

In order to fine tune the ride quality, refer to Figure 3.2 which describes what part of the S-curve that the different parameters effect. In general, higher numbers in the given parameters, cause quicker and more abrupt changes from one mode to the next during a run. All of the S-curve parameters have a minimum and maximum value. The controller will not allow you to enter values that are not valid. After adjusting the S-curve parameters, proceed to the next step.

3.5.3 Adjust the Stop

When at floor level the “UL, DL, & DZ” input LEDs should be on. If the elevator continually tries to seek floor level by leveling up and down, check the motor field voltage to be at the nameplate voltage while leveling. If the motor field voltage is correct but the car seems sluggish then increase the response of the drive by increasing the value of Function #40 in the drive. If the car still re-levels at the floor, try the following steps to correct the problem:

- Reduce the leveling and re-leveling velocity parameters from the 1021 LCD interface "Adjustable Variables" menu, "Car Motion", "Leveling Speed" and "Relevel Speed".

- If the car still oscillates, adjust the "floor level zone" on the selector. The "floor level zone" is increased by moving the "UL" and "DL" sensors closer together.

- If the car stops hard on the brake then make the following adjustments. From the 1021 LCD interface navigate to the "Adjustable Variables" menu, "Car Motion", and adjust both "Brake Drop Del" (brake drop delay) and "Soft Stop Time". These variables should be adjusted so that zero speed is observed at the end of the run prior to the brake setting. The controller should hold the car at zero speed for the duration of the "Soft Stop Time" which should continue while the brake is setting and for a short time after the brake sets. The "Soft Stop Time" MUST be set to at least 0.5 seconds LONGER than the "Brake Drop Del"

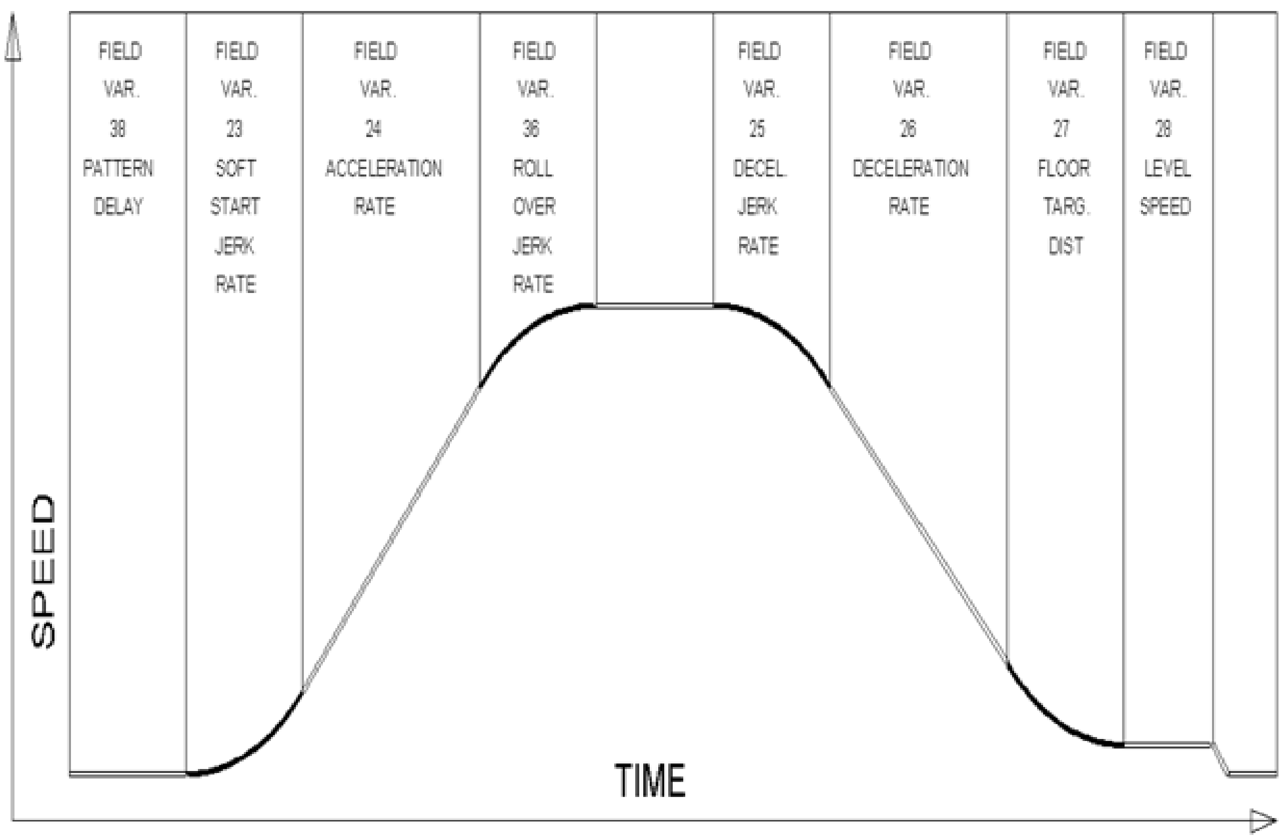
NOTE: The "Soft Stop Time" setting in the 1021 LCD interface should be compared with the setting in the 1066 LCD interface "Adj Var" menu, "SoftStop". The setting of "SoftStop" in the 1066 LCD interface should be greater than the "Soft Stop Time" setting in the 1021 LCD interface.

If the car spots when approaching the floor, the cause is usually due to the car not tracking (the drive response is set too low) or the speed profile into the floor is too aggressive. First try to increase the response of the drive by increasing the value of Function #40 in the drive.

If the car still spots, from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and increase the value of "Floor Targ Dis" (floor targeting distance). The default value for the floor targeting distance is 12 inches. Increase it by steps of 2 or 3 and continue retesting until the parameter is adjusted to 18. If no change is noticed, start again from 12 and decrease the value.

The deceleration rate can also be reduced to help remove the spotting. Once the proper stop is achieved, proceed to “Adjust The Start”.

Figure 3.2: S-Curve Parameters



3.5.4 Adjust the Start

To provide a proper start, from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust "Brake Pick Del" (brake pick delay), "Pattern Delay", and "Soft Start Jerk". Initially, set the brake pick delay to 0 and increase the pattern delay by 0.1 seconds until the controller picks the brake completely before the motor starts to move. If roll back occurs, then reduce the pattern delay until there is no roll back. Sometimes, the timing works out better if the brake pick delay is set to 0.1 second. If load weighing is used, pre-torquing can be used to provide a smoother start. See section 3.5.9.

Increase the soft start jerk rate in order to provide a quicker transition from the start to constant acceleration. Keep in mind that the larger the soft start number, the quicker the start. The ride should now be acceptable.

3.5.5 Verify Top Speed

To fine tune high speed, make high speed runs while monitoring Function #600 on the SCR drive display. The display should read contract speed.

If the speed is slightly under contract speed then verify that Function #10 Encoder PPR and Function #11 Rated Motor RPM are set properly. The speed displayed at Function #600 should match the speed displayed on the 1021 LCD interface, "Elevator Status" menu, "Dmd" and "Vel". This speed should also match the speed displayed on the 1066 LCD interface, "Car Spd" menu. When all of these speeds are the same (+/- 2 fpm), then proceed to the next step.

3.5.6 Adjust Safety Processor Board Speed Clamps

The 1066 Safety Processor Board monitors the speed of the elevator at the terminal landings independently from the main CPU.

When the "UT, DT, UTS, and DTS" limit switches are activated, the 1066 board calculates the velocity of the elevator and compares that velocity with a stored value of speed clamp. If the velocity when the switch activates is greater than the speed clamp value, then the 1066 board will generate a fault that stops the elevator.

From the 1066 LCD interface, navigate to the "Lim Vel" menu, and view the recorded velocities displayed for the “UT, DT, UTS & DTS” slowdown limits. “UTS & DTS” are used on cars with reduced stroke buffers or with a top speed greater than 200 fpm. The velocity value is shown from the “LIM VEL” menu on the 1066 LCD interface.

The velocity value shown on the display for the “UT or DT” limit is the value after the car activates the limit then counts an adjustable number of counts set from the 1066 LCD interface, "Adj Var" menu, "UT Count" or "DT Count". These count values can be adjusted to provide adequate distance, following the limit switch activation, to allow the elevator to begin its normal decel pattern. The default "UT Count" and "DT Count" values are normally adequate. However, these values may need to be field adjusted to allow enough distance for the car to begin its normal decel pattern. If the "UT Count" and "DT Count" values are modified, the limit velocities must be re-checked

Run the car again to the top repeatedly from 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the top floor.

Make the same runs to the bottom floor starting from 1 floor, then 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the bottom floor.

Take the highest speed value recorded in the runs above and add 20 fpm to that value to use as the clamp speed values for the respective limit switches. Enter these clamp speed values into the 1066 LCD interface "Adj Var" menu, "UT Vel", "DT Vel", "UTS Vel", "DTS Vel" respectively.

3.5.7 Adjust Digital Slowdown Speed Clamps

Having just made several runs into the top and bottom landings, the main CPU has also recorded the car's velocity when the slowdown limits were activated. If the car has been powered down prior to this step, several runs must be made to the terminal landings to allow the main CPU to record the limit velocity values.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Set DT/UT Slowdown Clamp" and view the speed displayed for "Clamp Speed". Add 20 fpm to this "Clamp Speed" value and enter it into the "DT/UT Limit" value.

The number of slowdown limits depends on the speed of the car as show in the table below:

Adjust speed clamps for each slowdown limits used as determined by the elevator's contract speed.

Car Speed	Number of Slowdown Limits	Clamp Number	Limit Used
<= 250 fpm	1	2	UT, DT
300-500 fpm	2	3	UT1, DT1
600-700 fmp	3	4	UT2, DT2
800 + fpm	4	5	UT3, DT3

Table 3.1: Slowdown Clamps

3.5.8 Verify Inspection Velocity Clamp On Safety Processor Board

Place the car on inspection operation. From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp velocity to 25 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to 50 fpm. Run the car in either direction and verify that the car shuts down when the speed rises above 25 fpm.

From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp to 140 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to the desired value.

3.5.9 Analog Load Weigher Setup

If the job uses an analog load weigher purchased from G.A.L., complete the following procedure.

NOTE: It is recommend using two people, one moving the weights and one in the machine room to set up the load weigher.

Mount the load weigher as described by the manufacturer. The load weigher control box will also contain a board supplied by G.A.L. that connects to the controller serial CAN bus and reads in the analog output from the load weighing device. Wire the load weigher and G.A.L. board according to the controller schematics.

Calibrate the load weighing device hardware according to the manufacturer's instructions. Following proper installation of the load weighing device, proceed to section 3.5.9.1, Empty Car Setup.

3.5.9.1 Empty Car Setup

Verify that the load weighing device is communicating to the main CPU by performing the following steps. From the 1021 LCD interface, navigate to the "Diagnostics" menu, "Car Comm Status", "Car to LW Board" and verify that "On-line = 1". If "On-line = 0" then verify wiring and installation of load weighing device.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Setup Load Weigher" and follow the instructions on the display as you go through the procedure.

It is okay to exit the setup screen to place a call and then return to it while the setup is being performed.

Run the car to the bottom floor and press Enter on the 1021 LCD interface when prompted to do so to start the automatic setup sequence. If the car is at the bottom floor and the doors are not closed (the doors will not close automatically from turning off the auto-door switch) then place a car call to run the car up one floor then back again. The doors will close when the call is placed.

When the automatic sequence is activated, the car will run to each floor and measure the empty load value. The 1021 LCD interface will indicate when the sequence if finished.

3.5.9.2 Full Car Setup

NOTE: The empty car setup must be successfully completed to run the full load setup.

Once the empty car setup is complete, run to the loading floor and set the "AUTO DOOR" switch to the "ON" position to allow weights to be loaded on the car. With the car fully loaded, set the "AUTO DOOR" switch to the "OFF" position and run the car to the bottom floor. Again if the doors are not closed, make a one floor run to force the doors to close.

With the car at the bottom floor, follow the instructions on the 1021 LCD interface to start the full load setup sequence. The car will automatically run to each floor and measure the full load value. When the full load measurement is complete, the car can be run to the loading floor and the weights removed.

After the weights are removed, cycle the doors to complete the procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "View/Modify LW Setup" and verify the load weigher status, "LW Device Stat: ON OK". If the status is "ON OK", then the load weigher should be accurately measuring the car load in real time. The percent load will be displayed, "Load: %".

The percent load values for different service options can now be set. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Service Options", and set the following variables:

• "Load Bypass"

• "Load Antinuisance"

• "Load Dispatch"

• "Load Overload"

NOTE: Setting the values of the variables above to 0% will disable that particular option.

3.5.9.3 Load Weighing Calibration Sequence

The load weigher is automatically calibrated once each week. If an error is detected during this calibration sequence, the load weigher and the pre-torque feature (if used) is disabled.

A load weighing calibration sequence can be manually activated by performing the following procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Load Weigher Calibration" and follow the instructions on the display.

3.5.10 Adjust the Motor Pre-torque

NOTE: The motor pre-torque uses the load value obtained from the analog load weigher and will only work if the load weigher has been installed properly, and the "Load Weigher Setup" has been performed successfully.

To enable pre-torquing on the drive, set Function #114 on the DSD-412 drive to “ON”. Remember to go to Function #994 to save any changed parameters. Run the empty car to a middle floor. From the 1021 LCD user interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust the following parameters:

• "Balance Load = 40" (typically car is 40% counterbalanced, but verify counterbalance percentage for each specific job)

• "Torque Amount = 10"

• "Pattern Delay = 2.5"

• "Brake Pick Del = 0.1"

The long pattern delay will allow an exaggerated amount of roll back in order for the pre-torquing to be set accurately. Make a one floor run down and observe the roll back when the brake picks at the start of the run. Increase the "Torque Amount" variable and continue to monitor the roll back while performing one floor runs in the down direction. As the "Torque Amount" is increased, the roll back should be minimized until the car will hold zero speed for the entire "Pattern Delay" time. A typical value for the "Torque Amount" is 40%. If the value is too large, the car will roll forward during the "Pattern Delay" time.

Note: The pattern delay must be at least 0.15 seconds (150 milliseconds). Setting the torque amount to 0.00 will disable the pre-torque feature. Also if the load weighing calibration sequence detects a load weighing error, the pre-torque feature is also automatically disabled.

3.5.11 Verify the Doors Are Safe

The elevator should now be adjusted. Verify that all door locks, gate switches, and safety circuits are operational. Set the "INS" switch to the "NORM" position and set the "AUTO DOOR" switch to the "ON" position. The elevator should level into the floor and open the doors. If the doors do not open, check the door operator wiring and cam adjustment. If the doors do open, the elevator is now on independent service.

3.5.12 Fine Tune the Ride Quality

Ride the elevator and evaluate the ride quality. Fine tune ride quality by navigating to the "Adjustable Variables" menu, "Car Motion" and adjusting the variables shown in Figure 3.2. Keep in mind that if acceleration or deceleration values are changed, the speed clamps for the safety processor board and the S-curve board may need to be re-adjusted.

To fine tune the floor level accuracy, determine if the controller is set to stop when "UL" and "DL" signals turn on, or if controller is set to stop off of the position count. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and view the "Stop On Pos Cnt" variable. If "Stop On Pos Cnt = 0" then controller is set to stop when the "UL and "DL" signals turn on. If "Stop On Pos Cnt = 1" then controller is set to stop on a combination of the floor level magnet and the position count.

With "Stop On Pos Cnt = 0", the floor levels should be set by adjusting the floor level magnet at each floor. For proper operation, the floor magnets should be set to exactly floor level. After the floor levels are set properly, perform another hoistway learn procedure.

With "Stop On Pos Cnt = 1", the floor levels are set by using both the floor magnet and the position count. For proper operation with this setting, the floor magnet should be set to exactly floor level. The final stop can then be fine-tuned by performing the following adjustments.

From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "DZ & LZ Offset, Sel Cnt" and adjust "Dn Lev Dist" and "Up Lev Dist". The units for these variables are in "pulse counts". With "Stop On Pos Cnt =1" the car will continue to move for the "Dn Lev Dist" or "Up Lev Dist" after "UL and DL" turn on. Use the "Dn Lev Dist" and the "Up Lev Dist" parameters to make level changes at all floors.

To make level changes at individual floors, perform the following adjustments. From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "FL and FL Offset Count", and the offset count can be adjusted. These variables introduce an offset (+/-) to the stored floor count that was determined in the hoistway learn procedure.

NOTE: The number of pulse counts per inch can be viewed from the 1021 LCD interface, "Hoistway Tables", "DZ & LZ Offset, Sel Cnt”, "Pulses/Inch".

NOTE: Regardless if "Stop On Pos Cnt=0" or if "Stop On Pos Cnt =1", the floor magnet must be set properly at floor level. If too large of values are entered into "Dn Lev Dist", "Up Lev Dist", or "Offset", the car will drive past the floor level magnet and re-level.

Check all signal devices for proper operation and remove all temporary jumpers. The adjustment should now be complete.

Section 4 - Adjustment of the GALaxy controller - HPV-600/900

In order to obtain a running platform in "car top inspection", see the "Quick Start-up Guide for GALaxy Controller HPV 600/900 with Distance Feedback". This procedure should be used only for installation purposes. When installation of all equipment is complete, and unit is ready for adjustment, proceed to section 4.1 and follow instructions.

4.1 General Setup

Before adjustment begins the following items must be completed.

1. All field wiring and safety circuits installed
2. Temporary jumpers from terminal "HC" to terminals "MES & ALT"
3. All hoistway limit switches installed
4. All car and hoistway doors and interlocks installed and pre-adjusted
5. Selector installed and magnets pre-adjusted
6. Familiarize yourself with all wiring schematics
7. Familiarize yourself with the Magnetek HPV 900/600 AC Vector Elevator Drive Technical Manual.
8. Verify that the AC motor is properly wired.
9. Verify that the motor encoder is connected properly.
10. Car should be properly counterbalanced.

4.2 Initial Power-up

4.2.1 Check Main Line Voltage

With main-line disconnect in the off position, check the line-side voltage with a volt meter to insure the voltage matches the controller name tag "Input Power" voltage. Check to insure all three phases are present. If voltage is not correct or all three phases are not present, do not proceed until corrected.

4.2.2 Set Toggle Switches

Set all toggle switches on the 1064 board down except for the gate and lock bypass switches as follows:

- DOOR LOCKS - "OFF"
- IND - "IND"
- AUTO DOOR - "OFF"
- STOP - "STOP"
- INSPECTION - "INSP"

4.2.3 Make Sure the Car Is Safe

Verify that all elevator doors are closed and that all safety circuits are functional.

4.2.4 Check Controller Voltage

Turn the main-line disconnect to the on position. Check the voltage at R, S, and T on the AC drive. Verify that all three phases are present. Check the voltage at fuses L1 and L2 on controller. If correct, check the voltage at terminal "LIN" with respect to "GND". The voltage should read 120VAC. If correct, check the voltage at terminals "S10, LC, & HC" with respect to "GND". All should read 120VAC. If not, check wiring diagram to determine problem before continuing.

4.2.5 Verify the Main CPU is Operating

Check to make sure that the "axy" of GALaxy on the 1021 LCD interface is blinking. If the "axy" is blinking, continue to the next step. If not, check voltage at terminals 5V to 0V on the 1064 board to insure 5VDC. If 5VDC is present and the "axy" on the 1021 LCD interface is not blinking, then contact factory.

4.2.6 Preset Adjustable Variables on Safety Processor Board

The 1066 LCD interface (safety processor board) and the 1021 LDC interface (main CPU) are normally preset prior to leaving the factory. However, it is prudent to check the setup values for the proper settings. Refer to section 13 of this manual for the operation of the safety processor board 1066 LCD interface. The following adjustment variables must be set properly:

• Top Spd (contract speed)

• Enc RPM (if Fdbk Typ=0, not applicable)(if Fdbk Typ=1, set to rpm of governor)(if Fdbk Typ=4, set to value of "CONTRACT MTR SPD" parameter in HPV 900/600 drive)

• Enc PPR (if Fdbk Typ=0, not applicable)(if Fdbk Typ=1, set to 8192)(if Fdbk Typ=4, set to PPR of motor encoder)

• Fdbk Typ (0=tape, 1=enc,4=InEnc

• Ctrl Typ (2=Tract DF)

• 2 Stop (0=Mult, 1=2 stop)

• RearDoor (0=Front only, 1=Rear)

• UTS Vel (Set to top speed)

• DTS Vel (Set to top speed)

• INS Vel (Set to 140)

• LEV Vel (Set to 140)

• UT Vel (Set to 500)

• DT Vel (Set to 500)

• UL Vel (Set to 160 if Non-DF)

• DL Vel (Set to 160 if Non-DF)

• SoftStop (Set to 1)

NOTE: The velocity values for the terminal limit switches above are only temporary settings until car is running high speed. In the final adjustment procedure, these variables must be set according to the procedures in section 4.5.8.

1021 LCD interface "Adjustable Variables" menu, "Car Motion" sub-menu:

• Top Speed (set to contract speed)

• Inspect Speed (set to 25 fpm)

• Encoder PPR (set to motor encoder PPR)

• Encoder RPM (if tape selector, set to value of "CONTRACT MTR SPD" in HPV 900/600 drive), (if 485 tapeless selector, set to value of "CONTRACT MTR SPD" in HPV 900/600 drive), (if CAN open tapeless selector, set to governor rpm)

NOTE: See section 4.3.10.2 for determining governor rpm.

4.2.7 Place Stop Switch in Run Position

Set the "STOP" toggle switch on the 1064 board to the "RUN" position. Verify that input LED's for "LC, HC, DN, UN, SS, GTS, RDY and CS" are all on. If not, then correct field wiring.

4.2.8 Hoist Motor Data

At this time the hoist motor data must be entered into the AC drive. The following functions must be entered or verified using the drive digital operator. Follow the instructions in the HPV 900 or HPV 600 drive manual to enter the following data:

DRIVE A1 Sub Menu

• CONTRACT CAR SPD (from controller data)

• CONTRACT MTR SPD (from motor nameplate RPM)

NOTE: The CONTRACT MTR SPD value may need to be fine-tuned to provide the correct rpm to run the machine/motor at controller demanded speed.

• ENCODER PULSES (PPR from encoder on motor)

MOTOR A5 Sub Menu

• RATED MTR PWR (from motor nameplate)

• RATED MTR VOLTS (from motor nameplate)

• RATED MOTOR CURR (from motor nameplate)

MOTOR POLES

• for 1800rpm motor set MOTOR POLES to 4.

• for 1200rpm motor set MOTOR POLES to 6.

• for 900rpm motor set MOTOR POLES to 8.

• RATED MTR SPEED (RPM from motor nameplate) NOTE: This is a preliminary setting for the RATED MTR SPEED parameter. The final value of this parameter will be set in the "Adaptive Tune" procedure after the car is running high speed.

Most of the drive parameters have been preset to values required for your specific job. Other parameters not listed here may need to be adjusted in the field. Please refer to the Magnetek HPV Technical manual for more parameter information and troubleshooting guidelines.

From the digital operator for the drive, reset any active faults and clear the fault history log.

4.2.9 Pre-set the Digital Speed Clamps

Pre-set the software digital speed clamps from the 1021 LCD interface under the "Elevator Setup Menu". The submenus for the clamp speeds are as follows:

• Set Ins/Leveling Clamp

• Set DT/UT Slowdown Clamp

• Set DT1/UT1 Slowdown Clamp

• Set DT2/UT2 Slowdown Clamp

• Set DT3/UT3 Slowdown Clamp

• Set DTS/UTS Slowdown Clamp

Set the speed for Ins/Leveling for 140 fpm and all the remaining slowdown limit speeds to the contract speed of the car. Please note that the displayed value of "Clamp Speed" is the value the clamp should be set to. The slowdown limit "Clamp Speed:" will show 0000 until the car is run into the limits and the speed is recorded. Please refer to the 1021 LCD interface section for the Elevator Setup Menu.

NOTE: The values of the clamp speed velocities above are only temporary settings until the car is running high speed. In the final adjustment procedure, these values must be set according to the procedures in section 4.5.8.

4.3 Run the Car on Inspection

4.3.1 Ready to Run On Inspection

The car should be ready to run on inspection if all is wired correctly. Select the "Elevator Status" on the 1021 LCD interface. The display should show "Out of Service" on the first line and "Inspection Mode" on the second. The 1066 LCD interface will display one of the following types of inspection:

• "MR INS" (Motor Room)

• "CT INS" (Car Top)

• "ACCESS" (Access)

• "IC INS" (In Car)"

• "AUTO" (Not on Inspection)

To run the car from the motor room, "MR INS" should be displayed.

The "inspection string" consists of contacts from the inspection switches and the gate and lock bypass switches in series. One and only one of the five inspection inputs should be on for the car to run. Starting from the car top inspection input, the five inspection inputs are, "INS" for car top, "ACC" for access, "ICI" for in-car, "MRI" for motor room, and "AUTO" for automatic (no inspection). The inspection string circuit is shown in Figure 4.1

Note that any one of the following conditions will cause an inspection error:

• More than one inspection input is on

• No inspection input is on

• Gate or Lock bypass switch is open and the car is not on car top inspection

If the controller is not on motor room inspection at this point, then verify all switch positions and wiring before proceeding.

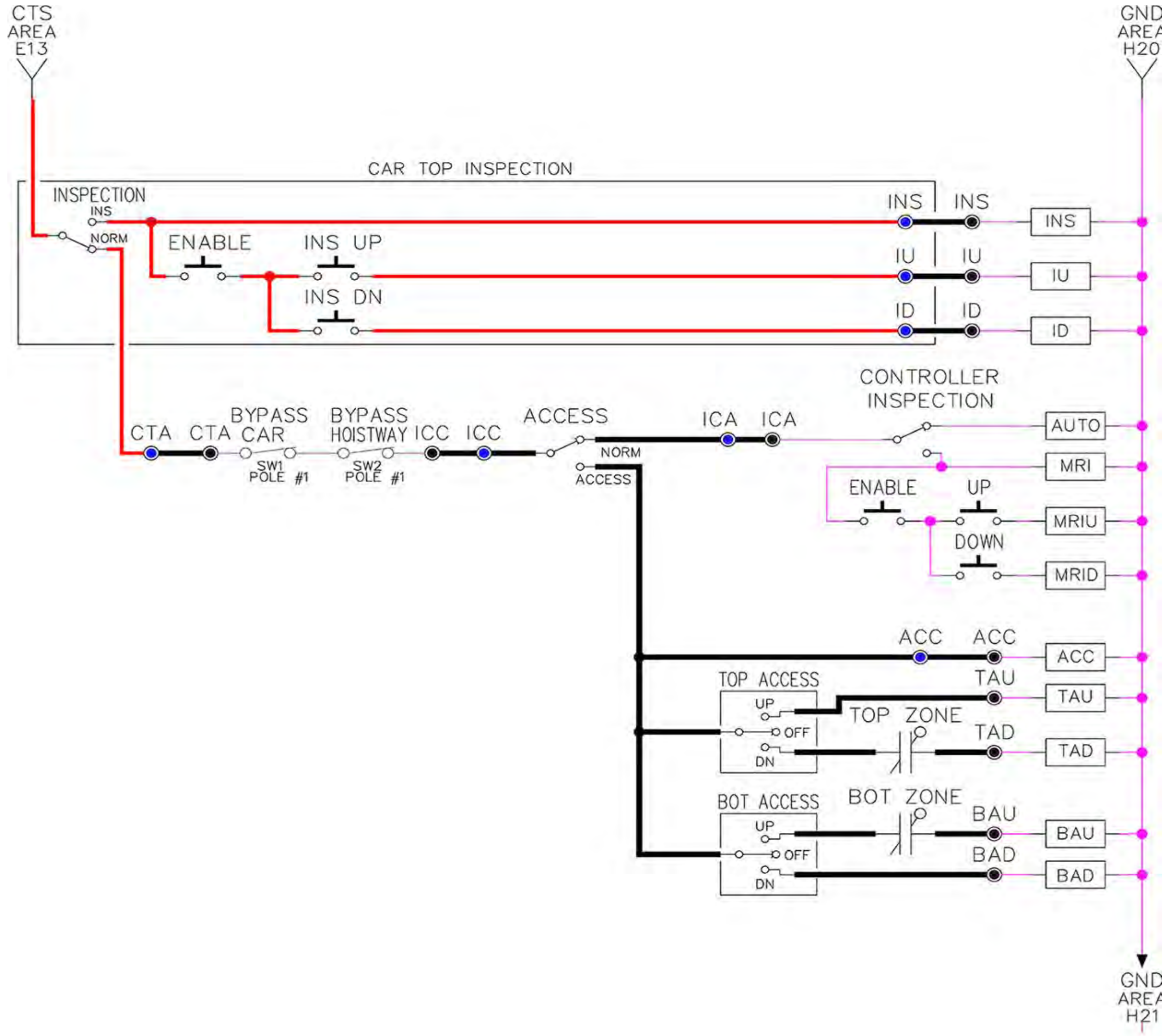


Figure 4.1: Inspection String Circuit

4.3.2 Adjust the Brake Voltage

Momentarily push the inspection “UP” or “DOWN” push button on the 1064 board while checking the DC brake voltage with a meter. If the voltage is not correct, it must be adjusted according to the following procedures.

If the controller utilizes an electronic brake board 1047 or 1051, then the brake voltage is adjusted through the 1021 LCD interface, "Car Brake" sub-menu. If the controller utilizes resistors and rectifiers for the brake coil circuit, then the brake voltage is adjusted by moving the adjustable tap on the brake resistor.

NOTE: Remove power before adjusting the resistor taps.

To adjust the brake voltage when using and electronic brake board, navigate to the "Adjustable Variables" menu, "Car Brake" and adjust "Brake Pick Volt", "Brake Hold Volt" and "Brk AC L-L Volt" to the proper values.

Make sure that the brake is lifting and setting properly before proceeding.

4.3.3 Check the Run Direction

Again momentarily push the inspection “UP” or “DOWN” push button on the 1064 board. One of the following should take place:

• The elevator will run controlled, in the correct direction (up for “UP” button, down for “DOWN” button) with no drive faults. If so, proceed to “Check Inspection Speed”.

• The elevator will run controlled, but in the wrong direction with no drive faults. If so, proceed to "Car Runs The Wrong Direction"

• The elevator will try to run, but immediately trips on a drive ENCODER FLT. If so proceed to “Drive Trips Immediately”.

• The elevator runs much slower than the inspection speed demand. If so, follow the steps in the “Car Runs Extremely Slow” section.

4.3.4 Car Runs the Wrong Direction

If the elevator runs controlled but in the wrong direction with no drive faults, then change the run direction of the motor by one of the following two ways.

Change the motor rotation on the drive from forward to reverse.

USER SWITCHES C1

MOTOR ROTATION

Run the elevator on inspection again and verify that the car runs controlled and in the correct direction. If so, proceed to "Check Inspection Speed". If not contact the factory.

Turn off the main line disconnect and swap 2 of the motor leads. Also, reverse the encoder direction. If an encoder isolation board is not used then change the encoder direction by swapping the wires at the drive as shown below:

HPV900 – A+ (TB1-21 with A- (TB1-20)

HPV600 – A+ (63) with A- (62)

If an encoder isolation board (1022N) is used, move J5 and J6 on the encoder board instead of moving the encoder wires at the drive. Refer to the jumper diagram on the board.

Turn the main disconnect on and run the elevator on inspection again.

The car should run controlled and in the correct direction. If so proceed to “Check Inspection Speed”. If not contact the factory.

4.3.5 Drive Trips Immediately

If the elevator tries to run, but immediately trips on a drive ENCODER FLT, recheck the drive motor parameters. This fault is most likely caused by improper parameter settings. Carefully review the drive MOTOR A5 parameters to match the motor data. Correct any invalid parameters and re-test the car.

If the parameters are correct, then measure the voltage of the encoder at the drive terminals as shown below:

• Voltage between A+ and A- should read greater than 1.5 VDC. For the HPV 900 drive, check terminals A (TB1-21) and A- (TB1-20). For the HPV 600 drive, check terminals A+ (63) and A- (62).

• Voltage between B+ and B- should read greater than 1.5 VDC. For the HPV 900 drive check terminals B+ (TB1-23) and B- (TB1-22). For the HPV 600 drive, check terminals B+ (65) and B- (64).

• Voltage between +5 and 0V should read roughly 5 VDC. For the HPV 900 drive check terminals +5 (TB1-25) and 0V (TB1-19). For the HPV 600 drive, check terminals +5 (67) and 0V (61).

If the voltage is incorrect then verify the encoder cable connections. Refer to the job schematics to correct any wiring error. If no error is found then contact the factory.

If the voltage is correct then change the encoder direction.

Turn off the main disconnect. If an encoder isolation board is not used then change the encoder direction by swapping the wires at the drive as shown below:

HPV 900 - A+ (TB1-21) with A- (TB1-20)

HPV 600 - A+ (63) with A- (62)

If an encoder isolation board (1022N) is used, move J5 and J6 on the encoder board instead of moving the encoder wires at the drive. Refer to the jumper diagram on the board.

Turn on the main disconnect and run the elevator on inspection again. If the elevator runs controlled and in the correct direction, proceed to “Check Inspection Speed”. If the elevator runs controlled but in the wrong direction, the go back and follow the directions in the “Car Runs The Wrong Direction” section.

If the car still trips immediately on an ENCODER FLT, then contact the factory.

4.3.6 Car Runs Extremely Slow

If the car runs much slower than the inspection speed demand, then change the encoder direction.

Turn off the main disconnect. If an encoder isolation board is not used then swap the encoder direction by swapping the wires at the drive as shown below:

HPV 900 - A+ (TB1-21) with A- (TB1-20)

HPV 600 - A+ (63) with A- (62)

If an encoder isolation board (1022N) is used, move J5 and J6 on the encoder board instead of moving the encoder wires at the drive. Refer to the jumper diagram on the board.

Turn on the main disconnect and run the elevator on inspection again. If the elevator runs controlled and in the correct direction, proceed to "Check Inspection Speed". Otherwise contact the factory.

4.3.7 Check Inspection Speed

With a hand held tachometer, check the speed of the elevator while running on inspection. The elevator should be running at 25 fpm. Also run the elevator while monitoring the HPV 900/600 digital operator, D1 menu, "SPEED FEEDBACK". The display should read 25 fpm.

From the 1021 LCD interface, "Elevator Status" menu, navigate until the display shows "Dmd" and "Vel". While running on inspection, monitor the controller demand speed "Dmd", and the speed feedback "Vel". These values should both display 25.

If the demand and feedback on the 1021 LCD interface is incorrect, check the Encoder RPM and PPR parameters from the “Adjustable Variables” menu. These variables should be set to the values listed in section 4.2.6.

If the speed on the hand held tachometer and on "Dmd" and "Vel" all read approximately 25 fpm (within +/-2 fpm) continue to the next step. If not, contact the factory.

4.3.8 Verify Controller Encoder Direction

From the 1021 LCD interface "Elevator Status" menu, navigate to display "Dir" and "DP". While moving the car on inspection, monitor "Dir" (direction) and "DP" (pulse counts). "Dir" should display "Up" when the car is moving up, and "Dn" when the car is moving down. The value of "Dp" should increment when the car is moving up, and should decrement when the car is moving down.

If the direction is wrong or the pulse counts change in the wrong direction, then the encoder direction to the controller must be changed.

If an encoder isolation board (1022N) is used, move J1 and J2 on the encoder board. Refer to the jumper diagram on the board.

If no encoder isolation board is used, the A+ and A- encoder wires from the drive must be swapped. Note that the motor encoder wires are daisy chained from the encoder to the drive and then from the drive to the controller encoder board. Only the A+ and A- wires from the drive to the controller board must be swapped. The wires from the encoder to the drive must remain on the same terminal locations on the drive.

If the encoder is counting properly continue to the next step. If not, contact the factory.

4.3.9 Verify Selector and Slowdown Inputs

Run the elevator up on inspection until it stops on the up normal limit. The up and down normal limits should be set two inches above and below the terminal floors respectively. Verify the selector inputs are being set properly on the controller by running the elevator down until it stops on the down normal limit.

As the car approaches floor level going down, “DL” turns on first, then “DZ” and then finally “UL”. At floor level, “UL, DL, and DZ” inputs should all be on at the same time. Leaving the floor going down “DL” will turn off first, then “DZ” and last “UL”.

Also verify that the up and down terminal slowdown limits inputs “UT, UTS, DT & DTS” are breaking at the proper distances as shown in the slowdown table 2.0. “UT, UTS, DT & DTS” turn off when active.

4.3.10 Verify Car Speed on Safety Processor Board

Run the car in either direction and check the car speed on the 1066 LCD interface. The speed shown should match the car’s actual speed. If the speed does not match and the secondary feedback comes from pulses from the tape go to “Correct Car Speed When Using A Tape”. If using 485 tapeless, go to "Correct Car Speed When Using 485 tapeless". If using CAN Open tapeless, go to "Correct Car Speed When Using CAN Open tapeless". If the correct speed is shown proceed to the “Learn the Hoistway” section.

4.3.10.1 Correct Car Speed When Using a Tape

The tape has holes every 3/8” that are 3/8” in diameter. On the selector unit adjust the PP sensor closer to the tape until the orange LED at the end of the sensor turns on. Then turn the sensor inwards another 1/8” and lock in the sensor. While running on top of car inspection verify that the orange LED at the end of the PP sensor turns on and off as it passes by the holes on the tape. The safety processor board on the controller measures the time between each pulse to calculate the velocity. If the velocity is not displayed correctly first make sure that the feedback type in the safety processor board adjustable variable is set to 0 for a tape application. Next, while the car is running, make sure that the PULSE LED on this board is pulsing. As the car increases in speed the LED will glow solid on. If the LED does not pulse, try swapping the wires at the PPS and PP terminals. If the LED still does not work, contact the factory. If the correct speed is shown proceed to “Learn the Hoistway”.

4.3.10.2 Correct Car Speed When Using 485 Tapeless System

When using the 485 tapeless system, the secondary speed feedback comes from the encoder mounted on the governor. The 1066 board uses a serial interface to a Turck absolute encoder, part # T8.5882.3FB8.3001.

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 1", and set the "Enc PPR = 8192". The "Enc RPM" value must be calculated as described below. To calculate the RPM, divide the contract speed of the car by the distance travel in one revolution with the governor as shown below:

RPM = Speed fpm/ (diameter GOV * pi)

For a 1 ft. diameter governor:

RPM = 350/ (1*pi) = 350/3.1415 = 111.4

For a 16 in diameter governor (16/12 = 1.33ft)

RPM = 350/ (1.33* 3.1415) = 350/4.188 = 83.5

4.3.10.3 Correct Car Speed When Using CAN Open Tapeless System

When using the CAN Open tapeless system, the secondary speed feedback comes from the incremental encoder mounted on the machine/motor.

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 4", and set the "Enc PPR" equal to the ppr of the machine/motor-mounted incremental encoder, and set the "Enc RPM" to the rpm of the machine/motor at contract speed.

On the 1066 LCD interface, navigate to the "Pls Cnt" menu. While running the elevator on inspection, verify that the pulse count value increments when running up and decrements when running down. The "Pls Cnt" value can be considerably out of range but will automatically correct during the "Learn Hoistway" procedure. To reverse the direction of pulse counting, navigate on the 1066 LCD interface to the "Adj Var" menu, "Enc Dir" and set to "0" for clockwise or "1" for counter-clockwise.

Navigate on the 1066 LCD interface to the "Car Spd" menu. Monitor the "Car Spd" while running the car at a known inspection speed. The value displayed should match the actual car speed measured with a hand held tachometer. If not, re-check the values set in "Enc RPM" and "Enc PPR" in the 1066 LCD interface. If the speed is correct, proceed to "Learn the Hoistway" section 4.4.

4.4 Learn the Hoistway

Run the elevator down on inspection until it stops on the down normal limit switch. Verify that the “DN and DL” input LED’s are both off and that the "UL" and "DZ" LED's are on. From the 1021 LCD interface navigate to the "Elevator Setup" menu, "Learn Hoistway". The learn procedure can be performed automatically by choosing "Auto" from the menu items, or performed manually by choosing "Insp" from the menu items. After choosing the learn method, follow the instructions displayed on 1021 LCD interface.

In general, the car will run up from the "down normal limit" to the "up normal limit" at 30 fpm. During this learn run, the DP count for each floor level and each limit switch will be stored in memory.

NOTE: The car must run the entire hoistway without stopping.

As the elevator moves up the hoistway, navigate to the "Hoistway Tables" menu, "Disp/Mod Hoistway Table", and verify that the "DP" count is incrementing as the elevator moves up. Also as the elevator passes each floor, the pulse count and distance for that floor should change and be stored. Verify that the floor distances are valid. The pulse count for the terminal slowdowns will also be stored. The elevator will stop when it reaches the up normal limit. Follow the instructions on the 1021 LCD interface by putting the car on inspection, and then the message "Hoistway Learn Complete" should be displayed.

Move the elevator on inspection until the “DZ and DL” LED’s are on. Set the "INS" switch on the 1064 board to the “NORMAL” position and the elevator should level down to floor level at the top floor. If so, proceed to final adjustment.

If the car levels down but does not run, then check “Elevator Status” and “View Fault Log” on the 1021 LCD interface for any fault information. Correct items causing faults and perform hoistway learn again. After problem is corrected, and a successful hoistway learn is performed, proceed to final adjustment.

4.5 Final Adjustment

4.5.1 Automatic Run

The elevator should now be sitting idle at the top floor. The "AUTO DOOR" switch should be set to the "OFF" position and the "IND" switch should be set to the "IND" position. If the learn procedure was successful the elevator should be ready to make an automatic run.

The default parameter settings for the ride quality should be adequate for an initial run. From the 1021 LCD interface navigate to the "Set Calls and Lockouts" menu, "Setup Car Calls" and enter a car call. The elevator should run to answer the call. When the elevator levels in and stops at the floor, the doors will remain closed.

The acceleration and deceleration of the car should be smooth and stepless regardless of the distance of the run. If the elevator does not function as described above, then problem should be analyzed before proceeding.

4.5.2 Drive Adaptive Tune

To complete the setup of the drive, an adaptive tune is required. It is necessary that the car run 70% of contract speed when running this test so that the drive does not go into flux weakening. In the DRIVE A1 Sub Menu, set the CONTRACT MTR SPD parameter to 70% of the rated motor RPM. If this value was adjusted to correct the top speed of the car, use 70% of the adjusted value. To calculate 70%, multiply the value by 0.7. For example, if the motor RPM is 1050 then 70% of the motor RPM is (1050 x 0.7 = 735).

This procedure will also require a balanced load in the car. Follow the adaptive tune procedure set in the Magnetek HPV 900 or HPV 600 Technical Manual. After completing the adaptive tune, reset the CONTRACT MTR SPD parameter and then proceed to the next step.

4.5.3 Fine Tune the Ride Quality

In order to fine tune the ride quality, refer to Figure 4.2 which describes what part of the S-curve that the different parameters effect. In general, higher numbers in the given parameters, cause quicker and more abrupt changes from one mode to the next during a run. All of the S-curve parameters have a minimum and maximum value. The controller will not allow you to enter values that are not valid. After adjusting the S-curve parameters for the desired ride, proceed to the next step.

4.5.4 Adjust the Stop

When at floor level the “UL, DL, & DZ” input LED’s should be on. If the elevator continually tries to seek floor level by leveling up and down, try the following steps to correct the problem:

Increase the response of the drive by increasing the value of A1 RESPONSE in the HPV 900/600 drive, and retesting the car.

Reduce the leveling and re-leveling velocity parameters from the 1021 LCD interface "Adjustable Variables" menu, "Car Motion", "Leveling Speed" and "Relevel Speed".

If the car still oscillates, adjust the "floor level zone" on the selector. The "floor level zone" is increased by moving the "UL" and "DL" sensors closer together.

If the car stops hard on the brake then make the following adjustments. From the 1021 LCD interface navigate to the "Adjustable Variables" menu, "Car Motion", and adjust both "Brake Drop Del" (brake drop delay) and "Soft Stop Time". These variables should be adjusted so that zero speed is observed at the end of the run prior to the brake setting. The controller should hold the car at zero speed for the duration of the "Soft Stop Time" which should continue while the brake is setting and for a short time after the brake sets. The soft stop time MUST be set to at least 0.5 seconds LONGER than the "Brake Drop Del".

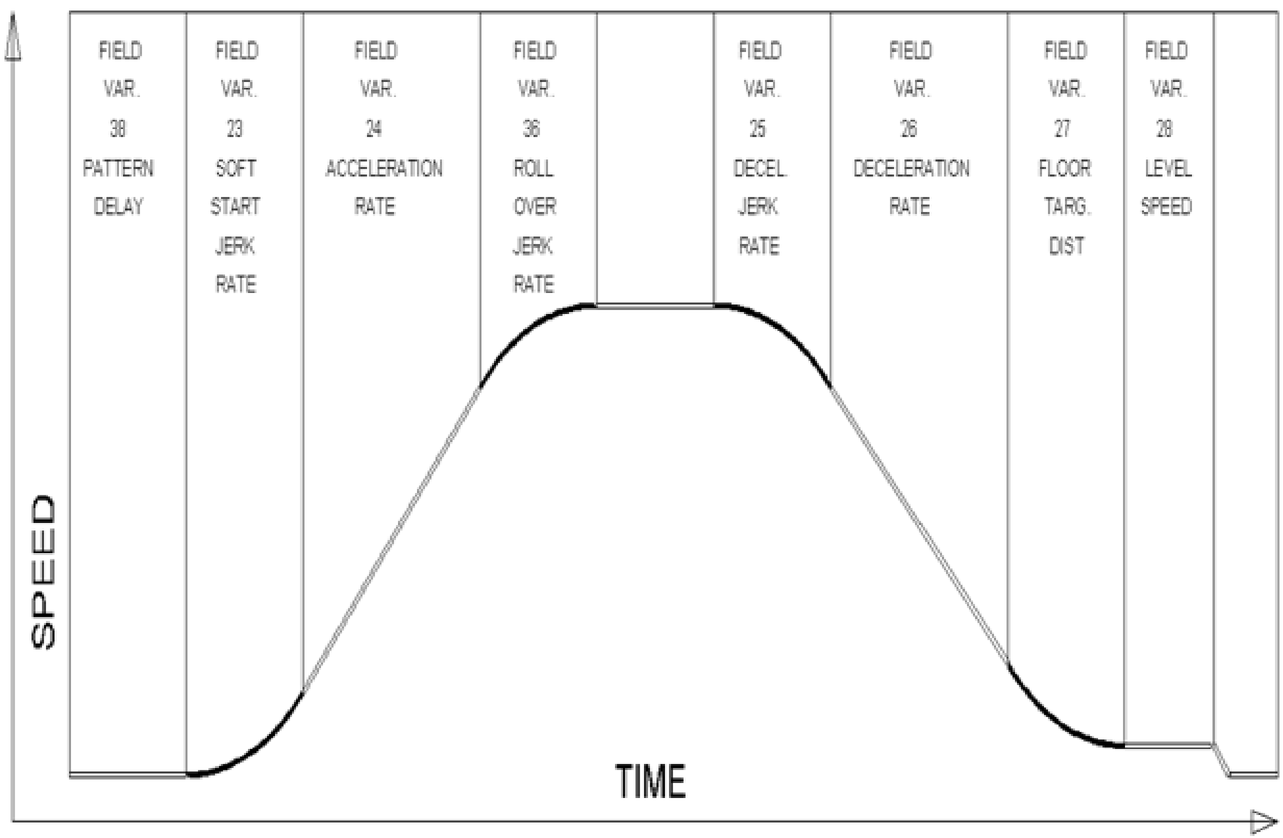
NOTE: The "Soft Stop Time" setting in the 1021 LCD interface should be compared with the setting in the 1066 LCD interface "Adj Var" menu, "SoftStop". The setting of "SoftStop" in the 1066 LCD interface should be greater than the "Soft Stop Time" setting in the 1021 LCD interface.

If the car spots when approaching the floor, the cause is usually due to the car not tracking (the drive response is set too low) or the speed profile into the floor is too aggressive. First try to increase the response of the drive by increasing the value of parameter A1 RESPONSE in the drive.

If the car still spots: from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and increase the value of "Floor Targ Dis" (floor targeting distance). The default value for the floor targeting distance is 12 inches. Increase it by steps of 2 or 3 and continue retesting until the parameter is adjusted to 18. If no change is noticed, start again from 12 and decrease the value.

The deceleration rate can also be reduced to help remove the spotting. Proceed with adjusting the start once the proper stop is achieved.

Figure 4.2: S-Curve Parameter



4.5.5 Adjust the Start

To provide a proper start, from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust "Brake Pick Del" (brake pick delay), "Pattern Delay", and "Soft Start Jerk". Initially, set the brake pick delay to 0 and increase the pattern delay by 0.1 seconds until the controller picks the brake completely before the motor starts to move. If roll back occurs, then reduce the pattern delay until there is no roll back. Sometimes, the timing works out better if the brake pick delay is set to 0.1 second. If load weighing is used, pre-torquing can be used to provide a smoother start. See section 4.5.10.

Increase the soft start jerk rate in order to provide a quicker transition from the start to constant acceleration. Keep in mind that the larger the soft start number, the quicker the start. The ride should now be acceptable.

4.5.6 Verify Top Speed

To fine tune high speed, make high speed runs while monitoring the SPEED FEEDBACK in the D1 submenu on the HPV drive display. The display should read contract speed, and it should match the speed displayed on the 1021 LCD interface, "Elevator Status" menu, "Dmd" and "Vel". This speed should also match the speed displayed on the 1066 LCD interface, "Car Spd" menu. If all of these values are the same (+/- 2 fpm), then proceed to the next step. If the speed is not correct increase or decrease drive parameter A1 CONTARCT MTR SPD until the AC drive display reads contract speed. When the speed displayed is correct, proceed to the next step.

4.5.7 Adjust Safety Processor Board Speed Clamps

The 1066 Safety Processor Board monitors the speed of the elevator at the terminal landings independently from the main CPU.

When the "UT, DT, UTS, and DTS" limit switches are activated, the 1066 board calculates the velocity of the elevator and compares that velocity with a stored value of speed clamp. If the velocity when the switch activates is greater than the speed clamp value, then the 1066 board will generate a fault that stops the elevator.

To set the speed clamps, make a one floor run to the top floor.

From the 1066 LCD interface, navigate to the "Lim Vel" menu, and view the recorded velocities displayed for the “UT, DT, UTS & DTS” slowdown limits. “UTS & DTS” are used on car with reduced stroke buffers or with a top speed greater than 200 fpm. The velocity value is shown from the “LIM VEL” menu on the 1066 LCD interface.

The velocity value shown on the display for the “UT or DT” limit is the value after the car activates the limit then counts an adjustable number of counts the 1066 LCD interface, "Adj Var" menu, "UT Count" or "DT Count". These count values can be adjusted to provide adequate distance, following the limit switch activation, to allow the elevator to begin its normal decel pattern. The default "UT Count" and "DT Count" values are normally adequate. However, these values may need to be field adjusted to allow enough distance for the car to begin its normal decel pattern. If the "UT Count" and "DT Count" values are modified, the limit velocities must be re-checked.

Run the car again to the top repeatedly from 2 floors, then 3 floors, etc., until top speed is reached. Record the limit velocities each time the car stops at the top floor. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the top floor.

Make the same runs to the bottom floor starting from 1 floor, then 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the bottom floor.

Take the highest speed value recorded in the runs above and add 20 fpm to that value to use as the clamp speed values for the respective limit switches. Enter these clamp speed values into the 1066 LCD interface "Adj Var" menu, "UT Vel", "DT Vel", "UTS Vel", "DTS Vel" respectively.

4.5.8 Adjust Digital Slowdown Speed Clamps

Having just made several runs into the top and bottom landings, the main CPU has also recorded the car's velocity when the slowdown limits were activated. If the car has been powered down prior to this step, several runs must to be made to the terminal landings to allow the main CPU to record the limit velocity values.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Set DT/UT Slowdown Clamp" and view the speed displayed for "Clamp Speed". Add 20 fpm to this "Clamp Speed" value and enter it into the "DT/UT Limit" value.

The number of slowdown limits depends on the speed of the car as show in the table below:

Car Speed	Number of Slowdown Limits	Clamp Number	Limit Used
<= 250 fpm	1	2	UT, DT
300-500 fpm	2	3	UT1, DT1
600-700 fmp	3	4	UT2, DT2
800 + fpm	4	5	UT3, DT3

Table 4.1: Slowdown Clamps

Adjust speed clamps for each slowdown limits used as determined by the elevator's contract speed.

4.5.9 Verify Inspection Velocity Clamp on Safety Processor Board

Place the car on inspection operation. From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp velocity to 25 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to 50 fpm. Run the car in either direction and verify that the car shuts down when the speed rises above 25 fpm.

From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp to 140 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to the desired value.

4.5.10 Analog Load Weigher Setup

If the job uses an analog load weigher purchased from G.A.L., complete the following procedure.

Mount the load weigher as described by the manufacturer. The load weigher control box will also contain a board supplied by G.A.L. that connects to the controller serial CAN bus and reads in the analog output from the load weighing device. Wire the load weigher and G.A.L. board according to the controller schematics.

Calibrate the load weighing device hardware according to the manufacturer's instructions. Following proper installation of the load weighing device, proceed to section 3.5.9.1, Empty Car Setup.

NOTE: It is recommend using two people, one moving the weights and one in the machine room to set up the load weigher.

4.5.10.1 Empty Car Setup

Verify that the load weighing device is communicating to the main CPU by performing the following steps. From the 1021 LCD interface, navigate to the "Diagnostics" menu, "Car Comm Status", "Car to LW Board" and verify that "On-line = 1". If "On-line = 0" then verify wiring and installation of load weighing device.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Setup Load Weigher" and follow the instructions on the display as you go through the procedure.

It is okay to exit the setup screen to place a call and then return to it while the setup is being performed.

Run the car to the bottom floor and press Enter on the 1021 LCD interface when prompted to do so to start the automatic setup sequence.

If the car is at the bottom floor and the doors are not closed (the doors will not close automatically from turning off the auto-door switch) then place a car call to run the car up one floor then back again. The doors will close when the call is placed.

When the automatic sequence is activated, the car will run to each floor and measure the empty load value. The 1021 LCD interface will indicate when the sequence is finished.

4.5.10.2 Full Car Setup

NOTE: The empty car setup must be successfully completed to run the full load setup.

Once the empty car setup is complete, run to the loading floor and set the "AUTO DOOR" switch to the "ON" position to allow weights to be loaded on the car. With the car fully loaded, set the "AUTO DOOR" switch to the "OFF" position and run the car to the bottom floor. Again if the doors are not closed, make a one floor run to force the doors to close.

With the car at the bottom floor, follow the instructions on the 1021 LCD interface to start the full load setup sequence. The car will automatically run to each floor and measure the full load value. When the full load measurement is complete, the car can be run to the loading floor and the weights removed.

After the weights are removed, cycle the doors to complete the procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "View/Modify LW Setup" and verify the load weigher status, "LW Device Stat: ON OK". If the status is "ON OK", then the load weigher should be accurately measuring the car load in real time. The percent load will be displayed, "Load: %".

The percent load values for different service options can now be set. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Service Options", and set the following variables:

- "Load Bypass"
- "Load Antinuisance"
- "Load Dispatch"
- "Load Overload"

NOTE: Setting the values of the variables above to 0% will disable that particular option.

4.5.10.3 Load Weighing Calibration Sequence

The load weigher is automatically calibrated once each week. If an error is detected during this calibration sequence, the load weigher and the pre-torque feature (if used) is disabled. A load weighing calibration sequence can be done manually by performing the following procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Load Weigher Calibration" and follow the instructions on the display.

4.5.11 Adjust the Motor Pre-torque

NOTE: The motor pre-torque uses the load value obtained from the analog load weigher and will only work if the load weigher has been installed properly, and the "Load Weigher Setup" has been performed successfully.

On the HPV-600 or HPV-900 drive under User Switches C1 parameter, set Pre-Torque source to serial. Run the empty car to a middle floor. The long pattern delay will allow an exaggerated amount of roll back in order for the pre-torquing to be set accurately. Make a one floor run down and observe the roll back when the brake picks at the start of the run. Increase the "Torque Amount" variable and continue to monitor the roll back while performing one floor runs in the down direction. As the "Torque Amount" is increased, the roll back should be minimized until the car will hold zero speed for the entire "Pattern Delay" time. A typical value for the "Torque Amount" is 40%. If the value is too large, the car will roll forward during the "Pattern Delay" time.

Note: Pattern delay must be at least 0.15 seconds (150 milliseconds). Setting the torque amount to 0.00 will disable the pre- torque feature. Also if the load weighing calibration sequence detects a load weighing error, the pre-torque feature is also automatically disabled.

4.5.12 Verify the Doors Are Safe

The elevator should now be adjusted. Verify that all door locks, gate switches, and safety circuits are operational. Set the "INS" switch to the "NORM" position and set the "AUTO DOOR" switch to the "ON" position. The elevator should level into the floor and open the doors. If the doors do not open, check the door operator wiring and cam adjustment. If the doors do open, the elevator is now on independent service.

4.5.13 Fine Tune the Ride Quality

Ride the elevator and evaluate the ride quality. Fine tune ride quality by navigating to the "Adjustable Variables" menu, "Car Motion" and adjusting the variables shown in Figure 4.2. Keep in mind that if acceleration or deceleration values are changed, the speed clamps for the safety processor board and the S-curve board may need to be re-adjusted.

To fine tune the floor level accuracy, determine if the controller is set to stop when "UL" and "DL" signals turn on, or if controller is set to stop off of the position count. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and view the "Stop On Pos Cnt" variable. If "Stop On Pos Cnt = 0" then controller is set to stop when the "UL and "DL" signals turn on. If "Stop On Pos Cnt = 1" then controller is set to stop on a combination of the floor level magnet and the position count.

With "Stop On Pos Cnt = 0", the floor levels should be set by adjusting the floor level magnet at each floor. For proper operation, the floor magnets should be set to exactly floor level. After the floor levels are set properly, perform another hoistway learn procedure.

With "Stop On Pos Cnt = 1", the floor levels are set by using both the floor magnet and the position count. For proper operation with this setting, the floor magnet should be set to exactly floor level. The final stop can then be fine-tuned by performing the following adjustments.

From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "DZ & LZ Offset, Sel Cnt" and adjust "Dn Lev Dist" and "Up Lev Dist". The units for these variables are in "pulse counts". With "Stop On Pos Cnt =1" the car will continue to move for the "Dn Lev Dist" or "Up Lev Dist" after "UL and DL" turn on. Use the "Dn Lev Dist" and the "Up Lev Dist" parameters to make level changes at all floors.

To make level changes at individual floors, perform the following adjustments. From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "FL and FL Offset Count", and the offset count can be adjusted. These variables introduce an offset (+/-) to the stored floor count that was determined in the hoistway learn procedure.

NOTE: The number of pulse counts per inch can be viewed from the 1021 LCD interface, "Hoistway Tables", "DZ & LZ Offset, Sel Cnt", "Pulses/Inch".

NOTE: Regardless if "Stop On Pos Cnt=0" or if "Stop On Pos Cnt =1", the floor magnet must be set properly at floor level. If too large of values are entered into "Dn Lev Dist", "Up Lev Dist", or "Offset", the car will drive past the floor level magnet and re-level.

Check all signal devices for proper operation and remove all temporary jumpers. The adjustment should now be complete.

Section 5 - Adjustment of the GALaxy Non-Distance Feedback controller - HPV-600/900

5.1 General Setup

Before adjustment begins the following items must be completed.

1. All field wiring and safety circuits installed
2. Temporary jumpers from terminal “HC” to terminals “MES & ALT”
3. All hoistway limit switches installed
4. All car and hoistway doors and interlocks installed and pre-adjusted
5. Selector installed and magnets pre-adjusted
6. Familiarize yourself with all wiring schematics
7. Familiarize yourself with the appropriate Magnetek HPV 900 or HPV 600 AC Vector Elevator Drive Technical Manual.
8. Verify that the AC motor is properly wired.
9. Verify that the encoder (if closed loop) is connected properly.
10. Car should be properly counterbalanced.

5.2 Initial Power-up

5.2.1 Check Main-line Voltage

With main-line disconnect in the off position, check the line-side voltage with a volt meter to insure the voltage matches the controller name tag “Input Power” voltage. Check to insure all three phases are present. If voltage is not correct or all three phases are not present, do not proceed until corrected.

5.2.2 Set Toggle Switches

Set all toggle switches on the 1064 board as follows:

- DOOR LOCKS - "OFF"
- IND - "IND"
- AUTO DOOR - "OFF"
- STOP - "STOP"
- INSPECTION - "INSP"

5.2.3 Make Sure the Car Is Safe

Verify that all elevator doors are closed and that all safety circuits are functional.

5.2.4 Check Controller Voltage

Turn the main-line disconnect to the “On” position. Check the voltage at R, S, and T on the AC drive. Verify that all three phases are present. Check the voltage at fuses L1 and L2 on the controller. If correct, check the voltage at terminal “LIN” with respect to “GND”. The voltage should read 120VAC. If correct, check the voltage at terminals “S10, LC, & HC” with respect to “GND”. All should read 120VAC. If not, check wiring diagram.

5.2.5 Verify the Main CPU is Operating

Check to make sure that the “axy” of GALaxy on the 1021 LCD interface is blinking. If the “axy” is blinking, continue to the next step. If not, check voltage at terminals 5V to 0V on the 1064 board to insure 5VDC. If 5VDC is present and the “axy” on the 1021 LCD interface is not blinking, then contact factory.

5.2.6 Preset Adjustable Variables on Safety Processor Board

The 1066 LCD interface (safety processor board) and the 1021 LDC interface (main cpu) are normally preset prior to leaving the factory. However, it is prudent to check the setup values for the proper settings. Refer to section 13 of this manual for the operation 1066 LCD interface, and refer to section 10 for operation of the 1021 LCD interface. The following adjustment variables must be set properly:

1066 LCD interface "Adj Var" menu:

- Top Spd (contract speed)
- Fdbk Typ (0=tape)
- Ctrl Typ (1=Tr NDF)
- 2 Stop (0=Mult, 1=2 stop)
- RearDoor (0=Front only, 1=Rear)
- UTS Vel (Set to top speed)
- DTS Vel (Set to top speed)
- INS Vel (Set to 140)
- LEV Vel (Set to 140)
- UT Vel (Set to 500)
- DT Vel (Set to 500)
- UL Vel (Set to 160 if Non-DF)
- DL Vel (Set to 160 if Non-DF)
- SoftStop (Set to 1)

NOTE: The velocity values for the terminal limit switches above are only temporary settings until car is running high speed. In the final adjustment procedure, these variables must be set according to the procedures in section 5.4.6.

1021 LCD interface "Adjustable Variables" menu, "Car Motion" sub-menu:

- Top Speed (set to contract speed)
- Inspect Speed (set to 25 fpm)
- Encoder PPR (set to motor encoder PPR)
- Encoder RPM (if tape selector, set to value of "CONTRACT MTR SPD" in HPV 900/600 drive)

5.2.7 Place Stop Switch in Run Position

Set the “STOP” toggle switch on the 1064 board to the “RUN” position. Verify that input LED’s for “LC, HC, DN, UN, SS, GTS, RDY and CS” are all on. If not, then correct field wiring.

5.2.8 Hoist Motor Data

At this time the hoist motor data must be entered into the AC drive. The following functions listed in the appropriate drive section must be entered or verified using the specific drive interface tool. Proceed to the HPV 900/600 or GPD 515 drive section below.

5.2.9 HPV 900/600 DRIVE

Follow the instructions in the HPV 900 or HPV 600 drive manual to enter the following data:

DRIVE A1 Sub Menu

- CONTRACT CAR SPD (from controller data)

• CONTRACT MTR SPD (from motor nameplate RPM)

• **NOTE:** The CONTRACT MTR SPD value may need to be fine-tuned to provide the correct rpm to run the machine/motor at controller demanded speed.

• ENCODER PULSES (PPR from encoder on motor)

MOTOR A5 Sub Menu

• RATED MTR PWR (from motor nameplate)

• RATED MTR VOLTS (from motor nameplate)

• RATED EXCIT FREQ (from motor nameplate)

• RATED MOTOR CURR (from motor nameplate)

MOTOR POLES

• for 1800rpm motor set MOTOR POLES to 4

• for 1200rpm motor set MOTOR POLES to 6

• for 900rpm motor set MOTOR POLES to 8

• RATED MTR SPEED (RPM from motor nameplate) NOTE: This is a preliminary setting for the RATED MTR SPEED parameter. The final value of this parameter will be set in the "Adaptive Tune" procedure after the car is running high speed.

• % NO LOAD CURR (from motor nameplate)

S-CURVES A2 Sub Menu

• ACCEL RATE 0 = 2.5

• DECEL RATE 0 = 2.5

• ACCEL JERK IN 0 = 3.0

• ACCEL JERK OUT 0 = 3.0

• DECEL JERK IN 0 = 3.0

• DECEL JERK OUT 0 = 3.0

MULTISTEP A3 Sub Menu

• SPEED CMD 0 = 0

• SPEED CMD 1 = Lev Speed

• SPEED CMD 2 = Ins Speed

• SPEED CMD 3 = High

• SPEED CMD 4 = 0

• SPEED CMD 5 = 0

• SPEED CMD 6 = 0

• SPEED CMD 7 = 0

• SPEED CMD 8 = 0

• SPEED CMD 9 = 0

CONFIGURE C0 Sub Menu

• LOGIC INPUT 1 = Drive Enable

• LOGIC INPUT 2 = Run Up

• LOGIC INPUT 3 = Fault Reset

• LOGIC INPUT 4 = Run Down

• LOGIC INPUT 5 = Contact Confirm

• LOGIC INPUT 6 = Step Ref B0

• LOGIC INPUT 7 = Step Ref B1

• LOGIC INPUT 8 = no function

Most of the drive parameters have been preset to values required for your specific job. Other parameters not listed here may need to be adjusted in the field. Please refer to the Magnetek HPV 900 or HPV 600 Technical manual for more parameter information and troubleshooting guidelines.

From the digital operator for the drive, reset any active faults and clear the fault history log.

5.2.9.1 GPD 515 DRIVE

Follow the instructions in the GPD 515 drive manual to enter the follow data:

• C1-10 Acc/Dec Time Setting = 0

• C1-01 Accel Time 1 = Top Speed/150

• C1-02 Decel Time 1 = Top Speed/150

Note: This will set the accel and decel rates to 150 fpm/s or 2.5 f/s^2. (0.66 for 100 fpm)

• C2-01 S-curve Accel Start = 0.2

• C2-02 S-curve Accel End = 0.2

• C2-03 S-curve Decel Start = 0.2

• C2-04 S-curve Decel End = 0.2

• D1-01 Frequency Ref = 0

• D1-02 Frequency Ref = Lev Speed

• D1-03 Frequency Ref = Ins Speed

• D1-04 Frequency Ref = High Speed

• D1-05 through D1-09 = 0

• E1-01 Input Voltage = Line Voltage

• E1-03 V/F Pattern = 1

• E1-04 Max Frequency = 60

• E2-01 Motor Current = Nameplate Motor Amps

• E2-03 No-Load Amps = Nameplate Motor

• No-Load Amps

• E2-04 Num of Poles = 4 (~1800 rpm) 6 (~1200 rpm) 8 (~900 rpm)

• H1-01 Multi-function = 24

• H1-02 Multi-function = 14

• H1-03 Multi-function = F

• H1-04 Multi-function = 3

• H1-05 Multi-function = 4

• H1-06 Multi-function = F

• H3-05 Multi-function = 1F

With Encoder

• F1-01 Encoder Const = Encoder PPR

• F1-05 PG Rotation = 0 CCW, 1 CW

The following data is set from the factory and is shown here for reference:

• A1-02 Control Method =0 (V/F if no encoder used)

• A1-02 Control Method =3 (Flux Vector if encoder used)

• A1-03 Initialize Parameters = 2220

• B1-01 Reference Selection = 1

• B1-02 Operation Method = 1

• B1-03 Stopping Method = 1

• B5-01 PID Control = 0

• H2-01 Operation Ready = 6

Most of the drive parameters have been preset to values required for your specific job. Other parameters not listed here may need to be adjusted in the field. Please refer to the Magnetek GPD 515 Technical manual for more parameter information and troubleshooting guidelines.

5.3 Run Car on Inspection

5.3.1 Ready to Run On Inspection

The car should be ready to run on inspection if all is wired correctly. Select the "Elevator Status" on 1021 LCD interface. The display should show "Out of Service" on the first line and "Inspection Mode" on the second. The 1066 LCD interface will display one of the following types of inspection:

• "MR INS" (Motor Room)

• "CT INS" (Car Top) "ACCESS" (Access)

• "IC INS" (In Car)

• "AUTO" (Not on Inspection)

To run the car from the motor room, "MR INS" should be displayed.

The "inspection string" (Figure 5.1) consist of contacts from the inspection switches and the gate and lock bypass switches in series. One and only one of the five inspection inputs should be on for the car to run. Starting from the car top inspection input, the five inspection inputs are, "INS" for car top, "ACC" for access, "ICI" for in-car, "MRI" for motor room, and "AUTO" for automatic (no inspection).

The inspection string circuit is shown in Figure 5.1.

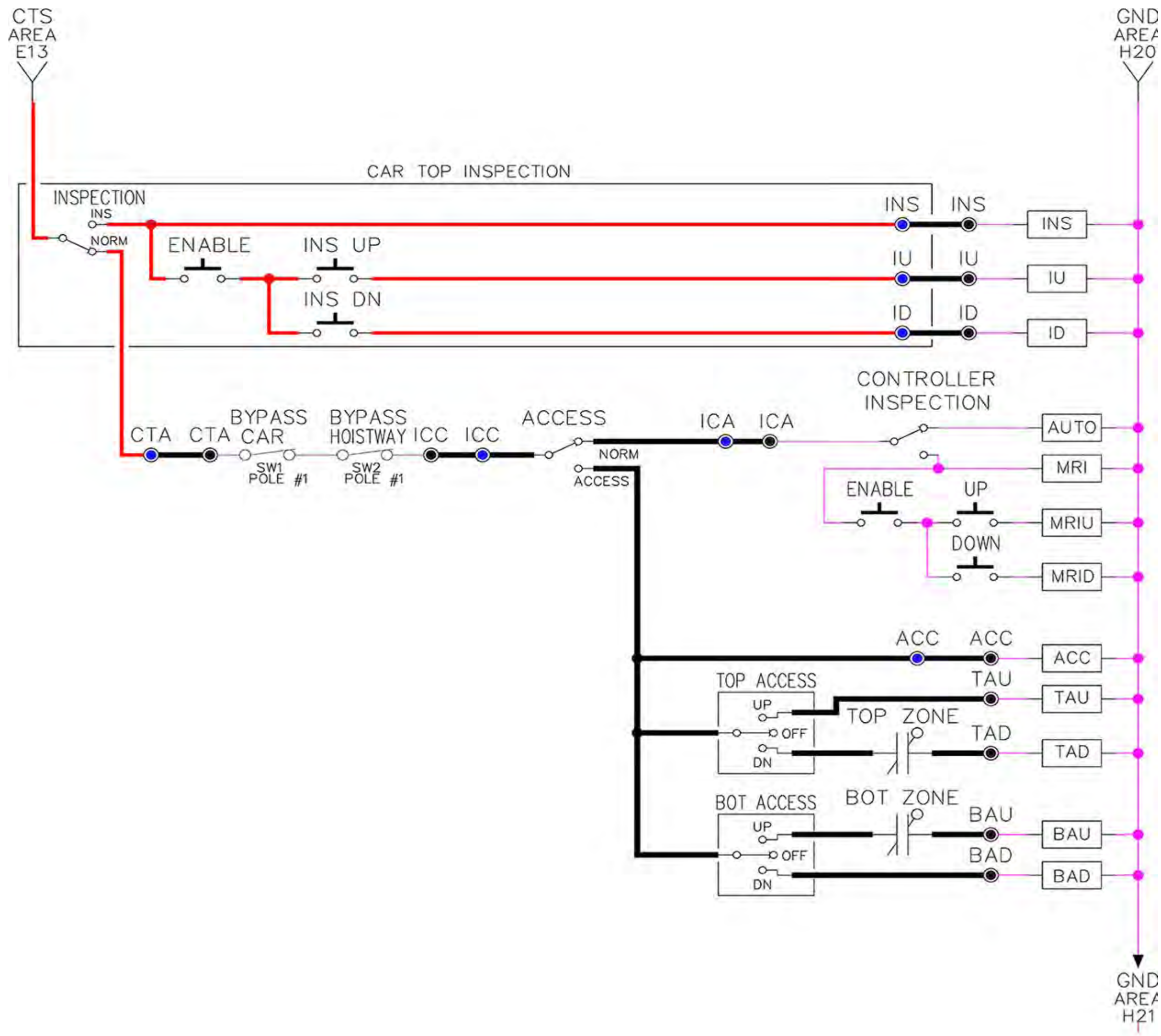


Figure 5.1: Inspection String Circuit

Note that any of the following conditions will cause an inspection error:

• More than one inspection input is on

• No inspection input is on

• Gate or Lock bypass switch is open and the car is not on car top inspection

If the controller is not on motor room inspection at this point, then verify all switch positions and wiring before proceeding.

5.3.2 Adjust the Brake Voltage

Momentarily push the inspection “UP” or “DOWN” push button on the 1064 board while checking the DC brake voltage with a meter.

If the voltage is not correct, it must be adjusted according to the following procedures.

If the controller utilizes an electronic brake board 1047 or 1051, then the brake voltage is adjusted through the 1021 LCD interface, "Car

Brake" sub-menu. If the controller utilizes resistors and rectifiers for the brake coil circuit, then the brake voltage is adjusted by moving the adjustable tap on the brake resistor.

NOTE: Remove power before adjusting the resistor taps.

To adjust the brake voltage when using and electronic brake board, navigate to the "Adjustable Variables" menu, "Car Brake" and adjust "Brake Pick Volt", "Brake Hold Volt" and "Brk AC L-L Volt" to the proper values. Make sure that the brake is lifting and setting properly before proceeding.

5.3.3 Check Run Direction

Momentarily push the inspection “UP” or “DOWN” push button on the 1064 board. One of the following should take place:

The elevator will run controlled, in the correct direction (up for “UP” button, down for “DOWN” button) with no drive faults. If so proceed to “Check Inspection Speed”.

The elevator will run controlled, but in the wrong direction (down for “UP” button, up of “DOWN” button) with no drive faults. If so proceed to "Car Runs The Wrong Direction".

The elevator will try to run, but immediately trips on a drive fault. Re-check the drive parameters. If an encoder is used and the drive records an ENCODER FLT proceed to “Verify Encoder Connection”. If no encoder is used then contact the factory.

The elevator will run controlled but very slow; proceed to “Verify Encoder Connection”.

5.3.4 Car Runs Wrong Direction

If the elevator runs controlled but in the wrong direction, with no drive faults, then change rotation of the motor. For an HPV 900 or 600 drive the motor rotation can be changed from the drive command. For a GPD 515 drive the motor leads will need to be swapped.

With HPV 900 or HPV 600

USER SWITCHES C1

MOTOR ROTATION

With GPD 515

Turn off the power and switch any two motor leads. If an encoder is used then swap the A+ and A- wires as follows:

A+ (TA1-4) with A- (TA1-5)

The motor should run controlled in the correct direction. If not then contact the factory, otherwise, proceed to “Run Inspection Speed”.

5.3.5 Verify Encoder Connection

If the elevator tries to run, but immediately trips on a drive ENCODER FLT or if the car runs very slow, then the drive encoder direction needs to be changed.

If the controller has an encoder isolation board (1022N), change the encoder direction for the drive by moving jumper J5 from “POS 1” to “POS 2”. This will swap the A and A- signals. Refer to the jumper diagram on the 1022 board.

If the controller does not have an encoder isolation board, then turn off the main disconnect, and swap the encoder wires at the drive as follows:

With HPV 900

A+ (TB1-21) with A- (TB1-20)

With HPV 600

A+ (Encoder Card Terminal 63) with A- (Encoder Card Terminal 62)

With GPD 515

A+ (TA1-4) with A- (TA1-5)

Turn on the main disconnect, run the elevator on inspection again.

If the elevator runs controlled, in the correct direction, proceed to the next step. If the elevator runs controlled but in the wrong direction, with no drive faults, then turn off the main disconnect, and swap the hoist motor field wires. Also swap the encoder wires or the encoder isolation board jumpers back as they were to begin with. Turn the main disconnect on. The car should now run controlled in the correct direction. If not, contact the factory.

5.3.6 Check Inspection Speed

With a hand held tachometer, check the speed of the elevator while running on inspection. The elevator should be running at 25 fpm. Also run the elevator while monitoring speed feedback on the HPV 900, HPV 600 or GPD 515 drive display. The display should show the inspection speed value in feet per minute or in hertz. If the speed on both of these devices reads within +/- 2 fpm of the programmed speed then continue to the next step. If not, contact the factory.

If using a GPD 515 drive, the speed display will be in hertz. Top speed will usually be 60Hz. The following formula is used to calculate the speed in Hz.

Speed (Hz) = (Speed (fpm)/ Top Speed (fpm)) *60

Example: Top Speed = 200 fpm Inspection Speed = 25 fpm Maximum Drive Frequency = 60 Hz Ins. Speed (Hz) = (25/200) * 60=7.5 Hz

5.3.7 Check Selector Inputs

Run the elevator up on inspection until it stops on the up normal limit. The up and down normal limits should be set two inches above and below the terminal floors respectively. Verify the selector inputs are being set properly on the controller by running the elevator down until it stops on the down normal limit. As the car approaches floor level going down, “DL” turns on first, then “DZ” and then finally “UL”. At floor level, “UL, DL, and DZ” inputs should all be on at the same time. Leaving the floor going down “DL” will turn off first, then “DZ” and last “UL”.

5.3.8 Verify Slowdown Limits

As the car is running down verify that the up and down slowdown sensors for each floor, “US and DS”, activate prior to reaching the landing. Also verify that the up and down terminal slowdown limits inputs “UT, UTS, DT & DTS” are breaking at the proper distances as shown in the slowdown table 2.0. “US and DS” turn on when active but “UT, UTS, DT & DTS” turn off when active.

“UT & DT” should turn off one inch closer to the terminal floor levels than when the “US & DS” inputs turn on.

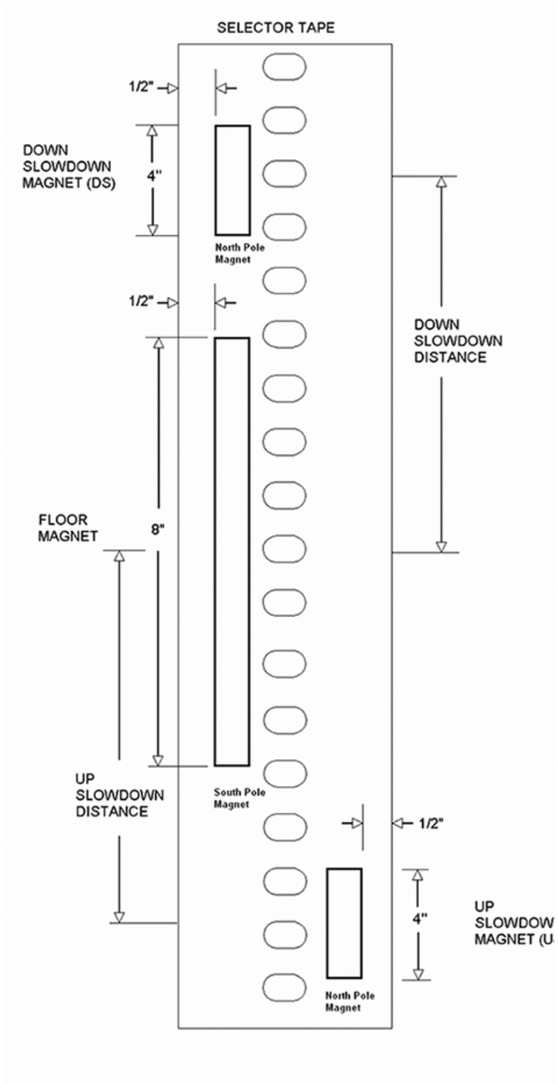


Figure 5.2: Selector Magnet Placement

5.3.9 Verify Car Speed on Safety Processor Board

Run the car in either direction and check the car speed on the 1066 LCD interface. The speed shown should match the car's actual speed. If the speed does not match and the secondary feedback comes from pulses from the tape, go to "Correct Car Speed When using A Tape". If the correct speed is shown proceed to the "Final Adjustment" section.

5.3.9.1 Correct Car Speed When Using A Tape

The tape has holes every 3/8" that are 3/8" in diameter. The safety processor measures the time between each pulse to calculate the velocity. If the velocity is not displayed correctly, first make sure that the feedback type in the safety processor board adjustable variable is set to "0" for a tape application. Next, while the car is running, make sure that the PULSE LED on this board is pulsing. As the car increases in speed the LED will glow solid on. If the LED does not pulse, try swapping the wires at the PPS and PP terminals. If the LED still does not work, contact the factory. If the correct speed is shown proceed to "Final Adjustment".

5.4 Final Adjustment

5.4.1 Automatic Run

With the car on inspection, bring it to a normal limit at a terminal landing. Make sure the normal limit input is off. The "AUTO DOOR" switch should be set to the "OFF" position and the "IND" switch should be set to the "IND" position. Set the "INS" switch to the "NORMAL". The car should level into the floor. From the 1021 LCD interface navigate to the "Set Calls and Lockouts" menu, "Setup Car Calls" and enter a car call. The elevator should run to answer the call. When the elevator levels in and stops at the floor, the doors will remain closed.

5.4.2 Adjust the Drive Speed Profile

The S-Curve parameters in the drive adjust the ride and performance of the car. Since the slowdown distances for each floor are fixed distances, these parameters must be adjusted to bring the car into the floor without over shooting or spotting at the floor. The following parameters adjust the speed profile.

With HPV 900 or HPV 600 S-

CURVE A2

- Accel Rate 0
- Decel Rate 0
- Accel Jerk In 0
- Accel Jerk Out 0
- Decel Jerk In 0
- Decel Jerk Out 0

MULTISTEP REF A3

- Speed Command 1
- Speed Command 2
- Speed Command 3
- Speed Command 4

With GPD 515

- C1-01 Accel Time 1
- C1-02 Decel Time 1
- C2-01 S-curve Accel Start
- C2-02 S-curve Accel End
- C2-03 S-curve Decel Start
- C2-04 S-curve Decel End
- D1-03 Freq Ref = Lev Speed
- D1-04 Freq Ref = High Speed
- D1-09 Freq Ref = Ins Speed

Perform a preliminary adjustment of the speed profile from the drive so that several successful runs from floor to floor can be made.

If using an HPV 900 or HPV 600, run the adaptive tune procedure next, otherwise, if using a GPD 515 proceed to adjust the stop. Keep in mind that the response of the drive may need to be adjusted.

5.4.3 Drive Adaptive Tune (HPV 900 /600 Only)

To complete the setup of the drive, an adaptive tune is required. It is necessary that the car run 70% of contract speed when running this test so that the drive does not go into flux weakening. In the DRIVE A1 Sub Menu, set the CONTRACT MTR SPD parameter to 70% of the rated motor RPM. If this value was adjusted to correct the top speed of the car, use 70% of the adjusted value. To calculate 70%, multiply the value by 0.7. For example, if the motor RPM is 1050 then 70% of the motor RPM is (1050 x 0.7 = 735). This procedure will also require balanced load in the car. Follow the adaptive tune procedure set in the Magnetek HPV 900 or HPV 600 Technical Manual. After completing the adaptive tune reset the CONTRACT MTR SPD parameter and then proceed to the next step.

5.4.4 Adjust the Stop

When at floor level the “UL, DL, & DZ” input LEDs should be on. If the elevator continually tries to seek floor level by leveling up and down, try the following steps to correct the problem:

1. Increase the response of the drive and retest the car.
2. Reduce the leveling and re-leveling velocity parameters in the car and retest.
3. Make sure the brake is dropping quick enough.
4. If the car still oscillates, adjust the "floor level" on the selector. The "floor level" is increased by moving the selector sensor boards closer together.

If the car spots when approaching the floor, the cause is usually due to the car not tracking. Try increasing the response of the drive again. The deceleration rate can also be reduced a little to help remove the spotting. Once the proper stop is achieved, proceed to the next step.

5.4.5 Adjust the Start

To provide a proper start, from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust "Brake Pick Del" (brake pick delay) and "Pattern Delay". Also adjust the start jerk rate in the drive.

Initially, set the brake pick delay to 0 and increase the pattern delay by 0.1 seconds until the controller picks the brake completely before the motor starts to move. If roll back occurs, then reduce the pattern delay until there is no roll back. Sometimes, the timing works out better if the brake pick delay is set to 0.1 second.

Adjust the drive start jerk rate to smooth out the start.

With the HPV 900 or HPV 600

Adjust Jerk Rate 1

With the GPD 515

Adjust C2-01 S-curve Accel Start

Refer to the GPD 515 manual for instructions to adjust the following parameters:

B6-01, B6-02, B6-03 and B6-04

Once the ride is acceptable, proceed to the next step.

5.4.6 Adjust Safety Processor Board Speed Clamps

The 1066 Safety Processor Board monitors the speed of the elevator at the terminal landings independently from the main CPU.

When the "UT, DT, UTS, and DTS" limit switches are activated, the 1066 board calculates the velocity of the elevator and compares that velocity with a stored value of speed clamp. If the velocity when the switch activates is greater than the speed clamp value, then the 1066 board will generate a fault that stops the elevator.

To set the speed clamps, make a one floor run to the top floor.

After the car stops, record the velocity the car hit the “UT, DT, UTS & DTS” slowdown limits. “UTS & DTS” are used on car with reduced stroke buffers or with a top speed greater than

200 fpm. The velocity value is shown from the "LIM VEL" menu on the 1066 LCD interface.

The velocity value shown on the display for the "UT or DT" limit is the value after the car activates the limit then counts an adjustable number of counts set from the 1066 LCD interface, "Adj Var" menu, "UT Count" or "DT Count". These count values can be adjusted to provide adequate distance, following the limit switch activation, to allow the elevator to begin its normal decel pattern. The default "UT Count" and "DT Count" values are normally adequate. However, these values may need to be field adjusted to allow enough distance for the car to begin its normal decel pattern. If the "UT Count" and "DT Count" values are modified, the limit velocities must be re-checked.

Run the car again to the top repeatedly from 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the top floor. Make the same runs to the bottom floor starting from 1 floor, then 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the bottom floor. Take the highest speed value recorded in the runs above and add 20 fpm to that value to use as the clamp speed values for the respective limit switches. Enter these clamp speed values into the 1066 LCD interface "Adj Var" menu, "UT Vel", "DT Vel", "UTS Vel", "DTS Vel" respectively.

The number of slowdown limits depends on the speed of the car as show in the table below:

Car Speed	Number of Slowdown Limits	Clamp Number	Limit Used
<= 250 fpm	1	2	UT, DT
300-500 fpm	2	3	UT1, DT1
600-700 fmp	3	4	UT2, DT2
800 + fpm	4	5	UT3, DT3

Table 5.1: Slowdown Clamps

5.4.7 Verify Inspection Velocity Clamp on Safety Processor Board

Place the car on inspection operation. From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp velocity to 25 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to 50 fpm. Run the car in either direction and verify that the car shuts down when the speed rises above 25 fpm.

From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp to 140 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to the desired value.

5.4.8 Analog Load Weigher Setup

If the job uses an analog load weigher purchased from G.A.L., complete the following procedure.

NOTE: It is recommended using two people, one moving the weights and one in the machine room to set up the load weigher.

Mount the load weigher as described by the manufacturer. The load weigher control box will also contain a board supplied by G.A.L. that connects to the controller serial CAN bus and reads in the analog output from the load weighing device. Wire the load weigher and G.A.L. board according to the controller schematics.

Calibrate the load weighing device hardware according to the manufacturer's instructions. Following proper installation of the load weighing device, proceed to section 5.4.8.1, Empty Car Setup.

5.4.8.1 Empty Car Setup

Verify that the load weighing device is communicating to the main CPU by performing the following steps. From the 1021 LCD interface, navigate to the "Diagnostics" menu, "Car Comm Status", "Car to LW Board" and verify that "On-line = 1". If "On-line = 0" then verify wiring and installation of load weighing device.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Setup Load Weigher" and follow the instructions on the display as you go through the procedure.

It is okay to exit the setup screen to place a call and then return to it while the setup is being performed.

Run the car to the bottom floor and press Enter on the 1021 LCD interface when prompted, to start the automatic setup sequence.

If the car is at the bottom floor and the doors are not closed, (the doors will not close automatically from turning off the auto-door switch), then place a car call to run the car up one floor then back again. The doors will close when the call is placed.

When the automatic sequence is activated, the car will run to each floor and measure the empty load value. The 1021 LCD interface will indicate when the sequence if finished.

5.4.8.2 Full Car Setup

NOTE: The empty car setup must be successfully completed to run the full load setup.

Once the empty car setup is complete, run to the loading floor and set the "AUTO DOOR" switch to the "ON" position to allow weights to be loaded on the car. With the car fully loaded, set the "AUTO DOOR" switch to the "OFF" position and run the car to the bottom floor. Again if the doors are not closed, make a one floor run to force the doors to close.

With the car at the bottom floor, follow the instructions on the 1021 LCD interface to start the full load setup sequence. The car will automatically run to each floor and measure the full load value. When the full load measurement is complete, the car can be run to the loading floor and the weights removed.

After the weights are removed, cycle the doors to complete the procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "View/Modify LW Setup" and verify the load weigher status, "LW Device Stat: ON OK". If the status is "ON OK", then the load weigher should be accurately measuring the car load in real time. The percent load will be displayed, "Load: %".

The percent load values for different service options can now be set. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Service Options", and set the following variables:

- "Load Bypass"
- "Load Antinuisance"
- "Load Dispatch"
- "Load Overload"

NOTE: Setting the values of the variables above to 0% will disable that particular option.

5.4.8.3 Load Weighing Calibration Sequence

The load weigher is automatically calibrated once each week. If an error is detected during this calibration sequence, the load weigher and the pre-torque feature (if used) is disabled.

A load weighing calibration sequence can be manually activated by performing the following procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Load Weigher Calibration" and follow the instructions on the display.

5.4.9 Check the Doors

The elevator should now be adjusted. Verify that all door locks, gate switches, and safety circuits are operational. Set the "INS" switch to the "NORM" position and set the "AUTO DOOR" switch to the "ON" position. The elevator should open the doors. If the doors do not open, check the door operator wiring and cam adjustment. If the doors do open, the elevator is now on independent service.

5.4.10 Fine Tune Ride and Stops

Ride the elevator and evaluate the ride quality. Fine-tune the ride quality with the drive S-Curve parameters in the drive. Fine-tune the floor level magnets. Check all signal devices for proper operation and remove any temporary jumpers. The adjustment should now be complete.

Section 6 - Adjustment of the GALaxy controller - DC Quattro Drive

6.1 General Information

In order to obtain a running platform in "car top inspection", see the "Quick Start-up Guide for GALaxy Controller Quattro DC Drive with Distance Feedback". This procedure should be used only for installation purposes. When installation of all equipment is complete, and unit is ready for adjustment, proceed to section 6.1 and follow instructions.

Before adjustment begins the following items must be completed:

1. All field wiring and safety circuits installed
2. Temporary jumpers from terminal “HC” to terminals “MES & ALT”
3. All hoistway limit switches installed
4. All car and hoistway doors and interlocks installed and pre-adjusted
5. 5. Selector installed and magnets pre- adjusted
6. Familiarize yourself with all wiring schematics
7. Familiarize yourself with the Quattro drive, drive manual, parameter adjustment, etc.
8. Motor encoder should be properly installed and wired.
9. Car should be properly counterbalanced.

6.2 Initial Power-up

6.2.1 Check Main Line Voltage

With main-line disconnect in the “OFF” position, check the line-side voltage with a volt meter to insure the voltage matches the controller name tag “Input Power” voltage. Check to insure all three phases are present. If voltage is not correct or all three phases are not present, do not proceed until corrected.

6.2.2 Set Toggle Switches

Set all toggle switches on the 1064 board as follows:

- DOOR LOCKS - "OFF"
- IND - "IND"
- AUTO DOOR - "OFF"
- STOP - "STOP"
- INSPECTION - "INSP"

6.2.3 Make Sure the Car Is Safe

Verify that all elevator doors are closed and that all safety circuits are functional.

6.2.4 Check Controller Voltage

Turn the main-line disconnect to the on position. Check the voltage at L1, L2, and L3 on the Quattro drive. Verify that all three phases are present. Check the voltage at fuses L1, L2, and L3 (if present) on controller. If correct, check the voltage at terminal “LIN” with respect to “GND”. The voltage should read 120VAC. If correct, check the voltage at terminals “S10, LC, & HC” with respect to “GND”. All should read 120VAC. If not, check wiring diagram to determine problem before continuing.

6.2.5 Verify the Main CPU is Operating

Check to make sure that the “axy” of GALaxy on the 1021 LCD interface is blinking. If the “axy” is blinking, continue to the next step. If not, check voltage at terminals 5V to 0V on the 1064 board to insure 5VDC. If 5VDC is present and the “axy” on the 1021 LCD interface is not blinking, then contact factory.

6.2.6 Preset Adjustable Variables on Safety Processor Board and Main CPU

The 1066 LCD interface (safety processor board) and the 1021 LDC interface (main CPU) are normally preset prior to leaving the factory. However, it is prudent to check the setup values for the proper settings. Refer to section 13 of this manual for the operation of the 1066 LCD interface, and refer to section 10 for operation of the 1021 LCD interface. The following adjustment variables must be set properly:

1066 LCD interface "Adj Var" menu:

- Top Spd (contract speed)
- Enc RPM (if Fdbk Typ=0, not applicable)

(if Fdbk Typ=1, set to rpm of governor)

(if Fdbk Typ=4, set to value of CONTRACT MTR SPD in Quattro drive)

- Enc PPR (if Fdbk Typ=0, not applicable)

(if Fdbk Typ=1, set to 8192)

(if Fdbk Typ=4, set to ppr of machine/motor encoder)

- Fdbk Typ (0=tape, 1=enc, 4=InENC)
- Ctrl Typ (2=Tract DF)
- 2 Stop (0=Mult, 1=2 stop)
- RearDoor (0=Front only, 1=Rear)
- UTS Vel (Set to top speed)
- DTS Vel (Set to top speed)
- INS Vel (Set to 140)
- LEV Vel (Set to 140)
- UT Vel (Set to 500)
- DT Vel (Set to 500)
- UL Vel (Set to 160 if Non-DF)
- DL Vel (Set to 160 if Non-DF)
- SoftStop (Set to 1)

NOTE: The velocity values for the terminal limit switches above are only temporary settings until car is running high speed. In the final adjustment procedure, these variables must be set according to the procedures in section 6.5.6.

1021 LCD interface "Adjustable Variables" menu, "Car Motion" sub-menu:

- Top Speed (set to contract speed)
- Inspect Speed (set to 25 fpm)
- Encoder PPR (set to machine/motor encoder PPR)
- Encoder RPM (if tape selector, set to value of CONTRACT MTR SPD in Quattro drive),(if 485 tapeless selector, set to value of CONTRACT MTR SPD in Quattro drive),(if CAN open tapeless selector, set to governor rpm)

NOTE: See section 6.3.11 for determining governor rpm.

6.2.7 Place Stop Switch In Run Position

Set the “STOP” toggle switch on the 1064 board to the up position. Verify that input LED’s for “LC, HC, DN, UN, SS, GTS, RDY and CS” are all on. If not, then correct field wiring.

6.2.8 Hoist Motor Data

At this time the hoist motor data must be entered into the Quattro drive. The following functions must be entered or verified using the drive display unit. Follow the instructions in the Quattro drive manual to enter the following data for each function:

Drive A1

• CONTRACT CAR SPD (from controller data)

• CONTRACT MTR SPD (from motor nameplate)

NOTE: The CONTRACT MTR SPD value may need to be fine-tuned to provide the correct rpm to run the machine/motor at controller demanded speed.

• ENCODER PULSES (PPR of encoder on machine/motor)

Line Side Power Convert A5

• INPUT L-L VOLTS (measured at drive)

Motor A6

• RATED MTR CURRENT (from machine/motor nameplate)

• ARMATURE VOLTAGE (from machine/motor nameplate)

• FULL FLD CURRENT (from controller data)

• WEAK FIELD CURRENT (from controller data)

• STANDBY FIELD (from controller data)

6.2.9 Quattro Drive Self-Tune

To have the Quattro drive unit learn the parameters of the hoist motor the drive self-tune must be performed. Place a temporary jumper from S10 to terminal MC on the GALX-1064AN board. This will energize the MC contactor coil to enable the drive to perform a motor self-tune. Turn on the main disconnect. Navigate to the Auto Tune option under MS Pwr Convert A4 on the Magnetek Operator. The Magnetek Operator will display “Start Tune?” Press the enter key on the Magnetek operator to start the auto tune process. During this test, the “ME” contactor in the Quattro drive will energize for short period of time. After the self-tune is performed correctly, “Auto Tune Finish” will appear on the Magnetek Operator. If a fault appears on the Magnetek Operator, the problem must be corrected and the self-tune performed again. If the self-tune is successful, then the following functions must be viewed and recorded under MS Power Data D2.

Auto Meas Arm L

Auto Meas IRDrop

Auto Meas Arm R

Auto Field Res

Auto Field TC

The value of MS Power Data D2 Auto Meas Arm L should be manually entered into Function MS Pwr Convert A4, Arm Inductance.

The value of MS Power Data D2 Auto Meas Arm R should be manually entered into Function MS Pwr Convert A4, Arm Resistance.

The value of MS Power Data D2 Auto Field Res should be manually entered into Function MS Pwr Convert A4, Motor Field Res.

The value of MS Power Data D2 Auto Field TC should be manually entered into Function MS Pwr Convert A4, Motor Field TC.

After these values are entered successfully, set parameter MS Pwr Convert A4, Gain Selection to “Use Self Tune”. Remove temporary jumper from S10 to MC on the GALX-1064AN board.

6.2.10 Pre-set the Digital Speed Clamps

Pre-set the software digital speed clamps from the 1021 LCD interface under the “Elevator Setup Menu”. The submenus for the clamp speeds are as follows:

Set Ins/Leveling Clamp

Set DT/UT Slowdown Clamp

Set DT1/UT1 Slowdown Clamp

Set DT2/UT2 Slowdown Clamp

Set DT3/UT3 Slowdown Clamp

Set DTS/UTS Slowdown Clamp

Set the speed for Ins/Leveling for 140 fpm and all the remaining slowdown limit speeds to the contract speed of the car. Please note that the displayed value of “Clamp Speed” is the value the clamp should be set to. The slowdown limit “Clamp Speed:” will show 0000 until the car is run into the limits and the speed is recorded.

Please refer to the 1021 LCD interface section for the Elevator Setup Menu.

NOTE: The values of the clamp speed velocities above are only temporary settings until the car is running high speed. In the final adjustment procedure, these values must be set according to the procedures in section 6.5.7.

6.3 Run the Car on Inspection

6.3.1 Ready to Run On Inspection

The car should be ready to run on inspection if all is wired correctly. Select the “Elevator Status” on the 1021 LCD interface. The display should show “Out of Service” on the first line and “Inspection Mode” on the second. The 1021 LCD interface on the Safety Processor Board will display one of the following types of inspection:

- “MR INS” (Motor Room)
- “CT INS” (Car Top)
- “ACCESS” (Access)
- “IC INS” (In Car)
- “AUTO” (Not on Inspection)

To run the car from the motor room, “MR INS” should be displayed.

The “inspection string” consists of contacts from the inspection switches and the gate and lock bypass switches in series. One and only one of the five inspection inputs should be on for the car to run. Starting from the car top inspection input, the five inspection inputs are, “INS” for car top, “ACC” for access, “ICI” for in-car, “MRI” for motor room, and “AUTO” for automatic (no inspection). The inspection string circuit is shown in Figure 6.1.

Note that any one of the following conditions will cause an inspection error:

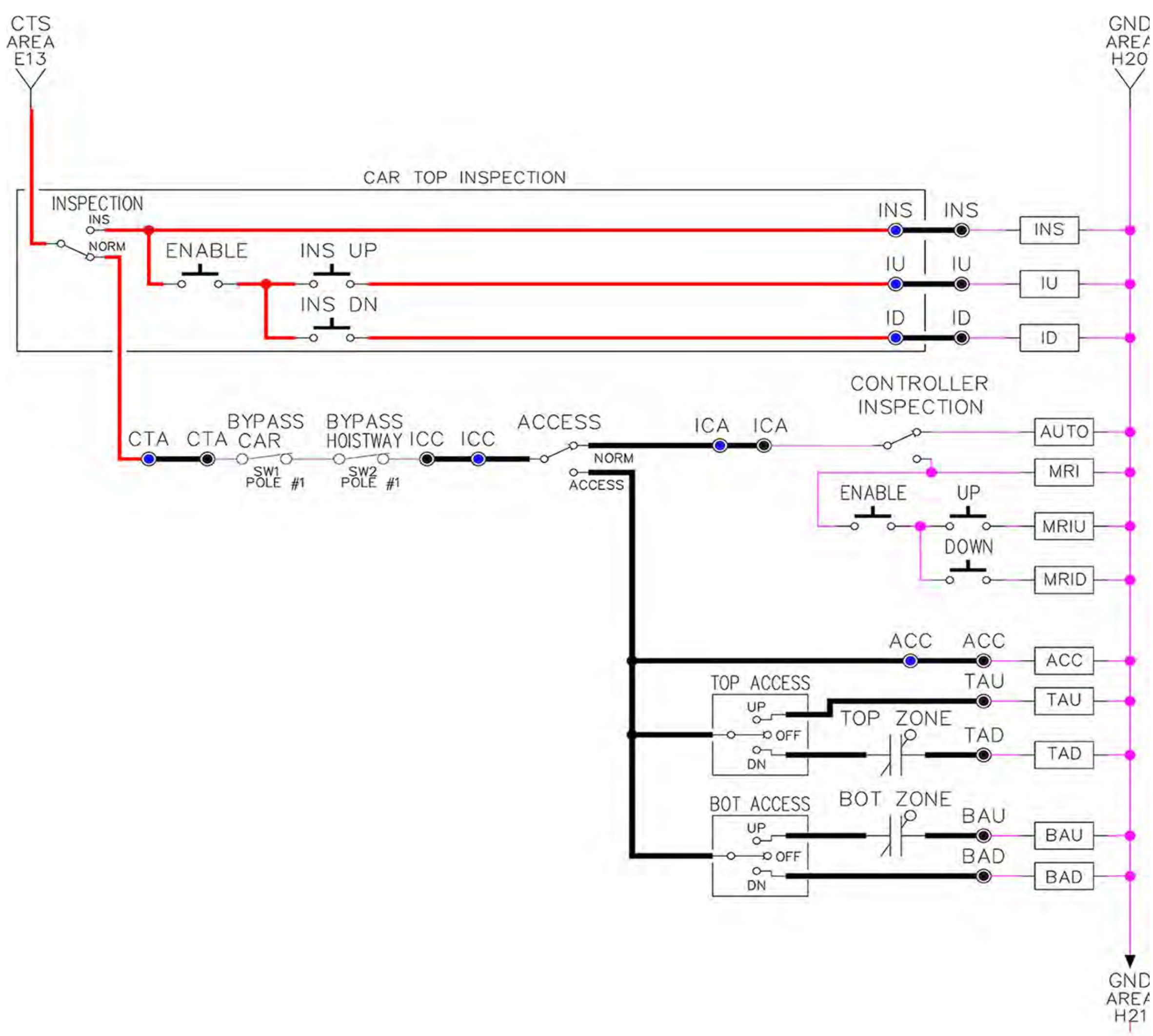
• More than one inspection input is on

• No inspection input is on

• Gate or Lock bypass switch is open and the car is not on car top inspection

If the controller is not on motor room inspection at this point, then verify all switch positions and wiring before proceeding.

Figure 6.1: Inspection String Circuit



6.3.2 Adjust the Brake Voltage

Momentarily push the inspection "UP" or "DOWN" push button on the 1064 board while checking the DC brake voltage with a meter. If the voltage is not correct, it must be adjusted according to the following procedures.

If the controller utilizes an electronic brake board 1047 or 1051, then the brake voltage is adjusted through the 1021 LCD interface, "Car Brake" sub-menu. If the controller utilizes resistors and rectifiers for the brake coil circuit, then the brake voltage is adjusted by moving the adjustable tap on the brake resistor.

NOTE: Remove power before adjusting the resistor taps.

To adjust the brake voltage when using and electronic brake board, navigate to the "Adjustable Variables" menu, "Car Brake" and adjust "Brake Pick Volt", "Brake Hold Volt" and "Brk AC L-L Volt" to the proper values. Make sure that the brake is lifting and setting properly before proceeding.

6.3.3 Check the Run Direction

Momentarily push the inspection "UP" or "DOWN" push button on the 1064 board. One of the following should take place:

The elevator will run controlled, in the correct direction (up for "UP" button, down for "DOWN" button) with no drive faults. If so proceed to "Check Inspection Speed".

The elevator will run controlled, but in the wrong direction (down for "UP" button, up of "DOWN" button) with no drive faults. If so proceed to section "Car Runs In The Wrong Direction".

The elevator will try to run, but immediately trip on a drive fault "Encoder Fault". If so proceed to section "Drive Trips Immediately".

6.3.4 Car Runs In the Wrong Direction

If the elevator runs controlled but in the wrong direction, with no drive faults, then turn off the main disconnect, swap the hoist motor field wires.

Also swap the encoder direction by swapping the wires or if an encoder isolation board (1022N) is used, move J5 and J6 on the encoder board. Refer to the jumper diagram on the board.

To change the encoder direction at the drive, swap the following wires:

A+ (TB3-2) with B+ (TB3-4)

A- (TB3-3) with B- (TB3-5)

Turn the main disconnect on, run the elevator on inspection again, and it should run controlled and in correct direction. If so, proceed to "Check Inspection Speed". If not, contact the factory.

6.3.5 Drive Trips Immediately

If the elevator tries to run, but immediately trips on a drive fault "Encoder Fault", then turn off the main disconnect, and swap the encoder direction by swapping the wires or if an encoder isolation board (1022N) is used, move J5 and J6 on the encoder board. Refer to the jumper diagram on the board.

Turn on the main disconnect and run the elevator on inspection again. If the elevator runs controlled and in the correct direction, proceed to next section.

If the elevator runs controlled but in the wrong direction, then go back and follow the directions in the “Car Runs The Wrong Direction” section. If the car still trips immediately on an a drive fault, then contact the factory.

6.3.6 Check Inspection Speed

With a hand held tachometer, check the speed of the elevator while running on inspection. The elevator should be running at 25 f.p.m. Also run the elevator while monitoring Function Speed Feedback on the Quattro drive under Display D0, Elevator Data D1, Speed Feedback. This function should also read 25 f.p.m.

From the 1021 LCD interface select the "Elevator Status" menu, navigate until the display shows "Dmd" and "Vel". While running on inspection, monitor the controller demand speed "Dmd", and the speed feedback "Vel". These values should both display 25. If the demand and feedback on the 1021 LCD interface is incorrect, check the Encoder RPM and PPR parameters from the “Adjustable Variables” menu. These variables should be set to values listed in section 6.2.6.

If the speed on the hand held tachometer and on "Dmd" and "Vel" all read approximately 25 fpm (within +/-2 fpm) continue to the next step. If not, contact the factory.

6.3.7 Verify Controller Encoder Direction

From the 1021 LCD interface "Elevator Status" menu, navigate to display "Dir" and "DP". While moving the car on inspection, monitor "Dir" (direction) and "DP" (pulse counts). "Dir" should display "Up" when the car is moving up, and "Dn" when the car is moving down. The value of "Dp" should increment when the car is moving up, and should decrement when the car is moving down.

If the direction is wrong or the pulse counts change in the wrong direction, then the encoder direction to the controller must be changed. If an encoder isolation board (1022N) is used, move J1 and J2 on the encoder board. Refer to the jumper diagram on the board.

If no encoder isolation board is used, the A+ and A- encoder wires from the drive must be swapped. Note that the motor encoder wires are daisy chained from the encoder to the drive and then from the drive to the controller encoder board. Only the A+ and A- wires from the drive to the controller board must be swapped. The wires from the encoder to the drive must remain on the same terminal locations on the drive.

If the encoder is counting properly continue to the next step. If not, contact the factory.

6.3.8 Verify Selector and Slowdown Inputs

Run the elevator up on inspection until it stops on the up normal limit. The up and down normal limits should be set two inches above and below the terminal floors respectively. Verify the selector inputs are being set properly on the controller by running the elevator down until it stops on the down normal limit.

As the car approaches floor level going down, “DL” turns on first, then “DZ” and then finally “UL”. At floor level, “UL, DL, and DZ” inputs should all be on at the same time. Leaving the floor going down “DL” will turn off first, then “DZ” and last “UL”.

Also verify that the up and down terminal slowdown limits inputs “UT, UTS, DT & DTS” are breaking at the proper distances as shown in the slowdown table 2.0. “UT, UTS, DT & DTS” turn off when active.

6.3.9 Verify Car Speed on Safety Processor Board

Run the car in either direction and check the car speed on the 1066 LCD interface. The speed shown should match the car’s speed actual speed. If the speed does not match and the secondary feedback comes from pulses from the tape go to “Correct Car Speed When Using A Tape”. If using 485 tapeless, go to "Correct Car Speed When Using 485 tapeless". If using CAN Open tapeless, go to "Correct Car Speed When Using CAN Open tapeless". If the correct speed is shown proceed to the “Learn the Hoistway” section.

6.3.10 Correct Car Speed When Using A Tape Installed In Hoistway

The tape has holes every 3/8” that are 3/8” in diameter. On the selector unit adjust the PP sensor closer to the tape until the orange LED at the end of the sensor turns on. Then turn the sensor inwards another 1/8” and lock in the sensor. While running on top of car inspection verify that the orange LED at the end of the PP sensor turns on and off as it passes by the holes on the tape. The safety processor measures the time between each pulse to calculate the velocity. If the velocity is not displayed correctly first make sure that the feedback type in the safety processor board adjustable variable is set to 0 for a tape application. Next, while the car is running, make sure that the PULSE LED on this board is pulsing. As the car increases in speed the LED will glow solid on. If the LED does not pulse, try swapping the wires at the PPS and PP terminals. If the LED still does not work, contact the factory. If the correct speed is shown proceed to “Learn the Hoistway”.

6.3.11 Correct Car Speed When Using 485 Tapeless System

When using the 485 tapeless system, the secondary speed feedback comes from the encoder mounted on the governor. The 1066 board uses a serial interface to a Turck absolute encoder, part # T8.5882.3FB8.3001.

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 1", and set the "Enc PPR = 8192". The "Enc RPM" value must be calculated as described below. To calculate the RPM, divide the contract speed of the car by the distance travel in one revolution with the governor as shown below:

RPM = Speed fpm/ (diameter GOV * pi)

For a 1 ft. diameter governor:

RPM = 350/ (1*pi) = 350/3.1415 = 111.4

For a 16 in diameter governor (16/12 = 1.33ft)

RPM = 350/ (1.33* 3.1415) = 350/4.188 = 83.5

6.3.12 Correct Car Speed When Using CAN Open Tapeless System

When using the CAN Open tapeless system, the secondary speed feedback comes from the incremental encoder mounted on the machine/motor.

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 4", and set the "Enc PPR" equal to the ppr of the machine/motor-mounted incremental encoder, and set the "Enc RPM" to the rpm of the machine/motor at contract speed.

On the 1066 LCD interface, navigate to the "Pls Cnt" menu. While running the elevator on inspection, verify that the pulse count value increments when running up and decrements when running down. The "Pls Cnt" value can be considerably out of range but will automatically correct during the "Learn Hoistway" procedure. To reverse the direction of pulse counting, navigate, on the 1066 LCD interface, to the "Adj Var" menu, "Enc Dir" and set to "0" for clockwise or "1" for counter-clockwise.

Navigate on the 1066 LCD interface to the "Car Spd" menu. Monitor the "Car Spd" while running the car at a known inspection speed. The value displayed should match the actual car speed measured with a hand held tachometer. If not, re-check the values set in "Enc RPM" and "Enc PPR" in the 1066 LCD interface. If the speed is correct, proceed to "Learn the Hoistway" section 6.4.

6.4 Learn the Hoistway

Run the elevator down on inspection until it stops on the down normal limit switch. Verify that the “DN and DL” input LED’s are both off. From the 1021 LCD interface navigate to the "Elevator Setup" menu, "Learn Hoistway". The learn procedure can be performed automatically by choosing "Auto" from the menu items, or performed manually by choosing "Insp" from the menu items. After choosing the learn method, follow the instructions displayed on 1021 LCD interface.

In general, the car will run up from the "down normal limit" to the "up normal limit" at 30 fpm. During this learn run, the DP count for each floor level and each limit switch will be stored in memory.

NOTE: The car must run the entire hoistway without stopping.

As the elevator moves up the hoistway, navigate to the "Hoistway Tables" menu, "Disp/Mod Hoistway Table", and verify that the "DP" count is incrementing as the elevator moves up. Also as the elevator passes each floor, the pulse count and distance for that floor should change and be stored. Verify that the floor distances are valid. The pulse count for the terminal slowdowns will also be stored. The elevator will stop when it reaches the up normal limit. Follow the instructions on the 1021 LCD interface by putting the car on inspection, and then the message "Hoistway Learn Complete" should be displayed.

Move the elevator on inspection until the “DZ and DL” LED’s are on. Set the “INS” toggle switch on the 1064 board to the “NORMAL” position, and the elevator should level down to floor level at the top floor. If so, proceed to final adjustment.

If the car levels down but does not run, then check “Elevator Status” and “View Fault Log” on the 1021 LCD interface for any fault information. Correct items causing faults and perform hoistway learn again. After problem is corrected and a successful hoistway learn is performed, proceed to final adjustment.

6.5 Final Adjustment

6.5.1 Automatic Run

The elevator should now be sitting idle at the top floor. The "AUTO DOOR" switch should be set to the "OFF" position and the "IND" switch should be set to the "IND" position. If the learn procedure was successful the elevator should be ready to make an automatic run.

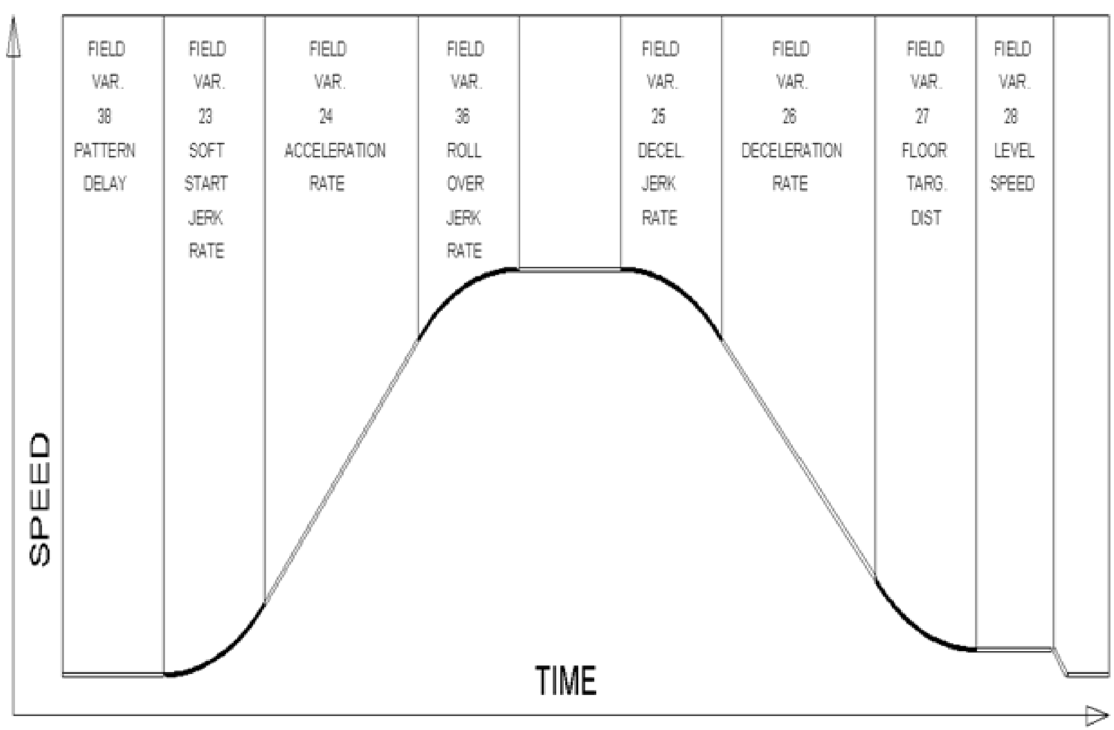
The default parameter settings for the ride quality should be adequate for an initial run. From the 1021 LCD interface navigate to the "Set Calls and Lockouts" menu, "Setup Car Calls" and enter a car call. The elevator should run to answer the call. When the elevator levels in and stops at the floor, the doors will remain closed.

The acceleration and deceleration of the car should be smooth and stepless regardless of the distance of the run. If the elevator does not function as described above, then the problem should be analyzed before proceeding.

6.5.2 Fine Tune the Ride Quality

In order to fine tune the ride quality, refer to Figure 6.2 which describes what part of the S-curve that the different parameters effect. In general, higher numbers in the given parameters, cause quicker and more abrupt changes from one mode to the next during a run. All of the S-curve parameters have a minimum and maximum value. The control will not allow you to enter values that are not valid. After adjusting the S-curve parameters, proceed to the next step.

Figure 6.2: S-Curve Parameters



6.5.3 Adjust the Stop

When at floor level the “UL, DL, & DZ” input LED’s should be on. If the elevator continually tries to seek floor level by leveling up and down, check the motor field voltage to be at the nameplate voltage while leveling. If the motor field voltage is correct but the car seems sluggish then increase the response of the drive by increasing the value of RESPONSE in the drive A1 submenu. If the car still re-levels at the floor, try the following steps to correct the problem:

1. Reduce the leveling and re-leveling velocity parameters from the 1021 LCD interface "Adjustable Variables" menu, "Car Motion", "Leveling Speed" and "Relevel Speed".

2. If the car still oscillates, adjust the "floor level zone" on the selector. The "floor level zone" is increased by moving the "UL" and "DL" sensors closer together.

If the car stops hard on the brake then make the following adjustments. From the 1021 LCD interface navigate to the "Adjustable Variables" menu, "Car Motion", and adjust both "Brake Drop Del" (brake drop delay) and "Soft Stop Time". These variables should be adjusted so that zero speed is observed at the end of the run prior to the brake setting. The controller should hold the car at zero speed for the duration of the "Soft Stop Time" which should continue while the brake is setting and for a short time after the brake sets. The soft stop time MUST be set to at least 0.5 seconds LONGER than the brake drop delay.

The "Soft Stop Time" setting in the 1021 LCD interface should be compared with the setting in the 1066 LCD interface "Adj Var" menu, "SoftStop". The setting of "SoftStop" in the 1066 LCD interface should be greater than the "Soft Stop Time" setting in the 1021 LCD interface.

If the car spots when approaching the floor, the cause is usually due to the car not tracking (the drive response is set too low) or the speed profile into the floor is too aggressive. First try to increase the response by increasing the value of drive parameter A1 RESPONSE.

If the car still spots, from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and increase the value of "Floor Targ Dis" (floor targeting distance). The default value for the floor targeting distance is 12 inches. Increase it by steps of 2 or 3 and continue retesting until the parameter is adjusted to 18.

If no change is noticed, start again from 12 and decrease the value.

The deceleration rate can also be reduced to help remove the spotting. Once the proper stop is achieved, proceed to “Adjust The Start”.

6.5.4 Adjust the Start

To provide a proper start, from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust "Brake Pick Del" (brake pick delay), "Pattern Delay", and "Soft Start Jerk". Initially, set the brake pick delay to 0 and increase the pattern delay by 0.1 seconds until the controller picks the brake completely before the motor starts to move. If roll back occurs, then reduce the pattern delay until there is no roll back. Sometimes, the timing works out better if the brake pick delay is set to 0.1 second. If load weighing is used, pre-torquing can be used to provide a smoother start. See section 6.5.9.

Increase the soft start jerk rate in order to provide a quicker transition from the start to constant acceleration. Keep in mind that the larger the soft start number, the quicker the start. The ride should now be acceptable.

6.5.5 Verify Top Speed

To fine tune high speed, make high speed runs while monitoring Elevator Data Submenu D1, Speed Feedback on the Quattro drive display. The display should read contract speed.

If the speed is slightly under or over contract speed then verify that Drive A1 Submenu, Contract MTR SPD is set properly. The speed displayed on the drive should match the speed displayed on the 1021 LCD interface, "Elevator Status" menu, "Dmd" and "Vel". This speed should also match the speed displayed on the 1066 LCD interface, "Car Spd" menu. When all of these speeds are the same (+/- 2 fpm), then proceed to the next step. When the Quattro display reads contract speed, proceed to the next step.

6.5.6 Adjust Safety Processor Board Speed Clamps

The 1066 Safety Processor Board monitors the speed of the elevator at the terminal landings independently from the main CPU.

When the "UT, DT, UTS, and DTS" limit switches are activated, the 1066 board calculates the velocity of the elevator and compares that velocity with a stored value of speed clamp. If the velocity when the switch activates is greater than the speed clamp value, then the 1066 board will generate a fault that stops the elevator.

To set the speed clamps, make a one floor run to the top floor. After the car stops, record the velocity the car hit the “UT, DT, UTS & DTS” slowdown limits. “UTS & DTS” are used on car with reduced stroke buffers or with a top speed greater than 200 fpm. The velocity value is shown from the “LIM VEL” menu on the 1066 LCD interface.

The velocity value shown on the display for the “UT or DT” limit is the value after the car activates the limit then counts an adjustable number of counts set from the 1066 LCD interface, "Adj Var" menu, "UT Count" or "DT Count". These count values can be adjusted to provide adequate distance, following the limit switch activation, to allow the elevator to begin its normal decel pattern. The default "UT Count" and "DT Count" values are normally adequate. However, these values may need to be field adjusted to allow enough distance for the car to begin its normal decel pattern. If the "UT Count" and "DT Count" values are modified, the limit velocities must be re-checked.

Run the car again to the top repeatedly from 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the top floor.

Make the same runs to the bottom floor starting from 1 floor, then 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the bottom floor.

Take the highest speed value recorded in the runs above and add 20 fpm to that value to use as the clamp speed values for the respective limit switches. Enter these clamp speed values into the 1066 LCD interface "Adj Var" menu, "UT Vel", "DT Vel", "UTS Vel", "DTS Vel" respectively.

6.5.7 Adjust Digital Slowdown Speed Clamps

Having just made several runs into the top and bottom landings, the main CPU has also recorded the car's velocity when the slowdown limits were activated. If the car has been powered down prior to this step, several runs must be made to the terminal landings to allow the main CPU to record the limit velocity values.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Set DT/UT Slowdown Clamp" and view the speed displayed for "Clamp Speed". Add 20 fpm to this "Clamp Speed" value and enter it into the "DT/UT Limit" value.

The number of slowdown limits depends on the speed of the car as show in the table below:

Adjust speed clamps for each slowdown limits used as determined by the elevator's contract speed.

The number of slowdown limits depends on the speed of the car as show in the table below:

Table 6.1: Slowdown Clamps

Car Speed	Number of Slowdown Limits	Clamp Number	Limit Used
<= 250 fpm	1	2	UT, DT
300-500 fpm	2	3	UT1, DT1
600-700 fmp	3	4	UT2, DT2
800 + fpm	4	5	UT3, DT3

6.5.8 Verify Inspection Velocity Clamp On Safety Processor Board

Place the car on inspection operation. From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp velocity to 25 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to 50 fpm. Run the car in either direction and verify that the car shuts down when the speed rises above 25 fpm.

From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp to 140 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to the desired value.

6.5.9 Analog Load Weigher Setup

If the job uses an analog load weigher purchased from G.A.L., complete the following procedure.

NOTE: It is recommended using two people, one moving the weights and one in the machine room to set up the load weigher.

Mount the load weigher as described by the manufacturer. The load weigher control box will also contain a board supplied by G.A.L. that connects to the controller serial CAN bus and reads in the analog output from the load weighing device. Wire the load weigher and G.A.L. board according to the controller schematics.

Calibrate the load weighing device hardware according to the manufacturer's instructions. Following proper installation of the load weighing device, proceed to section 6.5.9.1, Empty Car Setup.

6.5.9.1 Empty Car Setup

Verify that the load weighing device is communicating to the main CPU by performing the following steps. From the 1021 LCD interface, navigate to the "Diagnostics" menu, "Car Comm Status", "Car to LW Board" and verify that "On-line = 1". If "On-line = 0" then verify wiring and installation of load weighing device.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Setup Load Weigher" and follow the instructions on the display as you go through the procedure.

It is okay to exit the setup screen to place a call and then return to it while the setup is being performed.

Run the car to the bottom floor and press Enter on the 1021 LCD interface when prompted to do so to start the automatic setup sequence.

If the car is at the bottom floor and the doors are not closed (the doors will not close automatically from turning off the auto-door switch) then place a car call to run the car up one floor then back again. The doors will close when the call is placed.

When the automatic sequence is activated, the car will run to each floor and measure the empty load value. The 1021 LCD interface will indicate when the sequence if finished.

6.5.9.2 Full Car Setup

The empty car setup must be successfully completed to run the full load setup.

Once the empty car setup is complete, run to the loading floor and set the "AUTO DOOR" switch to the "ON" position to allow weights to be loaded on the car. With the car fully loaded, set the "AUTO DOOR" switch to the "OFF" position and run the car to the bottom floor. Again if the doors are not closed, make a one floor run to force the doors to close.

With the car at the bottom floor, follow the LCD interface instructions to press enter to start the full load setup sequence. The car will automatically run to each floor and measure the full load value. When the full load measurement is complete, the car can be run to the loading floor and the weights removed.

After the weights are removed, cycle the doors to complete the procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "View/Modify LW Setup" and verify the load weigher status, "LW Device Stat: ON OK". If the status is "ON OK", then the load weigher should be accurately measuring the car load in real time. The percent load will be displayed, "Load: __%".

The percent load values for different service options can now be set. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Service Options", and set the following variables:

- "Load Bypass"
- "Load Antinuisance"
- "Load Dispatch"
- "Load Overload"

NOTE: Setting the values of the variables above to 0% will disable that particular option.

6.5.9.3 Load Weighing Calibration Sequence

The load weigher is automatically calibrated once each week. If an error is detected during this calibration sequence, the load weigher and the pre-torque feature (if used) is disabled.

A load weighing calibration sequence can be manually activated by performing the following procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Load Weigher Calibration" and follow the instructions on the display.

6.5.10 Adjust the Motor Pre-torque

NOTE: The motor pre-torque uses the load value obtained from the analog load weigher and will only work if the load weigher has been installed properly, and the "Load Weigher Setup" has been performed successfully.

On the Quattro drive under User Switches C1 parameter, set Pre-Torque source to serial. Run the empty car to a middle floor. From the 1021 LCD user interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust the following parameters:

- "Balanced Load = 40" (typically car is 40% counterbalanced, but verify counterbalance percentage for each specific job)
- "Torque Amount = 10"
- "Pattern Delay = 2.5"
- "Brake Pick Del = 0.1"

The long pattern delay will allow an exaggerated amount of roll back in order for the pre-torquing to be set accurately. Make a one floor run down and observe the roll back when the brake picks at the start of the run. Increase the "Torque Amount" variable and continue to monitor the roll back while performing one floor runs in the down direction. As the "Torque Amount" is increased, the roll back should be minimized until the car will hold zero speed for the entire "Pattern Delay" time. A typical value for the "Torque Amount" is 40%. If the value is too large, the car will roll forward during the "Pattern Delay" time.

Note: The pattern delay must be at least 0.15 seconds (150 milliseconds). Setting the torque amount to 0.00 will disable the pre- torque feature. Also if the load weighing calibration sequence detects a load weighing error, the pre-torque feature is also automatically disabled.

6.5.11 Verify the Doors Are Safe

The elevator should now be adjusted. Verify that all door locks, gate switches, and safety circuits are operational. Set the "INS" switch to the "NORM" position and set the "AUTO DOOR" switch to the "ON" position. The elevator should level into the floor and open the doors. If the doors do not open, check the door operator wiring and cam adjustment. If the doors do open, the elevator is now on independent service.

6.5.12 Fine Tune The Ride Quality

Ride the elevator and evaluate the ride quality. Fine tune the ride quality by navigating to the "Adjustable Variables" menu, "Car Motion" and adjusting the variables shown in Figure 6.2. Keep in mind that if acceleration or deceleration values are changed, the speed clamps for the safety processor board and the S-curve board may need to be re-adjusted.

To fine tune the floor level accuracy, determine if the controller is set to stop when "UL" and "DL" signals turn on, or if controller is set to stop off of the position count. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and view the "Stop On Pos Cnt" variable. If "Stop On Pos Cnt = 0" then the controller is set to stop when the "UL and "DL" signals turn on. If "Stop On Pos Cnt = 1" then the controller is set to stop on a combination of the floor level magnet and the position count.

With "Stop On Pos Cnt = 0", the floor levels should be set by adjusting the floor level magnet at each floor. For proper operation, the floor magnets should be set to exactly floor level. After the floor levels are set properly, perform another hoistway learn procedure.

With "Stop On Pos Cnt = 1", the floor levels are set by using both the floor magnet and the position count. For proper operation with this setting, the floor magnet should be set to exactly floor level. The final stop can then be fine-tuned by performing the following adjustments.

From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "DZ & LZ Offset, Sel Cnt" and adjust "Dn Lev Dist" and "Up Lev Dist". The units for these variables are in "pulse counts". With "Stop On Pos Cnt =1" the car will continue to move for the "Dn Lev Dist" or "Up Lev Dist" after "UL and DL" turn on. Use the "Dn Lev Dist" and the "Up Lev Dist" parameters to make level changes at all floors.

To make level changes at individual floors, perform the following adjustments. From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "FL and FL Offset Count", and the offset count can be adjusted. These variables introduce an offset (+/-) to the stored floor count that was determined in the hoistway learn procedure.

NOTE: The number of pulse counts per inch can be viewed from the 1021 LCD interface, "Hoistway Tables", "DZ & LZ Offset, Sel Cnt", "Pulses/Inch".

NOTE: Regardless if "Stop On Pos Cnt=0" or if "Stop On Pos Cnt =1", the floor magnet must be set properly at floor level. If too large of values are entered into "Dn Lev Dist", "Up Lev Dist", or "Offset", the car will drive past the floor level magnet and re-level.

Check all signal devices for proper operation and remove all temporary jumpers. The adjustment should now be complete.

Section 7 - Adjustment of the GALaxy - Combivert F5 AC Drive

7.1 General Setup

In order to obtain a running platform in "car top inspection", see the "Quick Start-up Guide for GALaxy Controller KEB Combivert F5 AC Drive with Distance Feedback". This procedure should be used only for installation purposes. When installation of all equipment is complete, and unit is ready for adjustment, proceed to section 7.1 and follow instructions.

Before adjustment begins the following items must be completed.

1. All field wiring and safety circuits installed
2. Temporary jumpers from terminal “HC” to terminals “MES & ALT”
3. All hoistway limit switches installed
4. All car and hoistway doors and interlocks installed and pre-adjusted
5. Selector installed and magnets pre-adjusted
6. Familiarize yourself with all wiring schematics
7. Familiarize yourself with the KEB Combivert F5 Elevator Drive Technical Manual.
8. Verify that the PM AC motor is properly wired.
9. Verify that the encoder is connected properly.
10. Car should be properly counterbalanced.

7.2 Initial Power-up

7.2.1 Check Main Line Voltage

With main-line disconnect in the off position, check the line-side voltage with a volt meter to insure the voltage matches the controller name tag “Input Power” voltage. Check to insure all three phases are present. If voltage is not correct or all three phases are not present, do not proceed until corrected.

7.2.2 Set Toggle Switches

Set all toggle switches on the 1064 board as follows:

- DOOR LOCKS - "OFF"
- IND - "IND"
- AUTO DOOR - "OFF"
- STOP - "STOP"

7.2.3 Make Sure the Car Is Safe

Verify that all elevator doors are closed and that all safety circuits are functional.

7.2.4 Check Controller Voltage

Turn the main-line disconnect to the on position. Check the voltage at R, S, and T on the AC drive. Verify that all three phases are present. Check the voltage at fuses L1 and L2 on controller. If correct, check the voltage at terminal “LIN” with respect to “GND”. The voltage should read 120VAC. If correct, check the voltage at terminals “S10, LC, & HC” with respect to “GND”. All should read 120VAC. If not, check wiring diagram to determine problem before continuing.

7.2.5 Verify the Main CPU is Operating

Check to make sure that the “axy” of GALaxy on the 1021 LCD interface is blinking. If the “axy” is blinking, continue to the next step. If not, check voltage at terminals 5V to 0V on the 1064 board to insure 5VDC. If 5VDC is present and the “axy” on the 1021 LCD interface is not blinking, then contact factory.

7.2.6 Preset Adjustable Variables On Safety Processor Board

The safety processor (1066) board is normally preset prior to leaving the factory; however, it is prudent to check the setup values for the proper settings. Refer to section 13 of this manual for the operation of the safety processor board 1066 LCD interface. The following adjustment variables must be set properly:

• Top Spd (contract speed)

• Enc RPM (if Fdbk Typ=0, not applicable)(if Fdbk Typ=1, set to rpm of governor)(if Fdbk Typ=4, set to value of LF.11 in KEB drive)

• Enc PPR (if Fdbk Typ=0, not applicable)
(if Fdbk Typ=1, set to 8192)
(if Fdbk Typ=4, set to 2048)

• Fdbk Typ (0=tape, 1=enc, 4=IncEnc

• Ctrl Typ (2=Tract DF)

• 2 Stop (0=Mult, 1=2 stop)

• RearDoor (0=Front only, 1=Rear)

• UTS Vel (Set to top speed)

• DTS Vel (Set to top speed)

• INS Vel (Set to 140)

• LEV Vel (Set to 140)

• UT Vel (Set to 500)

• DT Vel (Set to 500)

• UL Vel (Set to 160 if Non-DF)

• DL Vel (Set to 160 if Non-DF)

• SoftStop (Set to 1)

NOTE: The velocity values for the terminal limit switches above are only temporary settings until car is running high speed. In the final adjustment procedure, these variables must be set according to the procedures in section 7.6.5.

1021 LCD interface "Adjustable Variables" menu, "Car Motion" sub menu:

• Top Speed (set to contract speed)

• Inspect Speed (set to 25 fpm)

• Encoder PPR (set to 2048 PPR)

• Encoder RPM (if tape selector, set to value of LF.11 in KEB drive), (if 485 tapeless selector, set to value of LF.11 in KEB drive), (if CAN open tapeless selector, set to governor rpm)

NOTE: See section 7.4.3.2 for determining governor rpm.

7.2.7 Place Stop Switch in Run Position

Set the “STOP” toggle switch on the 1064 board to the “RUN” position. Verify that input LED’s for “LC, HC, DN, UN, SS, GTS, RDY and CS” are all on. If not, then correct field wiring.

7.2.8 Hoist Motor Data

At this time the hoist motor data must be entered into the AC drive. The following functions must be entered or verified using the drive "Operator" display unit. Follow the instructions in the Combivert F5 drive manual to enter the following data:

Motor Data

• US.10 - Motor type configuration (for pm sync gearless set to P9LSS), (for pm sync geared set to PCLSd)

• US.4 – Load (Perform configuration load.)

• LF.10 - Motor HP - Read only. Cannot be entered. This is calculated from rated speed and torque for PM gearless configuration.

• LF.2 - (Set to "SErSP")

• LF.11 - Rated Motor Speed (from machine/motor nameplate)

• LF.12 - Rated Motor Current (from machine/motor nameplate)

• LF.13 - Rated Motor Frequency (from machine/motor nameplate)

• LF.14 - Rated Motor Voltage (from machine/motor nameplate)

• LF.17 - Rated Motor Torque (from machine/motor nameplate, or LF.17 = HP * 5258 / LF.11)

Machine Data

• LF.20 - Contract Speed (from controller data)

• LF.21 - Sheave Diameter (in)

• LF.22 - Gear Reduction Ration (1 if gearless)

• LF.23 - Roping ratio (1:1 or 2:1)

Encoder Data

• LF.27 - 2048 for EnDat

• LF.76 - 8 (absolute encoder)

The number of poles is provided below if you are using one of the following motors:

• MAG05 = 66 poles

• MAG10 = 66 poles

• MAG15 = 66 poles

• Leroy Somer Z2 = 16 poles

• Leroy Somer Z3 = 16 poles

• Leroy Somer Z4 = 16 poles

• Leroy Somer Z6 = 32 poles

• Leroy Somer Z10 = 32 poles

• Leroy Somer Z20 = 32 poles

• Imperial 474 = 20 poles

• Imperial 475 = 24 poles

• Imperial 522 = 20 poles

• Imperial 525 = 20 poles

• Imperial 805 = 44 poles

• Hollister Whitney = 28 poles

If you are not using one of the following motors listed and need to calculate the motor poles or motor rated speed, use the following formula based from the motor name plate data:

Poles= 2 X 60 X Motor Excitation Frequency (Hz)/Rated Motor Speed (RPM)

The number of motor poles will always be a whole, even number.

Most of the drive parameters have been preset to values required for your specific job. Other parameters not listed here may need to be adjusted in the field. Please refer to the Combivert F5 manual for more parameter information and troubleshooting guidelines.

7.2.9 Pre-set the Digital Speed Clamps

Pre-set the software digital speed clamps from the 1021 LCD interface under the “Elevator Setup Menu”. The submenus for the clamp speeds are as follows:

Set Ins/Leveling Clamp

Set DT/UT Slowdown Clamp

Set DT1/UT1 Slowdown Clamp

Set DT2/UT2 Slowdown Clamp

Set DT3/UT3 Slowdown Clamp

Set DTS/UTS Slowdown Clamp

Set the speed for Ins/Leveling for 140 fpm and all the remaining slowdown limit speeds to the contract speed of the car. Please note that the displayed value of “Clamp Speed” is the value the clamp should be set to. The slowdown limit “Clamp Speed:” will show 0000 until the car is run into the limits and the speed is recorded. Please refer to the 1021 LCD interface section for the Elevator Setup Menu.

NOTE: The values of the clamp speed velocities above are only temporary settings until the car is running high speed. In the final adjustment procedure, these values must be set according to the procedures in section 7.6.6.

7.3 Start-Up Procedure

7.3.1 Adjust the Brake Voltage

If the controller utilizes an electronic brake board 1047 or 1051, then the brake voltage is adjusted through the 1021 LCD interface, "Car Brake" sub-menu. If the controller utilizes resistors and rectifiers for the brake coil circuit, then the brake voltage is adjusted by moving the adjustable tap on the brake resistor.

NOTE: Remove power before adjusting the resistor taps.

To adjust the brake voltage when using and electronic brake board, navigate to the "Adjustable Variables" menu, "Car Brake" and adjust "Brake Pick Volt", "Brake Hold Volt" and "Brk AC L-L Volt" to the proper values.

7.3.2 Motor Learn Procedure

Lower the inspection speed on the controller to zero. Remove one wire from the brake coil, both on the main and emergency brake to prevent the brakes from picking. On the drive operator keypad set parameter LF.3 to “S.Lrn”. Press Enter and the drive keypad will display “Start”. Press and hold the up or down inspection switch. You will hear all the contactors (BRK, RUN and MC) pick and stay energized on the controller. The drive operator keypad will change as a number of motor measurements are made. This process takes 2 to 5 minutes. When the drive operator keypad displays “Done”, release the up or down inspection button. Return the wires back to the main and emergency brake to allow the brake to pick again.

7.3.3 Encoder Learn Procedure, v1.62 (unroped machine)

If you are using v1.62 on the Combivert F5 drive, the encoder position must be learned with the ropes removed from the machine. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed = 0". Verify the motor wiring from the drive to the motor, U to U, V to V and W to W. Verify that drive parameter 2.LF.26 = “Conn”. This parameter indicates that serial communication is established between the encoder and the drive. If 2.LF.26 does not display “Conn”, check the encoder wiring and drive settings LF.26, LF.27, LF.28, and LF.29. This problem must be rectified before proceeding. Once communication is established with the encoder, set LF.3 to “P Lrn” and press enter on the drive operator keypad. The drive operator keypad will display “Start”. Press and hold the "UP" or "DN" inspection button. The motor sheave will begin to move back and forth and the drive display will display a numeric value. If the sheave begins to move, but an E.EnC1 error occurs on the drive, the drive will swap the encoder channels in LF.28 automatically and then display “retry”. Press and hold the "UP" or "DN" inspection button again. If the sheave does not move and an E.EnC1 occurs, verify the brake is picking and the sheave is able to move freely. When sheave is able to move freely, perform "P Lrn" again. If this does not resolve the problem, try swapping output motor phases and try the "P Lrn" procedure again. When the process is complete the sheave will stop rotating and the drive will display “done” and the "UP" or "DN" inspection button can be released. Make a note of LF.77 value which is the learned encoder position value. Return the "Inspect Speed" on the 1021 LCD interface to the previous setting, and set the drive parameter LF.3 to "run".

Important: If the encoder is removed, absolute position will need to be relearned!

7.3.4 Encoder Learn Procedure, v1.72 (unroped or roped machine)

If you are using v1.72 on the Combivert F5 drive you can learn the encoder position with or without the ropes removed from the machine. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed = 0". Verify the motor wiring from the drive to the motor, U to U, V to V and W to W. Verify that drive parameter 2.LF.26 = “Conn”. This parameter indicates that serial communication is established between the encoder and the drive. If 2.LF.26 does not display “Conn”, check the encoder wiring and drive settings LF.26, LF.27, LF.28, and LF.29. This problem must be rectified before proceeding. Once communication is established with the encoder, set LF.3 to “SPI” and press enter on the drive operator keypad. The drive operator keypad will display “Start”. Press and hold the "UP" or "DN" inspection button. The drive will take ten encoder position samples. When the process is complete the drive keypad will display “done” and the “UP” or “DN” inspection button can be released. Make a note of LF.77 value which is the learned encoder position value. Return the "Inspect Speed" on the 1021 LCD interface to the previous setting, and set the drive parameter LF.3 to "run". After making a trial run, if the current in LF.93 is excessive, change the value in LF.28 from 0 to 1 or from 2 to 3 and repeat the process.

Important: If the encoder is removed, absolute position will need to be relearned!

7.3.5 Check Inspection Speed

If the ropes have been removed from the sheave, adjust the following drive parameters to the values listed below prior to running on inspection speed. If the ropes are on the sheave leave these drive parameters at the initial settings listed below.

- Change A.LF.31 from 1200 to 300
- Change d.LF.31 from 1200 to 300
- Change A.LF.32 from 200 to 50
- Change d.LF.32 from 200 to 50
- Change A.LF.33 from 200 to 0
- Change d.LF.33 from 200 to 0

Make sure that on the drive parameter LF.3 is set to “run”. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed = 25". Run the elevator on inspection, and verify that there is zero current draw in LF.93. Press the “UP” inspection button and verify motor is rotating in the up direction, and then press the “DOWN” inspection button and verify that the motor is rotating in the down direction. If not, then change LF.28 from 0 to 2 or from 1 to 3 and re-verify direction. If LF.28 is changed, you must relearn the encoder. With a hand held tachometer, check the speed of the elevator while running on inspection. The elevator should be running at 25 fpm.

From the 1021 LCD interface, select the "Elevator Status" menu; navigate until the display shows "Dmd" and "Vel". While running on inspection, monitor the controller demand speed "Dmd", and the speed feedback "Vel". These values should both display 25.

If the demand and feedback on the 1021 LCD interface is incorrect, check the Encoder RPM and PPR parameters from the “Adjustable Variables” menu. These variables should be set to values listed in section 7.2.6

If the speed on the hand held tachometer and on "Dmd" and "Vel" all read 25 fpm (within +/- 2 fpm), continue to the next step. If not, contact the factory.

7.3.6 Verify Controller Encoder Direction

From the 1021 LCD interface "Elevator Status" menu, navigate to display "Dir" and "DP". While moving the car on inspection, monitor "Dir" (direction) and "DP" (pulse counts). "Dir" should display "Up" when the car is moving up, and "Dn" when the car is moving down. The value of "Dp" should increment when the car is moving up, and should decrement when the car is moving down.

If the direction is wrong or the pulse counts change in the wrong direction, then the encoder direction to the controller must be changed.

On the encoder isolation board (1022N), move J1 and J2 on the encoder board. Refer to the jumper diagram on the board.

If the encoder is counting properly and the ropes were removed from the sheave, then set the following drive parameters back to their original settings.

- A.LF.31 to 1200
- d.LF.31 to 1200
- A.LF.32 to 200
- d.LF.32 to 200
- A.LF.33 to 200
- d.LF.33 to 200

Replace the ropes and proceed to section 7.4.

If the encoder is counting properly, and the ropes were not removed, proceed to section 7.4.

If the encoder is not counting properly, contact G.A.L. Technical Support.

7.4 Run the Car on Inspection with the ropes on the sheave of the motor.

7.4.1 Ready to Run On Inspection

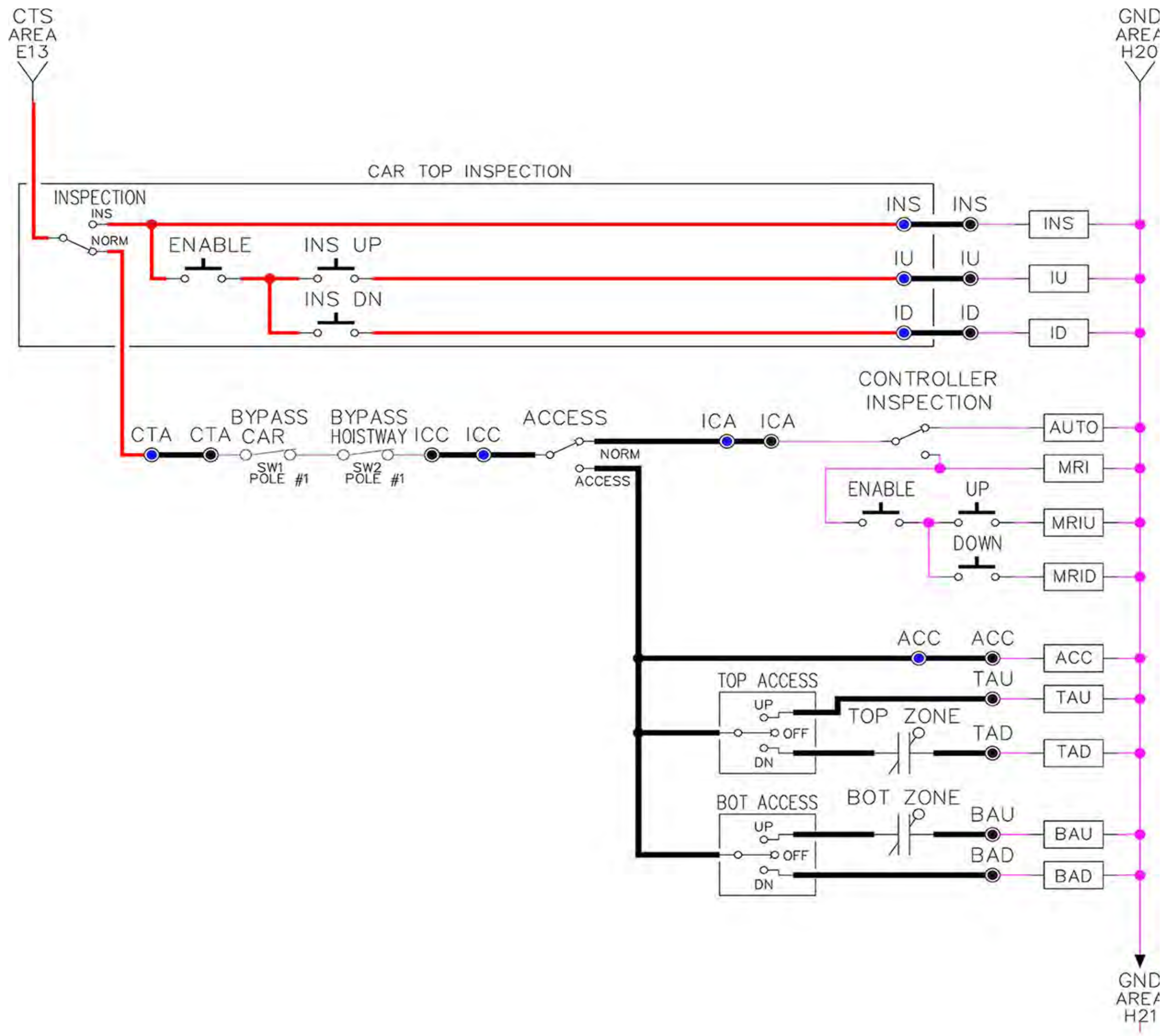
From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and verify that "Inspect Speed = 25". Before moving the car on inspection, verify again that all door locks, gate switches, safety circuits, and limit switches are functioning properly.

The car should be ready to run on inspection if all is wired correctly. Select the "Elevator Status" on the 1021 LCD interface. The display should show "Out of Service" on the first line and "Inspection Mode" on the second. The 1066 LCD interface will display one of the following types of inspection:

- "MR INS" (Motor Room)
- "CT INS" (Car Top)
- "ACCESS" (Access)
- "IC INS" (In Car)"
- "AUTO" (Not on Inspection)

To run the car from the motor room, "MR INS" should be displayed.

The "inspection string" consists of contacts from the inspection switches and the gate and lock bypass switches in series. One and only one of the five inspection inputs should be on for the car to run. Starting from the car top inspection input, the five inspection inputs are, "INS" for car top, "ACC" for access, "ICI" for in-car, "MRI" for motor room, and "AUTO" for automatic (no inspection). The inspection string circuit is shown in Figure 7.1.



Note that any one of the following conditions will cause an inspection error:

- More than one inspection input is on
- No inspection input is on
- Gate or Lock bypass switch is open and the car is not on car top inspection

If the controller is not on motor room inspection at this point, then verify all switch positions and wiring before proceeding.

Figure 7.1: Inspection String Circuit

7.4.2 Verify Selector and Slowdown Inputs

Run the elevator up on inspection until it stops on the up normal limit. The up and down normal limits should be set two inches above and below the terminal floors respectively. Verify the selector inputs are being set properly on the controller by running the elevator down until it stops on the down normal limit.

As the car approaches floor level going down, “DL” turns on first, then “DZ” and then finally “UL”. At floor level, “UL, DL, and DZ” inputs should all be on at the same time. Leaving the floor going down "DL" will turn off first, then "DZ" and last "UL".

Also verify that the up and down terminal slowdown limits inputs "UT, UTS, DT & DTS" are breaking at the proper distances as shown in the slowdown table 2.0. "UT, UTS, DT & DTS" turn off when active.

7.4.3 Verify Car Speed on Safety Processor Board

Run the car in either direction and check the car speed on the 1066 LCD interface. The speed shown should match the car's actual speed. If the speed does not match and the secondary feedback comes from pulses from the tape go to "Correct Car Speed When Using A Tape". If using 485 tapeless, go to "Correct Car Speed When Using 485 tapeless". If using CAN Open tapeless, go to "Correct Car Speed When Using CAN Open tapeless". If the correct speed is shown proceed to the "Learn the Hoistway" section.

7.4.3.1 Correct Car Speed When Using A Tape

The tape has holes every 3/8" that are 3/8" in diameter. On the selector unit adjust the PP sensor closer to the tape until the orange LED at the end of the sensor turns on. Then turn the sensor inwards another 1/8" and lock in the sensor. While running on top of car inspection verify that the orange LED at the end of the PP sensor turns on and off as it passes by the holes on the tape. The safety processor board on the controller measures the time between each pulse to calculate the velocity. If the velocity is not displayed correctly first make sure that the feedback type in the safety processor board adjustable variable is set to 0 for a tape application. Next, while the car is running, make sure that the PULSE LED on this board is pulsing. As the car increases in speed the LED will glow solid on. If the LED does not pulse, try swapping the wires at the PPS and PP terminals. If the LED still does not work, contact the factory. If the correct speed is shown proceed to "Learn the Hoistway".

7.4.3.2 Correct Car Speed When Using 485 Tapeless System

When using the 485 tapeless system, the secondary speed feedback comes from the encoder mounted on the governor. The 1066 board uses a serial interface to a Turck absolute encoder, part # T8.5882.3FB8.3001.

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 1", and set the "Enc PPR = 8192". The "Enc RPM" value must be calculated as described below. To calculate the RPM, divide the contract speed of the car by the distance travel in one revolution with the governor as shown below:

RPM = Speed fpm/ (diameter GOV * pi)

For a 1 ft. diameter governor:

RPM = 350/ (1*pi) = 350/3.1415 = 111.4

For a 16 in diameter governor (16/12 = 1.33ft)

RPM = 350/ (1.33* 3.1415) = 350/4.188 = 83.5

7.4.3.3 Correct Car Speed When Using CAN Open Tapeless System

When using the CAN Open tapeless system, the secondary speed feedback comes from KEB drive parameter US.83 and is normally set to "1" which is 2048 ppr (US.83 set to "0" is 1024 ppr).

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 4", and set the "Enc PPR" equal to the ppr from the KEB drive parameter US.83, and set the "Enc RPM" to the nameplate rpm of the machine/motor which should be the same value of paramter LF.11 in the KEB drive.

On the 1066 LCD interface, navigate to the "Pls Cnt" menu. While running the elevator on inspection, verify that the pulse count value increments when running up and decrements when running down. The "Pls Cnt" value can be considerably out of range but will automatically correct during the "Learn Hoistway" procedure. To reverse the direction of pulse counting, navigate on the 1066 LCD interface to the "Adj Var" menu, "Enc Dir" and set to "0" for clockwise or "1" for counter-clockwise.

Navigate on the 1066 LCD interface to the "Car Spd" menu. Monitor the "Car Spd" while running the car at a known inspection speed. The value displayed should match the actual car speed measured with a hand held tachometer. If the speed is correct, proceed to "Learn the Hoistway" section 7.5.

7.5 Learn the Hoistway

Run the elevator down on inspection until it stops on the down normal limit switch. Verify that the “DN and DL” input LED’s are both off and that the "UL" and "DZ" LED's are on. From the 1021 LCD interface navigate to the "Elevator Setup" menu, "Learn Hoistway". The learn procedure can be performed automatically by choosing "Auto" from the menu items, or performed manually by choosing "Insp" from the menu items. After choosing the learn method, follow the instructions displayed on 1021 LCD interface.

In general, the car will run up from the "down normal limit" to the "up normal limit" at 30 fpm. During this learn run, the DP count for each floor level and each limit switch will be stored in memory.

NOTE: The car must run the entire hoistway without stopping.

As the elevator moves up the hoistway, navigate to the "Hoistway Tables" menu, "Disp/Mod Hoistway Table", and verify that the "DP" count is incrementing as the elevator moves up. Also as the elevator passes each floor, the pulse count and distance for that floor should change and be stored. Verify that the floor distances are valid. The pulse count for the terminal slowdowns will also be stored. The elevator will stop when it reaches the up normal limit. Follow the instructions on the 1021 LCD interface by putting the car on inspection, and then the message "Hoistway Learn Complete" should be displayed.

Move the elevator on inspection until the “DZ and DL” LED’s are on. Set the “INS” toggle switch on the 1064 board to the “NORMAL” position, and the elevator should level down to floor level at the top floor. If so, proceed to final adjustment.

If the car levels down but does not run, then check “Elevator Status” and “View Fault Log” on the 1021 LCD interface for any fault information. Correct items causing faults and perform hoistway learn again. After problem is corrected, and a successful hoistway learn is performed, proceed to final adjustment.

7.6 Final Adjustment

7.6.1 Automatic Run

The elevator should now be sitting idle at the top floor. The "AUTO DOOR" switch should be set to the "OFF" position and the "IND" switch should be set to the "IND" position. If the learn procedure was successful the elevator should be ready to make an automatic run.

The default parameter settings for the ride quality should be adequate for an initial run. From the 1021 LCD interface navigate to the "Set Calls and Lockouts" menu, "Setup Car Calls" and enter a car call. The elevator should run to answer the call. When the elevator levels in and stops at the floor, the doors will remain closed.

At this point the acceleration and deceleration of the car should be smooth and stepless regardless of the distance of run.

The high speed of the car should be verified. To fine tune high speed, make high speed runs while monitoring parameter LF.90 on the drive. The display should read contract speed.

If the speed is slightly under or over contract speed, then verify that parameter LF.11 is set properly. The speed displayed on the drive should match the speed displayed on the 1021 LCD interface, "Elevator Status" menu, "Dmd" and "Vel". This speed should also match the speed displayed on the 1066 LCD interface, "Car Spd" menu. If LF.11 is changed, then go to the 1021 LCD interface, "Adjustable Variables" menu, "Car Motion" and change the value of "Encoder RPM" to match the drive. When all of these speeds are the same (+/- 2 fpm), then proceed to the next step.

7.6.2 Fine Tune the Ride Quality

NOTE: A.LF.xx' parameters refer to gains during acceleration and also high speed.

In order to fine tune the ride quality, refer to Figure 7.2 which describes what part of the S-curve that the different parameters effect. In general, higher numbers in the given parameters, cause quicker and more abrupt changes from one mode to the next during a run. All of the S-curve parameters have a minimum and maximum value. The controller will not allow you to enter values that are not valid.

In some instances the response of the drive may need to be adjusted so that the drive will properly follow the S-curve (demanded speed) from the controller. The response of the drive can be increased by adjusting the gain parameters in the drive. Preliminary adjustments can be made to the following parameters to increase the response.

Proportional gains - A.LF.31 and d.LF.31Integral gains - A.LF.32 and d.LF.32 Integral offset gains - A.LF.33 and d.LF.33 (offsets added to the integral gains for more control at low speeds) The complete description of these parameters and their effect on the control and ride quality can be found in the KEB drive manual. In general the "A" parameters affect the acceleration gains and the "d" parameters affect deceleration gains. Lower values make the drive less responsive, and higher values make the drive more responsive. As the gains are increased, the drive will cause the motor to follow the S-curve more closely. If these values are increased too much, vibrations and audible noise may occur in the motor.

After the car is running high speed with an acceptable ride quality, it is recommended to perform a "System Inertia Learn" on the KEB drive in order to provide optimum drive performance. This procedure is outlined in the KEB manual. After this procedure is completed, the "Feed Forward Torque Control" FFTC will be enabled in the drive. With the FFTC active, the drive gains listed above can be reduced, and the drive will still follow the S-curve from the controller. This is helpful if the higher values of the gain parameters are causing vibration and audible noise in the motor.

After performing the adjustments above the ride quality during acceleration, high speed, and deceleration should be good. If so, proceed to "Adjust the Stop", section 7.6.3.

7.6.3 Adjust the Stop

When at floor level the "UL, DL, & DZ" input LEDs should be on. If the elevator continually tries to seek floor level by leveling up and down, try the following steps to correct the problem:

Reduce the leveling and re-leveling velocity parameters from the 1021 LCD interface "Adjustable Variables" menu, "Car Motion", "Leveling Speed" and "Relevel Speed".

If the car still oscillates, adjust the "floor level zone" on the selector. The "floor level zone" is increased by moving the "UL" and "DL" sensors closer together.

If the car stops hard on the brake then make the following adjustments. From the 1021 LCD interface navigate to the "Adjustable Variables" menu, "Car Motion", and adjust both "Brake Drop Del" (brake drop delay) and "Soft Stop Time". These variables should be adjusted so that zero speed is observed at the end of the run prior to the brake setting. The controller should hold the car at zero speed for the duration of the "Soft Stop Time" which should continue while the brake is setting and for a short time after the brake sets.

The soft stop time MUST be set to at least 0.5 seconds LONGER than the brake drop delay.

The "Soft Stop Time" setting in the 1021 LCD interface should be compared with the setting in the 1066 LCD interface "Adj Var" menu, "SoftStop". The setting of "SoftStop" in the 1066 LCD interface should be greater than the "Soft Stop Time" setting in the 1021 LCD interface.

If the car spots when approaching the floor, the cause is usually due to the car not tracking (the drive response is set too low) or the speed profile into the floor is too aggressive. First try to increase the response of the drive (see section 7.6.2).

If the car still spots, increase the floor targeting distance and retest the ride. The default value for the floor targeting distance is 12 inches. Increase it by steps of 2 or 3 and continue retesting until the parameter is adjusted to 18. If no change is noticed, start again from 12 and decrease the value.

The deceleration rate can also be reduced to help remove the spotting. Proceed with adjusting the start once the proper stop is achieved.

7.6.4 Adjust the Start

To provide a proper start, from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust "Brake Pick Del" (brake pick delay), "Pattern Delay", and "Soft Start Jerk". Initially, set the brake pick delay to 0 and increase the pattern delay by 0.1 seconds until the controller picks the brake completely before the motor starts to move. If roll back occurs, then reduce the pattern delay until there is no roll back. Sometimes, the timing works out better if the brake pick delay is set to 0.1 second.

In order to provide a smooth start with no roll back and without feeling the car move under the brake, it may be necessary to utilize the motor pre-torque feature. There are two pre-torque options. The first option is using a load-weighing device described in section 7.6.8. The second option is using the KEB drive's "Synthetic Pre-Torque" feature which is the recommended option. To enable the "Synthetic Pre-Torque" option, set LF.30 = 5 in the KEB drive.

During the "Synthetic Pre-Torque" sequence, the KEB drive introduces a high gain for a very short time period immediately after the brake picks and clears the machine drum or rotor. In order for the feature to work properly, with no noise or vibration, the timing and the gain values have to be coordinated with a high degree of precision.

In the first phase of the sequence, the drive uses a "hold off" timer, US.17, to allow the machine brake to release prior to the high gain being introduced. US.17 should be set to expire at exactly the time the brake clears the drum or rotor. A typical initial value of US.17 = 0.2 sec. If this timer expires before the brake releases, audible noise and vibration from the motor will occur. If this timer expires after the brake releases, the car will roll back before the high gain is introduced by the drive. The brake pick delay timer may also need to be adjusted from the 1021 LCD interface, by navigating to the "Adjustable Variables" menu, "Car Motion" and adjusting "Brake Pick Del". In general, the value of US.17 will be greater than the value of "Brake Pick Del".

In the second phase of the sequence, the drive introduces the gain parameter, P.LF.32, after the US.17 timer expires. The value of P.LF.32 should be increased until the car is held at zero speed when the brake is released. Values as high as 20,000 are normal for parameter P.LF.32. If this value is set too low, the drive will not hold the motor at zero speed when the brake releases. If this value is set too high, then audible noise and vibration from the motor will occur. If audible noise and vibration occur, it is important to determine if it is caused by P.LF.32 being set too high, or if it is caused by US.17 expiring before the brake releases. Small increments (0.05 sec) to US.17 can be made until roll back is observed, and then decreased again until there is no roll back. By performing these small adjustments in an iterative fashion, the correct setting combination can be achieved.

Also during this second phase of the sequence, a second timer, US.18, begins timing at the same point that US.17 expires. The US.18 timer sets the duration that the P.LF.32 gain parameter is asserted. A typical initial value for US.18 = 0.15 sec., but this value must be fine-tuned as well. As a general rule, the value US.18 will be less than the value US.17 after the adjustment is complete. It is critical that the pattern delay timer from the controller expires at exactly the same time that US.18 expires. To adjust the pattern delay from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust "Pattern Delay". If the "Pattern Delay" value is too short, then acceleration will be demanded from the controller while the high gain is being asserted and vibration and noise from the motor will occur. If the "Pattern Delay" is set too long then roll back will occur after US.18 expires. In general, the value of "Pattern Delay" will be greater than the sum of the values of US.17 and US.18. Again, by performing small adjustments in the iterative fashion described above, the correct setting combination can be achieved.

After the "Synthetic Pre-Torque" is set properly, the car will start smoothly with no roll back and without feeling the brake. The soft start jerk rate can now be increased to provide a quicker transition from start to constant acceleration. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust the "Soft Start Jerk Rate".

The ride quality should now be acceptable.

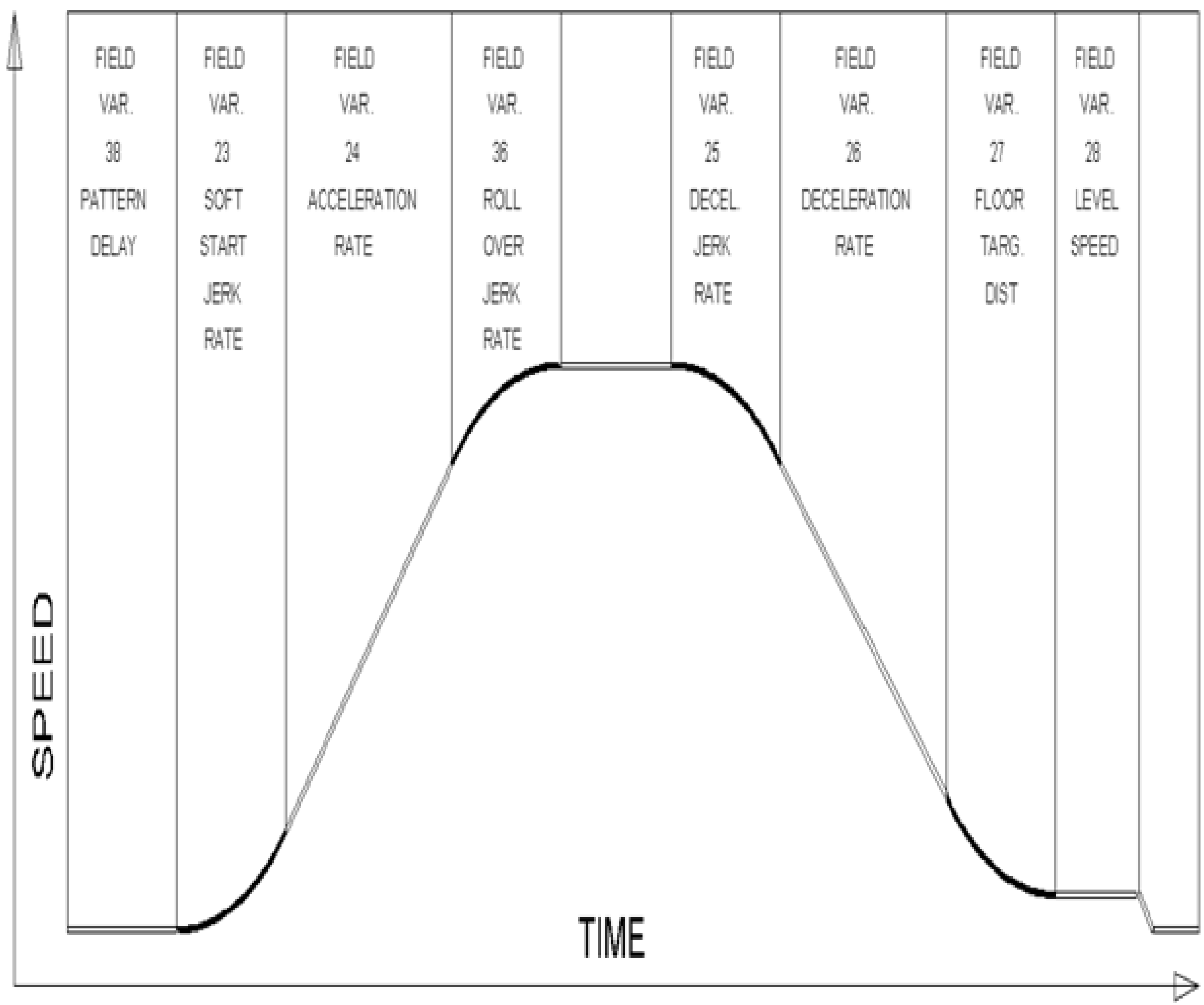
7.6.5 Adjust Safety Processor Board Speed Clamps

The 1066 Safety Processor Board monitors the speed of the elevator at the terminal landings independently from the main CPU.

When the "UT, DT, UTS, and DTS" limit switches are activated, the 1066 board calculates the velocity of the elevator and compares that velocity with a stored value of speed clamp. If the velocity when the switch activates is greater than the speed clamp value, then the 1066 board will generate a fault that stops the elevator.

To set the speed clamps, make a one floor run to the top floor.

Figure 7.2: Speed clamps



After the car stops, record the velocity the car hits the "UT, DT, UTS & DTS" slowdown limits. "UTS & DTS" are used on cars with reduced stroke buffers or with a top speed greater than 200 fpm. The velocity value is shown from the "LIM VEL" menu on the 1066 LCD interface.

The velocity value shown on the display for the "UT or DT" limit is the value after the car activates the limit then counts an adjustable number of counts set from the 1066 LCD interface, "Adj Var" menu, "UT Count" or "DT Count". These count values can be adjusted to provide adequate distance, following the limit switch activation, to allow the elevator to begin its normal decel pattern. The default "UT Count" and "DT Count" values are normally adequate. However, these values may need to be field adjusted to allow enough distance for the car to begin its normal decel pattern. If the "UT Count" and "DT Count" values are modified, the limit velocities must be re-checked.

Run the car again to the top repeatedly from 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the top floor. Make the same runs to the bottom floor starting from 1 floor, then 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the bottom floor. Take the highest speed value recorded in the runs above and add 20 fpm to that value to use as the clamp speed values for the respective limit switches. Enter these clamp speed values into the 1066 LCD interface "Adj Var" menu, "UT Vel", "DT Vel", "UTS Vel", "DTS Vel" respectively.

7.6.6 Adjust Digital Slowdown Speed Clamps

Having just made several runs into the top and bottom landings, the main CPU has also recorded the car's velocity when the slowdown limits were activated. If the car has been powered down prior to this step, several runs must be made to the limits to allow the main CPU to record the limit velocity values.

From the main CPU LCD interface, choose "Elevator Setup" and hit enter. Next choose "DT/UT Slowdown Clamp" and again hit enter.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Set DT/UT Slowdown Clamp" and view the speed displayed for "Clamp Speed". Add 20 fpm to this "Clamp Speed" value and enter it into the "DT/UT Limit" value.

The number of slowdown limits depends on the speed of the car as show in the table below:

Table 7.1: Slowdown Clamps

Car Speed	Number of Slowdown Limits	Clamp Number	Limit Used
<= 250 fpm	1	2	UT, DT
300-500 fpm	2	3	UT1, DT1
600-700 fmp	3	4	UT2, DT2
800 + fpm	4	5	UT3, DT3

Adjust speed clamps for each slowdown limits used as determined by the elevator's contract speed.

7.6.7 Verify Inspection Velocity Clamp on Safety Processor Board

Place the car on inspection operation. From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp velocity to 25 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to 50 fpm. Run the car in either direction and verify that the car shuts down when the speed rises above 25 fpm.

From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp to 140 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to the desired value.

7.6.8 Analog Load Weigher Setup

If the job uses an analog load weigher purchased from G.A.L., complete the following procedure.

NOTE: It is recommended using two people, one moving the weights and one in the machine room to set up the load weigher.

Mount the load weigher as described by the manufacturer. The load weigher control box will also contain a board supplied by G.A.L. that connects to the controller serial CAN bus and reads in the analog output from the load weighing device. Wire the load weigher and G.A.L. board according to the controller schematics.

Calibrate the load weighing device hardware according to the manufacturer's instructions. Following proper installation of the load weighing device, proceed to section 6.5.9.1, Empty Car Setup.

7.6.8.1 Empty Car Setup

Verify that the load weighing device is communicating to the main CPU by performing the following steps. From the 1021 LCD interface, navigate to the "Diagnostics" menu, "Car Comm Status", "Car to LW Board" and verify that "On-line = 1". If "On-line = 0" then verify wiring and installation of load weighing device.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Setup Load Weigher" and follow the instructions on the display as you go through the procedure.

It is okay to exit the setup screen to place a call and then return to it while the setup is being performed.

Run the car to the bottom floor and press Enter on the 1021 LCD interface when prompted to do so to start the automatic setup sequence.

If the car is at the bottom floor and the doors are not closed (the doors will not close automatically from turning off the auto-door switch) then place a car call to run the car up one floor then back again. The doors will close when the call is placed.

When the automatic sequence is activated, the car will run to each floor and measure the empty load value. The 1021 LCD interface will indicate when the sequence is finished.

7.6.8.2 Full Car Setup

The empty car setup must be successfully completed to run the full load setup.

Once the empty car setup is complete, run to the loading floor and set the "AUTO DOOR" switch to the "ON" position to allow weights to be loaded on the car. With the car fully loaded, set the "AUTO DOOR" switch to the "OFF" position and run the car to the bottom floor. Again if the doors are not closed, make a one floor run to force the doors to close.

With the car at the bottom floor, follow the instructions on the 1021 LCD interface to start the full load setup sequence. The car will automatically run to each floor and measure the full load value. When the full load measurement is complete, the car can be run to the loading floor and the weights removed.

After the weights are removed, cycle the doors to complete the procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "View/Modify LW Setup" and verify the load weigher status, "LW Device Stat: ON OK". If the status is "ON OK", then the load weigher should be accurately measuring the car load in real time. The percent load will be displayed, "Load: %".

The percent load values for different service options can now be set. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Service Options", and set the following variables:

- "Load Bypass"
- "Load Antinuisance"
- "Load Dispatch"
- "Load Overload"

NOTE: Setting the values of the variables above to 0% will disable that particular option.

7.6.8.3 Load Weighing Calibration Sequence

The load weigher is automatically calibrated once each week. If an error is detected during this calibration sequence, the load weigher and the pre-torque feature (if used) is disabled.

A load weighing calibration sequence can be manually activated by performing the following procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Load Weigher Calibration" and follow the instructions on the display.

7.6.9 Adjust the Motor Pre-torque

NOTE: This section describes the adjustment procedure if using the load value obtained from the analog load weigher to generate the proper pre-torque signal to the drive. This option will only work if the load weigher has been installed properly, and the "Load Weigher Setup" has been performed successfully.

If the option of "Synthetic Pre-Torque" is used, see section 7.6.4.

On the KEB drive, set parameter LF.30 = 3 to enable the pre-torque function from a load weighing device. Run the empty car to a middle floor. From the 1021 LCD user interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust the following parameters:

- "Balanced Load = 40" (typically car is 40% counterbalanced, but verify counterbalance percentage for each specific job)
- "Torque Amount = 10"
- "Pattern Delay = 2.5"
- "Brake Pick Del = 0.1"

The long pattern delay will allow an exaggerated amount of roll back in order for the pre-torquing to be set accurately. Make a one floor run down and observe the roll back when the brake picks at the start of the run. Increase the "Torque Amount" variable and continue to monitor the roll back while performing one floor runs in the down direction. As the "Torque Amount" is increased, the roll back should be minimized until the car will hold zero speed for the entire "Pattern Delay" time. A typical value for the "Torque Amount" is 40%. If the value is too large, the car will roll forward during the "Pattern Delay" time.

Note: The pattern delay must be at least 0.15 seconds (150 milliseconds). Setting the torque amount to 0.00 will disable the pre- torque feature. Also if the load weighing calibration sequence detects a load weighing error, the pre-torque feature is also automatically disabled.

7.6.10 Verify the Doors Are Safe

The elevator should now be adjusted. Verify that all door locks, gate switches, and safety circuits are operational. Set the "INS" switch to the "NORM" position and set the "AUTO DOOR" switch to the "ON" position. The elevator should level into the floor and open the doors. If the doors do not open, check the door operator wiring and cam adjustment. If the doors do open, the elevator is now on independent service.

7.6.11 Fine Tune the Ride Quality

Ride the elevator and evaluate the ride quality. Fine tune the ride quality by navigating to the "Adjustable Variables" menu, "Car Motion" and adjusting the variables shown in Figure 7.2.

Keep in mind that if acceleration or deceleration values are changed, the speed clamps for the safety processor board and the S-curve board may need to be re-adjusted.

To fine tune the floor level accuracy, determine if the controller is set to stop when "UL" and "DL" signals turn on, or if controller is set to stop off of the position count. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and view the "Stop On Pos Cnt" variable. If "Stop On Pos Cnt = 0" then controller is set to stop when the "UL and "DL" signals turn on. If "Stop On Pos Cnt = 1" then controller is set to stop on a combination of the floor level magnet and the position count.

With "Stop On Pos Cnt = 0", the floor levels should be set by adjusting the floor level magnet at each floor. For proper operation, the floor magnets should be set to exactly floor level. After the floor levels are set properly, perform another hoistway learn procedure.

With "Stop On Pos Cnt = 1", the floor levels are set by using both the floor magnet and the position count. For proper operation with this setting, the floor magnet should be set to exactly floor level. The final stop can then be fine-tuned by performing the following adjustments.

From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "DZ & LZ Offset, Sel Cnt" and adjust "Dn Lev Dist" and "Up Lev Dist". The units for these variables are in "pulse counts". With "Stop On Pos Cnt =1" the car will continue to move for the "Dn Lev Dist" or "Up Lev Dist" after "UL and DL" turn on. Use the "Dn Lev Dist" and the "Up Lev Dist" parameters to make level changes at all floors.

To make level changes at individual floors, perform the following adjustments. From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "FL and FL Offset Count", and the offset count can be adjusted. These variables introduce an offset (+/-) to the stored floor count that was determined in the hoistway learn procedure.

NOTE: The number of pulse counts per inch can be viewed from the 1021 LCD interface, "Hoistway Tables", "DZ & LZ Offset, Sel Cnt", "Pulses/Inch".

NOTE: Regardless if "Stop On Pos Cnt=0" or if "Stop On Pos Cnt =1", the floor magnet must be set properly at floor level. If too large of values are entered into "Dn Lev Dist", "Up Lev Dist", or "Offset", the car will drive past the floor level magnet and re-level.

Check all signal devices for proper operation and remove all temporary jumpers. The adjustment should now be complete.

Section 8 - Adjustment of the GALaxy - HPV-900 Permanent Magnet AC Gearless Motor

8.1 General Setup

Before adjustment begins the following items must be completed.

1. All field wiring and safety circuits installed

2. Temporary jumpers from terminal “HC” to terminals “MES & ALT”

3. All hoistway limit switches installed

4. All car and hoistway doors and interlocks installed and pre-adjusted

5. Selector installed and magnets pre- adjusted

6. Familiarize yourself with all wiring schematics

7. Familiarize yourself with the Magnetek HPV 900 PM Elevator Drive Technical Manual.

8. Verify that the PM AC motor is properly wired.

9. Verify that the encoder is connected properly.

10. Car should be properly counterbalanced.

8.2 Initial Power-up

8.2.1 Check Main Line Voltage

With main-line disconnect in the “OFF” position, check the line-side voltage with a volt meter to insure the voltage matches the controller name tag “Input Power” voltage. Check to insure all three phases are present. If voltage is not correct or all three phases are not present, do not proceed until corrected.

8.2.2 Set Toggle Switches

Set all toggle switches on the 1064 board as follows:

• DOOR LOCKS - "OFF"

• IND - "IND"

• AUTO DOOR - "OFF"

• STOP - "STOP"

8.2.3 Make Sure the Car Is Safe

Verify that all elevator doors are closed and that all safety circuits are functional.

8.2.4 Check Controller Voltage

Turn the main-line disconnect to the on position. Check the voltage at R, S, and T on the AC drive. Verify that all three phases are present. Check the voltage at fuses L1 and L2 on controller. If correct, check the voltage at terminal “LIN” with respect to “GND”. The voltage should read 120VAC. If correct, check the voltage at terminals “S10, LC, & HC” with respect to “GND”. All should read 120VAC. If not, check wiring diagram to determine problem before continuing.

8.2.5 Verify the Main CPU is Operating

Check to make sure that the “axy” of GALaxy on the 1021 LCD interface is blinking. If the “axy” is blinking, continue to the next step. If not, check voltage at terminals 5V to 0V on the 1064 board to insure 5VDC. If 5VDC is present and the “axy” on the 1021 LCD interface is not blinking, then contact factory.

8.2.6 Preset Adjustable Variables on Safety Processor Board

The safety processor (1028N/1066) board is normally preset prior to leaving the factory; however, it is prudent to check the setup values for the proper settings. Refer to section 13 of this manual for the operation of the safety processor board 1066 LCD interface. The following adjustment variables must be set properly:

1066 LCD interface "Adj Var" menu:

- Top Spd (contract speed)
- Enc RPM (if Fdbk Typ=0, not applicable)(if Fdbk Typ=1, set to rpm of governor)(if Fdbk Typ=4, set to value of "CONTRACT MTR SPD" parameter in HPV 900/600 drive)
- Enc PPR (if Fdbk Typ=0, not applicable)(if Fdbk Typ=1, set to 8192)(if Fdbk Typ=4, set to 8 times the ppr of motor encoder)
- Fdbk Typ (0=tape, 1=enc, 4=InEnc)
- Ctrl Typ (2=Tract DF)
- 2 Stop (0=Mult, 1=2 stop)
- RearDoor (0=Front only, 1=Rear)
- UTS Vel (Set to top speed)
- DTS Vel (Set to top speed)
- INS Vel (Set to 140)
- LEV Vel (Set to 140)
- UT Vel (Set to 500)
- DT Vel (Set to 500)
- UL Vel (Set to 160 if Non-DF)
- DL Vel (Set to 160 if Non-DF)
- SoftStop (Set to 1)

NOTE: The velocity values for the terminal limit switches above are only temporary settings until car is running high speed. In the final adjustment procedure, these variables must be set according to the procedures in section 8.6.6.

1021 LCD interface "Adjustable Variables" menu, "Car Motion" sub-menu:

• Top Speed (set to contract speed)

• Inspect Speed (set to 25 fpm)

• Encoder PPR ((if tape selector or if 485 tapeless selector, set to 8 times ppr of motor encoder)(if CAN open tapeless selector,set to motor encoder ppr)

• Encoder RPM (if tape selector, set to value of "CONTRACT MTR SPD" in HPV 900/600 drive), (if 485 tapeless selector, set to value of "CONTRACT MTR SPD" in HPV 900/600 drive), (if CAN open tapeless selector, set to governor rpm)

NOTE: See section 4.3.10.2 for determining governor rpm.

8.2.7 Place Stop Switch in Run Position

Set the “STOP” toggle switch on the 1064 board to the "RUN" position. Verify that input LED’s for “LC, HC, DN, UN, SS, GTS, RDY and CS” are all on. If not, then correct field wiring.

8.2.8 Hoist Motor Data

At this time the hoist motor data must be entered into the AC drive. The following functions must be entered or verified using the drive digital operator. Follow the instructions in the HPV 900 PM drive manual to enter the following data:

DRIVE A1 Sub Menu

- CONTRACT CAR SPD (from controller data)
- CONTRACT MTR SPD (from motor nameplate RPM)
- ENCODER PULSES (PPR from encoder on motor)

MOTOR A5 Sub Menu

- MOTOR ID (pm default)
- RATED MTR PWR (from motor nameplate)
- RATED MTR VOLTS (from motor nameplate)
- RATED MOTOR CURR (from motor nameplate)

MOTOR POLES

The number of poles is provided below is you are using one of the following motors:

- MAG05 = 66 poles
- MAG10 = 66 poles
- MAG15 = 66 poles

- Leroy Somer Z2 = 16 poles
- Leroy Somer Z3 = 16 poles
- Leroy Somer Z4 = 16 poles
- Leroy Somer Z6 = 32 poles
- Leroy Somer Z10 = 32 poles
- Leroy Somer Z20 = 32 poles

- Imperial 474 = 20 poles
- Imperial 475 = 24 poles
- Imperial 522 = 20 poles
- Imperial 525 = 20 poles
- Imperial 805 = 44 poles

- Hollister Whitney = 28 poles

If you are not using one of the following motors listed and need to calculate the motor poles, use the following formula based from the motor name plate data:

Poles=2 X 60 X Motor Excitation frequency (Hz) / Rated Motor Speed (RPM)

The number of motor poles will always be a whole, even number.

- RATED MTR SPEED (motor RPM on nameplate)

Most of the drive parameters have been preset to values required for your specific job. Other parameters not listed here may need to be adjusted in the field. Please refer to the Magnetek HPV Technical manual for more parameter information and troubleshooting guidelines.

From the digital operator for the drive, reset any active faults and clear the fault history log.

8.2.9 Pre-set the Digital Speed Clamps

Pre-set the software digital speed clamps from the 1021 LCD interface under the “Elevator Setup Menu”. The submenus for the clamp speeds are as follows:

Set Ins/Leveling Clamp

Set DT/UT Slowdown Clamp

Set DT1/UT1 Slowdown Clamp

Set DT2/UT2 Slowdown Clamp

Set DT3/UT3 Slowdown Clamp

Set DTS/UTS Slowdown Clamp

Set the speed for Ins/Leveling for 140 fpm and all the remaining slowdown limit speeds to the contract speed of the car. Please note that the displayed value of “Clamp Speed” is the value the clamp should be set to. The slowdown limit “Clamp Speed:” will show 0000 until the car is run into the limits and the speed is recorded. Please refer to the 1021 LCD Interface section for the Elevator Setup Menu.

NOTE: The values of the clamp speed velocities above are only temporary settings until the car is running high speed. In the final adjustment procedure, these values must be set according to the procedures in section 8.6.7.

8.3 PM Start-Up Procedure (no ropes on the sheave of the motor)

8.3.1 Adjust the Brake Voltage

If the controller utilizes an electronic brake board 1047 or 1051, then the brake voltage is adjusted through the 1021 LCD interface, "Car Brake" sub-menu. If the controller utilizes resistors and rectifiers for the brake coil circuit, then the brake voltage is adjusted by moving the adjustable tap on the brake resistor.

NOTE: Remove power before adjusting the resistor taps.

To adjust the brake voltage when using and electronic brake board, navigate to the "Adjustable Variables" menu, "Car Brake" and adjust "Brake Pick Volt", "Brake Hold Volt" and "Brk AC L-L Volt" to the proper values.

8.3.2 Encoder Learn Procedure

Very Important!! You have to perform an Absolute Encoder Alignment Procedure prior to placing the ropes on the sheave of the motor.

The following procedure is meant to work directly with the controller. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed = 0".On the HPV-900 digital operator go to the Utilities U0 option and press enter. Scroll through the Utilities options to Rotor Align U10 and press enter. Verify ALIGNMENT METHOD is set to OPEN LOOP. Scroll to ALIGNMENT and press enter to change parameter ALIGNMENT from DISABLE to ENABLE and press enter.

Press the down arrow to start the alignment procedure. Press enter to change the data from

NO to ON RUN. Wire the controller to either run from car top inspection or machine room inspection. See prints or quick start-up guide for wiring. Give the controller a command to run on inspection up or down by momentarily jump INS to IU or ID (for car top inspection) or by pushing the "UP or DOWN" inspection button (for machine room inspection) on the GALX-1064 main I/O board. The motor should rotate smoothly back and forth for about 4 seconds without any faults. If a fault occurs on the drive please consult the section on PM Start-Up Procedure in the HPV-900 PM Technical manual to resolve any faults. If faults persist contact G.A.L. Technical Support.

Once the encoder alignment procedure is complete, verify under A5 Motor the value of ENCODER ANG OFST is anything but 30000. If the value is 30000 then the alignment procedure did not work and must be performed again. Reset the inspection speed back to its original value. Prior to placing the ropes on the sheave of the motor verify that you are able to rotate the motor in the up direction and in the down direction. If you can rotate the motor then proceed to the next step.

8.3.3 Check Inspection Speed

With a hand held tachometer, check the speed of the elevator while running on inspection. The elevator should be running at 25 fpm. Also monitor the speed on the drive digital operator D1 submenu, SPEED FEEDBACK, and verify that it displays 25 fpm while running on inspection.

From the 1021 LCD interface, select the "Elevator Status" menu; navigate until the display shows "Dmd" and "Vel". While running on inspection, monitor the controller demand speed "Dmd", and the speed feedback "Vel". These values should both display 25. If the demand and feedback on the 1021 LCD interface is incorrect, check the Encoder RPM and PPR parameters from the “Adjustable Variables” menu. These variables should be set the same to values listed in section 7.2.6

If the speed on the hand held tachometer and on "Dmd" and "Vel" all read 25 fpm (within +/- 2 fpm), continue to the next step. If not, contact the factory.

8.3.4 Verify Controller Encoder Direction

From the 1021 LCD interface "Elevator Status" menu, navigate to display "Dir" and "DP". While moving the car on inspection, monitor "Dir" (direction) and "DP" (pulse counts). "Dir" should display "Up" when the car is moving up, and "Dn" when the car is moving down. The value of "Dp" should increment when the car is moving up, and should decrement when the car is moving down.

If the direction is wrong or the pulse counts change in the wrong direction, then the encoder direction to the controller must be changed.

On the encoder isolation board (1022N), move J1 and J2 on the encoder board. Refer to the jumper diagram on the board.

If the encoder is counting properly then place the ropes on the sheave of the motor and continue to the next step. If not, contact G.A.L. Technical Support.

8.4 Run the Car on Inspection (with the ropes on the sheave of the motor)

8.4.1 Ready to Run On Inspection

From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and verify that "Inspect Speed = 25". Before moving the car on inspection, verify again that all door locks, gate switches, safety circuits, and limit switches are functioning properly.

The car should be ready to run on inspection if all is wired correctly. Select the "Elevator Status" on the 1021 LCD interface. The display should show "Out of Service" on the first line and "Inspection Mode" on the second. The 1066 LCD interface will display one of the following types of inspection:

• "MR INS" (Motor Room) "CT INS"

• (Car Top) "ACCESS" (Access)

• "IC INS" (In Car)"

• "AUTO" (Not on Inspection)

To run the car from the motor room, "MR INS" should be displayed.

The "inspection string" consists of contacts from the inspection switches and the gate and lock bypass switches in series. One and only one of the five inspection inputs should be on for the car to run. Starting from the car top inspection input, the five inspection inputs are, "INS" for car top, "ACC" for access, "ICI" for in-car, "MRI" for motor room, and "AUTO" for automatic (no inspection). The inspection string circuit is shown in Figure 8.1

Note that any one of the following conditions will cause an inspection error:

• More than one inspection input is on

• No inspection input is on

• Gate or Lock bypass switch is open and the car is not on car top inspection

If the controller is not on motor room inspection at this point, then verify all switch positions and wiring before proceeding.

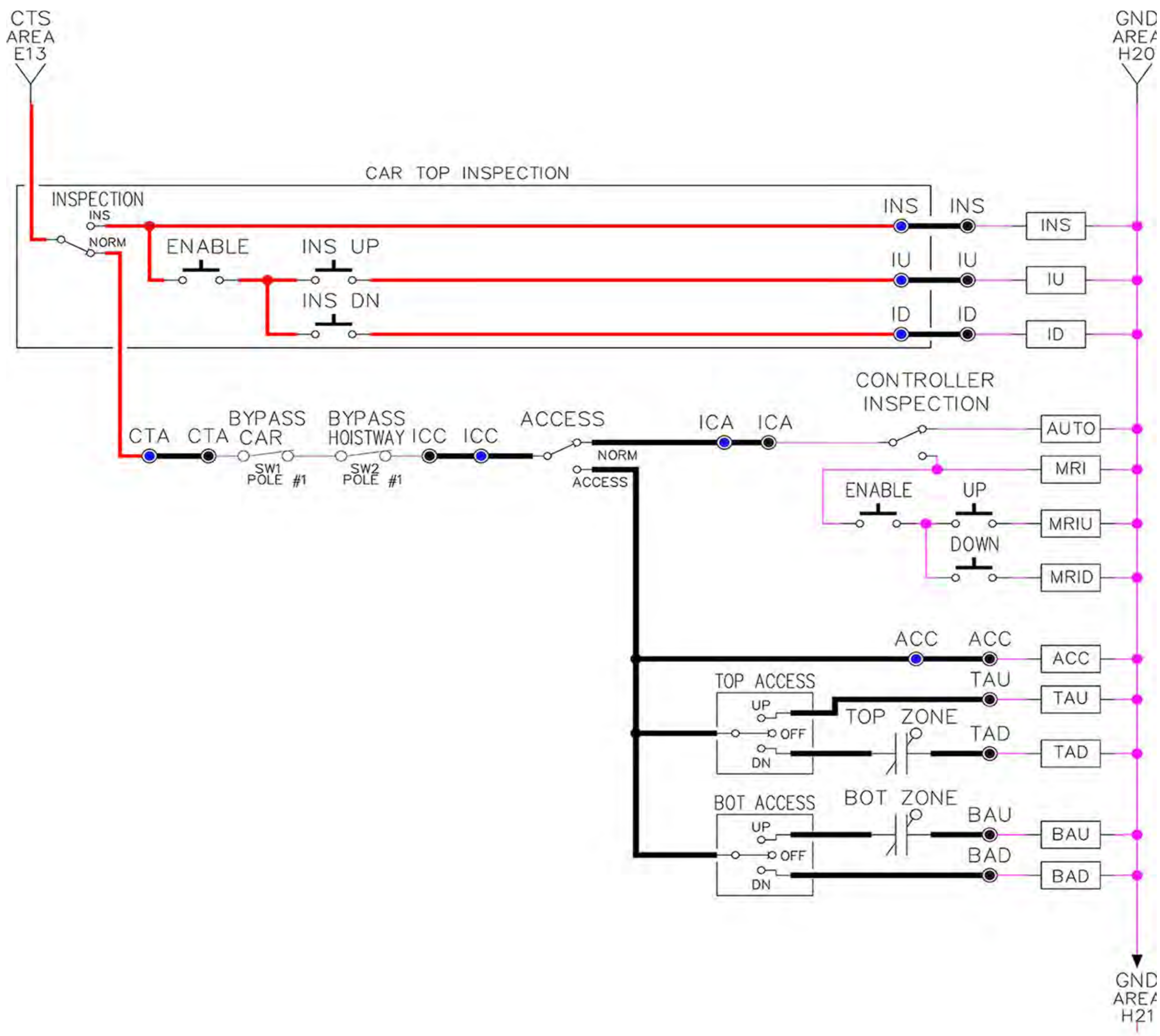


Figure 8.1: Inspection String Circuit

8.4.2 Verify Selector And Slowdown Inputs

Run the elevator up on inspection until it stops on the up normal limit. The up and down normal limits should be set two inches above and below the terminal floors respectively. Verify the selector inputs are being set properly on the controller by running the elevator down until it stops on the down normal limit.

As the car approaches floor level going down, “DL” turns on first, then “DZ” and then finally “UL”. At floor level, “UL, DL, and DZ” inputs should all be on at the same time. Leaving the floor going down “DL” will turn off first, then “DZ” and last “UL”.

Also verify that the up and down terminal slowdown limits inputs “UT, UTS, DT & DTS” are breaking at the proper distances as shown in the slowdown table 2.0. “UT, UTS, DT & DTS” turn off when active.

8.4.3 Verify Car Speed on Safety Processor Board

Run the car in either direction and check the car speed on the 1066 LCD interface. The speed shown should match the car's actual speed. If the speed does not match and the secondary feedback comes from pulses from the tape go to "Correct Car Speed When Using A Tape". If using 485 tapeless, go to "Correct Car Speed When Using 485 tapeless". If using CAN Open tapeless, go to "Correct Car Speed When Using CAN Open tapeless". If the correct speed is shown proceed to the "Learn the Hoistway" section.

8.4.3.1 Correct Car Speed When Using a Tape

The tape has holes every 3/8" that are 3/8" in diameter. On the selector unit adjust the PP sensor closer to the tape until the orange LED at the end of the sensor turns on. Then turn the sensor inwards another 1/8" and lock in the sensor. While running on top of car inspection verify that the orange LED at the end of the PP sensor turns on and off as it passes by the holes on the tape. The safety processor board on the controller measures the time between each pulse to calculate the velocity. If the velocity is not displayed correctly first make sure that the feedback type in the safety processor board adjustable variable is set to 0 for a tape application. Next, while the car is running, make sure that the PULSE LED on this board is pulsing. As the car increases in speed the LED will glow solid on. If the LED does not pulse, try swapping the wires at the PPS and PP terminals. If the LED still does not work, contact the factory. If the correct speed is shown proceed to "Learn the Hoistway".

8.4.3.2 Correct Car Speed When Using 485 Tapeless System

When using the 485 tapeless system, the secondary speed feedback comes from the encoder mounted on the governor. The 1066 board uses a serial interface to a Turck absolute encoder, part # T8.5882.3FB8.3001.

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 1", and set the "Enc PPR = 8192". The "Enc RPM" value must be calculated as described below. To calculate the RPM, divide the contract speed of the car by the distance travel in one revolution with the governor as shown below:

RPM = Speed fpm/ (diameter GOV * pi)

For a 1 ft. diameter governor:

RPM = 350/ (1*pi) = 350/3.1415 = 111.4

For a 16 in diameter governor (16/12 = 1.33ft)

RPM = 350/ (1.33* 3.1415) = 350/4.188 = 83.5

8.4.3.3 Correct Car Speed When Using CAN Open Tapeless System

When using the CAN Open tapeless system, the secondary speed feedback comes from the HPV 900/600 drive and should be set to 8 times the ppr of the motor encoder.

In the 1066 LCD interface "Adj Var" menu, set the "Fdbk Typ = 4", and set the "Enc PPR" equal to 8 times the ppr from the motor encoder.

On the 1066 LCD interface, navigate to the "Pls Cnt" menu. While running the elevator on inspection, verify that the pulse count value increments when running up and decrements when running down. The "Pls Cnt" value can be considerably out of range but will automatically correct during the "Learn Hoistway" procedure. To reverse the direction of pulse counting, navigate on the 1066 LCD interface to the "Adj

Var" menu, "Enc Dir" and set to "0" for clockwise or "1" for counter-clockwise.

Navigate on the 1066 LCD interface to the "Car Spd" menu. Monitor the "Car Spd" while running the car at a known inspection speed. The value displayed should match the actual car speed measured with a hand held tachometer. If the speed is correct, proceed to "Learn the Hoistway" section 8.5.

8.5 Learn the Hoistway

Run the elevator down on inspection until it stops on the down normal limit switch. Verify that the "DN and DL" input LED's are both off and that the "UL" and "DZ" LED's are on. From the 1021 LCD interface navigate to the "Elevator Setup" menu, "Learn Hoistway". The learn procedure can be performed automatically by choosing "Auto" from the menu items, or performed manually by choosing "Insp" from the menu items. After choosing the learn method, follow the instructions displayed on 1021 LCD interface.

In general, the car will run up from the "down normal limit" to the "up normal limit" at 30 fpm. During this learn run, the DP count for each floor level and each limit switch will be stored in memory.

NOTE: The car must run the entire hoistway without stopping.

As the elevator moves up the hoistway, navigate to the "Hoistway Tables" menu, "Disp/Mod Hoistway Table", and verify that the "DP" count is incrementing as the elevator moves up. Also as the elevator passes each floor, the pulse count and distance for that floor should change and be stored. Verify that the floor distances are valid. The pulse count for the terminal slowdowns will also be stored. The elevator will stop when it reaches the up normal limit. Follow the instructions on the 1021 LCD interface by putting the car on inspection, and then the message "Hoistway Learn Complete" should be displayed.

Move the elevator on inspection until the "DZ and DL" LED's are on. Set the "INS" toggle switch on the 1064 board to the "NORMAL" position, and the elevator should level down to floor level at the top floor. If so, proceed to final adjustment.

If the car levels down but does not run, then check "Elevator Status" and "View Fault Log" on the 1021 LCD interface for any fault information. Correct items causing faults and perform hoistway learn again. After problem is corrected, proceed to final adjustment.

8.6 Final Adjustment

8.6.1 Automatic Run

The elevator should now be sitting idle at the top floor. The "AUTO DOOR" switch should be set to the "OFF" position and the "IND" switch should be set to the "IND" position. If the learn procedure was successful the elevator should be ready to make an automatic run.

The default parameter settings for the ride quality should be adequate for an initial run. From the 1021 LCD interface navigate to the "Set Calls and Lockouts" menu, "Setup Car Calls" and enter a car call. The elevator should run to answer the call. When the elevator levels in and stops at the floor, the doors will remain closed.

The acceleration and deceleration of the car should be smooth and stepless regardless of the distance of the run. If the elevator does not function as described above, then problem should be analyzed before proceeding.

8.6.2 Fine Tune the Ride Quality

In order to fine tune the ride quality, refer to Figure 8.2 which describes what part of the S-curve that the different parameters effect. In general, higher numbers in the given parameters, cause quicker and more abrupt changes from one mode to the next during a run. All of the S-curve parameters have a minimum and maximum value. The control will not allow you to enter values that are not valid.

After adjusting the S-curve parameters for the desired ride, proceed to the next step.

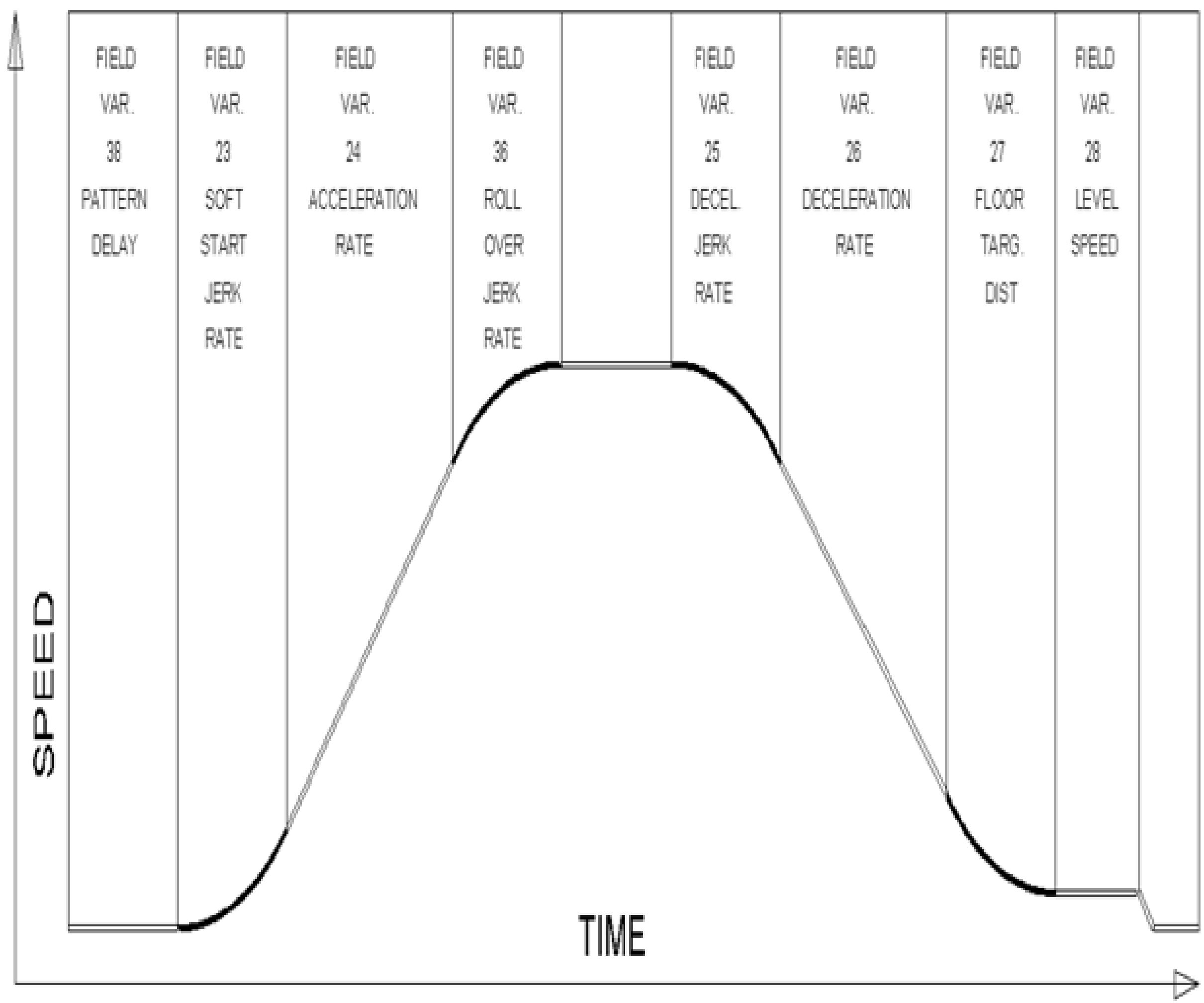


Figure 8.2: S-Curve Parameters

8.6.3 Adjust the Stop

When at floor level the "UL, DL, & DZ" input LED's should be on. If the elevator continually tries to seek floor level by leveling up and down, try the following steps to correct the problem:

Increase the response of the drive by increasing the value of A1 RESPONSE in the HPV 900/600 drive, and retesting the car.

Reduce the leveling and re-leveling velocity parameters from the 1021 LCD interface "Adjustable Variables" menu, "Car Motion", "Leveling Speed" and "Relevel Speed".

If the car still oscillates, adjust the "floor level zone" on the selector. The "floor level zone" is increased by moving the "UL" and "DL" sensors closer together.

If the car stops hard on the brake then make the following adjustments. From the 1021 LCD interface navigate to the "Adjustable Variables" menu, "Car Motion", and adjust both "Brake Drop Del" (brake drop delay) and "Soft Stop Time". These variables should be adjusted so that zero speed is observed at the end of the run prior to the brake setting. The controller should hold the car at zero speed for the duration of the "Soft Stop Time" which should continue while the brake is setting and for a short time after the brake sets. The soft stop time MUST be set to at least 0.5 seconds LONGER than the "Brake Drop Del".

The "Soft Stop Time" setting in the 1021 LCD interface should be compared with the setting in the 1066 LCD interface "Adj Var" menu, "SoftStop". The setting of "SoftStop" in the 1066 LCD interface should be greater than the "Soft Stop Time" setting in the 1021 LCD interface.

If the car spots when approaching the floor, the cause is usually due to the car not tracking (the drive response is set too low) or the speed profile into the floor is too aggressive. First try to increase the response of the drive by increasing the value of parameter A1 RESPONSE in the drive.

If the car still spots, from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and increase the value of "Floor Targ Dis" (floor targeting distance). The default value for the floor targeting distance is 12 inches. Increase it by steps of 2 or 3 and continue retesting until the parameter is adjusted to 18. If no change is noticed, start again from 12 and decrease the value.

The deceleration rate can also be reduced to help remove the spotting. Proceed with adjusting the start once the proper stop is achieved.

8.6.4 Adjust the Start

To provide a proper start, from the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust "Brake Pick Del" (brake pick delay), "Pattern Delay", and "Soft Start Jerk". Initially, set the brake pick delay to 0 and increase the pattern delay by 0.1 seconds until the controller picks the brake completely before the motor starts to move. If roll back occurs, then reduce the pattern delay until there is no roll back. Sometimes, the timing works out better if the brake pick delay is set to 0.1 second. If load weighing is used, pre-torquing can be used to provide a smoother start. See section 8.6.9.

Increase the soft start jerk rate in order to provide a quicker transition from the start to constant acceleration. Keep in mind that the larger the soft start number, the quicker the start. The ride should now be acceptable.

8.6.5 Verify Top Speed

To fine tune high speed, make high speed runs while monitoring the SPEED FEEDBACK on the HPV drive display. The display should read contract speed, and it should match the speed displayed on the 1021 LCD interface, "Elevator Status" menu, "Dmd" and "Vel". This speed should also match the speed displayed on the 1066 LCD interface, "Car Spd" menu. If all of these values are the same (+/- 2 fpm), then proceed to the next step. If the speed is not correct increase or decrease drive parameter A1 CONTARCT MTR SPD until the AC drive display reads contract speed, If A1 CONTRACT MTR SPD is changed, then go to the 1021 LCD interface, "Adjustable Variables" menu, "Car Motion" and change the value of "Encoder RPM" to match the drive. When the speed displayed is correct, proceed to the next step.

8.6.6 Adjust Safety Processor Board Speed Clamps

The 1066 Safety Processor Board monitors the speed of the elevator at the terminal landings independently from the main CPU. When the "UT, DT, UTS, and DTS" limit switches are activated, the 1066 board calculates the velocity of the elevator and compares that velocity with a stored value of speed clamp. If the velocity when the switch activates is greater than the speed clamp value, then the 1066 board will generate a fault that stops the elevator.

To set the speed clamps, make a one floor run to the top floor.

From the 1066 LCD interface, navigate to the "Lim Vel" menu, and view the recorded velocities displayed for the “UT, DT, UTS & DTS” slowdown limits. “UTS & DTS” are used on car with reduced stroke buffers or with a top speed greater than 200 fpm. The velocity value is shown from the “Lim Vel” menu on the 1066 LCD interface.

The velocity value shown on the display for the “UT or DT” limit is the value after the car activates the limit then counts an adjustable number of counts set from the 1066 LCD interface, "Adj Var" menu, "UT Count" or "DT Count". These count values can be adjusted to provide adequate distance, following the limit switch activation, to allow the elevator to begin its normal decel pattern. The default "UT Count" and "DT Count" values are normally adequate. However, these values may need to be field adjusted to allow enough distance for the car to begin its normal decel pattern. If the "UT Count" and "DT Count" values are modified, the limit velocities must be re-checked.

Run the car again to the top repeatedly from 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the top floor.

Make the same runs to the bottom floor starting from 1 floor, then 2 floors, then 3 floors, etc., until top speed is reached. From the 1066 LCD interface "Lim Vel" menu, record the limit velocities displayed each time the car stops at the bottom floor.

Take the highest speed value recorded in the runs above and add 20 fpm to that value to use as the clamp speed values for the respective limit switches. Enter these clamp speed values into the 1066 LCD interface "Adj Var" menu, "UT Vel", "DT Vel", "UTS Vel", "DTS Vel" respectively.

8.6.7 Adjust Digital Slowdown Speed Clamps

Having just made several runs into the top and bottom landings, the main CPU has also recorded the car's velocity when the slowdown limits were activated. If the car has been powered down prior to this step, several runs must be made to the terminal landings to allow the main CPU to record the limit velocity values.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Set DT/UT Slowdown Clamp" and view the speed displayed for "Clamp Speed". Add 20 fpm to this "Clamp Speed" value and enter it into the "DT/UT Limit"

The number of slowdown limits depends on the speed of the car as show in the table below:

Table 8.1: Slowdown Clamps

Car Speed	Number of Slowdown Limits	Clamp Number	Limit Used
<= 250 fpm	1	2	UT, DT
300-500 fpm	2	3	UT1, DT1
600-700 fmp	3	4	UT2, DT2
800 + fpm	4	5	UT3, DT3

Adjust speed clamps for each slowdown limits used as determined by the elevator's contract speed.

8.6.8 Verify Inspection Velocity Clamp On Safety Processor Board

Place the car on inspection operation. From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp velocity to 25 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to 50 fpm. Run the car in either direction and verify that the car shuts down when the speed rises above 25 fpm.

From the 1066 LCD interface, navigate to the "Adj Var" menu, "Ins Vel" and set the speed clamp to 140 fpm. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and set the "Inspect Speed" to the desired value.

8.6.9 Analog Load Weigher Setup

If the job uses an analog load weigher purchased from G.A.L., complete the following procedure.

NOTE: It is recommended using two people, one moving the weights and one in the machine room to set up the load weigher.

Mount the load weigher as described by the manufacturer. The load weigher control box will also contain a board supplied by G.A.L. that connects to the controller serial CAN bus and reads in the analog output from the load weighing device. Wire the load weigher and G.A.L. board according to the controller schematics.

Calibrate the load weighing device hardware according to the manufacturer's instructions. Following proper installation of the load weighing device, and proceed to section 3.5.9.1, Empty Car Setup.

8.6.9.1 Empty Car Setup

Verify that the load weighing device is communicating to the main CPU by performing the following steps. From the 1021 LCD interface, navigate to the "Diagnostics" menu, "Car Comm Status", "Car to LW Board" and verify that "On-line = 1". If "On-line = 0" then verify wiring and installation of load weighing device.

From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Setup Load Weigher" and follow the instructions on the display as you go through the procedure.

It is okay to exit the setup screen to place a call and then return to it while the setup is being performed.

Run the car to the bottom floor and press Enter on the 1021 LCD interface when prompted to do so to start the automatic setup sequence.

If the car is at the bottom floor and the doors are not closed (the doors will not close automatically from turning off the auto-door switch) then place a car call to run the car up one floor then back again. The doors will close when the call is placed.

When the automatic sequence is activated, the car will run to each floor and measure the empty load value. The 1021 LCD interface will indicate when the sequence if finished.

8.6.9.2 Full Car Setup

NOTE: The empty car setup must be successfully completed to run the full load setup.

Once the empty car setup is complete, run to the loading floor and set the "AUTO DOOR" switch to the "ON" position to allow weights to be loaded on the car. With the car fully loaded, test the "AUTO DOOR" switch to the "OFF" position and run the car to the bottom floor. Again if the doors are not closed, make a one floor run to force the doors to close.

With the car at the bottom floor, follow the instructions on the 1021 LCD interface to start the full load setup sequence. The car will automatically run to each floor and measure the full load value. When the full load measurement is complete, the car can be run to the loading floor and the weights removed.

After the weights are removed, cycle the doors to complete the procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "View/Modify LW Setup" and verify the load weigher status, "LW Device Stat: ON OK". If the status is "ON OK", then the load weigher should be accurately measuring the car load in real time. The percent load will be displayed, "Load: %".

The percent load values for different service options can now be set. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Service Options", and set the following variables:

- "Load Bypass"
- "Load Antinuisance"
- "Load Dispatch"
- "Load Overload"

NOTE: Setting the values of the variables above to 0% will disable that particular option.

8.6.9.3 Load Weighing Calibration Sequence

The load weigher is automatically calibrated once each week. If an error is detected during this calibration sequence, the load weigher and the pre-torque feature (if used) is disabled.

A load weighing calibration sequence can be manually activated by performing the following procedure. From the 1021 LCD interface, navigate to the "Elevator Setup" menu, "Load Weigher Setup", "Load Weigher Calibration" and follow the instructions on the display.

8.6.10 Adjust the Motor Pre-torque

NOTE: The motor pre-torque uses the load value obtained from the analog load weigher and will work only if the load weigher is installed and successfully setup.

On the HPV-900 PM drive under User Switches C1 parameter, set Pre-Torque source to serial. Run the empty car to a middle floor. From the 1021 LCD user interface, navigate to the "Adjustable Variables" menu, "Car Motion" and adjust the following parameters:

- "Balanced Load = 40" (typically car is 40% counterbalanced, but verify counterbalance percentage for each specific job)
- "Torque Amount = 10"
- "Pattern Delay = 2.5"
- "Brake Pick Del = 0.1"

The long pattern delay will allow an exaggerated amount of roll back in order for the pre-torquing to be set accurately. Make a one floor run down and observe the roll back when the brake picks at the start of the run. Increase the "Torque Amount" variable and continue to monitor the roll back while performing one floor runs in the down direction. As the "Torque Amount" is increased, the roll back should be minimized until the car will hold zero speed for the entire "Pattern Delay" time. A typical value for the "Torque Amount" is 40%. If the value is too large, the car will roll forward during the "Pattern Delay" time.

Note: The pattern delay must be at least 0.15 seconds (150 milliseconds). Setting the torque amount to 0.00 will disable the pre-torque feature. Also if the load weighing calibration sequence detects a load weighing error, the pre-torque feature is also automatically disabled.

8.6.11 Verify the Doors Are Safe

The elevator should now be adjusted. Verify that all door locks, gate switches, and safety circuits are operational. Set the "INS" switch to the "NORM" position and set the "AUTO DOOR" switch to the "ON" position. The elevator should level into the floor and open the doors. If the doors do not open, check the door operator wiring and cam adjustment. If the doors do open, the elevator is now on independent service.

8.6.12 Fine Tune the Ride Quality

Ride the elevator and evaluate the ride quality. Fine tune ride quality by navigating to the "Adjustable Variables" menu, "Car Motion" and adjusting the variables shown in Figure 4.2. Keep in mind that if acceleration or deceleration values are changed, the speed clamps for the safety processor board and the S-curve board may need to be re-adjusted.

To fine tune the floor level accuracy, determine if the controller is set to stop when "UL" and "DL" signals turn on, or if controller is set to stop off of the position count. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Motion" and view the "Stop On Pos Cnt" variable. If "Stop On Pos Cnt = 0" then controller is set to stop when the "UL and "DL" signals turn on. If "Stop On Pos Cnt = 1" then controller is set to stop on a combination of the floor level magnet and the position count.

With "Stop On Pos Cnt = 0", the floor levels should be set by adjusting the floor level magnet at each floor. For proper operation, the floor magnets should be set to exactly floor level. After the floor levels are set properly, perform another hoistway learn procedure.

With "Stop On Pos Cnt = 1", the floor levels are set by using both the floor magnet and the position count. For proper operation with this setting, the floor magnet should be set to exactly floor level. The final stop can then be fine-tuned by performing the following adjustments.

From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "DZ & LZ Offset, Sel Cnt" and adjust "Dn Lev Dist" and "Up Lev Dist". The units for these variables are in "pulse counts". With "Stop On Pos Cnt =1" the car will continue to move for the "Dn Lev Dist" or "Up Lev Dist" after "UL and DL" turn on. Use the "Dn Lev Dist" and the "Up Lev Dist" parameters to make level changes at all floors.

To make level changes at individual floors, perform the following adjustments. From the 1021 LCD interface, navigate to the "Hoistway Tables" menu, "FL and FL Offset Count", and the offset count can be adjusted. These variables introduce an offset (+/-) to the stored floor count that was determined in the hoistway learn procedure.

NOTE: The number of pulse counts per inch can be viewed from the 1021 LCD interface, "Hoistway Tables", "DZ & LZ Offset, Sel Cnt", "Pulses/Inch".

NOTE: Regardless if "Stop On Pos Cnt=0" or if "Stop On Pos Cnt =1", the floor magnet must be set properly at floor level. If too large of values are entered into "Dn Lev Dist", "Up Lev Dist", or "Offset", the car will drive past the floor level magnet and re-level.

Check all signal devices for proper operation and remove all temporary jumpers. The adjustment should now be complete.

Section 9 - Troubleshooting

9.1 General Information

The GALaxy controller is equipped with a number of features that aid in troubleshooting any problems that may occur. The physical layout of the controller provides ready access to all I/O in order to make voltage measurements. All inputs have LED’s that monitor the state of the input. The controller is equipped with the 1021 LCD interface for the Main CPU and the 1066 LCD interface for the Safety Processor Board. Section 10 describes the use of the 1021 LCD interface, and Section 13 describes the use of the 1066 LCD interface. In this section the basic points of troubleshooting will be detailed.

9.2 Microprocessor CPU

The CPU is very reliable and normally trouble free. With power turned on, the “axy” in GALaxy on the 1021 LCD interface should be blinking at one second intervals to indicate that the CPU is running. If it is not blinking, then check voltage at the 5V terminal with respect to the 0V terminal on the 1064 board. This voltage should read 5VDC. If not, then check the input and output voltage of the DC power supply. If the “axy” is not blinking and 5VDC is present at the 5V terminal with respect to the 0V terminal, then contact the factory.

All job parameters that are field adjustable are stored in a non-volatile SRAM chip on the 1036 board. If the field adjustable parameters return to the default settings when the main power is turned off, check that the J1 (Pin Devices) jumper on the 1036 board is set to 28 pin and the J2 (VDROP) jumper on the 1036 board is on. Both jumpers are located on the lower right hand corner of the 1036 board.

9.3 Input/output Boards

The two main sections of all the I/O boards are the low voltage and the high voltage sections. The low voltage section consists of all the digital interfacing necessary for the CPU to communicate with the field components. The high voltage section consists of the field components (buttons, switches, lights, relays and sensors) and their associated input and output signals. The standard voltage for all I/O is 120VAC. However, if necessary, the I/O boards can accept a voltage range from 24V to 120V AC and 24V DC.

It is very important that the wiring schematics are reviewed in order to determine the voltages for which the controller was designed before applying power. The majority of problems that may arise with the control system are due to faulty inputs or outputs on the high voltage side of the system. For example, having a limit switch not feeding or an acknowledgment light out. The GALaxy control system is designed to enable the technician to check both the high voltage section and the low voltage section to correct the problem.

The high voltage section is checked with a digital voltmeter or with the individual LEDs that are associated with each input. Depending on the particular input or output, the voltage measured at the terminal will either be “high” or “low” with respect to its reference point. For example, to determine whether or not the up terminal slowdown limit switch was feeding, the voltage should be measured at terminal “UT” with respect to “GND”. If the switch is feeding it should read 120VAC. If the switch is open, the voltage should read less than 50VAC. Another means by which to determine whether the switch is feeding is to view the “UT” input LED. If the LED is on, the switch is feeding. If the LED is off, the switch is open.

The previous example determines whether or not the field component is functioning properly. However, to determine if the signal is actually being communicated to the CPU the signal must be checked on the low voltage section of the board. The low voltage section is checked from the 1021 LCD interface. Using the previous example, from the 1021 LCD interface, navigate to the "Inputs and Outputs" menu, "Car Inputs and Outputs" and scroll through the I/O list until the "UT" input is located. The LCD will display "UT=1" if the "UT" switch is feeding and "UT=0" if the switch is open.

A second example will show how to determine if an output is working properly. With the car at the first floor and the controller designed for 120VAC discrete position indicators, the “P1” output should be on. The voltage measured at terminal “P1” with respect to “GND”, should read 120VAC. If the voltage reads less than 50VAC, the voltage supplied to the output device must be checked. The schematic, in this case, would show the “P1” voltage is supplied at the “PIC” terminal. A voltmeter would be used to measure the voltage between “PIC” and “GND”. If that voltage is at the terminal but the indicator is not on. The 1021 LCD interface could be used to view if the CPU is turning the “P1” output on. From the 1021 LCD interface, navigate to the "Inputs and Outputs" menu, "Car Inputs and Outputs" and, scroll through the I/O list until the “P1” is located. The display will show “P1=1” which indicates that the CPU is sending a signal to turn on the “P1” output. For this example, since the CPU is turning on the output, and the correct voltage is at the output common but not at the output terminal, it would indicate that the output solid-state relay for “P1” is defective and should be replaced.

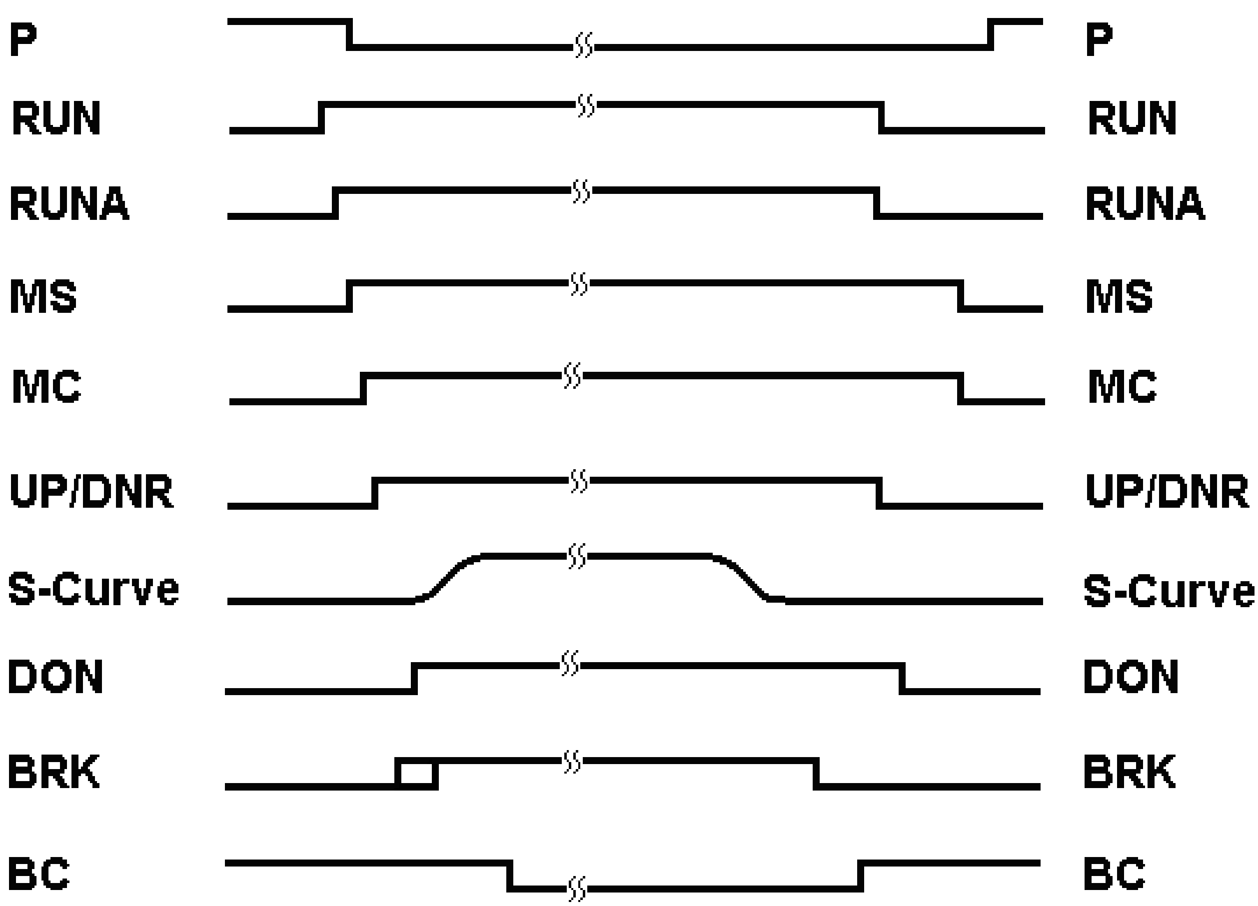
All of the I/O’s are optically isolated between the high voltage section and the low voltage section. The input optoisolators and the output solid-state relays are socketed IC's that are labeled on the silk screen of the various I/O boards with a "U" number (for example U45). If it is determined through the previous troubleshooting procedures that the input signal is present at the terminal, but is not being communicated to the CPU, the input optoisolator may be defective and can be replaced in the field. If it is determined that the CPU is communicating the output signal to the solid-state relay, but the voltage does not go high at the terminal, the solid-state relay may be defective and can be replaced in the field. Any time IC’s are replaced, the power should be turned off and care should be taken in removal of the old chip and replacement of the new one.

All of the I/O and their associated IC's are listed in the wiring schematics.

9.4 Run Sequence

The following diagram in Figure 9.0 shows the run sequence of the controller. The timing of BRK changes with the adjustment variable DON Start Control. When set to 0 the BRK output turns on before DON and when set to 1 BRK turns on after DON. The BRK timing typical works best with the adjustable variable set to 0 for VVVF and 1 for DC SCR.

Figure 9.0 Run Sequence



PAL Inhibit (off to run)

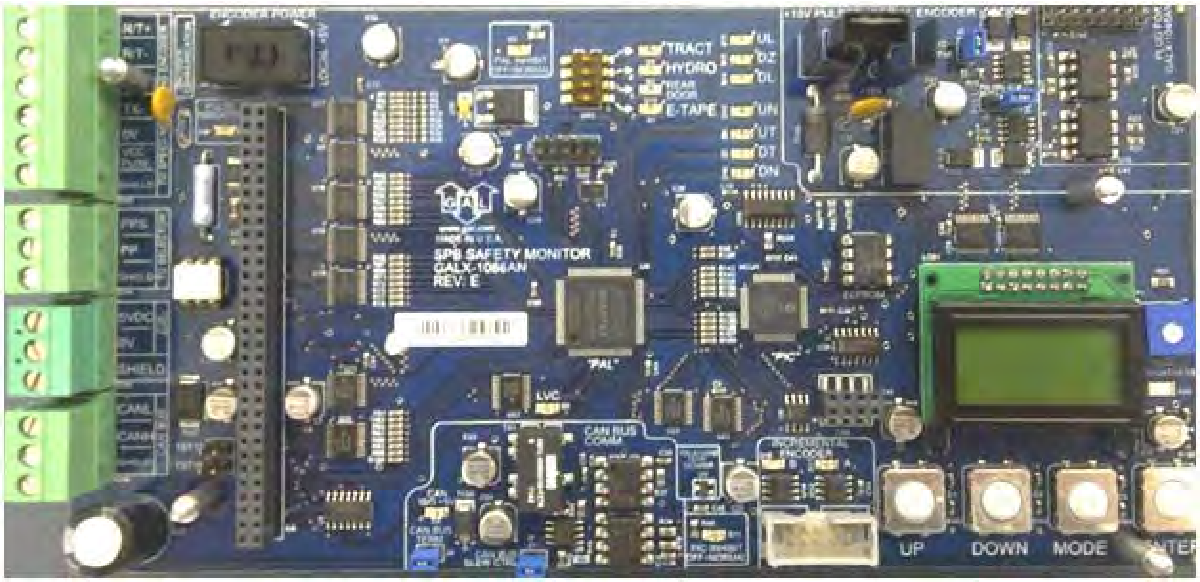


Figure 9.1a: Safety Processor Board

PIC Inhibit (off to run)

9.5 The Safety Processor Board

The Safety Processor Board has two fault LED's, one on the top center and one on the bottom center of the board. The top center LED is for PAL inhibit and the bottom center one is for PIC inhibit (See Figure 9.1a).

Important: When either LED is on, this board will prevent the car from running.

The Safety Processor Board performs the following functions:

• verifies the speed of the car when terminal limits are activated

• verifies that the doors are closed and safe to run

• verifies all inspection operations

• verifies that the car velocity is not greater than 150 fpm in the door zone and with the doors open.

While the Safety Processor Board cannot turn on any run control signals, it can turn off the follow signals from the main CPU: RUNA, BRK, UP, DNR, UPF and DF. The SFC relay in the safety string is also controlled by the Safety Processor Board.

The Safety Processor board detects two types of faults, active faults and velocity faults. Active faults are input conditions that are considered as unsafe or an error such as the lock bypass switch place on while the car is on automatic. Velocity faults are generated when the Safety Processor Board detects that the car speed is too high during certain conditions, such as hitting the DTS terminal limit at a speed greater than the speed setting for that limit. Both types of faults are reset after a 2 second delay, the condition is corrected and the main CPU is not commanding an up or down run.

When troubleshooting errors detected by the Safety Processor board, take the following steps:

• Check LED status. Either PAL inhibit or PIC inhibit LED on indicates an error.

• View the elevator service “Elev Serv”. Anything other than Automatic or a valid inspection service is an error.

• From the 1066 LCD interface, navigate to the "Inp/Out" menu, and view all of the I/O status. See section 13 for a complete description of the input and output signals.

• From the 1066 LCD interface, navigate to the "Faults" menu, and view the recorded faults. The Safety Processor Board faults are recorded in ram and will be lost when power is turned off.

As mentioned earlier, RUNA is one of the signals that can be turned off by the Safety Processor Board. If a "RUNA Off" error is generated on the 1021 LCD interface (main CPU), it is typically caused by the Safety Processor detecting an error at the instant the run is starting. When a RUNA Off error is recorded, check the status of the Safety Processor board first.

During a fault condition when the Safety Processor drops the SFC relay, every input after the SFC terminal will lose voltage including the inputs for the normal and terminal limits. This could cause an Up or Down directional limit error on the main CPU.

Additional fault information is shown in the next section of system faults.

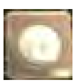
9.6 System Faults

Faults that are detected by the main CPU can be viewed on the 1021 LCD interface by navigating to the "Fault Log" menu, "View Fault Log". The lists of possible faults detected by the main CPU are listed in this section 11: Main CPU Faults. By pressing the "ENTER" button on the 1021 LCD interface when the particular fault is being displayed, the interface will display detailed information for that fault. Table 9.2: Detailed Faults describes this information. In general, when a fault occurs, the system records the state of all the items listed in Table 9.2 and makes that information available for troubleshooting purposes.

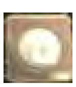
Faults that are detected by the Safety Processor board can be viewed on the 1066 LCD interface by navigating to the "Faults" menu. The possible faults detected by the Safety Processor are listed in section 13.

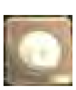
Section 10 – 1021 LCD Interface

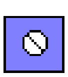
10.1 Operating the 1021 LCD Interface

 **UP** button is used to scroll up to the next menu item or to increment a data value.

 **DOWN** button is used to scroll down to the next menu item or to decrement a data value.

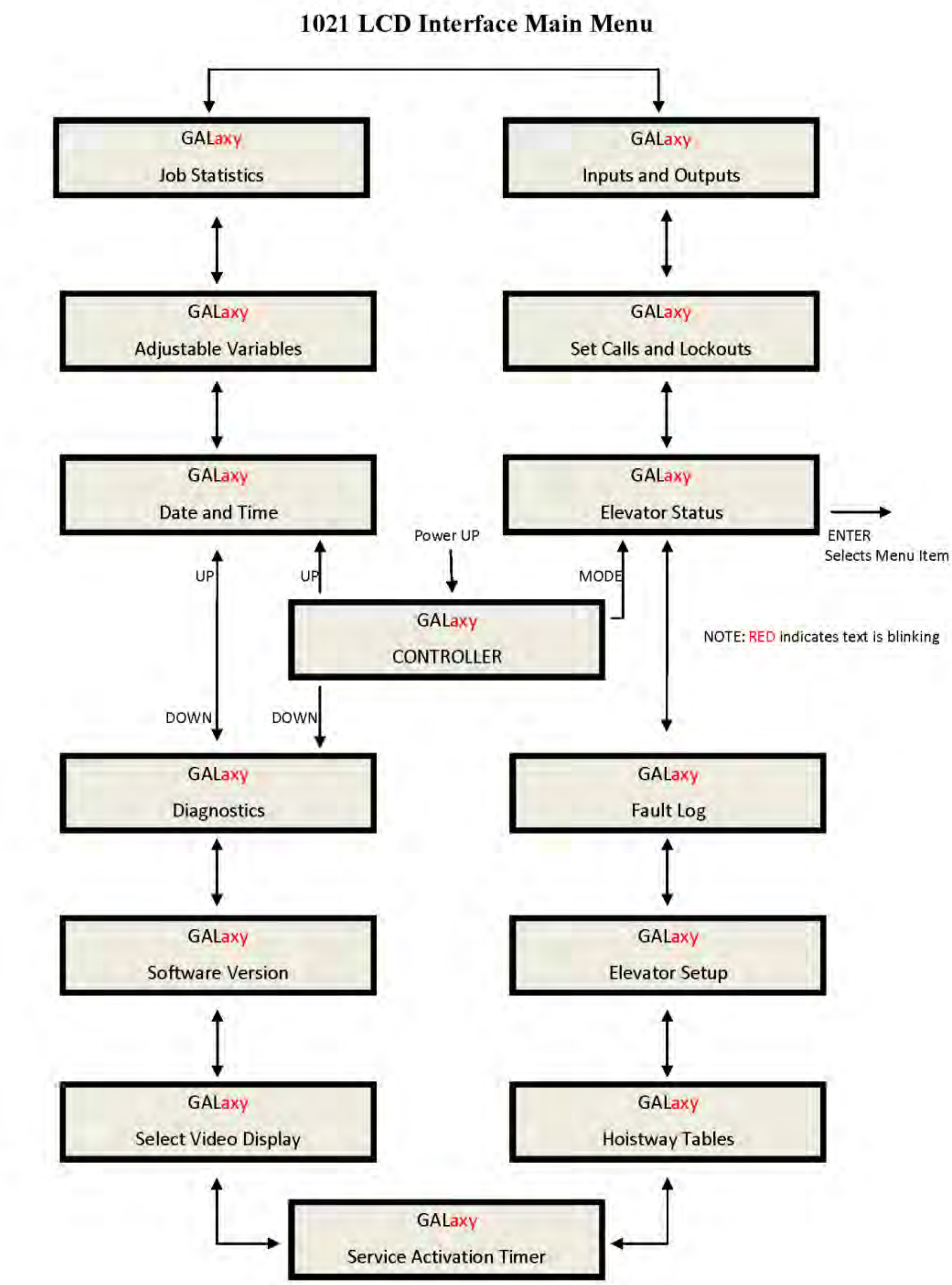
 **MODE** button is used to go back to the previous menu or to select a digit of a data value.

 **ENTER** button is used to select the menu item or to complete the operation of changing a data value.

 **Potentiometer** is used to adjust the viewing angle. It will make the display lighter or darker.

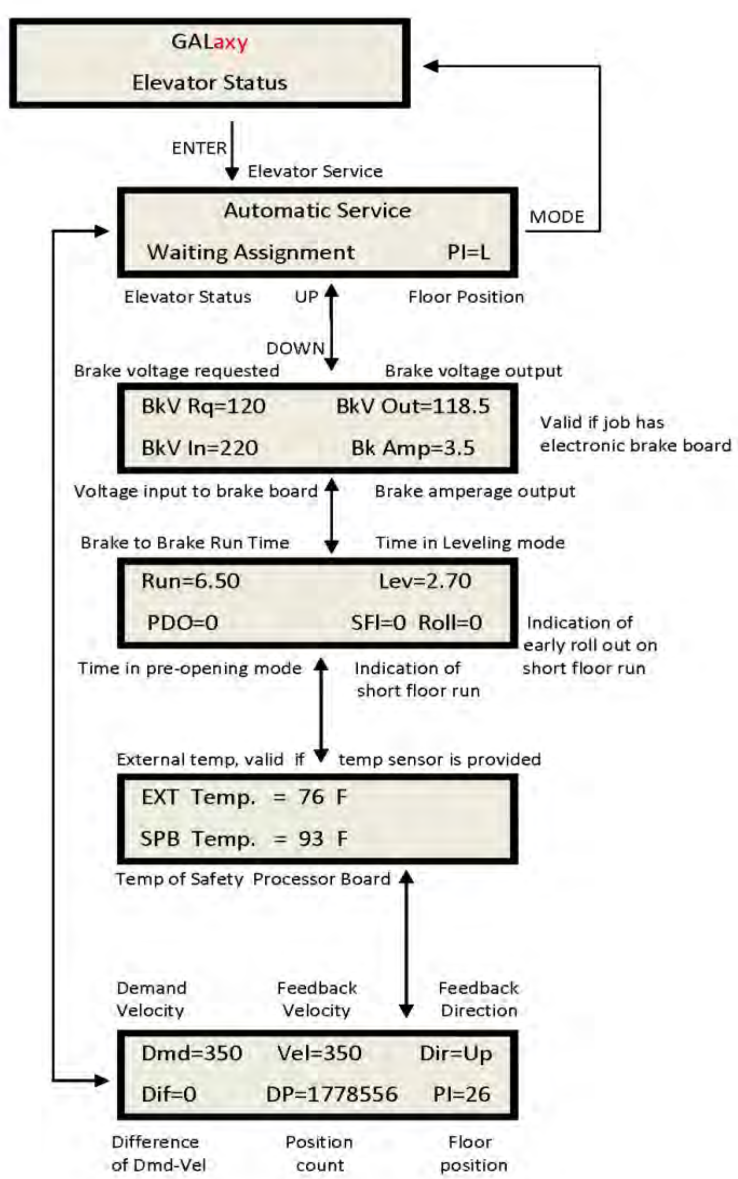
The LCD display interface board uses a 2 line by 24 character display and four buttons. This interface allows the user to adjust parameters, view critical controller information, to implement the controller setup and to view the elevator status. Upon power-up the display shows a blinking GALaxy name to indicate the controller is running as show above.

The four inputs buttons used with the LCD display are, UP, DOWN, MODE and ENTER. The UP and DOWN buttons are used to scroll up and down to each menu item. When an appropriate menu item is reached, the ENTER button is used to select the item. Some menu items, once selected, show a second menu. Again, use the UP and DOWN buttons to scroll through the menu items and the ENTER button to select a particular item. The MODE button is used to go back to the previous menu. When a menu item is an adjustable variable, select the item with the ENTER button and change the variable with the UP or DOWN button. The MODE button is used to move the cursor to the next digit. When the appropriate value is reached, used the ENTER button to complete the variable change operation and return to the current menu.



The elevator status display continuously updates to show the current status and fault information. The Up and Down keys allows access to both status display and he velocity display. When a system fault occurs, it will be displayed on the top line of the status display while the fault exist and will remain for 60 seconds after the fault is cleared. The following status information can be displayed:

1021 LCD Interface Main Menu
Elevator Status



Elevator Service:
Out of Service
Automatic Service
Independent Service
Load Weighing By Pass
Attendant Service
Code Blue Service
Fire Service Phase II
Emergency Power Service
Earth Quake Service
Fire Phase I Main Return
Fire Phase I Alt Return
Homing
Reset Going Up
Reset Going Down
Stalled Out of Service

Fault Status:
Reset Fault
Out Of Step Fault
Binary Input Fault
Safety String Fault
Door Zone Fault
Stalled Fault
Door Open Fault
Door Close Fault
Up Directional Fault
Dn Directional Fault
No Potential Fault
Stop Switch Fault
Gate or Interlock
LC Fuse Blown Fault
HC Fuse Blown Fault
Drive Ready Fault
'P' Input Off Fault
Car Safe Fault
UL or DL off Fault
Delta off Fault
UT count Fault
UT1 count Fault
UT2 count Fault
UT3 count Fault
DT count Fault
DT1 count Fault
DT2 count Fault
DT3 count Fault
Rear Door Open Flt
Rear Door Close Flt
Group Comm Loss
Car 1 Comm Loss
Car 2 Comm Loss
Car 3 Comm Loss
Car 4 Comm Loss
Car 5 Comm Loss
Car 6 Comm Loss
RUN I/O Failed ON
Fault #39
RUN I/O Failed OFF
RUNA I/O Failed ON
RUNA I/O Failed OFF
UP I/O Failed ON
UP I/O Failed OFF
DNR I/O Failed ON
DNR I/O Failed OFF
UPF I/O Failed ON
UPF I/O Failed OFF
DF I/O Failed ON
DF I/O Failed OFF
MCC I/O Failed ON
MCC I/O Failed OFF
MCA I/O Failed ON
MCA I/O Failed OFF
BRK I/O Failed ON
BRK I/O Failed OFF
DON I/O Failed ON
DON I/O Failed OFF
RUN I/O or UP Fail
RUN I/O or DNR Fail
Top Door Lock Fault
Mid Door Lock Fault
Bot Door Lock Fault
Gate Switch Fault
Rear Top Lock Fault
Rear Mid Lock Fault
Rear Bot Lock Fault

Rear Gate Sw Fault
'P' Input On Fault
Estop Fault
Inspection Input Flt
Gate/Lock Byp Sw Flt
GRT1 input ON Fault
GRT1 input OFF Fault
GRT2 input ON Fault
GRT2 input OFF Fault
Gripper did not Pick
Gripper Trip Fault

Elevator Status:

Reset Mode PI= 1
Inspection Mode PI= 1
Up Fast PI= 1
Up Transition PI= 1
Leveling Up PI= 1
Down Fast PI= 1
Down Transition PI= 1
Leveling Down PI= 1
Soft Start Mode PI= 1
Constant Accel PI= 1
Roll Over Max Vel PI= 1
Constant Velocity PI= 1
Roll Over Deccel PI= 1
Constant Deccel PI= 1
Targeting Floor PI= 1
Emergency Slowdown PI= 1
Safety String Open PI= 1
Elevator Off Line PI= 1
Elevator Parked PI= 1
Waiting Assignment PI= 1
Door Procedure PI= 1
Elevator Stalled PI= 1

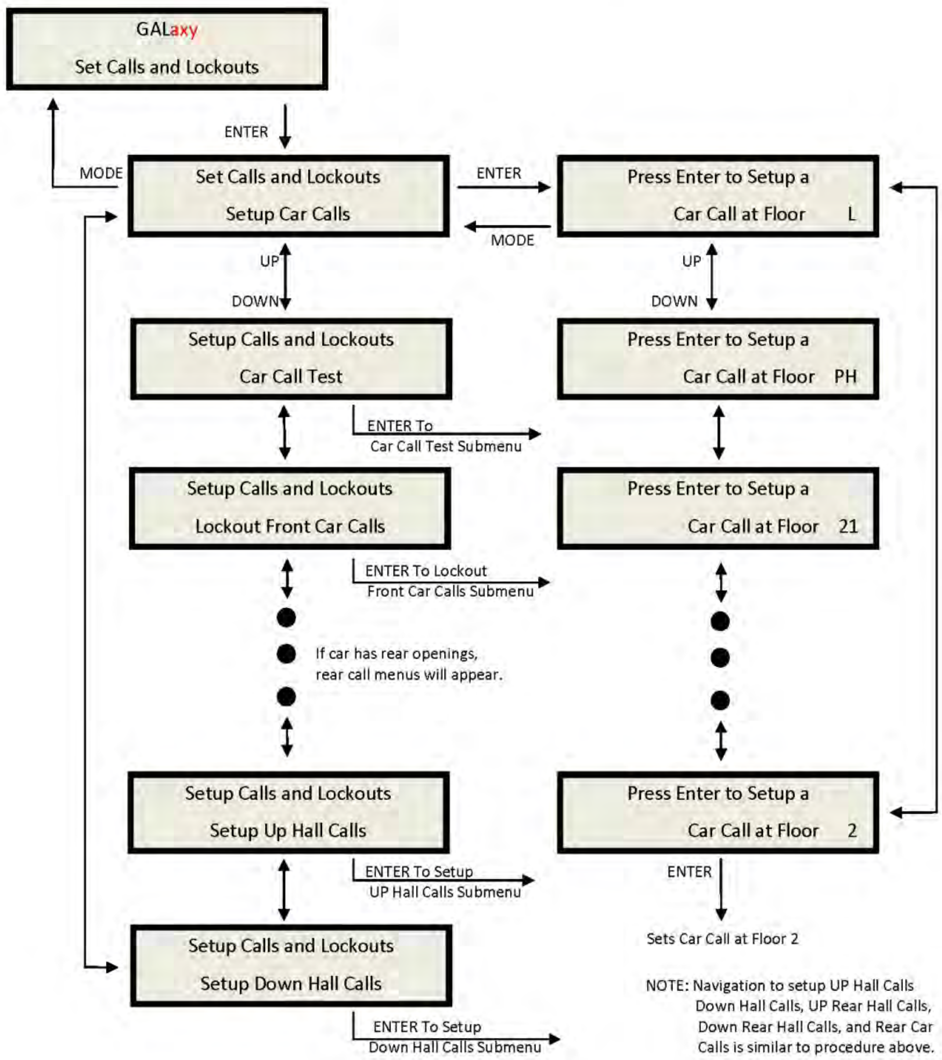
Door Status:

Elev Door Closed PI= 1
Elev Door Opening PI= 1
Elev Door Dwelling PI= 1
Elev Door Open PI= 1
Elev Door Closing PI= 1
Elev Door Nudging PI= 1
F1RET Door Open PI= 1
F2CPO Door Open PI= 1
F2CPO Door Opening PI= 1
F2CPO Door Closed PI= 1
F2CPO Door Closing PI= 1
F2CPC Door Open PI= 1
F2CPC Door Opening PI= 1
F2CPC Door Closed PI= 1
F2CPC Door Closing PI= 1
F2HLD Door Open PI= 1
F2HLD Door Opening PI= 1
F2HLD Door Closed PI= 1
F2HLD Door Closing PI= 1
F2MBC Door Open PI= 1
F2MBC Door Opening PI= 1
F2MBC Door Closed PI= 1
F2MBC Door Closing PI= 1

Rear Door Status:

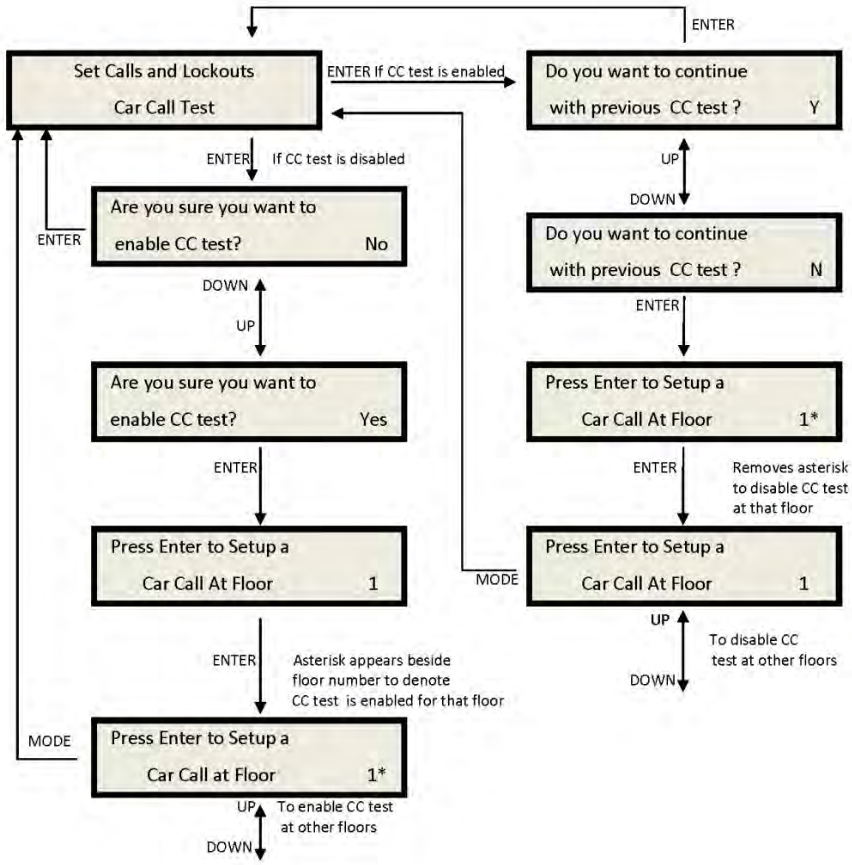
Rear Door Closed PI= 1
Rear Door Opening PI= 1
Rear Door Dwelling PI= 1
Rear Door Open PI= 1
Rear Door Closing PI= 1
Rear Door Nudging PI= 1
F1RET RDor Open PI= 1
F2CPO RDor Open PI= 1
F2CPO RDor Opening PI= 1
F2CPO RDor Closed PI= 1
F2CPO RDor Closing PI= 1
F2CPC RDor Open PI= 1
F2CPC RDor Opening PI= 1
F2CPC RDor Closed PI= 1
F2CPC RDor Closing PI= 1
F2HLD RDor Open PI= 1
F2HLD RDor Opening PI= 1
F2HLD RDor Closed PI= 1
F2HLD RDor Closing PI= 1
F2MBC RDor Open PI= 1
F2MBC RDor Opening PI= 1
F2MBC RDor Closed PI= 1
F2MBC RDor Closing PI= 1

1021 LCD Interface Main Menu
Set Calls and Lockouts



When a car is in the group the menu system allows access to setting both hall calls and car calls. When not the group, only car calls can be set. Rear lockouts are only displayed only when the car has a rear door.

1021 LCD Interface
Car Call Test Sub-menu



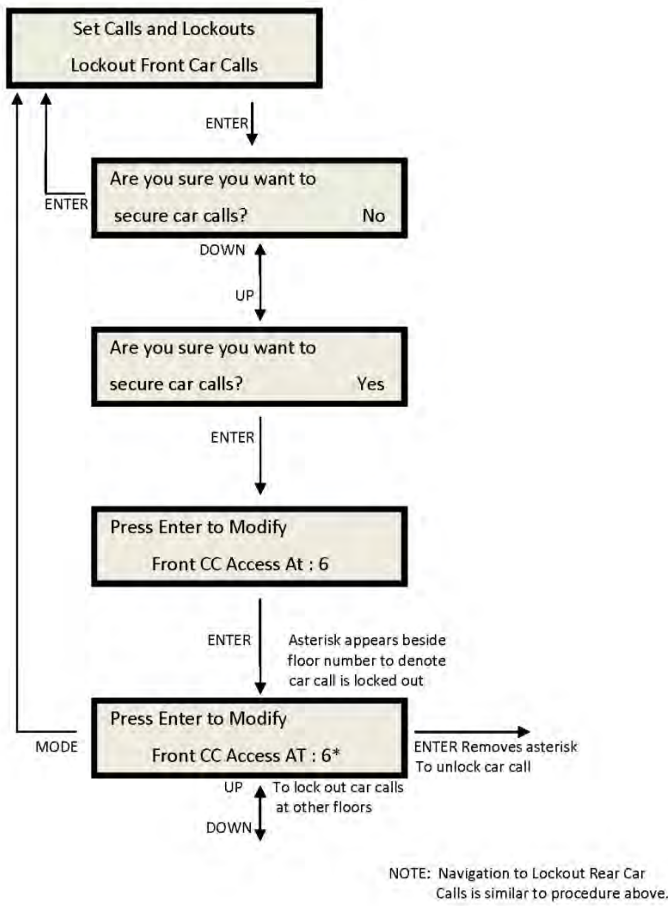
This menu allows the mechanic to initiate a continuous test of the elevator. The test can be conducted with the "AUTO DOORS" switch set to "ON" or "OFF". By following the instructions from the menu, the "Car Call Test" can be initiated or discontinued. When performing the "Car Call Test", the car will answer all of the registered calls in one direction. When the last call has been answered, the calls will be re-initiated automatically, and the car will answer the calls in the opposite direction. This operation will continue until one of the following occurs.

- the test is discontinued from the 1021 LCD interface
- the car is taken out of automatic operation
- a fault occurs

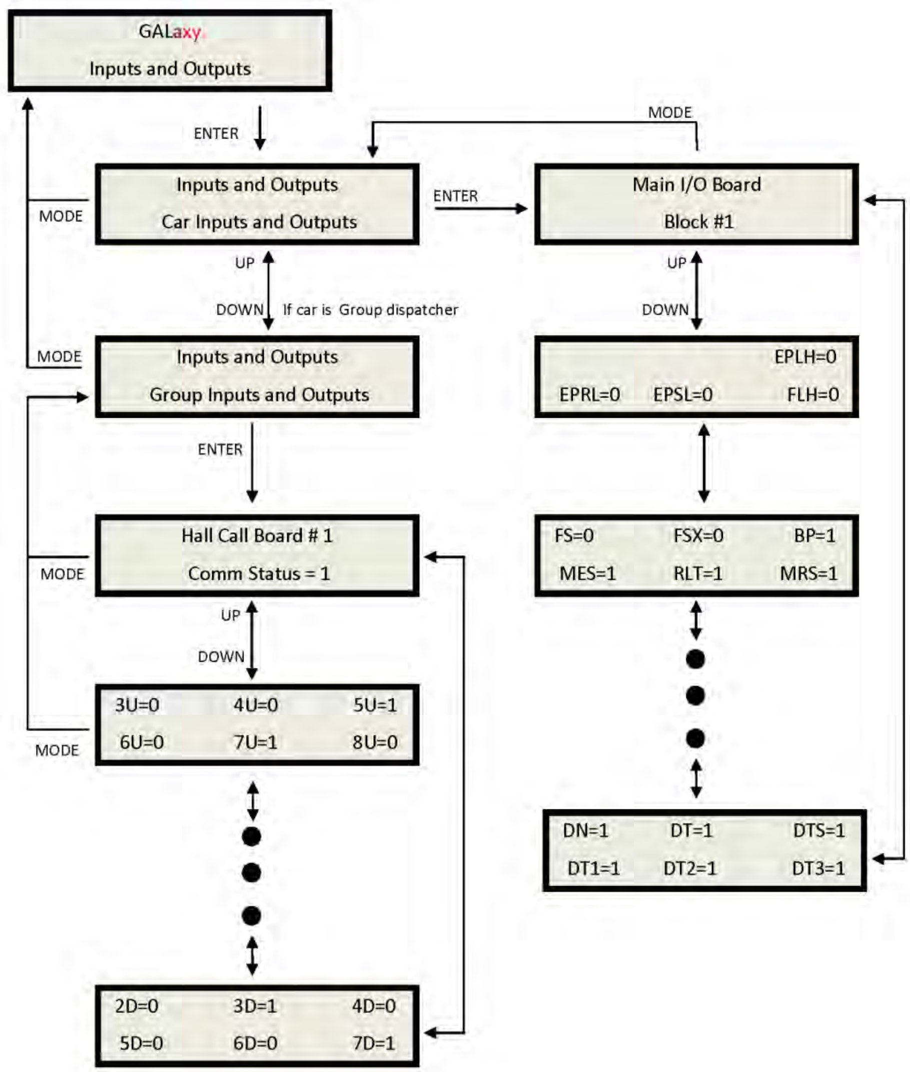
NOTE: The car will not perform the "Car Call Test" if it is on "Independent Service".

NOTE: When performing the "Car Call Test" with the "AUTO DOORS" switch set to "OFF", it is recommended to set the "Non-interference Time" to at least 5 seconds. From the 1021 LCD interface, navigate to the "Adjustable Variables" menu, "Car Timers" and set "Non Interfer T = 5".

1021 LCD Interface
Lockout Front Car Calls Sub-menu

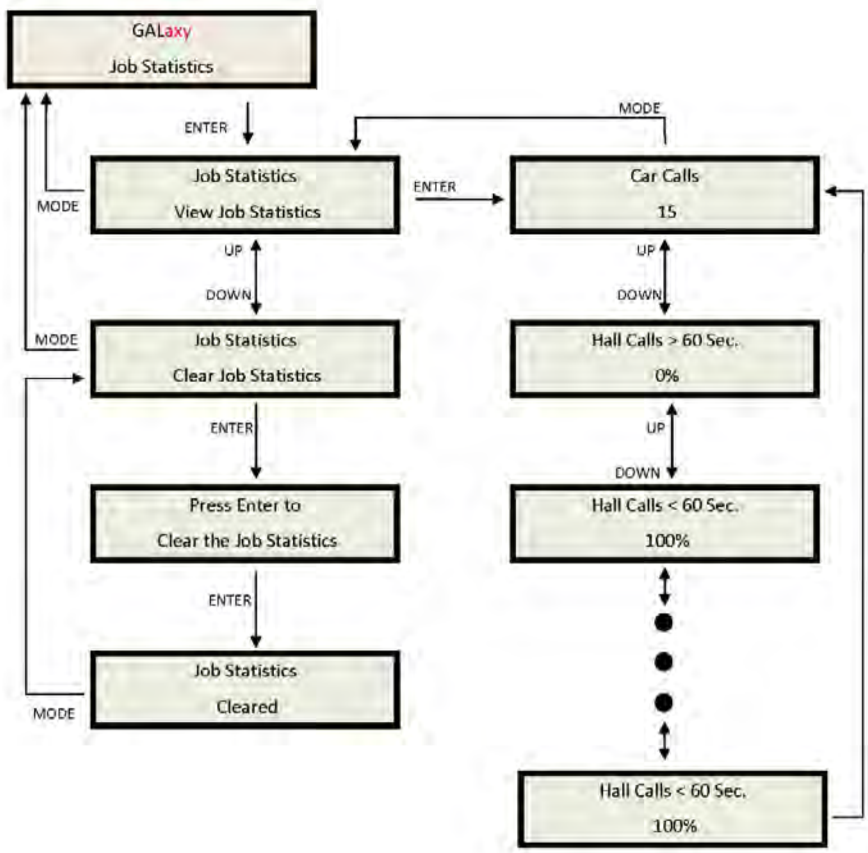


1021 LCD Interface Main Menu
Inputs and Outputs



Car Inputs & Outputs:
Inputs and outputs show a “1” for ON and a “0” for OFF. A list every input and output used on the controller and the board it is located on is shown in Appendix A. The controller determines which boards are used depending on the options selected and the number of front and rear floors. All the I/Os for a given board are displayed even if a particular I/O is not used.

Group Inputs & Outputs:
Inputs and outputs show a “1” for ON and a “0” for OFF. This I/O display is show only in the group car and only when serial hall call board are used. It the hall calls are placed on the standard car I/O they will be shown with the car I/O screen. A list every input and output used on the controller and the board it is located on is shown in Appendix A. All the I/O’ for a given board are displayed even if a particular I/O is not used.



The Job Statistics shows the number car calls and the number and percent of hall calls serviced since the job was started or since the job statistics were cleared. Below is a list of all the categories maintained:

• Number of Car Calls
• Number of Up Hall Calls
• Number of Down Hall Calls
• Number of Up Hall Calls with < 15 second wait time
• Number of Up Hall Calls with < 30 second wait time
• Number of Up Hall Calls with < 45 second wait time
• Number of Up Hall Calls with < 60 second wait time
• Number of Up Hall Calls with > 60 second wait time

• Number of Down Hall Calls with < 15 second wait time• Number of Down Hall Calls with < 30 second wait time
• Number of Down Hall Calls with < 45 second wait time
• Number of Down Hall Calls with < 60 second wait time
• Number of Down Hall Calls with > 60 second wait time
• Percent of Hall Calls with < 15 second wait time
• Percent of Hall Calls with < 30 second wait time
• Percent of Hall Calls with < 45 second wait

time

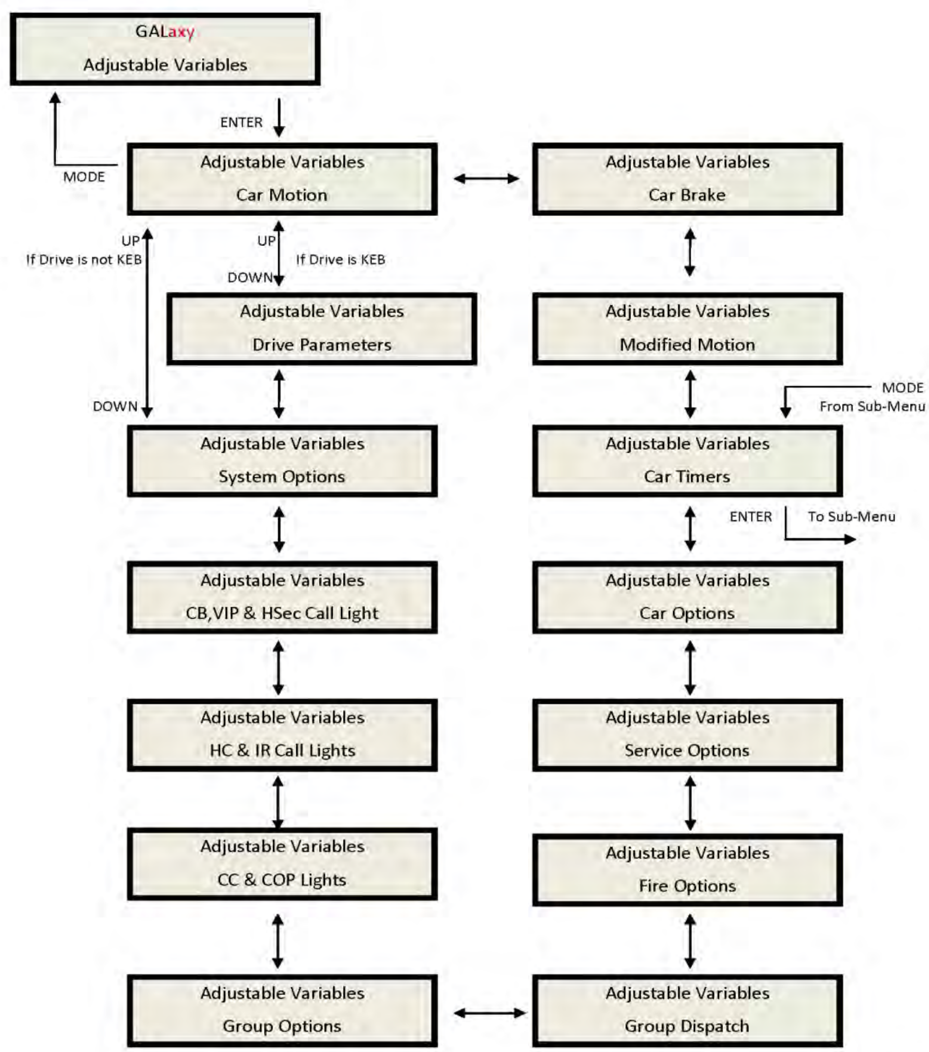
• Percent of Hall Calls with < 60 second wait time

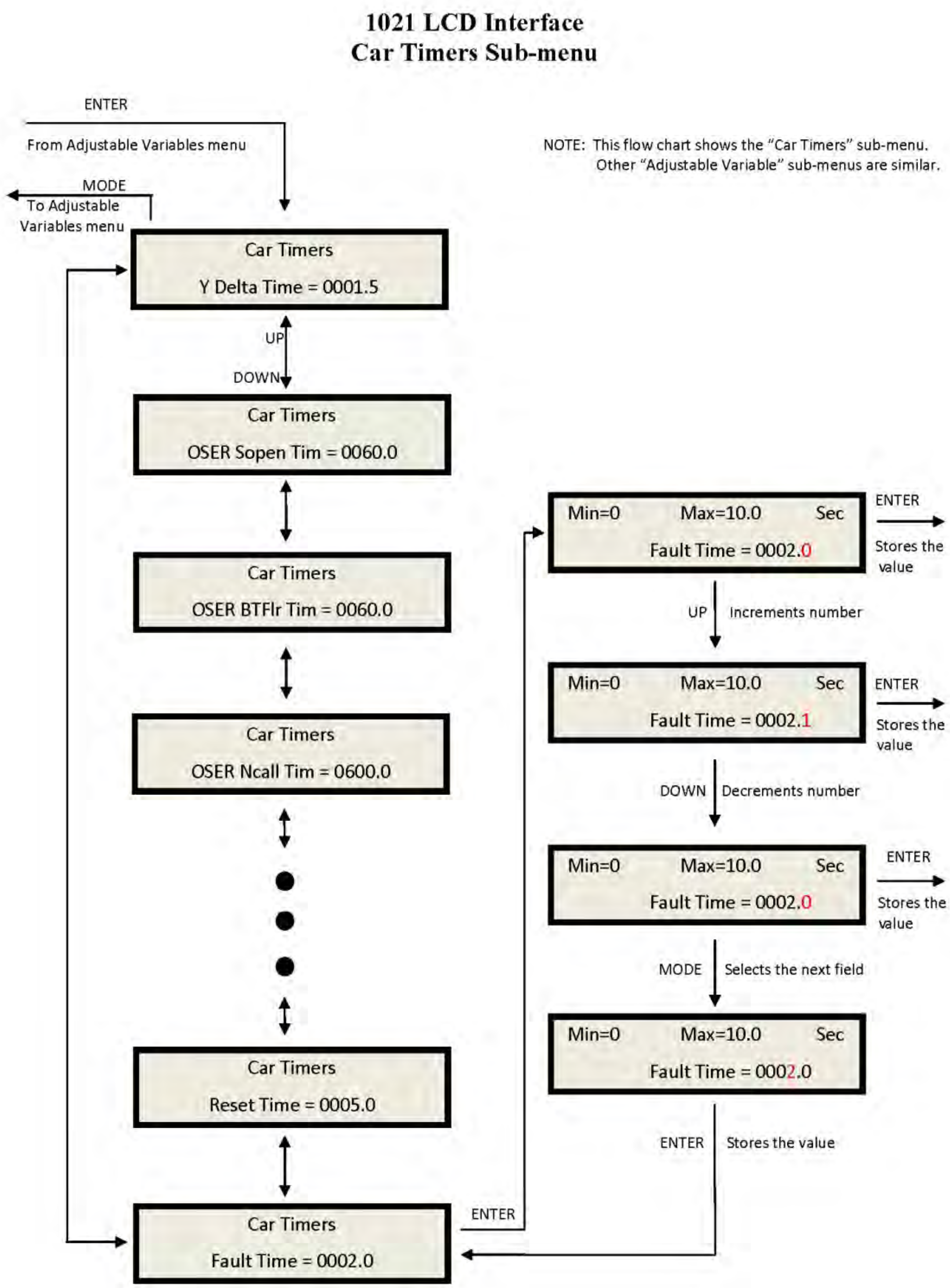
• Percent of Hall Calls with > 60 second wait time

Clear Job Statistics: This operation will set all the job statistics data to zero.

All Field variables are adjustable from the LCD Interface. Values can be changed within the valid minimum and maximum range. A complete list of field adjustable variables is shown in the Adjustable Variables section.

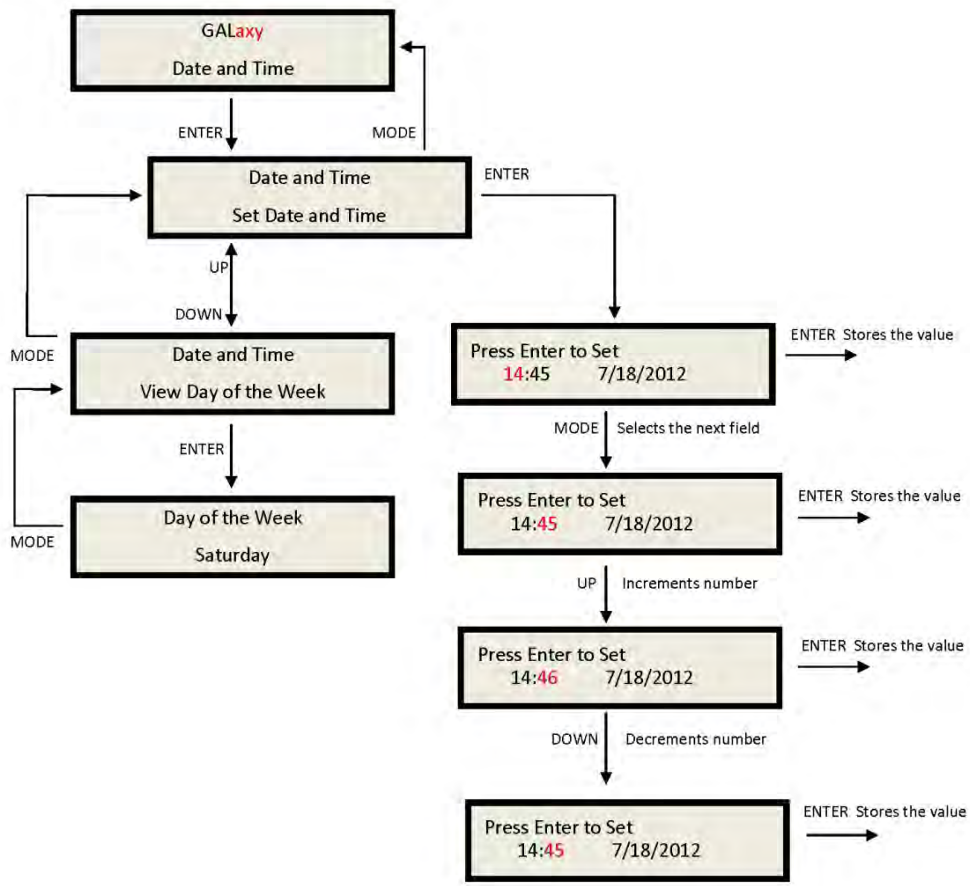
1021 LCD Interface Main Menu
Adjustable Variables





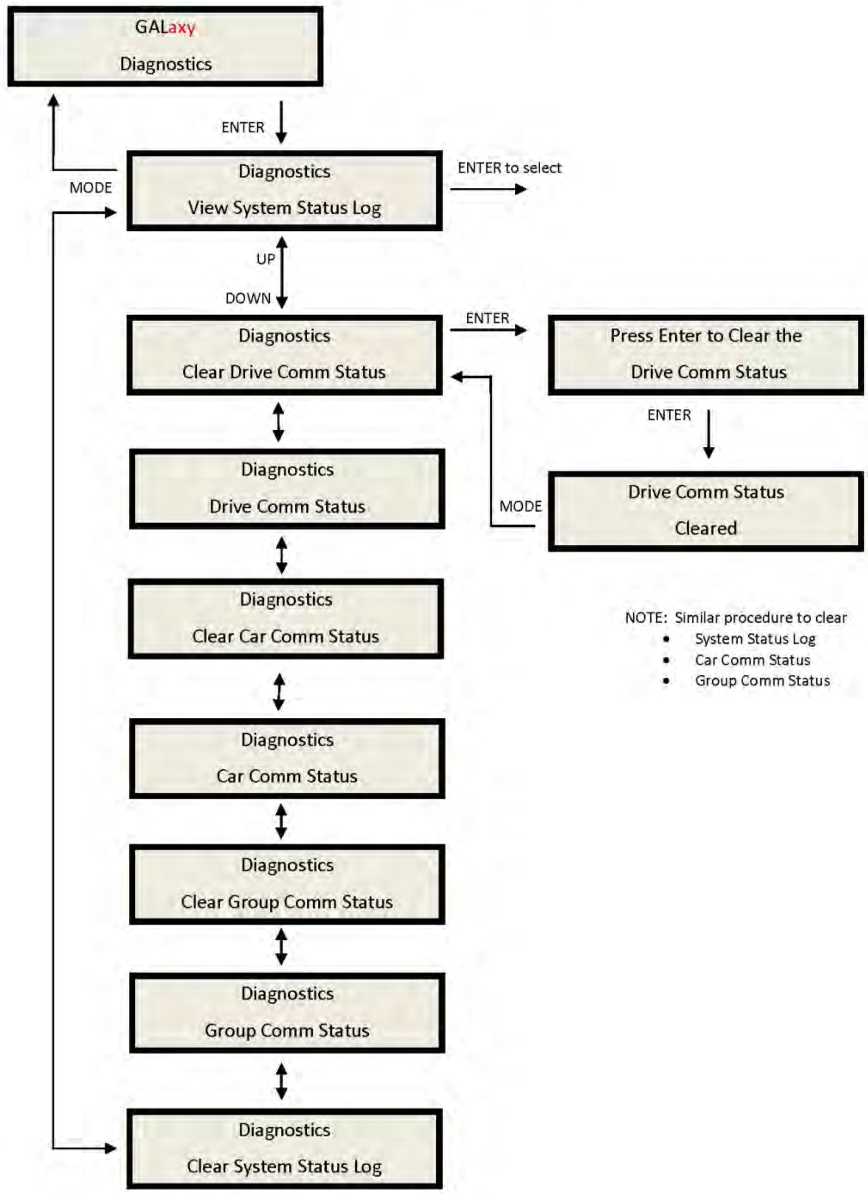
This is an example of an Adjustable Variables
sub menu.

1021 LCD Interface Main Menu
Date and Time

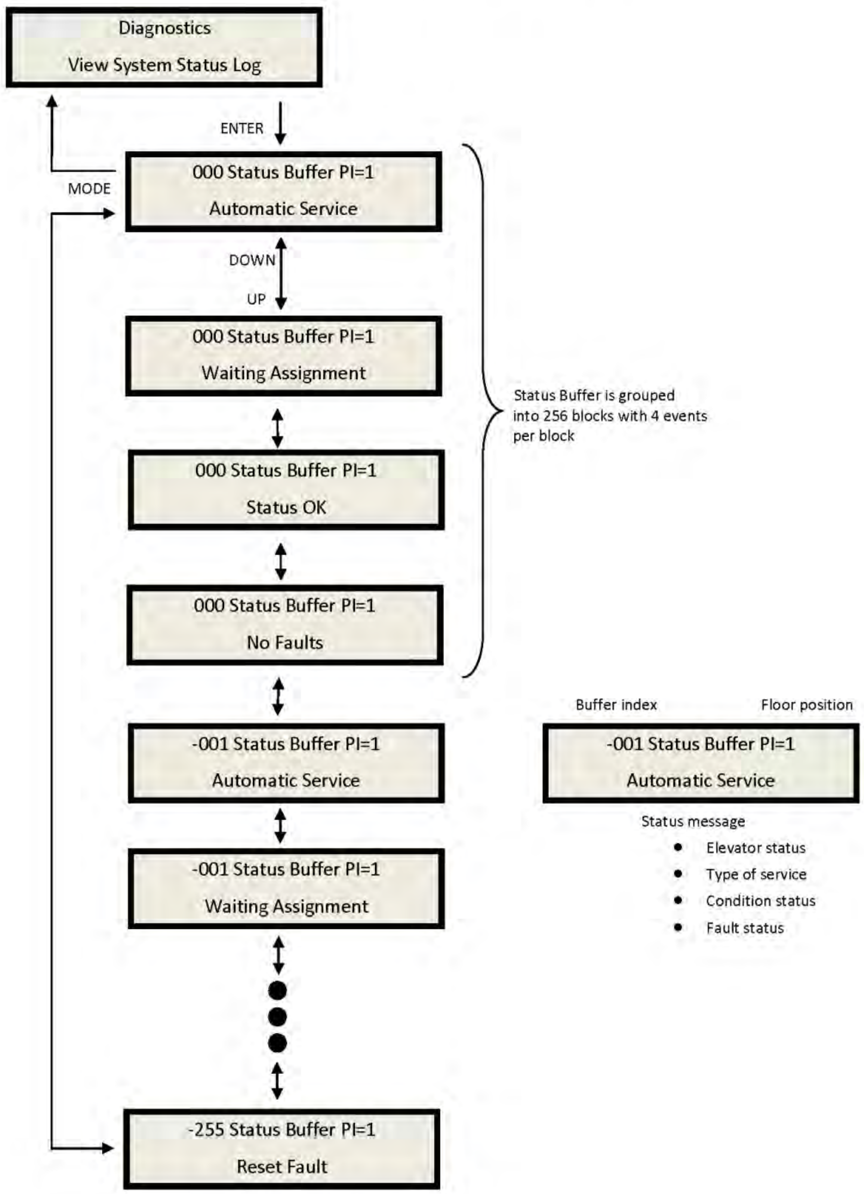


It is important to set the date and time on the controller clock so that the fault log shows the correct time sequence that faults occur.

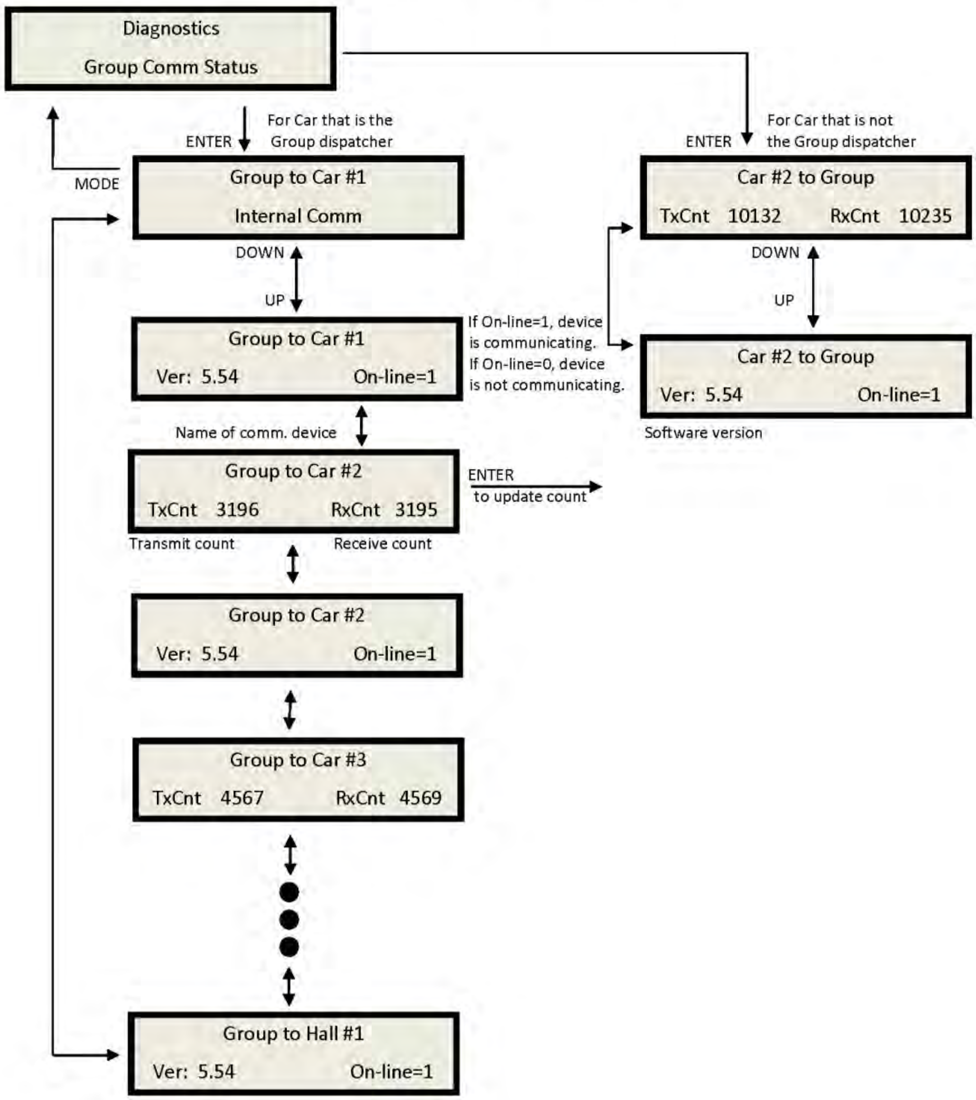
1021 LCD Interface Main Menu
Diagnostics



1021 LCD Interface
View System Status Log Sub-menu



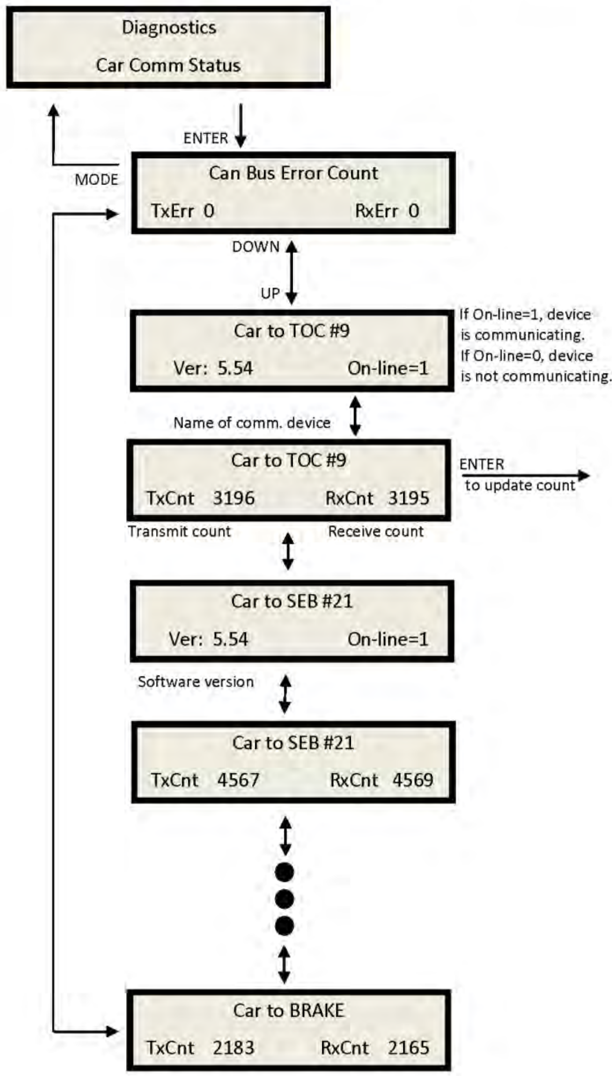
1021 LCD Interface
Group Comm Status Sub-menu



Group Comm status:

The group communications status shows the number of data packets successfully transmitted and received from the group to the cars, for the "group" car, and from the car to the group for the remaining cars. The communication sequence is always initiated by the group. The group sends a data packet to the car and after the car validates the checksum of the packet, it responds with a data packet to the group. The transmit and receive counters should always be incrementing in both the car and the "group" car. If either counter does not increment, it would indicate a poor cable connection or that there is electrical noise on the communications cable. Electrical noise is usually caused by installing the communications cable in the same conduit with high voltage wires.

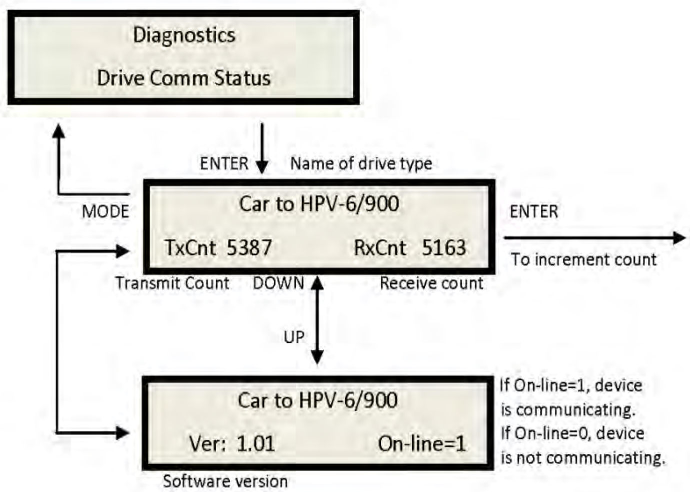
1021 LCD Interface
Car Comm Status Sub-menu



Car Comm Status:

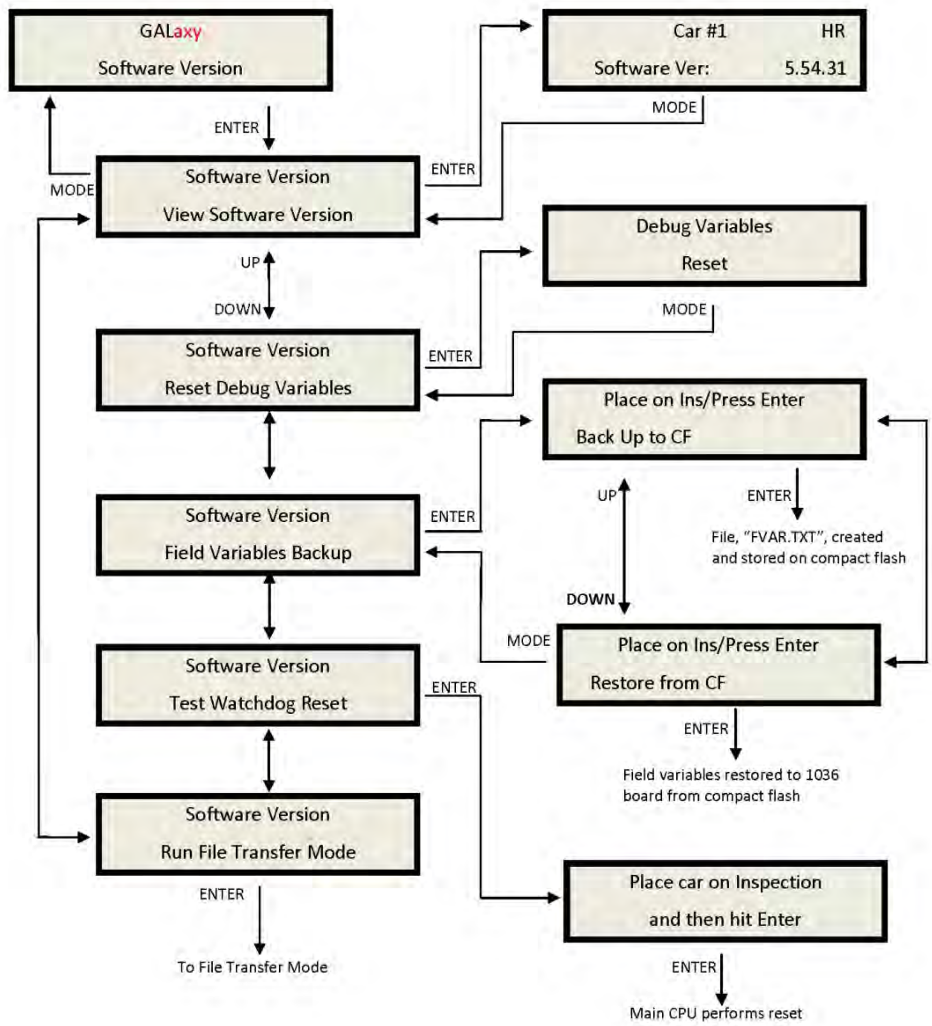
The car communications status shows the number of data packets successfully transmitted and received from the car to devices on the car's CAN bus. These devices can be mounted in the motor room, in the car operating panel or on the car top. The second line of the car status shows the device software version number and if the device is currently on line communicating. The transmit and receive counters should always be incrementing for all devices. If the receive counter does not increment, it would indicate a poor cable connection or that there is electrical noise on the communications cable. Electrical noise is usually caused by installing the communications cable in the same conduit with high voltage wires.

1021 LCD Interface
Drive Comm Status Sub-menu



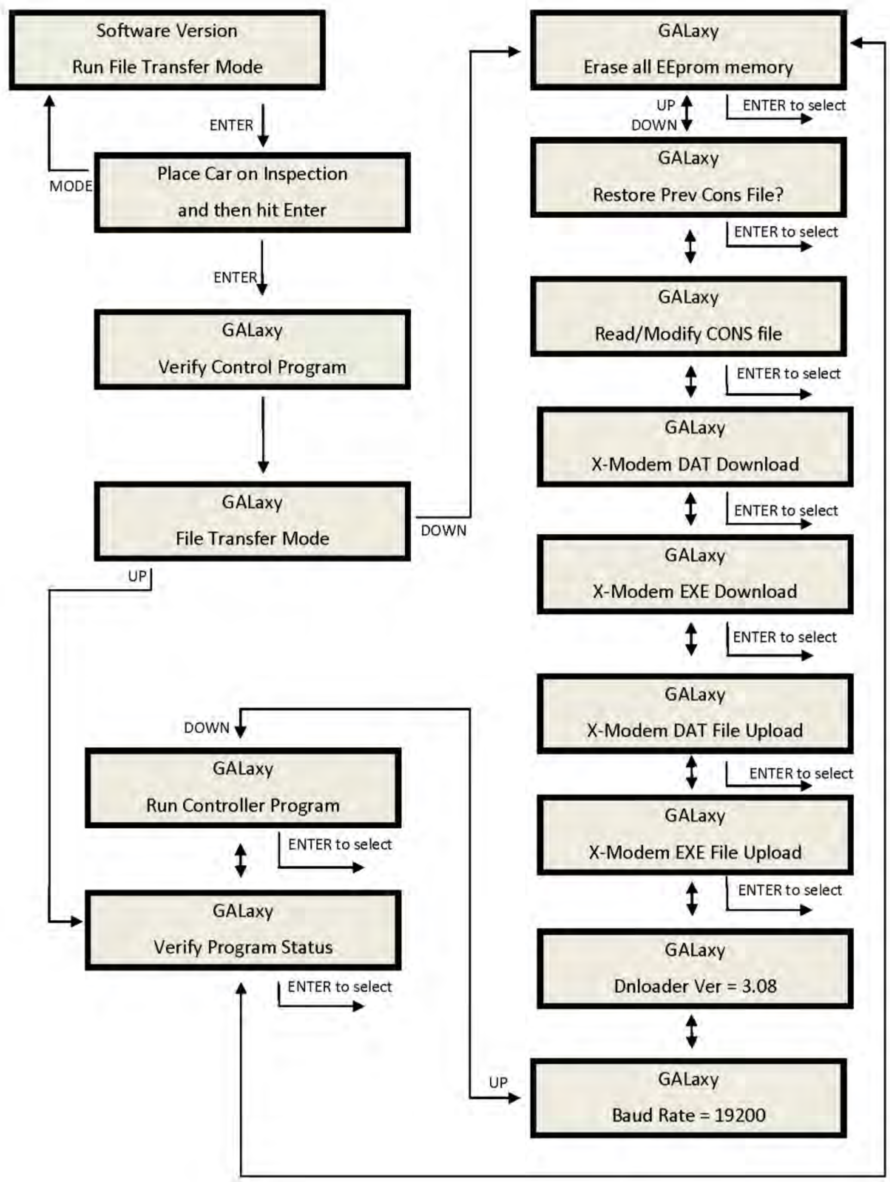
Drive Comm Status:
The drive communications status shows the number of data packets successfully transmitted and received from the car to the drive. The second line of the drive status shows the drive's software version number and if the drive is currently on line communicating. The transmit and receive counters should always be incrementing for all devices. If the receive counter does not increment, it would indicate a poor cable connection or that there is electrical noise on the communications cable.

1021 LCD Interface Main Menu
Software Version

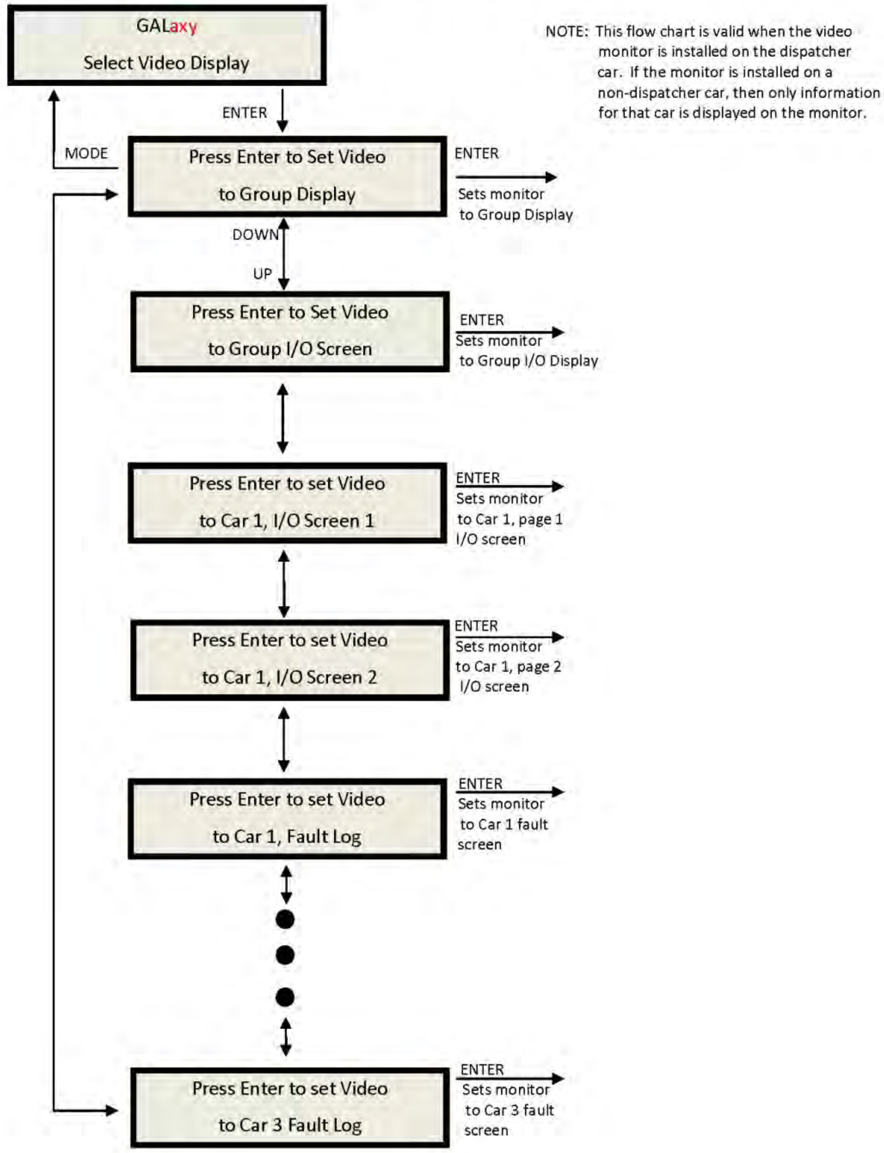


Software version:
The software version menu allows the user to view the controller's software version or to place the controller in file transfer mode to upload or download the controller software to another version. To place the car in file transfer mode, the car must be on inspection. As shown in the above diagram, the controller is programmed to be Car # 1, having software version 5.54.31.

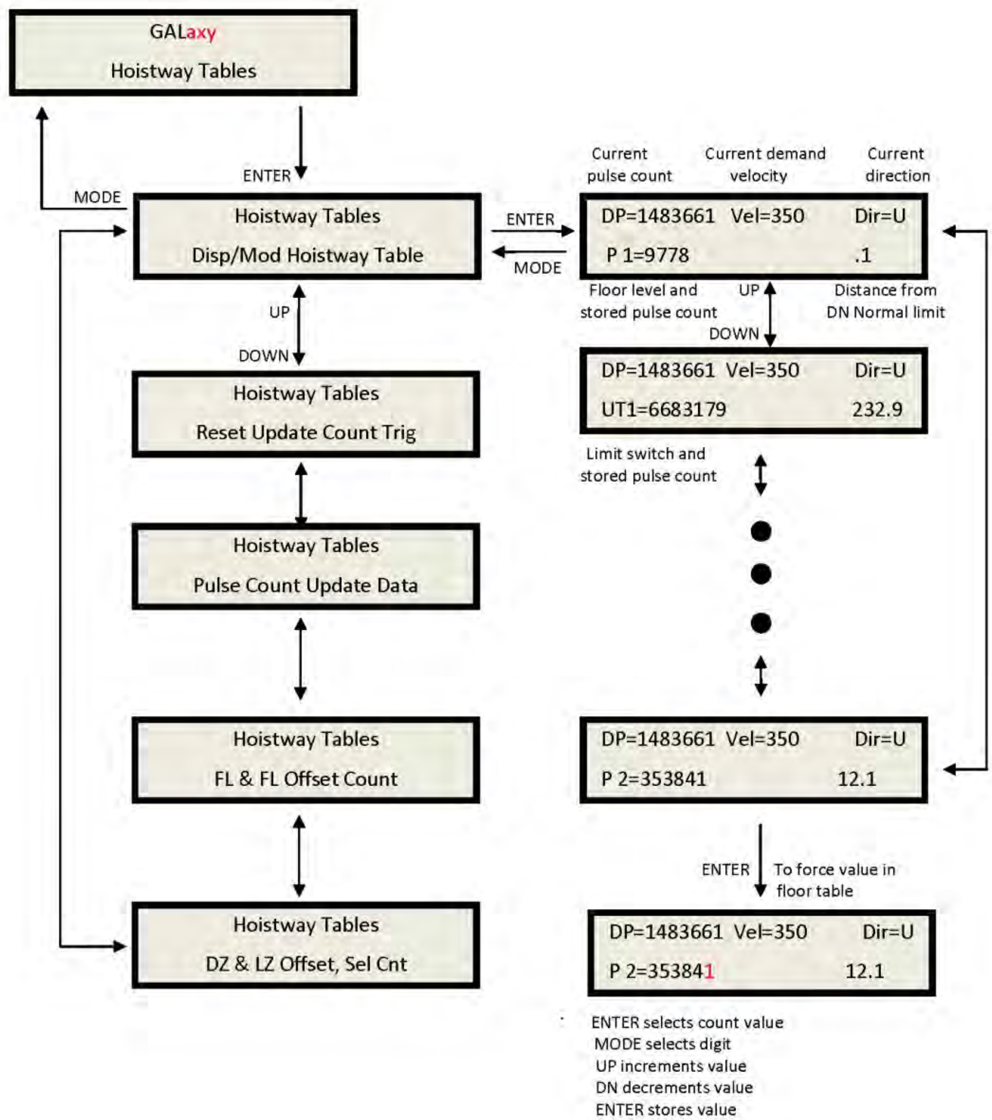
1021 LCD Interface
File Transfer Mode Sub-menu



1021 LCD Interface Main Menu
Select Video Display

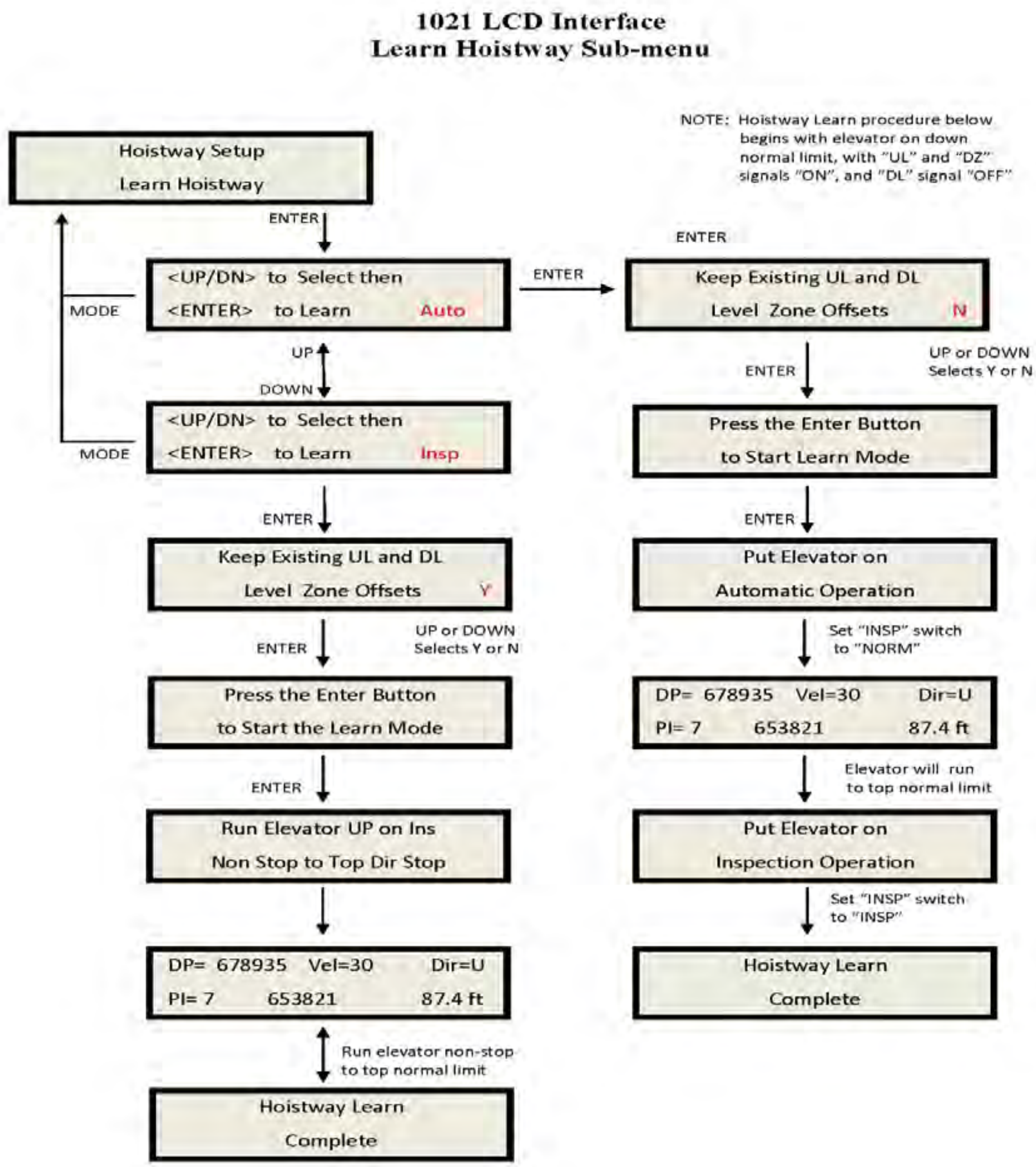


1021 LCD Interface Main Menu
Hoistway Tables
Disp/Mod Hoistway Tables Sub-menu



Display Hoistway table:

This menu is useful for checking the direction of the encoder by watching if pulse counts are counting up or down. Once the hoistway is learned, the pulse count values for each floor can be displayed. If the pulse count for each floor is zero, the hoistway has not been learned or retained in memory. The velocity displayed here is the speed of the car read from the motor encoder.



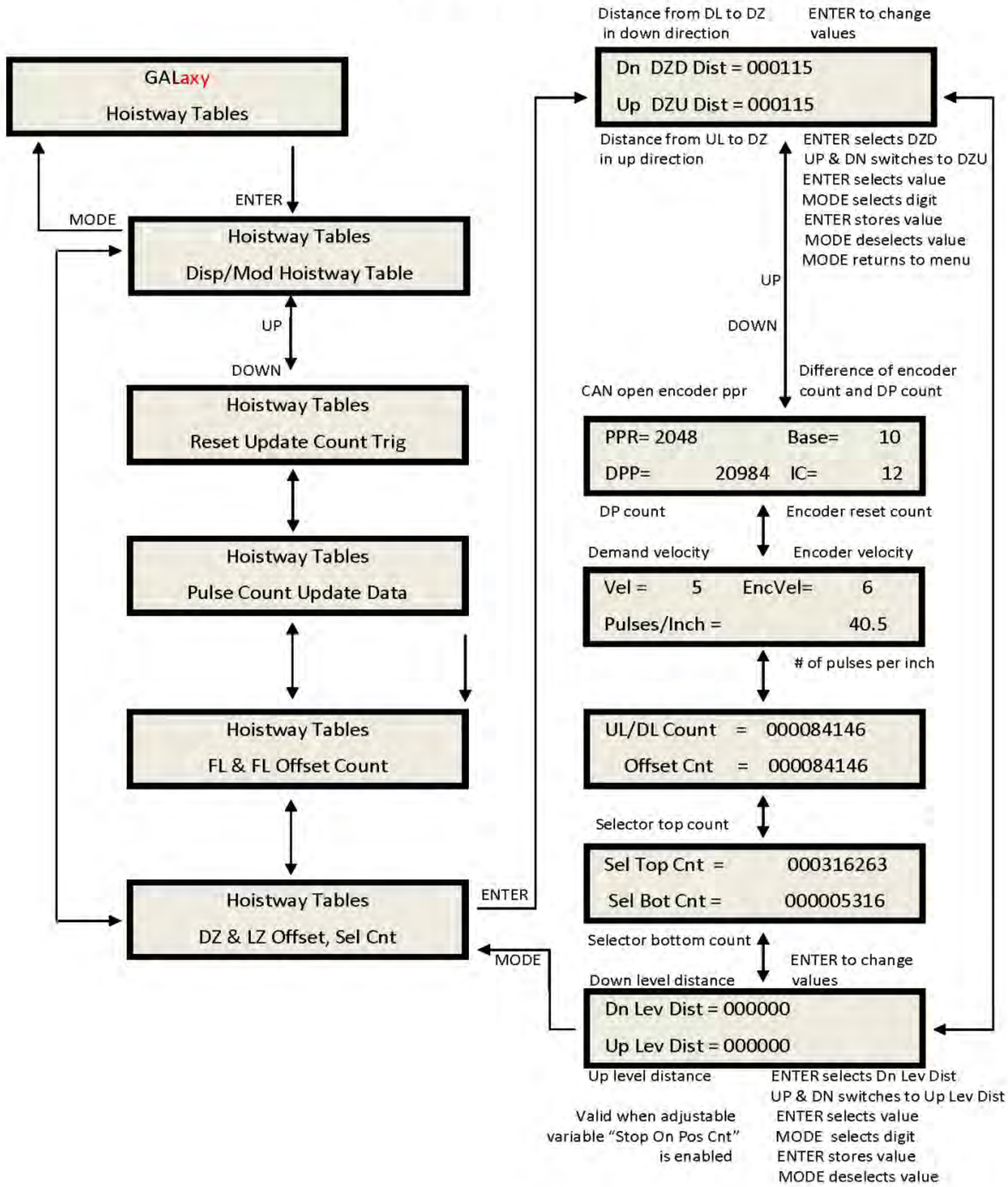
Auto learn hoistway:

This operation is used to automatically learn the hoistway on initial setup. From the LCD Interface, select the "Elevator Setup" menu, use the up or down button to select the "Learn Hoistway" item and then hit enter. Follow the directions displayed for each step. Learn Hoistway can be initiated with the car located anywhere in the hoistway but is usually quicker to run the car to the bottom first.

Inspection learn hoistway:

This operation is used to manually learn the hoistway on initial setup. From the LCD Interface select the "Elevator Setup" menu, use the up or down button to select the "Learn Hoistway" item and then hit enter. Follow the directions displayed for each step. Learn Hoistway can be initiated with the car located anywhere in the hoistway but is usually quicker to run the car to the bottom first.

1021 LCD Interface Main Menu
Hoistway Tables
DZ & DZ Offset, Sel Cnt Sub-menu

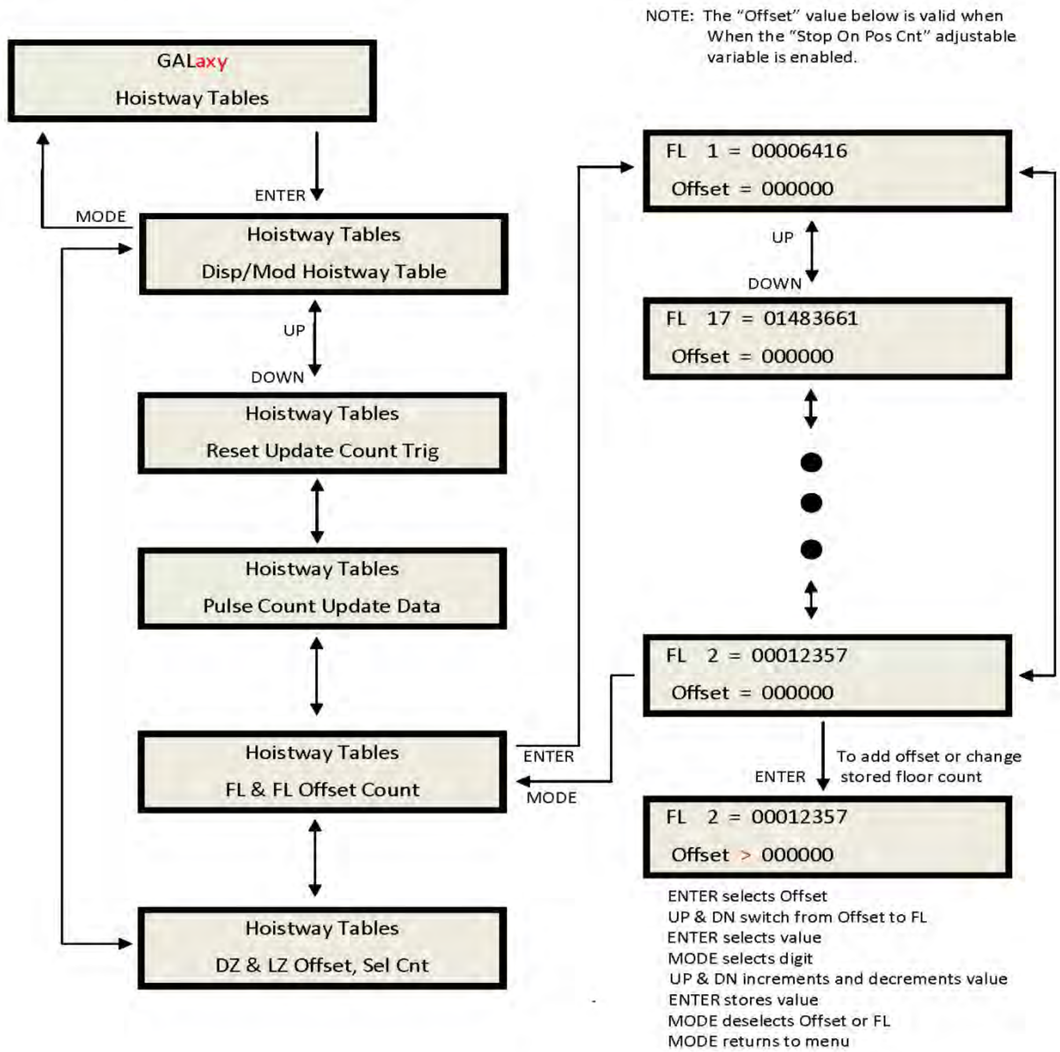


DZ & DZ Offset, Sel Cnt

This menu provides status information when using a CAN open encoder. It also allows the mechanic to adjust the "Dn Lev Dist" and "Up Lev Dist" parameters in order to "fine tune" the floor levels after the car is running high speed.

These parameters are valid when the "Stop on Pos" adjustable variable is enabled. Refer to sections "Fine Tune The Ride Quality" in sections 3,4,6,7, & 8 for proper adjustment.

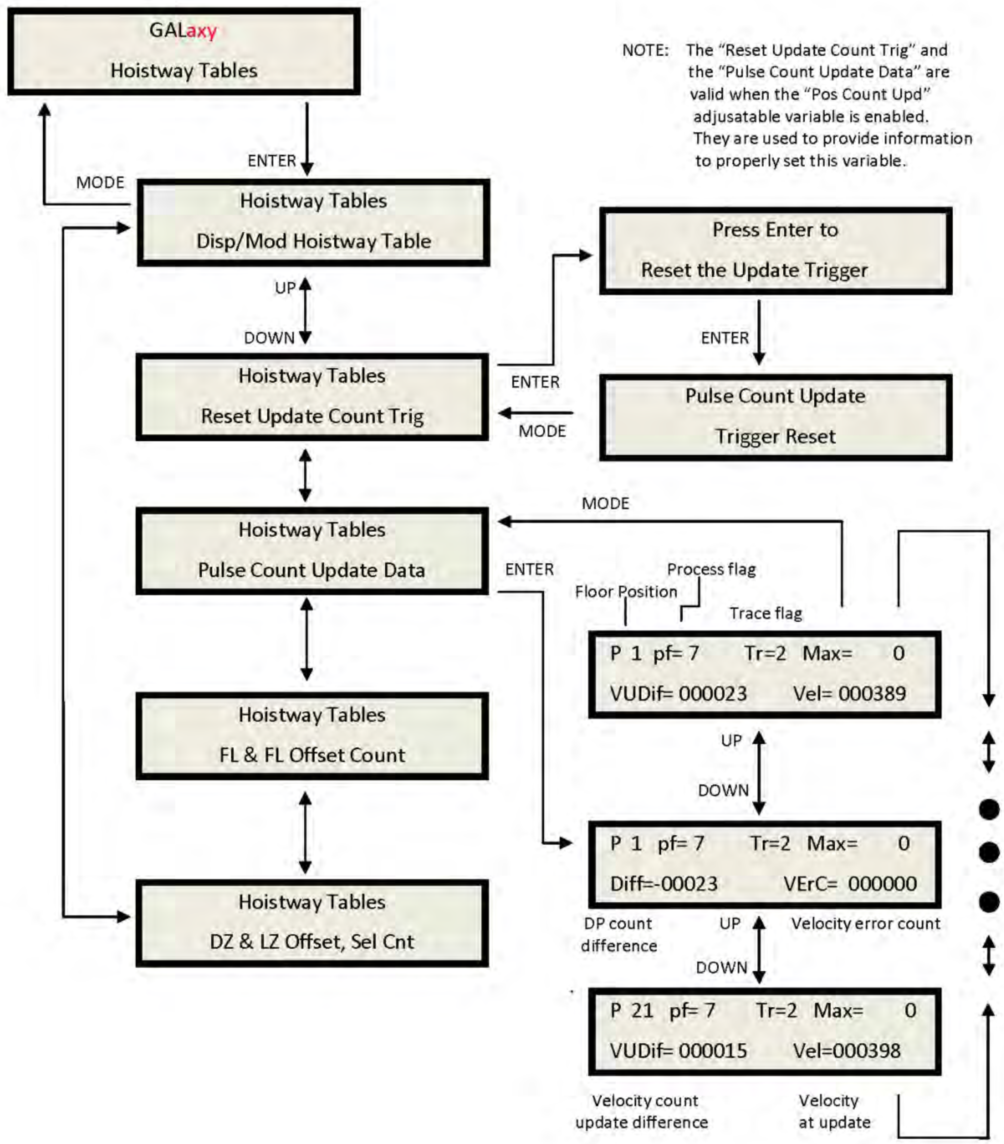
1021 LCD Interface Main Menu
Hoistway Tables
FL & FL Offset Count Sub-menu



FL & FL Offset Count Sub-menu

This menu allows the mechanic to adjust the stored floor count for each floor level. It also allows offsets to be used to "fine tune" the floor levels after the car is running high speed. The "Floor Level Offset" is valid when the "Stop on Pos" adjustable variable is enabled. Refer to sections "Fine Tune The Ride Quality" in sections 3,4,6,7, & 8 for proper adjustment.

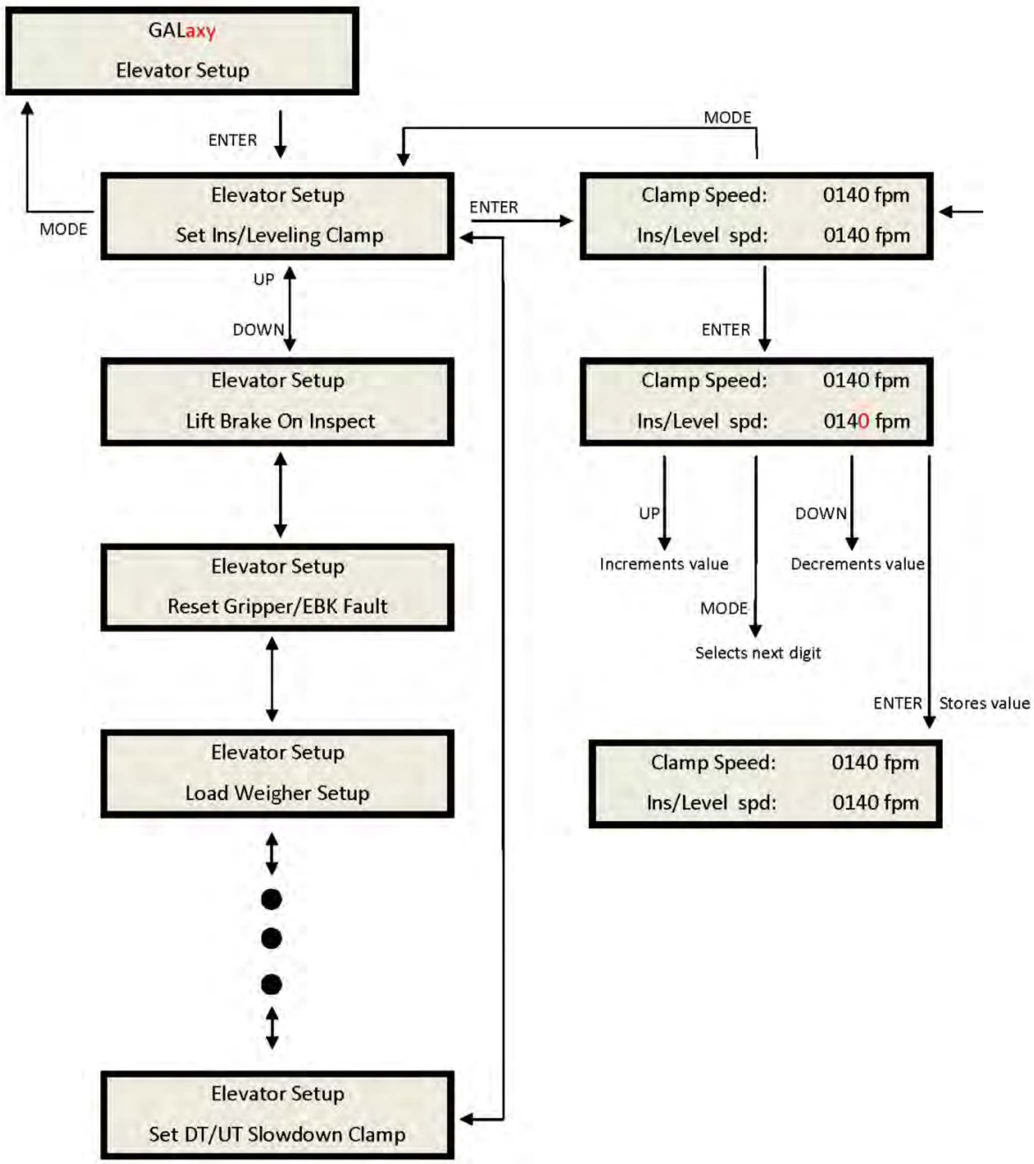
1021 LCD Interface Main Menu
Hoistway Tables
Reset Update Count Trig, Pulse Count Update Data Sub-menus



Reset Update Count Trig, Pulse Count Update Data

This menu is valid when the "Pos Count Upd" variable is enabled. When this variable is enabled, the DP count will be updated while the car is in motion. The "Pulse Count Update Data" menu provides detailed information in order to properly set this variable. The "Reset Update Count Trig" menu allows the mechanic to manually reset the "Update Trigger".

1021 LCD Interface Main Menu
Elevator Setup



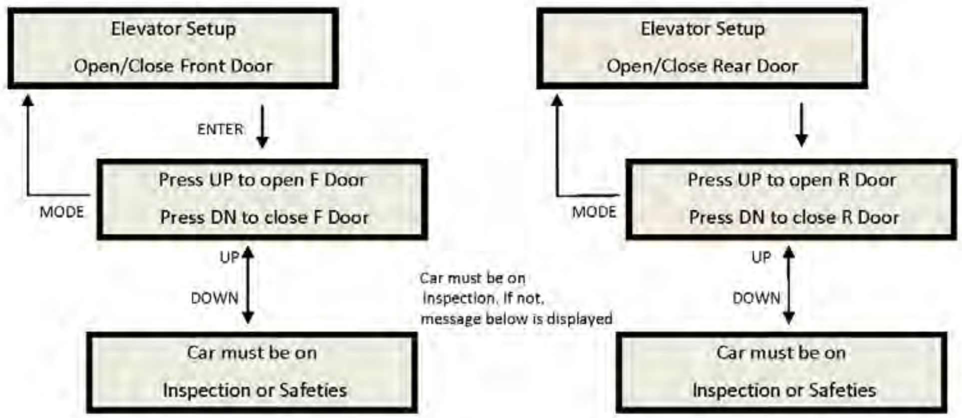
Elevator setup:

From this menu, the user can select to set all of the speed clamps, learn the hoistway, run an overspeed test, run a car buffer test or run a counterweight buffer test, open and close the doors on inspection and setup the load weigher.

Speed clamps:

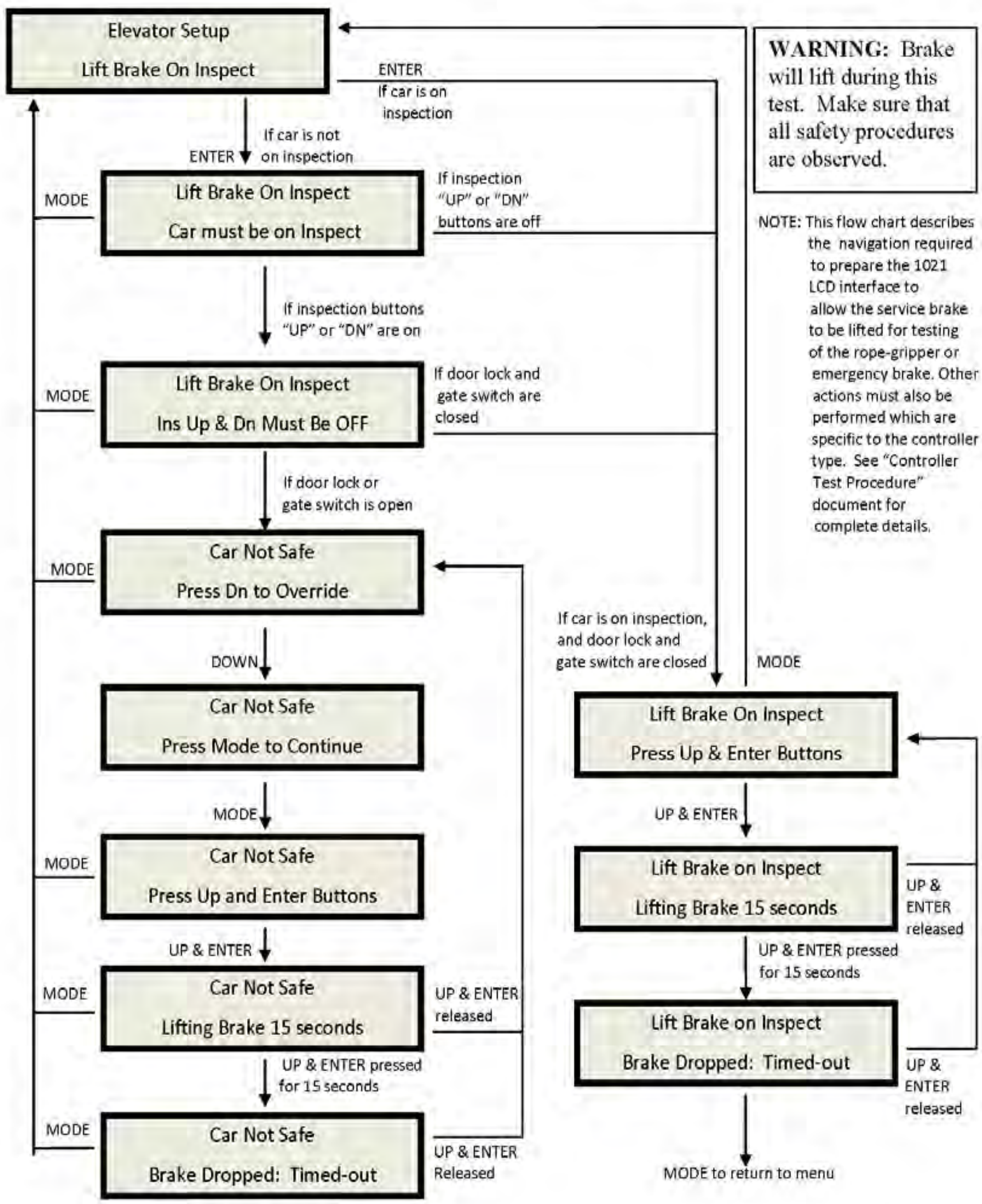
Once the car is running on automatic, the acceleration and deceleration rates are adjusted, and several runs have been made to the top and bottom terminals at contract speed, the speed clamps can then be adjusted. Using the set speed clamp menus on the LCD interface, select the clamp to adjust and hit enter to access that particular speed clamp setting. In the above illustration, the suggested setting is shown as the “Clamp Speed” and the actual clamp setting is shown as “Ins/
Level Spd”. The enter button is used to enter and exit the edit mode. Once in the edit mode, the mode button selects the next digit to edit. The up and down buttons increment or decrement the clamp speed setting. All speed clamps are adjusted in the same manor. The speed clamps that can be adjusted are the inspection/leveling speed clamp, the Down and Up Terminal Slowdown speed clamps (DT/UT, DT1/UT1, DT2/ UT2 and DT3/UT3) and the Down and Up Emergency Terminal Speed clamp (DTS/UTS).

1021 LCD Interface
Open/Close Front Door
Open/Close Rear Door

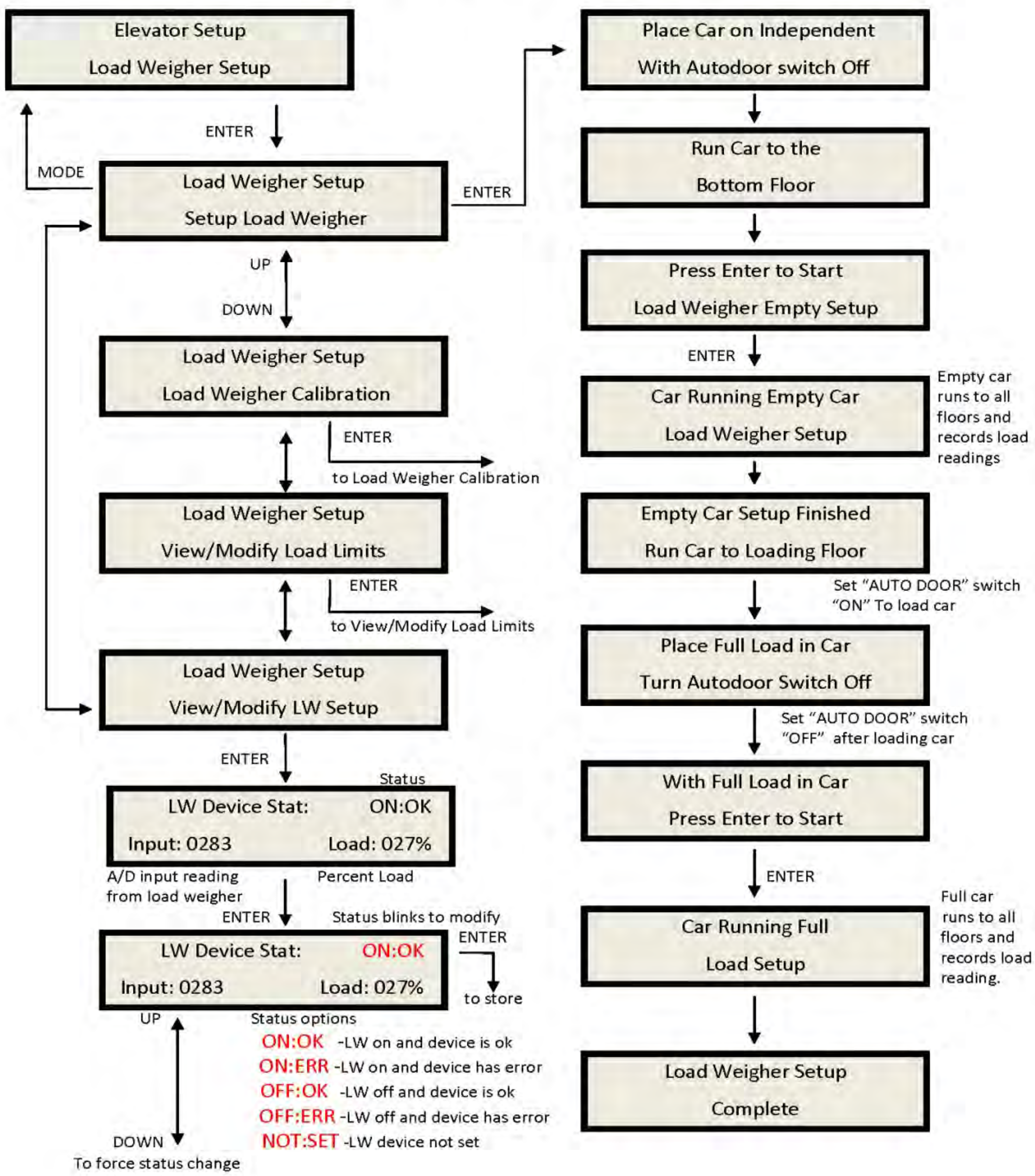


Inspection Open - Close:
The menu allows the user to open or close the elevator doors from the up or down LCD interface buttons while the car is on inspection.

1021 LCD Interface
Lift Brake On Inspect Sub-menu



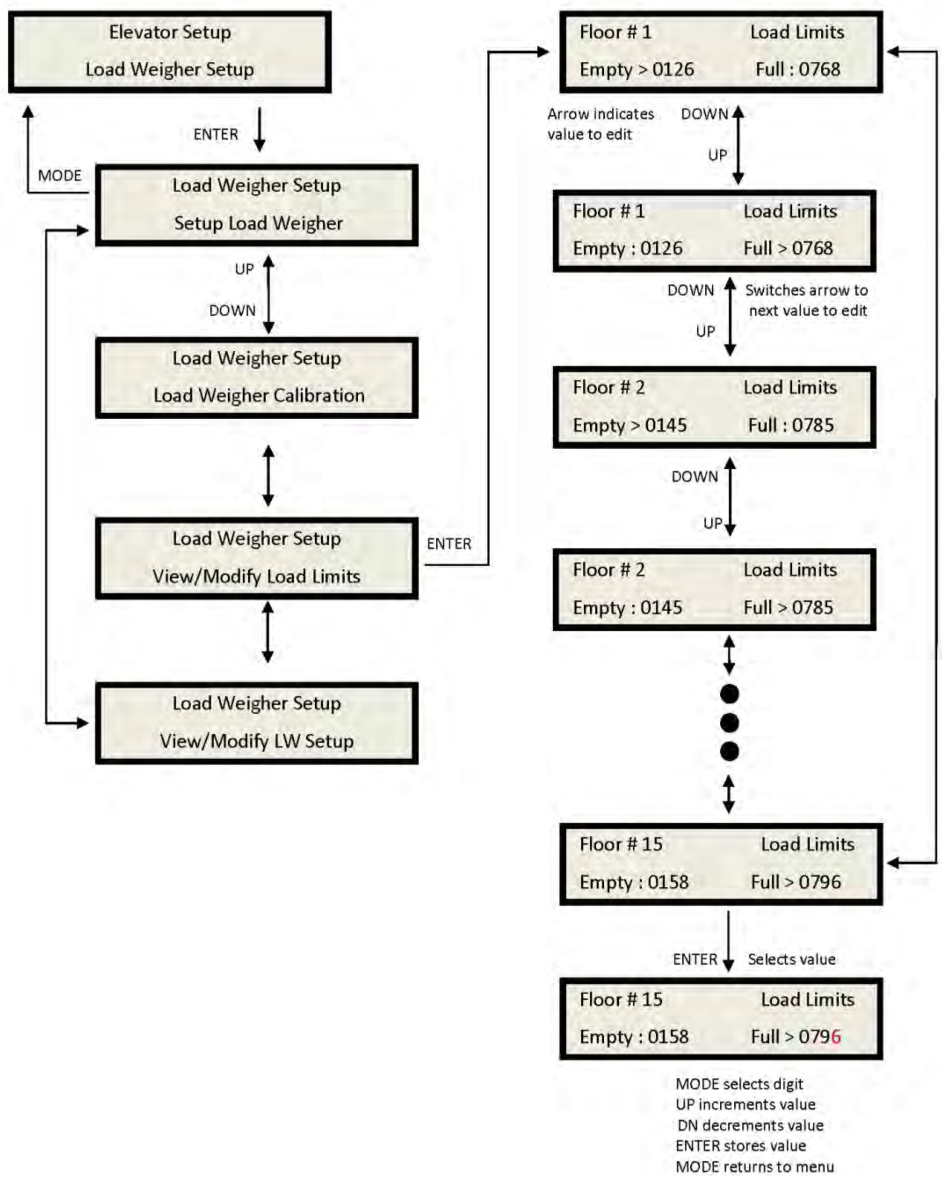
1021 LCD Interface
Load Weigher Setup Sub-menu



Loadweigher Setup:

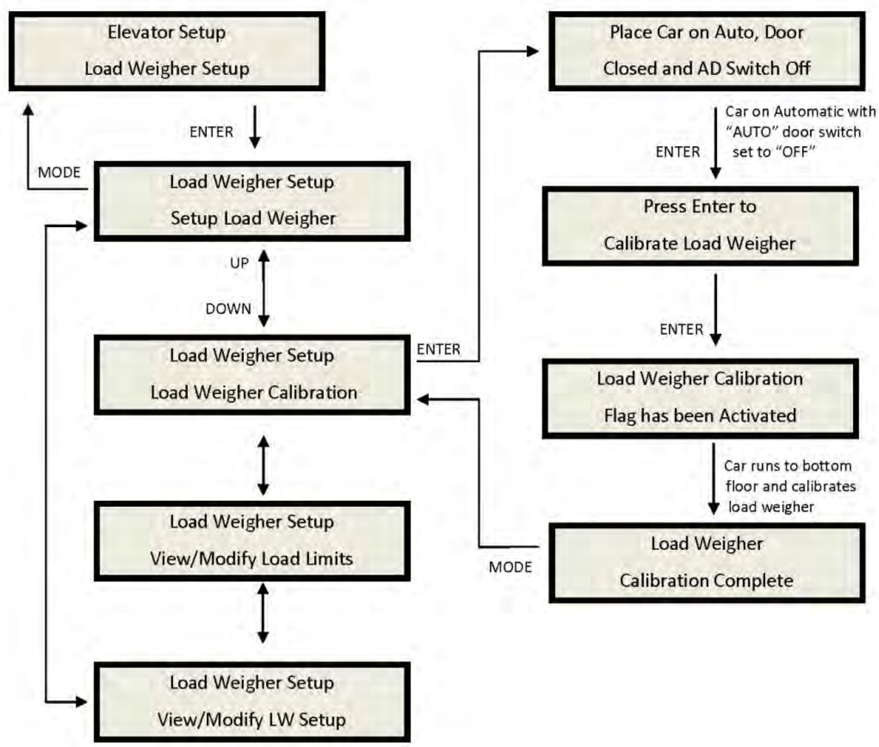
The load weigher hardware is setup according to the manufacturer's instructions. The controller is then setup to read the empty and full load values at every floor.

1021 LCD Interface
Load Weigher Setup Sub-menu
View/Modify Load Limits

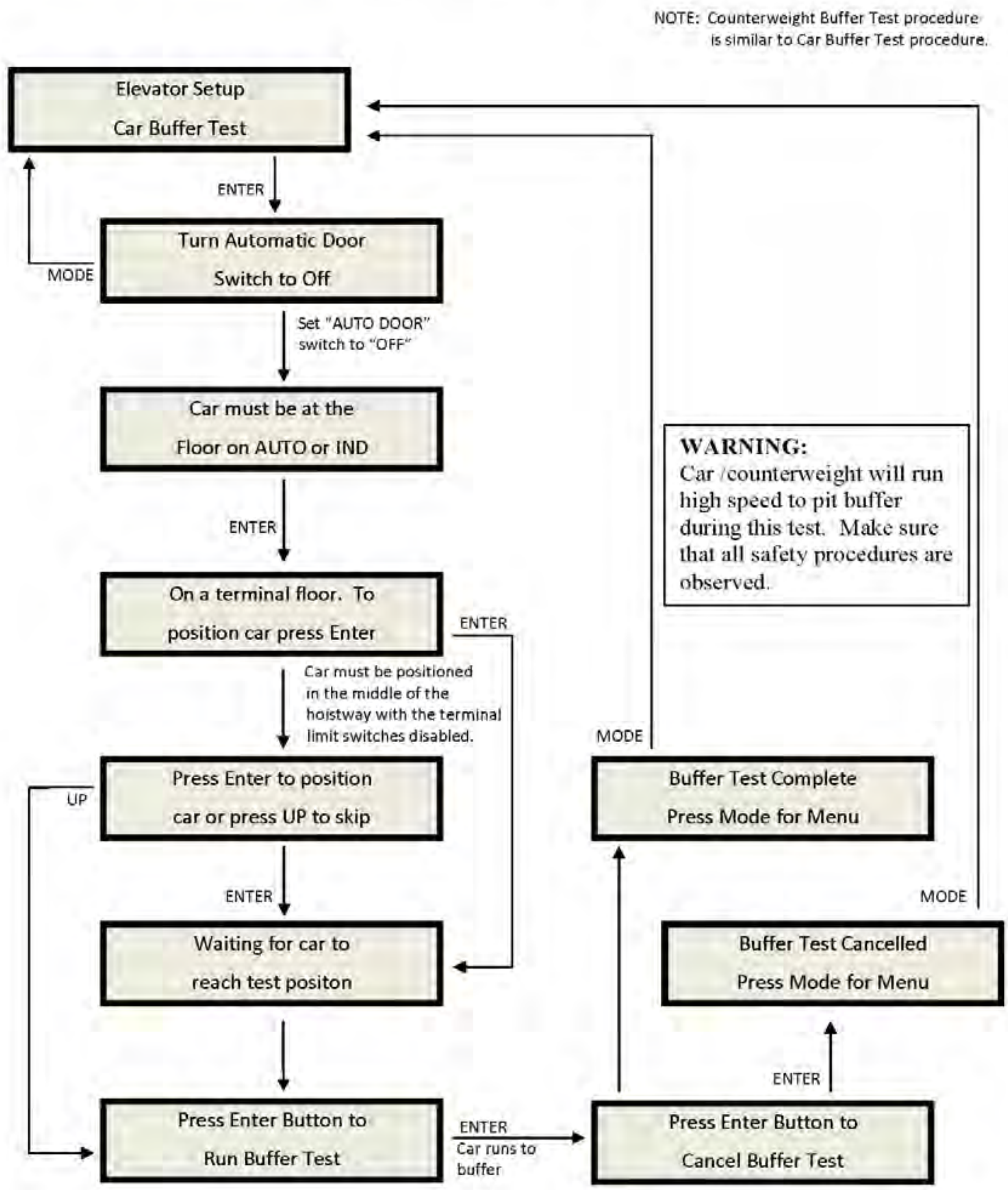


Display Hoistway table:
This menu is useful for checking the direction of the encoder by watching if pulse counts are counting up or down. Once the hoistway is learned, the pulse count values for each floor can be displayed. If the pulse count for each floor is zero, the hoistway has not been learned or retained in memory. The velocity displayed here is the speed of the car read from the motor encoder.

1021 LCD Interface
Load Weigher Setup Sub-menu
Calibrate Load Weigher



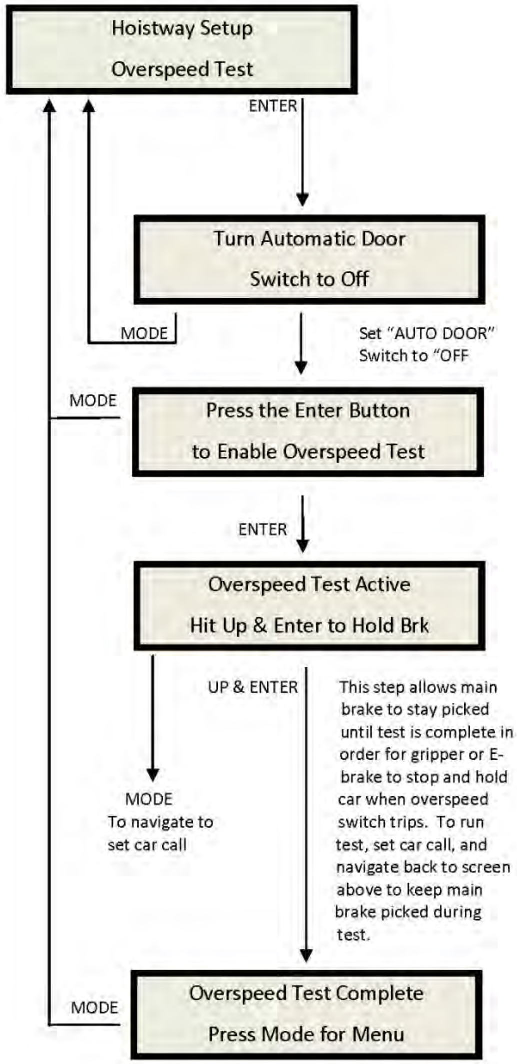
1021 LCD Interface
Car Buffer Test Sub-menu



Counterweight & Buffer Test

The car and counterweight buffer test follow the same menu operation. For specific instruction on executing a buffer test, refer to Appendix B.

1021 LCD Interface
Overspeed Test Sub-menu



NOTE: Before performing Overspeed Test procedure, the following parameters should be adjusted to force car to run faster than contract speed.

- For DSD 412 drive - drive Function #11 MOTOR RPM
- For HPV 600/900 – drive parameter A1 CONTRACT MTR SPEED
- For KEB F5 – from the 1021 LCD interface, "Adjustable Variables" menu, "Car Motion" adjust "DRV Speed Mult"

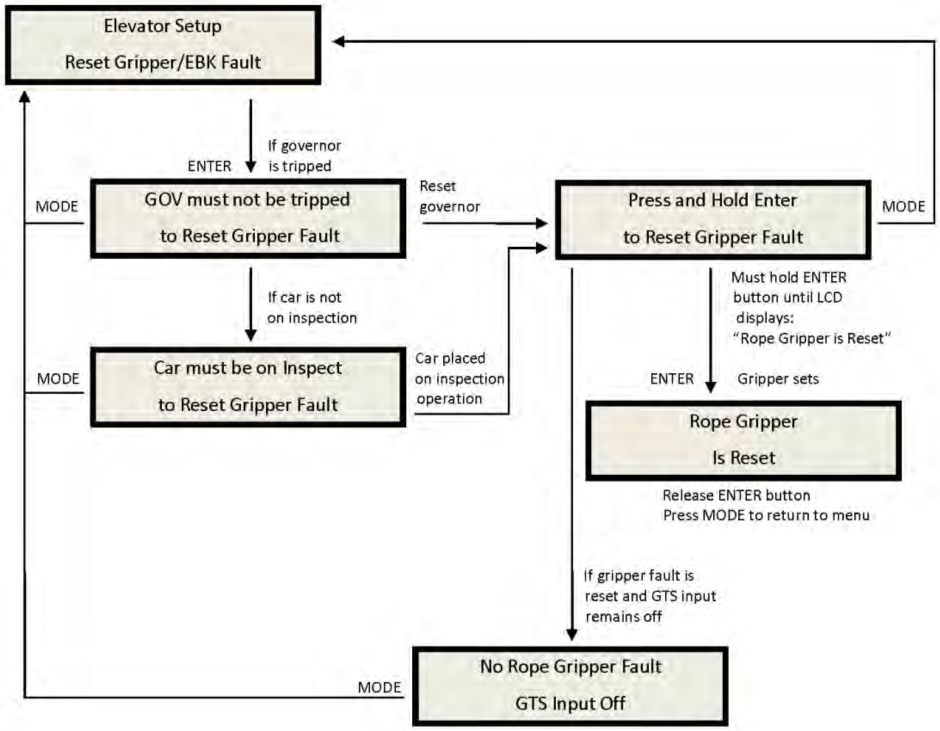
After test is complete, return parameters to proper values for contract speed.

WARNING: Car will overspeed during this test. Make sure that all safety procedures are observed.

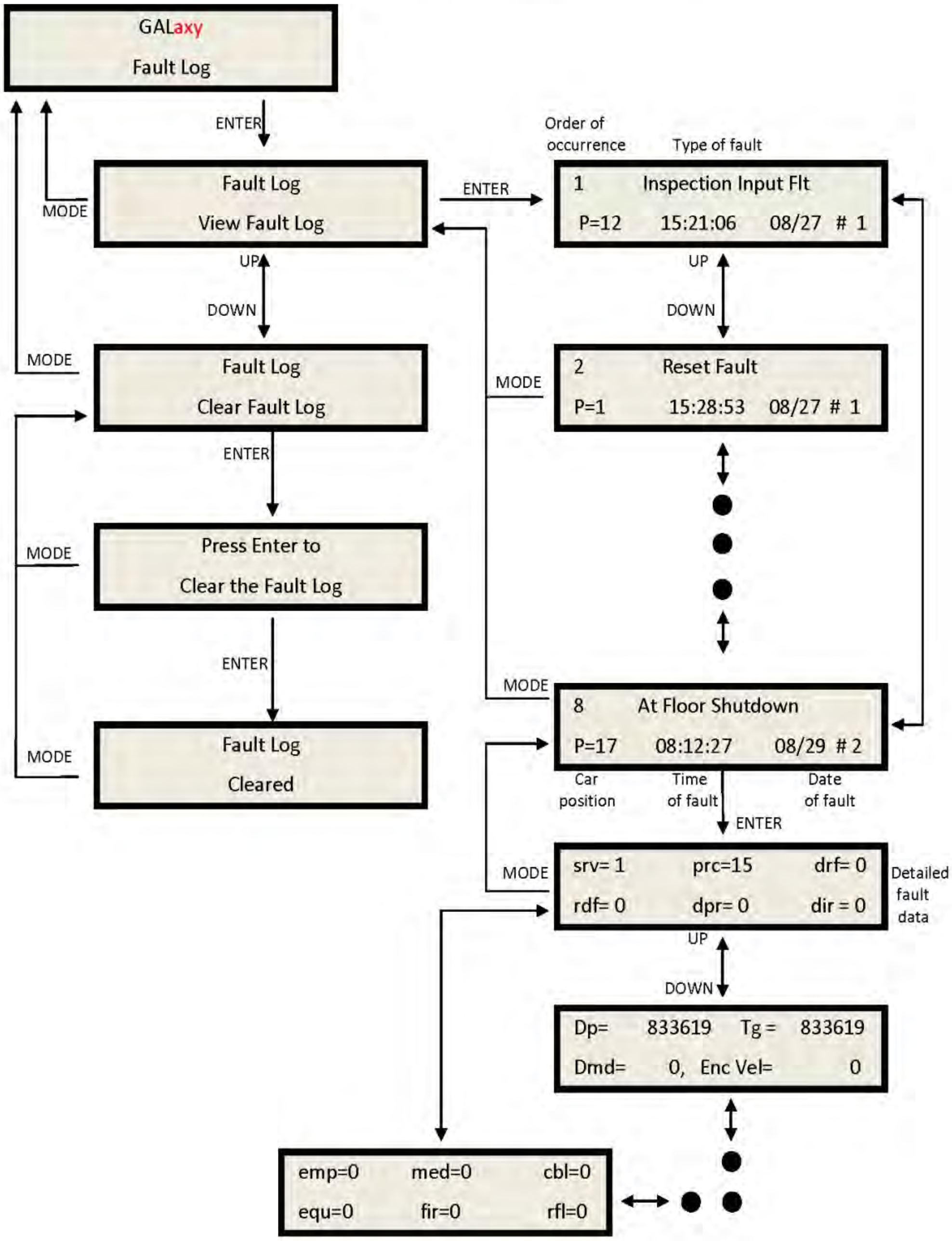
Overspeed Test

The overspeed test disables the velocity check for the car traveling faster than 15% over contract speed. The mechanism is disabled for one run. See Appendix B for instruction on running an overspeed test.

1021 LCD Interface
Reset Gripper Fault Sub-menu



1021 LCD Interface Main Menu
Fault Log



Fault Log:

This menu allows the user to view or clear the fault log.

View Fault Log:

The fault display shows the fault, the car position, time and date the fault occurred and the number of occurrences. Faults are displayed in the order of occurrence with the order number displayed on the top left. The largest order number signifies the last fault that has occurred. Faults are stored in a circular buffer that fits up to 50 faults. Once the buffer is full the next fault over writes the oldest fault. Refer to the system faults in the troubleshooting section of this manual for possible causes of the fault and a description of the detailed fault data.

Clear fault log:

This operation clears the fault log. Once cleared, all faults will show “No Occurrences” until a new fault occurs.

Section 11 Main CPU Faults & Detailed Faults

This section contains the Main CPU Faults & Detailed Faults.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Adv PreTrq Start Flt	Did not get safe on advance pre-torque start	Advance pretorque is enabled. When it activates, it waits for 5 seconds and expects the car to have moved by then – fault gets declared. Possible Door operator or door lock failure caused car not to go.
ASV Time-out Car 1	Automatic Service Time-out Car 1	• Car was not able to answer group hall call within the automatic service time-out timer. Look for fault condition on car.
ASV Time-out Car 2	Automatic Service Time-out Car 2	• Car was not able to answer group hall call within the automatic service time-out timer. Look for fault condition on car.
ASV Time-out Car 3	Automatic Service Time-out Car 3	• Car was not able to answer group hall call within the automatic service time-out timer. Look for fault condition on car.
ASV Time-out Car 4	Automatic Service Time-out Car 4	• Car was not able to answer group hall call within the automatic service time-out timer. Look for fault condition on car.
ASV Time-out Car 5	Automatic Service Time-out Car 5	• Car was not able to answer group hall call within the automatic service time-out timer. Look for fault condition on car.
ASV Time-out Car 6	Automatic Service Time-out Car 6	• Car was not able to answer group hall call within the automatic service time-out timer. Look for fault condition on car.
ASV Time-out Car 7	Automatic Service Time-out Car 7	• Car was not able to answer group hall call within the automatic service time-out timer. Look for fault condition on car.
ASV Time-out Car 8	Automatic Service Time-out Car 8	• Car was not able to answer group hall call within the automatic service time-out timer. Look for fault condition on car.
At Floor Shutdown	At floor shutdown	Car faulted out while at floor. Look at the fault log for a a different fault at the same time to determine cause of failure

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Binary Input Fault	The floor position, read from binary inputs on the selector, does not match the car position.	• Excessive wear on the selector guides. • Preset magnet is missing or misaligned. • Faulty hall effect sensor on sensor board. • Faulty output on selector driver board. • Improper wiring between selector and the Top of Car board (1037 or 1040 board). • Faulty BP1, BP2 or BP4 input
BKS Fault Slowdown	BKS Brake Switch Fault Slowdown. The brake lift switch dropped during the run causing the car to slowdown at the next available floor	• Faulty brake lift switch. • Low brake hold voltage
Bot Final Limit Flt	Bottom Final Limit Open	• Car traveled onto the bottom final limit. • Faulty wiring of the final limit circuit.
Bottom Door Lock Fault	The Bottom Door Lock failed on while the door was open.	• Faulty door lock. • Door lock not adjusted properly. • Jumper placed on door lock circuit. • Faulty wiring to DLB input. • Faulty DLB and DLB-1 inputs (For this to occur both DLB and DLB-1 inputs must fail on). • DOL input failed. Replace DOL input chip. • Door operator open limit DOL is not adjusted properly
Brake Drop Fault	Brake failed to drop. The BKS input did not close while stopped.	• Improper adjustment of brake switch. • Brake failed to drop.
Brake Pick Fault	Brake failed to pick. The BKS input did not open during the run.	• Improper adjustment of brake switch. • Brake failed to pick.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
BRK Can-Com Error	Brake Board CanCommunication Error.	• Faulty CanCommunication wire connection. Verify proper twisted pair wires to the canh and canl terminals on the brake board. • Noise on the Canbus. Verify that the shield wire is connected according to the job print.
Brk Flt Set EM Brake	Emergency brake set from brake fault	"Brake Lift Sw" parameter is set to 2. There was a brake fault and this triggered an emergency brake/ gripper fault
Brk Flt Set Gripper	The Rope Gripper was tripped when the brake did not drop. The brake switch adjustable variable can be set to only show the brake drop fault if the brake does not drop.	• Improper adjustment of brake switch. • Brake failed to drop.
BRK I/O Failed Off	The BRK input or output has failed off. The BRK coil is wired through a NO contact of MC, a NO regulator release contact of the drive (DON) and a BRK triac of the controller.	• Improper wiring of the brake BRK coil. Refer to prints for wire connections. • Faulty BRKi input. Replace BRKi input chip on 1038 board. • Faulty BRK output. Replace BRK output chip on 1038 board.
BRK I/O Failed On	The BRK input or output has failed on.	• Improper wiring of the brake BRK coil. Refer to prints for wire connections. • Faulty BRKi input. Replace BRKi input chip on 1038 board. • Faulty BRK output. Replace BRK output chip on 1038 board.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
BRK Low DC Bus Volts	DC Bus Voltage is less than 80% of expected	• Incorrect Setting of Line to Line Brake voltage in Adjustable Variables • Incorrect dipswitch setting for Three Phase or Single Phase • Low Line Voltage • Rectifiers Blown or have bad Connection
BRK No Currnt w/Volt	Reading a resistance value (Vout/Aout) of 1000Ω or greater	• No Brake Connected • Bad Current Sensor
BRK No DC Bus Volts	DC Bus Voltage is less than 5VDC	• No AC Voltage Coming into AC1-AC2-AC3 • Rectifiers Blown or have bad Connection
BRK No Output Volts	If no DC Bus Faults, Requested Output Voltage is greater than 0, Actual Output voltage is less than 3VDC	• IGBT Not Gating
BRK Over Current Flt	Average Current is higher than Preset Limit (based on board configuration)	• IGBT Shorted • Free Wheeling Diode Shorted • Gating Circuitry Shorted ON
BRK Over Voltage Flt	Output Voltage is at least 20V greater than the Voltage Requested.	• IGBT Shorted • Gating Circuitry shorted ON
BRK Rq Volt > DC Bus	Requested Output Voltage is 5% greater than the DC Bus Voltage	• Incorrect Setting of Pick/Hold/Relevel Voltage in Adjustable Variables • Low Line Voltage

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Buffer Switch Fault	Buffer Switch Open	• Verify that the buffer switch is set and the switch is closed. • Faulty wiring on the buffer switch circuit. • Car hit the buffer
CanAcknowledge Err	Canbus acknowledge error	No yet implemented. Error should not occur.
CanBus Idle Error	Canbus idle error	No yet implemented. Error should not occur.
CanBus Off Error	CanBus Off Error. The Canbus has been inactive for too long a period of time.	• Faulty Canbus wiring. Check the Canbus terminal connections on all boards.
CanChip Init Error	CanChip Initialization Error. The Canchip provides a clock output that is used for the system 10 msec clock. The main CPU continually check the clock setup data and if incorrect will reset the Canchip and set this error code.	• Faulty system ground. This error Can occur if electrical noise on the system ground causes the Canchip to reset. • Faulty 1036 board. Replace the 1036 board.
Car 1 Comm Loss	It can't have this fault	• Faulty ram-flash memory chip. • Reset fault. It faults returns, replace memory chips.
Car 2 Comm Loss	The group car is not communicating with Car 2.	• Faulty wiring from R/T+ and R/T- from car to car. • Faulty U6 driver chip on 1036 board. • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Car 3 Comm Loss	The group car is not communicating with Car 3.	• Faulty wiring from R/T+ and R/T- from car to car. • Faulty U6 driver chip on 1036 board. • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
Car 4 Comm Loss	The group car is not communicating with Car 4.	• Faulty wiring from R/T+ and R/T- from car to car. • Faulty U6 driver chip on 1036 board. • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
Car 5 Comm Loss	The group car is not communicating with Car 5.	• Faulty wiring from R/T+ and R/T- from car to car. • Faulty U6 driver chip on 1036 board. • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
Car 6 Comm Loss	The group car is not communicating with Car 6	• Faulty wiring from R/T+ and R/T- from car to car. • Faulty U6 driver chip on 1036 board. • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
Car 7 Comm Loss	The group car is not communicating with Car 7	• Faulty wiring from R/T+ and R/T- from car to car. • Faulty U6 driver chip on 1036 board. • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
Car 8 Comm Loss	The group car is not communicating with Car 8	• Faulty wiring from R/T+ and R/T- from car to car. • Faulty U6 driver chip on 1036 board. • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
Car Call Light Fuse	Car Call Light Fuse Blown	• Check for short on the Car Call Light circuit.
Car Call Power Fuse	Car Call Power Fuse Blown	• Check for short on Car Call Power circuit.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Car Com Device Reset	Serial Car board reset unexpectedly. Usually caused by loss of power to the individual board.	• Usually caused by loss of power to the individual board. Check for loose connection on power to board. • Faulty I/O board.
Car Gate Safe Fault	Car Gate safe fault	After Controller was safe with doors, gate switch and locks made and ready to run, a Gate switch (front or rear) input turned OFF.
Car Safe Fault	The Car Safe Fault occurs from the wanting to run but does not have a critical input energized. Some of the conditions for a car safe fault will also cause other faults to be logged.	• The car does not have the gate or lock inputs and is running or trying to run • The gripper GTS input is not on. • The stop switch is open • An inspection string input fault. Only one input should be on in the inspection string (AUTO, CTI, ICI, ACC or MRI) • Gate or Lock Bypass switch is on when not on car top inspection
Car Safe Fault Preop	The car had a car safe fault while pre-opening the door.	• The car lost the DZ input while leveling into the floor and the door was open.
Car Safe Fault Start	The car had an onward call, had the door close limit but the car gate or door locks did not make after a 3 second time-out.	• The locks are not making properly when the door closes. • The door is not closing properly.
Car Safety Sw. Fault	Car Safety Switch Fault	• Verify that the car safety is not tripped. • Faulty wiring in the car safety circuit

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Car Top Stop Switch	Car top stop switch	Safety String Fault. Refer to Safety String Page on Diagrams. Check/replace input Chip.
CCB FET Open Blue	Car Call Board FET open blue	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB FET Open Green	Car Call Board FET open green	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB FET Open Red	Car Call Board FET open red	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB FET Short Blue	Car Call Board FET short blue	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB FET Short Green	Car Call Board FET short green	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB FET Short Red	Car Call Board FET short red	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB LED Open Blue	Car Call Board LED open blue	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
CCB LED Open Green	Car Call Board LED open green	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB LED Open Red	Car Call Board LED open red	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB LED Short Blue	Car Call Board LED short blue	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB LED Short Green	Car Call Board LED short green	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB LED Short Red	Car Call Board LED short red	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB No Comm Aux Bd 1	Car Call Board local aux board 1 comm loss	Comm loss to RGB Auxiliary Car Call Board. Check wiring and bus termination jumpers on boards. If problem persists, check Car Comm Status under diagnostics.
CCB No Comm Aux Bd 2	Car Call Board local aux board 2 comm loss	Comm loss to RGB Auxiliary Car Call Board. Check wiring and bus termination jumpers on boards. If problem persists, check Car Comm Status under diagnostics.
CCB No Comm Board 1	Car Call Board local board 1 comm loss	Comm loss to RGB Car Call Board. Check wiring and bus termination jumpers on boards. If problem persists, check Car Comm Status under diagnostics.
CCB No Comm Board 2	Car Call Board local board 2 comm loss	Comm loss to RGB Car Call Board. Check wiring and bus termination jumpers on boards. If problem persists, check Car Comm Status under diagnostics.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
CCB No LED Board	Car Call LED board missing	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
CCB Stuck Button	Car Call Board stuck button	Faulty LED signal from RGB Board. Look at detailed car faults log to determine device. "dev" gives you address for global CAN device, "dv2" gives you local CAN device and "pf1" the number for the io location within the local board.
Comp. Switch Fault	Compensating Rope Switch Open	• Verify that the compensating rope switch is set and the switch is closed. • Improper cabling of the compensating ropes on the sheave.
CWT Sw Error at DT	Car “above cwt” flag was set for above the counterweight when the car hit the down terminal slowdown limit.	• The counterweight switch was not hit during the run or the car was lost when powered up. • Faulty wiring of the counterweight switch. • Improper adjustment of the counterweight switch.
CWT Sw Error at UT	Car “above cwt” flag was set for below the counterweight when the car hit the up terminal slowdown limit.	• The counterweight switch was not hit during the run or the car was lost when powered up. • Faulty wiring of the counterweight switch. • Improper adjustment of the counterweight switch.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
DBR Temperature Flt	Dynamic Braking Resistor Temperature Fault. The temperature for the dynamic braking resistors is read in through a temperature sensor mounted above the resistors. The temperature sensor connects to the temperature sensor input board mounted on the DIO1 connector on the CPU board. When the temperature sensor opens a contact, the CPU detects a temperature fault, an error is recorded, the car is shut down at the next floor and the DBC relay is de-energized to open the DB Resistor circuit.	• Faulty Temperature Sensor. If the DB Resistors are not hot, check the temperature sensor input board connected to the CPU board. The input LED should be on when the temperature is okay. If the LED is not on, jump the two terminals on the temperature input board and the LED should go on. If the LED goes on then the Temperature Sensor is bad. Replace the Temperature Sensor. • Faulty Temperature Sensor Input Board. Test the sensor input as above. If the LED does not turn on when the input terminals are jumped together, replace the Temperature Sensor Input Board.
Delta Off Fault	DEL input did not come on at start or went off during a run.	• The delta contact did not make on a Y-Delta starter. • The MC contact did not make on an across-the-line starter • The “at speed” contact did not make on an electronic soft-starter. • Faulty DEL input. Replace the DEL input chip.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Delta On Fault	DEL input failed on when is should have been off. This would occur at the start of a run when the I/O's are checked. The input failed on or the contact for the input failed closed.	• Faulty DEL input (failed on). Check the input and output status on the LCD interface. • Faulty contact for DEL input failed on. Replace the DEL input chip.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
DF I/O Failed Off	The DF input or output has failed off	Traction • Fault on 1028 Safety Processor Board. The Safety Processor Board can disable the run control to the DF output chip. Check if the PIC or PAL inhibit LED turns on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor Board LCD display. • Faulty DF/B0 output. Replace the DF/B0 output chip. • Faulty DFi/B0i input. Replace DFi/B0i input chip. • No 24VDC from the drive. Verify the 24VDC between terminals 10 and 12 on the drive. • Incorrect jumper placement on 1038 board. Verify that jumpers on the bottom center of the board are positioned for the correct drive type (DSD or HPV). If necessary move the jumpers to the correct drive type. • RUN, MC or BRK auxiliary contact not making properly. Contact GAL for instructions Hydro • Fault on 1028 Safety Processor Board. The Safety Processor Board can disable the run control to the SDF output chip. Check if the PIC or PAL inhibit LED turns on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor Board LCD display. • Faulty wiring to the SC common on the 1039 board. • Faulty wiring to the SDF terminal on the 1039 board. • Faulty wiring to the Down Fast valve. • Faulty SDFi input (replace input chip). • Faulty SDF output (replace output chip). Traction • Faulty DF or B0 output. Replace the DF or B0 output chip. • Faulty DFi or B0i input. Replace DFi or B0i input chip. • Incorrect jumper placement on 1038 board. Verify that jumpers on the bottom center of the board are positioned for the correct drive type (DSD or HPV). If necessary move the jumpers to the correct drive type. Hydro • Faulty SDFi input (replace input chip). • Faulty SDF output (replace output chip).

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
DF I/O Failed On	The DF input or output has failed on.	Traction • Faulty DF or B0 output. Replace the DF or B0 output chip. • Faulty DFi or B0i input. Replace DFi or B0i input chip. • Incorrect jumper placement on 1038 board. Verify that jumpers on the bottom center of the board are positioned for the correct drive type (DSD or HPV). If necessary move the jumpers to the correct drive type. Hydro • Faulty SDFi input (replace input chip). • Faulty SDF output (replace output chip).
DL & DL-1 Opposite	Input failure on one of the Down Level sensor input	• Faulty DL or DL-1 input (replace input chips).
DL Failed On Fault	DL Failed On Fault. The DL leveling sensor did not turn off during a run.	• DL hall effect sensor bad on selector sensor board. Replace sensor board. • DL Output Driver failed on. Replace output on selector driver board. • DL traveling cable wire is shorted to 120 VAC. Remove input wire to 1038 or 1064 board and verify that LED goes out. Correct short condition. • DL inputs failed on. Short on 1038 or 1064 main I/O board. Replace main I/O board.
DLB & DLB-1 Opposite	Input failure on one of the Door Lock Bottom (DLB) inputs.	• Faulty DLB or DLB-1 input (replace input chip).
DLM & DLM-1 Opposite	Input failure on one of the Door Lock Middle (DLM) inputs.	• Faulty DLM or DLM-1 input (replace input chip).
DLT & DLT-1 Opposite	Input failure on one of the Door Lock Top (DLT) inputs.	• Faulty DLT or DLT-1 input (replace input chip).

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Dn Normal SW Setup	Down Normal must turn on before reaching bottom floor dead level	The down normal needs to be moved down so when the car is Dead at the bottom landing level DN is ON. Allow at least 2 inches run before DN turns OFF
DNR I/O Failed Off	The DNR input or output has failed off.	Traction • Fault on Safety Processor Board. This board can disable the run control to the DNR output chip. Check if the PIC or PAL inhibit LED turns on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor Board LCD display. • Faulty DNR output or DNRi input. Replace the DNR output and DNRi input chip. • No 24VDC from the drive. Refer to Schematics. • Incorrect jumper placement on 1038 board. Verify that jumpers on the bottom of the board are positioned for the correct drive type (DSD or HPV). • RUN, MC or BRK auxiliary contact not making properly. Contact GAL for instructions Hydro • Faulty wiring to the SD or SC terminal on the 1038/1064 board. • Faulty wiring to the Down valve. • Faulty SD output or SDi input. Replace output and input chip.
DNR I/O Failed On	The DNR input or output has failed on.	Traction • Faulty DNR output. Replace the DNR output chip. • Faulty DNRi input. Replace DNRi input chip. • Incorrect jumper placement on 1038 board. Verify that jumpers on the bottom center of the board are positioned for the correct drive type (DSD or HPV). If necessary move the jumpers to the correct drive type. Hydro • Faulty SDi input (replace input chip). • Faulty SD output (replace output chip).

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
DON I/O Failed Off	The DON input or the drive run relay contact has failed off. The run relay on the drive turns on the DON input (Drive ON) indicating that the regulator is released and the drive is controlling the motor.	• Loss of voltage on terminal CS. • MC contact in series with the drive run relay opened. • The drive faulted on start and dropped the run relay. Check the drive fault log. • Faulty run relay on the drive. • Faulty DON input on the controller. Replace the DON input chip. • The run relay in the drive is not programmed properly. Check the default drive setup for the Configure C0 parameters.
DON I/O Failed On	The DON input or the drive output has failed on. When the drive is turned off, the run relay on the drive will drop out turning off DON.	• Improper wiring of the brake BRK coil. Refer to prints for wire connections. • Faulty BRKi input. Replace BRKi input chip on 1038 board. • Faulty BRK output. Replace BRK output chip on 1038 board. • Fault on 1028 Safety Processor Board. The Safety Processor Board can disable the run control to the BRK output chip. Check if the PIC or PAL inhibit LED turns on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor Board LCD display
Door Close Fault	The door did not reach the Door Close Limit within the door close protection time.	• Door Close Limit (DCL) not adjusted properly. • Faulty Door Close Limit (DCL). Replace DCL input chip. • Trash in door track preventing door from closing.
Door Lock Safe Fault	Door lock safe fault	After Controller was safe with doors, gate switch and locks made and ready to run, a door lock inputs turned OFF.
Door Low Voltage Flt	Door Line Voltage Low	Voltage Sensor Board Related. Voltage being monitored for Door Operator dropped below the setting for parameter "Low Door Volt "
Door Motor Overload	Door Motor Overload	Door Motor Overload signal tripped. Check Input chip for DMO signal

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Door Open Fault	The door did not reach the Door Open Limit within the door open protection time.	• Door Open Limit (DOL) not adjusted properly. • Faulty Door Open Limit (DOL). Replace DOL input chip.
Door Zone Aux On Flt	The auxiliary door zone input failed on.	• DZA output on selector board failed on. (Replace DZA output on selector driver board). • One or both of the DZA sensors on the selector sensor board failed. Replace selector sensor board. • DZA input on the 1037/1040 board failed. Replace DZA input on 1037/1040 board.
Door Zone Fault	Door Zone Fault occurs from the following conditions: • The car is not on UL or DL when expected. • The car does not have DZ when expected. • The DZ relay does not drop out while in motion.	• The car does not have DZ when it is expected to be level at the floor. • DZ output on selector board failed on or did not turn on. (Replace DZ output on selector driver board). • One or both of the DZ sensors on the selector sensor board failed. Replace selector sensor board. • DZ input on 1038 board failed on or off. Replace DZ input on 1038 board.
Door Zone Off Fault	The door zone input failed off.	• DZ output on selector board did not turn on. (Replace DZ output on selector driver board). • One or both of the DZ sensors on the selector sensor board failed. Replace selector sensor board. • DZ input on the 1040 board failed. Replace DZ input on 1037/1040 board.
DoorZone Aux Off Flt	The auxiliary door zone input failed off.	• DZA output on selector board did not turn on. (Replace DZA output on selector driver board). • One or both of the DZA sensors on the selector sensor board failed. Replace selector sensor board. • DZA input on the 1040 board failed. Replace DZA input on 1037/1040 board.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Down Directional Fault	Car unexpectedly hit the Down Normal Limit while running down.	• Faulty wiring for the DN limit. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal.
DPM Input Fault	The DPM input fault occurs when door opens and the DPM input did not go off.	• DPM switch not setup properly on the door operator. • Faulty DPM input. Replace DPM input chip.
DPM Off/GS or DL On	DPM Off with Gate Switch or Door Lock On. The Door Protection Module input must go on before gate switch or door lock inputs go on.	• The DPM switch on the door operator is not setup properly. • There is no DPM input on the door operator. Jump the DPM input to the GS-1 terminal. • Fault DPM input. Replace the DPM input chip.
Drive Com 8259 Error	Drive Communications 8259 Error. This error is used to detect a hardware failure on the controller communications port to the drive.	• Hardware failure on the CPU board or 1036 board. If this error occurs, contact G.A.L.
Drive Com Int Error	Drive Communications Interrupt Enable Error. This error is used to detect a hardware failure on the controller communications port to the drive.	• Hardware failure on the CPU board or 1036 board. If this error occurs, contact G.A.L.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Drive Com Rcv Error	Controller has a communications error with drive. The controller has not received a valid message from the drive for more than one second.	• Faulty communications cable connection. Check the drive twisted pairs connected from the drive to the 1036 board. • Noise on the communication cable. Verify that the shield on the communications cable to the drive is connected to earth ground on one end. • Faulty communication chip. Replace the U9 driver chips on the 1036 board.
Drive Com Trm Error	Drive Communications Transmit Error. This error is used to detect a hardware failure on the controller communications port to the drive.	• Hardware failure on the CPU board or 1036 board. If this error occurs, contact G.A.L.
Drive Com Tx Stop Er	Drive Communications Transmit Stop Error. This error is used to detect a hardware failure on the controller communications port to the drive.	• Missing jumper on J7 of the 1036 board (COM1 IRQ6). Install the jumper. • Hardware failure on the CPU board or 1036 board. If this error occurs and the jumper J7 is in place, contact G.A.L.
Drive Com TxEmpty Er	Drive Communications Transmit Stop Error. This error is used to detect a hardware failure on the controller communications port to the drive.	• Missing jumper on J7 of the 1036 board (COM1 IRQ6). Install the jumper. • Hardware failure on the CPU board or 1036 board. If this error occurs and the jumper J7 is in place, contact G.A.L.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Drive has Com Error	Drive has a communications error. The controller has received a message from the drive that it has communication receive errors.	• Faulty communications cable connection. Check the drive twisted pairs connected from the drive to the 1036 board. • Noise on the communication cable. Verify that the shield on the communications cable to the drive is connected to earth ground on one end. • Faulty communication chip. Replace the U8 and/or U9 driver chips on the 1036 board.
Drive Ready Fault	The drive has a fault	• The drive has or had a fault. Check the drive fault log. • Faulty RDY input. (Replace the RDY input).
DT Count Fault	The verification position count for the DT input switch was off by more than 10 inches when the switch was activated.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • DT switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.
DT Failed On Fault	DT input Failed On Fault. The car was at the bottom floor and the DTS input was low true (DTS switch made) but the DT input was high (DT not made).	• The DTS switch is not wired or the DTS switch is not used. If the DTS switch is not used, jump the DT and DTS inputs together. • The DT did not break at the bottom terminal landing. Adjust or replace the DT switch. • Faulty DT input. Replace the DT input chip.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
DT1 Count Fault	The verification position count for the DT1 input switch was off by more than 10 inches when the switch was activated.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • DT1 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.
DT2 Count Fault	The verification position count for the DT2 input switch was off by more than 14 inches when the switch was activated.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • DT2 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
DT3 Count Fault	The verification position count for the DT3 input switch was off by more than 18 inches when the switch was activated.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • DT3 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.
DT4 count Fault	The verification position count for the DT4 input switch was off by more than 24 inches when the switch was activated.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • DT4 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
DT5 count Fault	The verification position count for the DT5 input switch was off by more than 32 inches when the switch was activated.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • DT5 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.
DT6 count Fault	The verification position count for the DT6 input switch was off by more than 42 inches when the switch was activated.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • DT6 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
DTS count Fault	Down Terminal Slowdown Limit Count Fault. The verification position count for the DTS input switch was off by more than 10 inches when the switch was activated.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • DTS switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.
DTS Failed On Fault	DTS input Failed On Fault. The car was at the bottom floor and the DT input was low true (DT switch made) but the DTS input was high (DTS not made).	• The DT switch is not wired or DT input was lost. • The DTS did not break at the bottom terminal landing. Adjust or replace the DTS switch. • Faulty DTS input. Replace the DTS input chip.
EBAi Input Off Fault	Emergency brake test contacts in BA1,BA2 failed off	• Possible bad NC contact on BA1 or BA2 relays • Check wiring on emergency brake relays • Replace EBAi input on expansion i/o board
EBAi Input On Fault	Emergency brake test contacts in BA1,BA2 failed on	• Make sure BA1 and BA2 relays are being cycled • Replace EBAi input on expansion i/o board
EBBi Input Off Fault	Emergency brake test contacts in BB1,BB2 failed off	• Possible BBd NC contact on BB1 or BB2 relays • Check wiring on emergency brake relays • Replace EBBi input on expansion i/o board
EBBi Input On Fault	Emergency brake test contacts in BB1,BB2 failed on	• Make sure BB1 and BB2 relays are being cycled • Replace EBBi input on expansion i/o board

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
EBK1 Input Failed OFF	Emergency Brake EBK1i failed off fault	Locate EBK1 and visually determine if output is turning ON and OFF Faulty EBK1i input chip. Replace the EBK1i input chip. Faulty EBK1 output Chip. Replace the EBK1 output chip.
EBK1 Input Failed ON	Emergency Brake EBK1 failed on fault	Locate EBK1 and visually determine if output is turning ON and OFF Faulty EBK1i input chip. Replace the EBK1i input chip. Faulty EBK1 output Chip. Replace the EBK1 output chip.
EBK2 Input Failed OFF	Emergency Brake EBK2 failed off fault	Locate EBK2 and visually determine if output is turning ON and OFF Faulty EBK2i input chip. Replace the EBK2i input chip. Faulty EBK2 output Chip. Replace the EBK2 output chip.
EBK2 Input Failed ON	Emergency Brake EBK2 failed on fault	Locate EBK2 and visually determine if output is turning ON and OFF Faulty EBK2i input chip. Replace the EBK2i input chip. Faulty EBK1 output Chip. Replace the EBK2 output chip.
EE Ram Failed	EE Ram (Flash Memory) Fault. Valid flash memory is not found or memory chip is not large enough	• Call factory to verify memory size on 1036 board. Replace memory chip with larger size. • Faulty 1036 board. Replace 1036 board
EM Brake Input OFF	After the controller turn on the output EBKC, EBKi never came on	• Improper wiring of the brake EBRKC coil. Refer to prints for wire connections. • Faulty EBKi input. Replace EBKi input chip on i/o board. • Faulty EBKC output. Replace EBKC output chip on i/o board
EM Brake Input ON	The EBKi input or EBKC output has failed on.	• Improper wiring of the brake Emergency Brake coil. Refer to prints for wire connections. • Faulty EBKi input. Replace EBKi input chip on i/o board. • Faulty EBKC output. Replace EBKC output chip on i/o board.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
EM Brake Switch OFF	Emergency brake switch EBKS failed off once the car stopped	• Improper wiring of Emergency brake switch. • Faulty EBKS input. Replace EBKS input chip on i/o board.
EM Brake Switch ON	Emergency brake switch EBKS failed off once the car stopped	• Improper wiring of Emergency brake switch. • Faulty EBKS input. Replace EBKS input chip on i/o board. • Check adjustment of Emergency brake switch.
EM BRK CanCom Error	Emergency Brake Board Can Communication Error.	• Faulty Can communication wire connection. Verify proper twisted pair wires to the canh and canl terminals on the brake board. • Noise on the Canbus. Verify that the shield wire is connected according to the job print.
Emergency Brake Trip	Emergency Brake Trip fault	Controller may have seen car overspeed, unintended motion or lost governor input (GOV).
Emergency Exit Flt	An emergency stop occurred while moving.	• The Safety string opened while the car was running. Check the safety circuit. • The LC input is off. Check the LC fuse. If the LC fuse is blown check for short from LC to GND.
Enc CanBus Ack Err	Encoder Canbus acknowledge error	No yet implemented. Error should not occur.
Enc CanBus Idle Err	Encoder Canbus idle	No yet implemented. Error should not occur.
Enc CanBus Off Err	Encoder Canbus off	No yet implemented. Error should not occur.
Enc CanPacket Fault	Encoder Canbus packet fault	No yet implemented. Error should not occur.
Encoder Busy Error	Encoder busy fault	Can Open Encoder appears as busy and it is not taking signals from controller. Check encoder to see if it failed. Check wiring and shield connections as well as voltage from the GALX-1092.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Encoder Com Error	Encoder communication error. Encoder board detected Comm error while talking to the CAN Open encoder	Verify Connections on Encoder Board. Possible Noise on Encoder cable. Check Encoder Voltage. Check for wires shield connections on GALX-1092 Board.
Encoder Count Error	Encoder Count Error. An error is announced when the encoder count value is greater than 4 inches in 3 milliseconds.	• Faulty encoder connection. Verify the encoder connection to the 1022 encoder isolation board. • Faulty 4I30 encoder board. Replace the 4I30 board. • Faulty 1022 encoder isolation board. Replace the encoder isolation board. • Bus address problem on the PC/104 bus. Contact GAL regarding this fault.
Encoder Dir Fault	Encoder direction fault. Controller is in motion with an encoder velocity of more than 50 feet per minute and the direction in the encoder feedback is opposite to the direction run command	Check for proper Voltage on Encoder. Verify Connections on Encoder Board. Possible Noise on Encoder cable. Check for wires shield connections on encoder Isolation Board.
Encoder Init	Encoder initialization fault. Encoder board failed to initialize CAN open Encoder	Verify Connections on Encoder Board. Possible Noise on Encoder cable. Check Encoder Voltage. Check for wires shield connections on GALX-1092 Board.
Encoder PPR Error	PPR setting error from CAN Open encoder	Controller attempted to set PPR on the CAN Open Encoder but when we read it back, it did not change. Possible Noise on Encoder cable. Check Encoder Voltage. Check for wires shield connections on GALX-1092 Board.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Encoder Preset Flt	Encoder Preset error generated because controller could not establish position from Can open encoder.	Can Open Encoder / Encoder Board lost track of car position. Possible Noise on Encoder cable. Check Encoder Voltage. Check for wires shield connections on GALX-1092 Board.
EP Recall Car 1 OT	Emergency Power Recall Car Out of Service Car 1	• Car 1 was out of service while elevators were in an Emergency Power Recall Sequence • Check faults for car 1
EP Recall Car 2 OTS	Emergency Power Recall Car Out of Service Car 2	• Car 2 was out of service while elevators were in an Emergency Power Recall Sequence • Check faults for car 2
EP Recall Car 3 OTS	Emergency Power Recall Car Out of Service Car 3	• Car 3 was out of service while elevators were in an Emergency Power Recall Sequence • Check faults for car 3
EP Recall Car 4 OTS	Emergency Power Recall Car Out of Service Car 4	• Car 4 was out of service while elevators were in an Emergency Power Recall Sequence • Check faults for car 4
EP Recall Car 5 OTS	Emergency Power Recall Car Out of Service Car 5	• Car 5 was out of service while elevators were in an Emergency Power Recall Sequence • Check faults for car 5
EP Recall Car 6 OTS	Emergency Power Recall Car Out of Service Car 6	• Car 6 was out of service while elevators were in an Emergency Power Recall Sequence • Check faults for car 6
EP Recall Car 7 OTS	Emergency Power Recall Car Out of Service Car 7	• Car 7 was out of service while elevators were in an Emergency Power Recall Sequence • Check faults for car 7
EP Recall Car 8 OTS	Emergency Power Recall Car Out of Service Car 8	• Car 8 was out of service while elevators were in an Emergency Power Recall Sequence • Check faults for car 8

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
EPR Pwr Lost Moving	EP Recovery power lost while moving	Controller failed to turn on Normal Power Drive and Emergency Power Drive outputs (NPD and EPD) while in motion. Condition should not occur.
EPRecall Car1 Tim-ot	Emergency Power Recall Time-out Car 1	• Car 1 timeout while it was in Emergency power recall mode • Make sure the field variable "Recall Timeout" is set properly to allow the car enough time to recover if it is between floors and away from Emergency Power Floor • If you have a blank shaft, consider increasing the Recovery Speed (default 25fpm)
EPRecall Car2 Tim-ot	Emergency Power Recall Time-out Car 2	• Car 2 timeout while it was in Emergency power recall mode • Make sure the field variable "Recall Timeout" is set properly to allow the car enough time to recover if it is between floors and away from Emergency Power Floor • If you have a blank shaft, consider increasing the Recovery Speed (default 25fpm)
EPRecall Car3 Tim-ot	Emergency Power Recall Time-out Car 3	• Car 3 timeout while it was in Emergency power recall mode • Make sure the field variable "Recall Timeout" is set properly to allow the car enough time to recover if it is between floors and away from Emergency Power Floor • If you have a blank shaft, consider increasing the Recovery Speed (default 25fpm)
EPRecall Car4 Tim-ot	Emergency Power Recall Time-out Car 4	• Car 4 timeout while it was in Emergency power recall mode • Make sure the field variable "Recall Timeout" is set properly to allow the car enough time to recover if it is between floors and away from Emergency Power Floor • If you have a blank shaft, consider increasing the Recovery Speed (default 25fpm)
EPRecall Car5 Tim-ot	Emergency Power Recall Time-out Car 5	• Car 5 timeout while it was in Emergency power recall mode • Make sure the field variable "Recall Timeout" is set properly to allow the car enough time to recover if it is between floors and away from Emergency Power Floor • If you have a blank shaft, consider increasing the Recovery Speed (default 25fpm)

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
EPRecall Car6 Tim-ot	Emergency Power Recall Time-out Car 6	• Car 6 timeout while it was in Emergency power recall mode • Make sure the field variable "Recall Timeout" is set properly to allow the car enough time to recover if it is between floors and away from Emergency Power Floor • If you have a blank shaft, consider increasing the Recovery Speed (default 25fpm)
EPRecall Car7 Tim-ot	Emergency Power Recall Time-out Car 7	• Car 7 timeout while it was in Emergency power recall mode • Make sure the field variable "Recall Timeout" is set properly to allow the car enough time to recover if it is between floors and away from Emergency Power Floor • If you have a blank shaft, consider increasing the Recovery Speed (default 25fpm)
EPRecall Car8 Tim-ot	Emergency Power Recall Time-out Car 8	• Car 8 timeout while it was in Emergency power recall mode • Make sure the field variable "Recall Timeout" is set properly to allow the car enough time to recover if it is between floors and away from Emergency Power Floor • If you have a blank shaft, consider increasing the Recovery Speed (default 25fpm)
Estop Fault	An emergency stop occurred while moving or attempting to move.	• The “P” input did not drop from MC, BRK or RUN contactors being energized. • The drive on (DON) input did not energize or dropped out while running. • The BRK contactor did not energize or dropped out while running. • BRKI input did not turn on or dropped out while running. • The DEL contactor did not energize or dropped out while running • The DEL input did not turn on or dropped out while running. • The stop switch was pulled while running. • The car was not safe usually from clipping a door lock. See Car Safe Fault. • The stall protection timer timed-out. • (Hydro only) An emergency power recall was initiated while the car was running up. • The pulse count stopped counting

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
FDoor Close Cont Flt	Door Close Contact safe fault	.After Controller was safe with doors, gate switch, door contacts and locks made and ready to run, a door contact input turned OFF.
Field Vars Deflt Ini	Field Variables Default Initialization. Field adjustable variables are being initialized for the first time.	• Job related parameters are invalid. This error occurs on the first time the 1036 board is being powered up.
Field Vars Relocated	Field Variables Relocated. In software version 5.08 the adjustable field variables were relocated to a new location in flash memory to allow for additional future field variables.	• The software has been updated to a version 5.08 or higher from a previous version. This is normal and should only occur once. If an older version software (earlier than 5.08) is later installed, the job parameters may be lost.
Fire Fighter Stop Sw	Fire Fighter Stop Sw	• Fire Fighter Stop switch is pulled. • Faulty wire connection in the Fire Fighter stop switch circuit.
Fld Var Partial Init	Field variables partial table initialized. Controller did not see extended memory initialized before. It should occur once when updating controller software	• The software has been updated. This is normal and should only occur once. If fault constantly comes in, make sure you have 16C88 installed in M1 for the COMM/Memory Board. If not, you need to update memory.
Front Det Edge Fault	Front Detector Edge Time-out	The Electric Eye signal stayed on continuously for longer than the parameter "EE Time-out" is set to.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
FST I/O Failed Off	The FST input on the 1038 board did not pick up when expected.	• Faulty FST output chip. Replace output chip. • Faulty FSTI input chip. Replace input chip.
FST I/O Failed On	The FST input on the 1038 board did not drop out when expected.	• Faulty FST output chip. Replace output chip. • Faulty FSTI input chip. Replace input chip.
FSTP I/O Failed Off	The FSTP input on the 1038 board did not pick up when expected.	• Faulty FST1 output chip. Replace output chip. • Faulty FSTI input chip. Replace input chip.
FSTP I/O Failed On	The FSTP input on the 1038 board did not drop out up when expected	• Faulty FST1 output chip. Replace output chip. • Faulty FSTI input chip. Replace input chip.
Gate Switch Fault	The Gate Switch failed on while the door was open.	• Gate switch not adjusted properly. • GS input failed on. Replace GS input on 1038/1064 board.
Gate/Lock Bypass Switch Fault	The gate or lock bypass switch was on while the car was NOT on car top inspection.	• Gate or Lock bypass switch on the controller 1038 board is in the on position. • Gate or Lock bypass input failed on. Replace GBP OR LBP input chip on 1038 board.
Governor Switch Flt	Governor Switch Tripped.	• Verify that the governor switch is set properly. • Verify that the drive is setup properly and that the car does not overspeed.
Gripper did not Pick	The rope gripper did not pick when the GR1 and GR2 relays were energized.	• Faulty wiring to the rope gripper. • Faulty GTS switch on rope gripper. Make sure that the switch opens and closes properly when the gripper is energized and dropped. • Faulty GTS input. Replace the GTS input chip.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Gripper Trip Fault	An overspeed or uncontrolled motion caused the rope gripper to trip.	• Check if the governor has tripped from. • Make sure that the brake can hold the car.
Group Comm Loss	Car 2 is not communicating with Car 1.	• Faulty wiring from TX+/TX- from car to car. • Faulty U6 driver chip on the 1036 Comm/Memory board (next to the connector for the group comm). • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
Grp Comm Config Err	Group Comm configuration error.	• There as a device trying to get initialized that should not be on the bus • Check detailed fault data for "dev" to identify board address
GRT1 input Off Fault	While testing the rope gripper relays, the contacts for GR1R or GR2R did not close or the GRT1 input failed off.	• Faulty GR1R or GR2R relays. Replace both GR1R and GR2R relays. • Faulty GRT1 input. Replace the GRT1 input chip.
GRT1 Input On Fault	While testing the rope gripper relays, the contacts for GR1R or GR2R did not open or the GRT1 input failed on.	• Faulty GR1R or GR2R relays. Replace both GR1R and GR2R relays. • Faulty GRT1 input. Replace the GRT1 input chip.
GRT2 input Off Fault	While in a door zone the DZ and DZ1 contacts used in the rope gripper circuit were not closed or the GRT2 input failed off.	• Faulty DZ or DZ1 relays. Replace both DZ and DZ1 relays. • Faulty GRT2 input. Replace the GRT2 input chip. • Faulty LE or LE1 outputs. When a DZ input is on from the selector DZ output, LE and LE1 outputs control the DZ and DZ1 relays respectively. Replace the LE and LE1 output chips.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
GRT2 input On Fault	The DZ and DZ1 contacts used in the rope gripper circuit did not open during a run or the GRT2 input failed on.	• Faulty DZ or DZ1 relays. Replace both DZ and DZ1 relays. • Faulty GRT2 input. Replace the GRT2 input chip. • Faulty LE or LE1 outputs. When a DZ input is on from the selector DZ output, LE and LE1 outputs control the DZ and DZ1 relays respectively. Replace the LE and LE1 output chips.
GS & GS_1 Opposite	Input failure on one of the Gate Switch (GS) inputs.	• GS or GS-1 input failed on. Replace GS or GS-1 input chip. Check status of input from Input and Output menu on the LCD interface.
GTS Input Off Fault	Emergency Brake: GTS input did not turn on while doing the safety check for PFC and SFC relays.	• Check wiring for emergency brake • Check emergency brake relays during safety check • Faulty GTS input chip. Replace input chip.
GTS Input On Fault	Emergency Brake: GTS input did not turn off while doing the safety check for PFC and SFC relays.	• Check wiring for emergency brake • Check emergency brake relays during safety check • Faulty GTS input chip. Replace input chip.
Hall Call Light Fuse	Hall Call Light Fuse Blown	• Check for short on the Hall Call Light circuit.
HC Com Device Reset	Serial Hall Call board reset unexpectedly. Usually caused by loss of power to the individual board.	• Usually caused by loss of power to the individual board. • Faulty power connection to board. • Fault hall call board.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
HC DrvBd Rx from Bot	Not receiving packets from the bottom station	• Cable is bad or disconnected • Cables going to wrong port (i.e, switched TO ABOVE and TO BELOW) • Transmitter from device above or below is bad, check faults for that device. • Receiver on board is bad – replace device
HC DrvBd Tx to Bot	Can't internally read information from Transmitter to bottom station	• Cable connecting two devices could be flip-flopped (i.e, gray wire goes from pin 1 on one end to pin 8 on the other end). Disconnect cable, and if fault changes to Rx Fault, the problem is the cable. • Cables going to wrong port (i.e, switched TO ABOVE and TO BELOW) • Transmitter is bad – replace the Device.
HC DvrBd Rx from Top	Not receiving packets from the top station.	• Cable is bad or disconnected • Cables going to wrong port (i.e, switched TO ABOVE and TO BELOW) • Transmitter from device above or below is bad, check faults for that device. • Receiver on board is bad – replace device
HC DvrBd Too Few Dev	Too Few stations detected based on configuration – will only trigger if loop is closed (i.e. will not trigger if device #5 is not functioning, causing driver to establish communication with all but one station.)	• Check configuration and number of stations
HC DvrBd TooMany Dev	Too Many stations detected based on configuration.	• Check configuration and number of stations

Main CPU Faults

Fault	Description	Possible Cause/Suggested Fix
HC DvrBd Tx to Top	Can't internally read information from Transmitter to top station.	• Cable connecting two devices could be flip-flopped (ie, gray wire goes from pin 1 on one end to pin 8 on the other end). Disconnect cable, and if fault changes to Rx Fault, the problem is the cable. • Cables going to wrong port (i.e, switched TO ABOVE and TO BELOW) • Transmitter is bad – replace the Device.
HC Fuse Blown Fault	The HC input is off. No power on HC.	• Make sure that the hall call power for each car is in phase. During a power up for car 1 while car 2 is powering the hall call power could cause a momentary short if the hall call power for each car is not in phase. • Short circuit in the hall call lighting circuitry.
HCB Ax Dn Input Ovld	HCB Aux Down input overload	Controller detected overload in the input from the Aux terminal at the station. To identify fault device refer to Detailed Fault Log "dev" and "dv2" will provide address for Serial Driver address and Station where the fault was generated.
HCB Ax Up Input Ovld	HCB Aux Up input overload	Controller detected overload in the input from the Aux terminal at the station. To identify fault device refer to Detailed Fault Log "dev" and "dv2" will provide address for Serial Driver address and Station where the fault was generated.
HCB Device Comm Loss	The Driver does not see this HCB device	• Comm faults above and below a device – check wiring • Board not powering up – check 24VAC and MCU on device • Fuses blown on driver
HCB Device Reset	The HCB has just comeback online	• Fixed previous problem. • There is a power/communication problem, where the board is either resetting (power) or temporarily losing communication on both ports.
HCB Dn FET Open	HCB fet open down	• Replace GALX-1054AN
HCB Dn FET Short	HCB fet short down	• Replace GALX-1054AN

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
HCB Dn Input Ovrload	HCB Down input overload	Controller detected overload in the input from the LED board at the station. To identify fault device refer to Detailed Fault Log "dev" and "dv2" will provide address for Serial Driver address and Station where the fault was generated.
HCB Dn LED Open	HCB led open down	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB Dn LED Short	HCB led short down	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB FET Open Blue Dn	HCB fet open blue down	• Replace GALX-1054AN
HCB FET Open Blue Up	HCB fet open blue up	• Replace GALX-1054AN
HCB FET Open Grn Dn	HCB fet open green down	• Replace GALX-1054AN
HCB FET Open Grn Up	HCB fet open green up	• Replace GALX-1054AN
HCB FET Open Red Dn	HCB fet open red down	• Replace GALX-1054AN
HCB FET Open Red Up	HCB fet short red up	• Replace GALX-1054AN
HCB FET Short Blu Dn	HCB fet short blue down	• Replace GALX-1054AN

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
HCB FET Short Blu Up	HCB fet short blue up	• Replace GALX-1054AN
HCB FET Short Grn Dn	HCB fet short green down	• Replace GALX-1054AN
HCB FET Short Grn Up	HCB fet short green up	• Replace GALX-1054AN
HCB FET Short Red Dn	HCB fet short red down	• Replace GALX-1054AN
HCB FET Short Red Up	HCB fet short red up	• Replace GALX-1054AN
HCB Invalid Floor	HCB has invalid floor	• This fault is only intended for internal use to identify floors that need to be skipped in diagnostics. It should never occur
HCB LED Open Blue Dn	HCB led open blue down	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB LED Open Blue Up	HCB led open blue up	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB LED Open Grn Dn	HCB led open green down	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
HCB LED Open Grn Up	HCB led open green up	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB LED Open Red Dn	HCB led open red down	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB LED Open Red Up	HCB led short red up	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB LED Short Blu Dn	HCB led short blue down	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB LED Short Blu Up	HCB led short blue up	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB LED Short Grn Dn	HCB led short green down	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB LED Short Grn Up	HCB led short green up	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
HCB LED Short Red Dn	HCB led short red down	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB LED Short Red Up	HCB led short red up	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB Low Supply Volt	Hall call board has low supply voltage	Low voltage at Hall call device level. To identify fault device refer to Detailed Fault Log "dev" and "dv2" will provide address for Serial Driver address and Station where the fault was generated.
HCB No Dn Led Board	HCB No Down Led Board Detected	• HCB board could not detect an LED board • Replace LED board (GALX-1085AN)
HCB No Up Led Board	HCB No Up Led Board Detected	• HCB board could not detect an LED board • Replace LED board (GALX-1085AN)
HCB Rx from above fl	HCB rx fault up to above floor	• Receiver on board is bad – replace device • Cable is bad or disconnected • Cables going to wrong port (i.e, switched to above and to below) • Transmitter from device above is bad.
HCB Rx from below fl	HCB rx fault down from below floor	• Receiver on board is bad – replace device • Cable is bad or disconnected • Cables going to wrong port (i.e, switched to above and to below) • Transmitter from device below is bad.
HCB Stuck Dn Button	HCB stuck button down	• Button is physically stuck – fix button • Input is stuck on or shorted – replace device
HCB Stuck Up Button	HCB stuck button up	• Button is physically stuck – fix button • Input is stuck on or shorted – replace device

Main CPU Faults

Fault	Description	Possible Cause/Suggested Fix
HCB Tx to above fl	Can't internally read information from Transmitter to device above	• Cable connecting two devices could be flip-flopped (ie, gray wire goes from pin 1 on one end to pin 8 on the other end). Disconnect cable, and if fault changes to Rx Fault, the problem is the cable. • Transmitter is bad, Replace the Device
HCB Tx to below fl	Can't internally read information from Transmitter to device below	• Cable connecting two devices could be flip-flopped (ie, gray wire goes from pin 1 on one end to pin 8 on the other end). Disconnect cable, and if fault changes to Rx Fault, the problem is the cable. • Transmitter is bad, Replace the Device
HCB Up FET Open	HCB fet open up	• Replace GALX-1054AN
HCB Up FET Short	HCB fet short up	• Replace GALX-1054AN
HCB Up Input Ovrload	HCB Up input overload	Controller detected overload in the input from the LED board at the station. To identify fault device refer to Detailed Fault Log "dev" and "dv2" will provide address for Serial Driver address and Station where the fault was generated.
HCB Up LED Open	HCB led open up	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
HCB Up LED Short	HCB led short up	• Make Sure there is a GALX-1056AN attached to the proper connector (Up LED always attached to CN5, Down LED attached to CN5 if only down call at that station (like the top floor), otherwise attached via ribbon at CN6. • Replace GALX-1056AN for the associated up or down call.
Hoist Motor Overload	Hoist Motor Overload	Hoist Motor Overload signal tripped. Check Input chip for HMO input

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Hoistway Default Ini	Hoistway Default Initialization. Hoistway values are being initialized for the first time.	• Job related hoistway setup information is invalid. This occurs on the first time the 1036 board is being powered up.
Hoistway Learn Fault	Car is on automatic and the hoistway has not been learned.	• Hoistway learn procedure needs to be performed. • Faulty ram-flash memory chip.
Hoistway Update Init	Hoistway Update Initialization. Table of door zone positions for hoistway used to update position count while traveling has been initialized for the fires time.	• Job related hoistway setup information is invalid. This occurs on the first time the 1036 board is being powered up.
Hot Oil Fault	Hot Oil Fault	Hydro only - Job is configured for hot oil detect. TPH input turned ON. Check for defective input.
HC DrvBd error 248	Reserved for hc board fault	
HC DrvBd error 249	Reserved for hc board fault	
Inspection Input Fault	More than one input is on in the inspection string. The inspection string condition is also shown on the safety processor.	• Faulty Top of Car inspection wiring. Verify voltage on CTA and ICA terminals when car top inspection switch is in the run position. Verify INS input when switch in the inspection position. • Verify that one and only one inspection string inputs is on: AUTO, MRI, INS, ICI and ACC. • Faulty inspection string input: AUTO, MRI, INS, ICI or ACC. Replace faulty input chip

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Inspection Up/Dn Sw	An up or down inspection run input was on when first entering into inspection operation. This caused from a faulty inspection up or down switch or from someone holding the up or down run button when placing the car on inspection.	• Faulty inspection up or down input: IU, ID, MRIU, MRID, BAD, BAU, TAD or TAU. Replace faulty input chip. • Faulty inspection wiring keeping an inspection up or down input on. • Placing the car on inspection while holding an up or down run button
Invald DT or DT1 Cnt	Invalid DT or DT1 Count. The position count for DT is greater than the count for DT1	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invalid Fault Code	Invalid Fault Code	
Invald FL Offset Cnt	Invalid Floor Offset Count. If the offset count is greater than 3 inches.	• The offset starts out at zero and is modified by the adjuster. This value should never be greater than 3 inches. • Encoder was changed from lower resolution to higher resolution which would cause the offset value to be out of range. Correct the offset value.
Fault# > IDS Flt Siz	Largest error IDS can do	
Invalid DN or DT Cnt	Invalid DN or DT Count. The position count for DN is greater than the count for DT	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Invalid Floor Count	Invalid Floor Count. The floor count of the floor above must always be larger than the floor below. An above floor count was lower than the floor below in the floor hoistway table	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invalid SEL Bot Cnt	Invalid Selector Bottom Count. (Tapeless selector) The bottom floor count is less then 4000. The count is initialized at 5000.	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invalid SEL Top Cnt	Invalid Selector Top Count. The top selector count – the bottom selector count is less than the number of floors times 30. The count averaged less than 30 counts per floor.	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invalid UT or UN Cnt	Invalid UT or UN Count. The position count for UT is greater than the count for UN	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Invld DT1 or DT2 Cnt	Invalid DT1 or DT2 Count. The position count for DT1 is greater than the count for DT2	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld DT2 or DT3 Cnt	Invalid DT2 or DT3 Count. The position count for DT2 is greater than the count for DT3	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld DT3 or DT4 Cnt	Invalid DT3 or DT4 Count. The position count for DT3 is greater than the count for DT4	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld DT4 or DT5 Cnt	Invalid DT4 or DT5 Count. The position count for DT4 is greater than the count for DT5	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld DT5 or DT6 Cnt	Invalid DT5 or DT6 Count. The position count for DT5 is greater than the count for DT6	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld DZU or DZD Cnt	Invalid DZU or DZD Count. If the DZU count is greater than the floor position count or the DZD count is less than the floor position count, then this error is declared.	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Invld UT1 or UT Cnt	Invalid UT1 or UT Count. The position count for UT1 is greater than the count for UT	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld UT2 or UT1 Cnt	Invalid UT2 or UT1 Count. The position count for UT2 is greater than the count for UT1	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld UT3 or UT2 Cnt	Invalid UT3 or UT2 Count. The position count for UT3 is greater than the count for UT2	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld UT4 or UT3 Cnt	Invalid UT4 or UT3 Count. The position count for UT4 is greater than the count for UT3	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld UT5 or UT4 Cnt	Invalid UT5 or UT4 Count. The position count for UT5 is greater than the count for UT4	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invld UT6 or UT5 Cnt	Invalid UT6 or UT5 Count. The position count for UT6 is greater than the count for UT5	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory
Invlid Top Floor Cnt	Invalid Top Floor Count. The top floor count is zero.	• Invalid hoistway learn. Re-learn the hoistway. • The hoistway has not been learned. Learn the hoistway. • If this problem is not corrected with a hoistway learn, contact the factory

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
KEB Not In Run Mode	Keb drive not in run mode. We need to verify that the drive is in Run Mode before we do every Run.	LF.03 was not set to zero with the car in automatic. If the error occurred while troubleshooting disregard error. If it happens when in service, check drive for possible cause of this parameter not being set properly.
L1 Low Line Voltage	L1 Line Voltage Low	Voltage Sensor Board Related. Voltage being monitored on L1 dropped below the setting for parameter " Low Line Volt "
L2 Low Line Voltage	L2 Line Voltage Low	Voltage Sensor Board Related. Voltage being monitored on L2 dropped below the setting for parameter " Low Line Volt "
L3 Low Line Voltage	L3 Line Voltage Low	Voltage Sensor Board Related. Voltage being monitored on L3 dropped below the setting for parameter " Low Line Volt "
LC Fuse Blown Fault	The LC input is off. No power on LC.	• Short from LC to GND.
Learn HW Safe Fault	Part of the safety string open while in automatic learn hoistway mode	• Check for possible faults on the safety processor or drive • Door locks, gate switch or contacts open while in motion
Learn HW Stall Fault	Car timed out while learning hoistway in auto	• Increase field variable "Hoistway Learn Stall Time" and try again
Lev Flt Set EM Brake	Emergency brake set from leveling fault	A leveling fault occurred and the parameter "Leveling Fault = " is set so it trips the Rope Gripper/Emergency Brake
Lev Flt Set Gripper	Gripper set from leveling fault	A leveling fault occurred and the parameter "Leveling Fault = " is set so it trips the Rope Gripper/Emergency Brake

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Level Stop Cnt Fault	Leveling stop fault occurred from incorrect count. As the car was leveling off the pulses, UL or DL turned off.	• Floor offset value set too high • Increase dead zone when the car is configured to stop on the pulses instead of just the magnet • Ensure outer sensors are set no more than 7.5" apart
Leveling Fault	Leveling Fault. When the car attempted to drop the brake, the car moved out of the dead level. The leveling fault count was incremented. If this occurs more times than the adjustable variable “Level Fault Cnt” then this error is declared.	• Brake is dropping too slowly. Adjust the drop of the brake. • The drive is not holding zero speed. Run the car on inspection at 5fpm and while running change the inspection speed to zero. The car should stop and hold zero. • The response is not high enough on the drive. • Brake contactor is not dropping properly.
Leveling Tim-out Flt	Leveling Time-out Fault	• Car overshot floor and continue leveling. • Car targeted floor too soon and was creeping to the floor in leveling. • Check for causes of invalid pulse counts or invalid floor positions • Invalid floor position preset • Faulty encoder connection • Faulty encoder wiring

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Limit Opp Dir Flt	Car hit limits in wrong direction. In a single Run every Limit switch signal should only change state once or not change at all. If car was traveling down and an Up Terminal Slowdown switch goes LOW after we go in motion we will detect that as a fault.	If Controller is not really faulting, check that Slowdowns are not at the same position as the dead levl position. In Gearless jobs roll back could cause this extra change of state and therefore generate the fault. In that event reposition Terminal Slowdown by a couple of inches.
Load Weigh Var Init	Load weigher init	No yet implemented. Error should not occur.
Lobby Hall Call Fuse	Lobby Call common fuse	Lobby Common fuse blown. Check Input chip for LHC
Low Pressure Fault	Low Oil Pressure Fault. The low oil pressure switch has been activated.	• Low oil in the tank. • Faulty LOS input if low oil switch option is being used. Replace the LOS input chip. • Faulty Low Oil Switch. If low oil switch option is being used. Verify the operation of the low oil switch.
Lowoil Switch Fault	Low Oil Switch Fault. The low oil switch became active	• Low oil in the hydraulic tank • Faulty wiring to the low oil input • Faulty low oil input. Replace LOS input.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
LW Calibration Error	Load Weigher Calibration Error. The load weigher attempted to do an automatic calibration and could not be calibrated.	• The load weigher device should be re-calibrated according to the manufacturer's instructions.
MCA I/O Failed Off	The MCA input or output has failed off.	• Faulty MCAi input chip. Replace input chip. • Faulty MCA output chip. Replace output chip.
MCA I/O Failed On	The MCA input or output has failed on.	• Faulty MCAi input chip. Replace input chip. • Faulty MCA output chip. Replace output chip.
MCC I/O Failed Off	The MCC input or output has failed off.	• Faulty MCCi input chip. Replace input chip. • Faulty MCC output chip. Replace output chip.
MCC I/O Failed On	The MCC input or output has failed on.	• Faulty MCCi input chip. Replace input chip. • Faulty MCC output chip. Replace output chip.
Middle Door Lock Fault	The Middle Door Lock failed on while the door was open.	• Faulty door lock. • Jumper on door lock circuit. • Door lock not adjusted properly. • Faulty wiring to DLM input. • Faulty DLM and DLM-1 inputs (For this to occur both DLM and DLM-1 inputs must fail on). • DOL input failed. Replace DOL input chip. • Door operator open limit DOL is not adjusted properly
Motion Exit GTS Flt	GTS Motion emergency exit	No yet implemented. Error should not occur.
Motion Exit Ins Flt	emergency motion exit from inspection	Car was in motion before going in inspection Mode. Check for inspection inputs faulting out or Automatic input going low.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
MRAM Hardware Fault	Mram Fault	No yet implemented. Error should not occur.
NV Ram Failed	NV Ram (Battery Backed) Fault. Valid battery backed ram memory is not found or memory chip is not large enough	• Call factory to verify memory size on 1036 board. Replace memory chip with larger size. • Faulty 1036 board. Replace 1036 board
Overspeed Fault	Car overspeed fault. If the car goes 15% over contract speed the fault will be logged and the car will do an emergency stop.	• Encoder PPR incorrectly set. Set to match the Drive's Encoder Pulses. • Encoder RPM incorrectly set. Set to match the Motor's RPM. • The drive is not controlling the hoist machine motor. Check the response setting on the drive.
P input off Fault	The normally closed contacts on MC, BRK or RUN contactors did not drop.	• Not enough current draw through all three contacts. Place a 10K 3W resistor from the normally closed contact of RUN to GND. • Faulty normally closed contacts on MC, BK or RUN. Replace auxiliary contacts.
P Input On Fault	The "P" input did not drop out while the car was running. This input should drop out when MC, BRK and Run contactors are energized.	• Faulty contactor or auxiliary contacts on MC, BRK, or RUN. Replace auxiliary contacts or entire contactor

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
PC/104 Bus Error	PC/104 Bus Error. During two consecutive reads to the encoder board the count value was different.	• This error detects a hardware error on the PC/104 bus. Contact GAL regarding this error.
PFC Relay Failed Off	PFC relay did not pick up as expected	• Faulty PFC output chip. Replace output chip. • Faulty PFC relay on main I/O Board (1038 or 1064). Replace PFC relay.
PFC Relay Failed On	PFC relay did not drop as expected when performing a SFC/PFC test.	• Faulty PFC output chip. Replace output chip. • Faulty PFC relay on main I/O Board (1038 or 1064). Replace PFC relay.
PFC-SFC Test Lost DZ	Lost DZ input when performing a SFC/PFC test.	• DZ output on selector board did not turn on. (Replace DZ output on selector driver board). • One or both of the DZ sensors on the selector sensor board failed. Replace selector sensor board. • DZ input on the 1040 board failed. Replace DZ input on 1037/1040 board. • Check leveling magnet.
Pit Door Switch Flt	Pit Door Switch Open	• Verify that the pit door switch is closed. • Faulty wiring on the pit door switch circuit.
Pit Switch Fault	Pit Switch Input Open	• Verify that the pit switch is closed. • Faulty wiring on the pit switch circuit.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Pls Er 75% Top Speed	Pulse Error occurred while car is running greater then 75% of contract speed. The pulse counts have to change a minimum distance by the time the car reaches 75% of top speed.	• This error occurs if the car looses its pulse feedback from the encoder. Make sure that the encoder is not slipping. Check the encoder cable from the drive to the controller. Also check the ribbon cable from the encoder isolation board (1022N) to the encoder board (4I30) on the PC/104 CPU stack. • Possible faulty encoder isolation board (1022N), faulty ribbon cable or faulty encoder board (4I30).
Position Fault	The Terminal limits do not match the car position (UT or DT is hit but the car position is not at the top or bottom floor).	• Car is out of step from faulty selector inputs. Check that the DZ, UL and DL selector inputs work properly at each floor. • Car missed a slowdown input magnet. Check that the US and DS selector inputs work properly prior to each landing. • UT or DT input lost from the safety string being opened. • Improper adjustment of UT or DT limit switches
Possible DRV/1028 Er	The controller CPU lost the stop switch input, but has the SS and GTS inputs ON indicating that the drive or Safety Processor (1028) board has opened the safety string.	• View the faults on the Safety Processor board display and debug from the fault code listed. • View the drive faults log or led status and debug as directed from the drive manual.
Power Up Reset	Whenever power is cycled on the controller this error will indicate that the controller CPU was reset	• This error code is normal for a power loss. If power was not lost and the CPU re-boots, verify the +5VDC on the CPU power connector reads in the range of 4.90 and 5.1 VDC. If out of range, adjust the 5VDC supply pot for the correct voltage.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Pulse Error > 75 fpm	Pulse count shows a travel distance less then 2 inches while the car demand velocity is greater than 75 fpm.	• Make sure that the encoder is not slipping. Check the ribbon cable from the encoder isolation board (1022N) to the encoder board (4I30) on the PC/104 CPU stack. • Possible faulty encoder isolation board (1022N), faulty ribbon cable or faulty encoder board (4I30).
PWL UPS Comm Fault	Power loss: Controller cannot establish comm to UPS	• Check wiring and shielded pairs • Defective comm board • Possible bad UPS unit
PWL UPS Low Bat Flt	Power loss: ups battery fault	• UPS Battery voltage has dropped below 18V • Replace unit
PWL UPS Low Bat Volt	Power loss: ups batter fault	• Defective battery inside UPS unit • Replace UPS
PWL UPS On Bat Power	Power loss: ups on battery power	• No Line voltage on UPS. Unit running on battery power
PWL UPS Turned Off	Power loss: ups turned off	• Power loss on UPS. Power has been turned off
RCM / Lock Flt	Retiring Cam/Lock fault. Job has door contacts and door lock inputs as well as retiring cam output. Door locks are not coming on when trying to leave the floor.	Door Contacts were already closed and the controller attempted to energize the retiring cam (RCM)several times and the door locks did not turn on. After 4 attempts, it will declare this fault. Check locks or retiring cam device.
RDoor Close Cont Flt	Rear Door Close Contact safe fault	After Controller was safe with doors, gate switch, door contacts and locks made and ready to run, a door contact input turned OFF.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Rear Bottom Door Lock Fault	The Rear Bottom Door Lock failed on while the door was open (door on the rear door open limit).	• Faulty door lock. • Jumper placed on door lock circuit. • Rear door lock not adjusted properly. • Faulty wiring to DLB input. • Faulty DLB and DLB-1 inputs (For this to occur both DLB and DLB-1 inputs must fail on). • DOLR input failed. Replace DOLR input chip. • Rear door operator open limit is not adjusted properly
Rear Det Edge Fault	Rear Detector Edge Time-out	The Rear Electric Eye signal stayed on continuously for longer than the parameter "EE Time-out" is set to.
Rear Door Close Fault	The rear door did not reach the Rear Door Close Limit within the door close protection time.	• Rear Door Close Limit (DCLR) not adjusted properly. • Faulty Rear Door Close Limit (DCLR). Replace DCRL input. • Trash in door track preventing door from closing.
Rear Door Open Fault	The rear door did not reach the Rear Door Open Limit within the door open protection time.	• Rear Door Open Limit (DOLR) not adjusted properly. • Faulty Rear Door Open Limit (DOLR). Replace DOLR input.
Rear Gate Switch Fault	The Rear Gate Switch failed on while the door was open.	• Rear Gate switch not adjusted properly. • RGS input failed on. Replace RGS input.
Rear Middle Door Lock Fault	The Middle Door Lock failed on while the door was open.	• Faulty door lock. • Jumper placed on door lock circuit. • Rear door lock not adjusted properly. • Faulty wiring to RLM input. • Faulty RLM and RLM-1 inputs (For this to occur both RLM and RLM-1 inputs must fail on). • DOLR input failed. Replace DOLR input chip. • Rear door operator open limit is not adjusted properly

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Rear Top Door Lock Fault	The Rear Top Door Lock failed on while the door was open.	• Faulty door lock. • Jumper placed on door lock circuit. • Rear door lock not adjusted properly. • Faulty wiring to DLT input. • Faulty DLT and DLT-1 inputs (For this to occur both DLT and DLT-1 inputs must fail on). • DOLR input failed. Replace DOLR input chip. • Rear door operator open limit is not adjusted properly
Reset Fault	Anytime the system detects one of the following faults a reset fault is logged: • Power is cycled • Controller finds itself out of the door zone. • Binary input fault. • Terminal limits do not match the current position. • Car has been switched off of inspection. • After an open safety string has been closed.	• This fault is logged under normal conditions. Check the fault log for error that would indicate a fault condition prior to the reset fault.
RGS & RGS-1 Opposite	Input failure on one of the Rear Gate Switch (RGS) inputs.	• Faulty RGS or RGS-1 input. Replace input chip.
RLM & RLM-1 Opposite	Input failure on one of the Rear Lock Middle (RLM) inputs	• Faulty RLM or RLM-1 input. Replace input chip.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
RPM Input Fault	RPM Input Fault. The Rear Door Protection input stayed on when the rear door reached full open.	• RPM switch not setup properly on the door operator. Faulty RPM input. Replace RPM input chip.
RPM Off/RGS or DL On	RPM Off with Rear Gate Switch or Door Lock On. The Rear Door Protection Module input must go on before rear gate switch or door lock inputs go on.	• The RPM switch on the door operator is not setup properly. • There is no RPM input on the door operator. Jump the RPM input to the RGS terminal. • Faulty RPM input. Replace the RPM input chip.
RUN 0/RUN I Failed	RUN output failed off or run input failed on	• Faulty RUNi input chip. Replace input chip. • Faulty RUN output chip. Replace output chip.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Run Fault: Shutdown	Run Fault: Shutdown. If the car attempts to run 4 consecutive times and incurs a specific type of emergency stop without making a successful run, the car is shutdown and this error code is shown. The specific types of emergency stops to cause this fault are as follows: 1. The car has picked the brake and is in the run mode for more than 2 seconds and the position pulse has not changed. 2. The car is demanding a velocity greater than 75 fpm and change in position count is less than 3 inches. 3. The run stall protection timer has expired	• Verify that the brake is lifting properly. • Verify that the encoder pulses increment and decrement when running up or down.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
RUN I/O Failed On	The RUN input or output has failed on.	Traction • Faulty wiring to RN1 terminal. • Faulty RUNi input. Replace the RUNi input chip. • Faulty RUN output. Replace the RUN output chip. Hydro • Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1038 board is connected properly. • Faulty RUNi input. Replace the RUNi input chip. • Faulty RUN output. Replace the RUN output chip.
Run Inhibit Rset Cnt	Run inhibit from reset count	Once the car is in Reset mode, the controller attempted 5 times to come off reset but it keeps being sent back in reset.
RUN, RUNA, DNR Failure	The RUN input or output, the RUNA output or the DNR output failed to turn on.	Hydro • Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1038 board is connected properly. • Faulty wiring at the SD terminal. Verify that the down valve is wired to the SD terminal on the 1038 board. • Faulty SDi input (replace input chip). • Faulty SD output (replace output chip). • Faulty RUNi input. Replace the RUNi input chip. • Faulty RUN output. Replace the RUN output chip.
RUN, RUNA, UP Fail	The RUN input or output, the RUNA output or the UP output failed to run on.	Hydro • Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1038 board is connected properly. • Faulty wiring at the SU terminal. Verify that the down valve is wired to the SU terminal on the 1038 board. • Faulty SUi input (replace input chip). • Faulty SU output (replace output chip). • Faulty RUNi input. Replace the RUNi input chip. • Faulty RUN output. Replace the RUN output chip.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
RUNA I/O Failed Off	The RUNA input or output has failed off.	Traction • Fault on Safety Processor Board. This board can disable the run control to the RUNA output chip. Check if the PIC or PAL inhibit LEDs are on or if they turn on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor Board LCD display. • Faulty RUNAi input. Replace the RUNAi input chip. • Faulty RUNA output. Replace the RUNA output chip. Hydro • Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1038 board is connected properly. • Faulty RUNAi input. Replace RUNAi input chip. • Faulty RUNA output. Replace RUNA output chip. • Faulty RUN output. Replace RUN output chip.
RUNA I/O Failed Off	The RUNA input or output has failed off.	Traction • Fault on Safety Processor Board. This board can disable the run control to the RUNA output chip. Check if the PIC or PAL inhibit LEDs are on or if they turn on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor Board LCD display. • Faulty RUNAi input. Replace the RUNAi input chip. • Faulty RUNA output. Replace the RUNA output chip. Hydro • Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1038/1064 board is connected properly. • Faulty RUNAi input. Replace RUNAi input chip. • Faulty RUNA output. Replace RUNA output chip. • Faulty RUN output. Replace RUN output chip
RUNA I/O Failed On	The RUNA input or output has failed on	Traction • Faulty RUNAi input. Replace the RUNAi input chip. • Faulty RUNA output. Replace the RUNA output chip. Hydro • Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1038 board is connected properly. • Faulty RUN output. Replace RUN output chip. • Faulty RUNAi input. Replace RUNAi input chip. • Faulty RUNA output. Replace RUNA output chip.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
RUNA O/RUN I Failed	RUNA output or RUNI input failed.	• RUNA output failed off. Replace the RUNA output chip. Or • RUNI input failed off. Replace the RUNI input chip.
RUNA O/RUN I Failed	RUNA output or RUNI input failed	• RUNA output failed off. Replace the RUNA output chip. Or • RUNI input failed off. Replace the RUNI input chip.
Safety String Fault	Safety string fault occurs from the following conditions: • The safety string is open (SS input is off). • The drive ready input is not energized from the drive. • The potential to run input "P" is off.	• The safety string is open (SS input if off). Refer to the job prints and check all circuits ahead of the SS input.
SEB CanCom Error	Serial Expansion Board CanCommunications Error. One of the Serial Expansion boards is not communicating with the main CPU.	• From the LCD user interface, select the Diagnostic menu and then the Car Com Status menu. The device that is not communicating will be shown with the online status equal 0. Check the terminal connection for the twisted pair wires.
SEL CanCom Error	Top of car selector board communication error.	• From the LCD user interface, select the Diagnostic menu and then the Car Com Status menu. If the selector board is not communicating it will show with the online status equal to 0. • Check the terminal connection for the twisted pair wires. Verify that CANH and CANL on the selector board are wired to CANH and CANL to the top of car board respectively.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Selector Count Fault	Selector Count Fault. If the hoistway has been learned and the selector count init flag (tapeless selector) is not set then this error is declared.	• The governor encoder has lost battery power. • The encoder was disconnected from the governor. • Faulty encoder connection to the governor • Loss of communications from the Safety Processor Board to the encoder.
Selector Preset Flt	Selector preset position fault	Controller could not established position from selector pulse count or tapeless encoder. It tried to establish position but pulse count did not match floor tables. Check pulses on Safety processor board, encoder comm and 485 encoder.
SFC Relay Failed Off	SFC relay did not pick up as expected.	• Faulty SFC output chip. Replace output chip. • Faulty SFC relay on main I/O Board (1038 or 1064). Replace SFC relay. • Verify the software version on the safety processor board (1028) is 3.07 or higher.
SFC Relay Failed On	SFC relay did not drop as expected when performing a SFC/PFC test.	• Faulty SFC output chip. Replace output chip. • Faulty SFC relay on main I/O Board (1038 or 1064). Replace SFC relay. • Verify the software version on the safety processor board (1028) is 3.07 or higher.
Side Emerg. Exit Flt	Side Emergency Exit Fault	• Verify that the side emergency exit is properly shut and the switch is closed. • Faulty wiring in the side emergency exit circuit.
Slip Detect Fault	SPB Velocity difference fault. There is a speed difference between the CPU and the safety processor board possibly because of Rope Slippage	This is a Slip detection mechanism required for 2010 code. The parameter "Slip Vel Diff " determines how many feet per minute the two speeds could be apart when "Slip Det Dis" is set to zero.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
SPB CanCom Error	Safety Processor Board CanCommunications Error. The Safety Processor Board is not communicating to the main CPU.	• Check the terminal connection for the twisted pair wires. • Verify that the bus termination jumper is placed on the Safety Processor Board (1028 or 1066). • Verify that the bus termination jumper is place on the 1036 Comm/Memory board. • Disconnect the Canwires to the traveling cable. If the SPB (1028 or 1066) starts communicating, verify that the bus termination jumper is placed on the TOC board (1037 or 1040). Replace the traveling cable Canwires.
SPB Enc Opp Dir Flt	Safety Processor Board encoder opposite direction fault in tapeless encoder jobs. Car moving up while CPU is giving a Down command or vice versa.	Speed was greater than 100 foot per minute while the SPB detected velocity in the opposite direction of the controller run command. Possible Noise on Encoder cable. Check Encoder Voltage. Check for wires shield connections on GALX-1066 Board.
SPB SFC Off Fault	Safety Processor Board SFC fault. CPU detected SFC (Secondary Fault Controller) turn off while the ready input (RDY) was still on	• Check faults in safety processor board • Replace SFC (EQR) input chip • If no voltage at SFC terminal and no faults in safety processor, replace output chip for SFC on the main i/o board
SPB Unintend Motion	Safety Processor Board unintended motion	• Safety processor detected unintended motion of elevator with the doors open

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Stalled Fault	Stall Fault occurs if the motion run timer exceeds the stall protection time. The motion run timer is incremented while the car is trying to run.	• Increase Stall Timer on the controller under Adjustable Variables and Car Timers.
Stop Switch Fault	Stop switch is pulled while the car is in motion.	• Stop switch is pulled. • Faulty wire connection in the stop switch circuit.
Target Fault at DT	When going down, the target count should always be below the position count. This fault is logged if the target count is above the position count when the DT slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at DT1	This fault is logged if the target count is above the position count when the DT1 slowdown limit is hit	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at DT2	This fault is logged if the target count is above the position count when the DT2 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Target Fault at DT3	This fault is logged if the target count is above the position count when the DT3 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at DT4	This fault is logged if the target count is above the position count when the DT4 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at DT5	This fault is logged if the target count is above the position count when the DT5 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at DT6	This fault is logged if the target count is above the position count when the DT6 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at DTS	This fault is logged if the target count is above the position count when the DTS slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Target Fault at UT	When going up, the target count should always be above the position count. This fault is logged if the target count is below the position count when the UT slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at UT1	This fault is logged if the target count is below the position count when the UT1 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at UT2	This fault is logged if the target count is below the position count when the UT2 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at UT3	This fault is logged if the target count is below the position count when the UT3 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
Target Fault at UT4	This fault is logged if the target count is below the position count when the UT4 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at UT5	This fault is logged if the target count is below the position count when the UT5 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at UT6	This fault is logged if the target count is below the position count when the UT6 slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.
Target Fault at UTS	This fault is logged if the target count is above the position count when the UTS slowdown limit is hit.	• This fault should never occur. Please call the factory if this fault occurs.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
TOC CanCom Error	Top of Car Board Communication Error.	• Fault Canwire connection. Verify the traveling cable connections from the 1036 Comm/Memory board, to the Safety Processor Board (GALX-1028 or GALX-1066) and to the TOC board (1037 or 1040). • Jumper for bus termination resistors not placed. Verify that the bus termination resistor jumpers are placed on the TOC (1037 or 1040), on the 1036 Comm/Memory Board, and on the Safety Processor Board (GALX-1028 or GALX-1066). • Noise on the communication cable. Verify that the traveling cable shield wires are connected is connected only at one end or is not connected at all. • Faulty communication chip. Replace the Canbus drive chip 82C251. • Faulty 5V isolated supply for Candriver on TOC board (1037 or 1040). Measure DC voltage between pins 2 and 3 on the 82C251 Candriver chip. Call GAL for instructions.
Top Door Lock Fault	The Top Door Lock failed on while the door was open.	• Faulty door lock. • Jumper on door lock circuit. • Door lock not adjusted properly. • Faulty wiring to DLT input. • Faulty DLT and DLT-1 inputs (For this to occur both DLT and DLT-1 inputs must fail on). • DOL input failed. Replace DOL input chip. • Door operator open limit DOL is not adjusted properly
Top Emerg. Exit Flt	Top Emergency Exit Fault	• Verify that the top emergency exit is properly shut and the switch is closed. • Faulty wiring in the top emergency exit circuit. • Faulty wiring in the side emergency exit circuit.
Top Final Limit Flt	Top Final Limit Open.	• Car traveled onto the top final limit. • Faulty wiring of the final limit circuit.
UL & UL-1 Opposite	Input failure on one of the Up Level sensor input	• Faulty UL or UL-1 input (replace input chips).

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
UL Failed On Fault	UL Failed On Fault. The UL leveling sensor did not go off during a run.	• UL hall effect sensor bad on selector sensor board. Replace sensor board. • UL Output Driver failed on. Replace output on selector driver board. • UL traveling cable wire is shorted to 120 VAC. Remove input wire to 1038 or 1064 board and verify that LED goes out. Correct short condition. • UL inputs failed on. Short on 1038 or 1064 main I/O board. Replace main I/O board.
UL or DL Fault	Both UL and DL level sensors are off when car is at a floor.	• Faulty adjustment of the selector head. • Worn selector guides. Replace selector guides. • Faulty Door Zone Magnet. If this fault occurs at one particular floor, replace the door zone magnet at the floor. • Faulty sensor board. Replace the selector sensor board.
UL,DL & DZ Off at FL	UL, DL & DZ sensors off at floor. The car thinks it should be at a floor or is at a floor and all the floor sensors have turned off.	• Loss of power on the selector. • Faulty cable from the selector driver board to the sensor or sensor board. • Faulty wiring from the selector driver board to the main I/O board (1038 or 1064).
UL,DL Learn Cnt Flt	Pulses per inch are incorrect from the Encoder RPM/ PPR settings	• Dead Zone was estimated to be greater than eight inches • Make sure the car is running at correct speed before learning the hoistway • The recommended distance between UL and DL sensors in tapeless system is 7.5 inches if the controller is configured to stop on pulses

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
UL/DL Dir Seq Fault	UL and DL Direction Fault. Once the car is in Motion, controller verifies the order for the leveling signals. UL, DZ and DL should come in the right sequence depending in the direction of travel.	During Setup, the leveling signals may be wired incorrectly. Once in service this fault should not occur. If detected, Check Detailed Fault data to determine direction of travel as well as possible inputs causing error.
Unintended Motion Ft	Unintended Motion fault	Unintended motion occurred. Car moved out of door zone with doors open or it had a speed feedback when not running from main encoder. If "Griper/EBK Trip" is SET then Safety processor speed could cause fault as well.
Up Directional Fault	Car unexpectedly hit the Up Normal Limit while running up.	• Faulty wiring for the UN limit. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal.
UP I/O Failed Off	The UP input or output has failed off	Traction • Fault on Safety Processor Board. This board can disable the run control to the UP output chip. Check if the PIC or PAL inhibit LED turns on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the SPB LCD display. • Faulty UP output or UPi input. Replace the UP output and UPi input chips. • No 24VDC from the drive. Refer to Schematics. • Incorrect jumper placement on 1038/1064 board. Verify that jumpers on the bottom of the board are positioned for the correct drive type (DSD or HPV). • RUN or MC auxiliary contact not making properly. Contact GAL for instructions. Hydro • Faulty wiring to the SU or SC terminal on the 1038/1064 board. • Faulty wiring to the Up valve. • Faulty SUi input. Replace SUi input chip. • Faulty SU output. Replace SU output chip.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
UP I/O Failed On	The UP input or output has failed on.	Traction • Faulty UP output. Replace the UP output chip. • Faulty UPi input. Replace UPi input chip. • Incorrect jumper placement on 1038/1064 board. Verify that jumpers on the bottom center of the board are positioned for the correct drive type (DSD or HPV). Hydro • Faulty SUi input. Replace SUi, input chip. • Faulty SU output. Replace SU output chip.
UP I/O Failed On	The UP input or output has failed on.	Traction • Faulty UP output. Replace the UP output chip. • Faulty UPi input. Replace UPi input chip. • Incorrect jumper placement on 1038/1064 board. Verify that jumpers on the bottom center of the board are positioned for the correct drive type (DSD or HPV). If necessary move the jumpers to the correct drive type. Hydro • Faulty SUi input. Replace SUi, input chip. • Faulty SU output. Replace SU output chip.
Up Normal SW Setup	Up Normal must turn off after reaching the top floor dead level	Up Normal (UN) switch Turned off before controller detected top landing. The up normal may need to move up so it records dead level at top floor before UN turns OFF. If problem persists, look at hoistway tables to detect possible defective magnets.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
UPF I/O Failed Off	The UPF input or output has failed off.	Traction • Fault on Safety Processor Board. This Board can disable the run control to the UPF/B1 output chip. Check if the PIC or PAL inhibit LED turns on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor Board LCD display. • Faulty UPF/B1 output. Replace the UPF/B1 output chip. • Faulty UPFi/B1i input. Replace UPFi/B1i input chip. • No 24VDC from the drive. Verify the 24VDC between terminals 10 and 12 on the drive. • Incorrect jumper placement on 1038 board. Verify that jumpers on the bottom center of the board are positioned for the correct drive type (DSD or HPV). If necessary move the jumpers to the correct drive type. • RUN, MC or BRK auxiliary contact not making properly. Contact GAL for instructions Hydro • Fault on 1028 Safety Processor Board. The Safety Processor Board can disable the run control to the UPF output chip. Check if the PIC or PAL inhibit LED turns on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor Board LCD display. • Faulty wiring to the SC common on the 1038 board. • Faulty wiring to the SUF terminal on the 1038 board. • Faulty wiring to the Up Fast valve
UPS Low Bat Capacity	power loss ups battery capacity low fault	Battery Capacity went below the threshold set by the parameter "Low Bat Cap Lev"
User Variable Init	User variable init	No yet implemented. Error should not occur.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
UT Count Fault	The verification position count for the UT input switch was off by more than 10 inches when the switch was activated. The car was lost due to a preset error or the controller has a faulty encoder signal for the pulse count.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • UT switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.
UT Failed On Fault	UT input Failed On Fault. The car was at the top floor and the UTS input was low true (UTS switch made) but the UT input was high (UT not made).	• The UTS switch is not wired or the UTS switch is not used. If the UTS switch is not used, jump the UT and UTS inputs together. • The UT did not break at the bottom terminal landing. Adjust or replace the UT switch.
UT1 Count Fault	The verification position count for the UT1 input switch was off by more than 10 inches when the switch was activated. The car was lost due to a preset error or the controller has a faulty encoder signal for the pulse count.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • UT1 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
UT2 Count Fault	The verification position count for the UT2 input switch was off by more than 14 inches when the switch was activated. The car was lost due to a preset error or the controller has a faulty encoder signal for the pulse count.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • UT2 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.
UT3 Count Fault	The verification position count for the UT3 input switch was off by more than 18 inches when the switch was activated. The car was lost due to a preset error or the controller has a faulty encoder signal for the pulse count.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • UT3 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
UT4 count Fault	The verification position count for the UT4 input switch was off by more than 24 inches when the switch was activated. The car was lost due to a preset error or the controller has a faulty encoder signal for the pulse count.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car an make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • UT4 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.
UT5 count Fault	The verification position count for the UT5 input switch was off by more than 32 inches when the switch was activated. The car was lost due to a preset error or the controller has a faulty encoder signal for the pulse count.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • UT5 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
UT6 count Fault	The verification position count for the UT6 input switch was off by more than 42 inches when the switch was activated. The car was lost due to a preset error or the controller has a faulty encoder signal for the pulse count.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • UT6 switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.
UTM Contact/GTS Flt	UTS contact/GTS input pick fault	GTS input did not come on. Gripper is set and GTS did not come on or turned OFF momentarily
UTS count Fault	Up Terminal Slowdown Limit Count Fault. The verification position count for the UTS input switch was off by more than 10 inches when the switch was activated. The car was lost due to a preset error or the controller has a faulty encoder signal for the pulse count.	• The car was lost due to a preset error. Check the guides on the selector. Check the fault log for binary preset errors. • The controller has a faulty encoder signal for the pulse count. Check that the car can make long runs without overshooting the floor or stopping short of the floor. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal. • Incorrect counting of pulse counts. Check encoder connection to motor and encoder wiring. • Hoistway not learned properly. Perform a hoistway learn procedure. • UTS switch not adjusted properly. Check at slow speed if switch is breaking, making and then braking again. Switch needs to be closer to the cam.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
UTS Failed On Fault	UTS input Failed On Fault. The car was at the top floor and the UT input was low true (UT switch made) but the UTS input was high (UTS not made).	• The UT switch is not wired or UT input was lost. • The UTS did not break at the bottom terminal landing. Adjust or replace the UTS switch.
Velocity Diff Fault	Velocity difference between demand and encoder feedback.	Controller detected a difference between demand and feedback speed greater than the setting under "Velocity Diff". Make sure speed is tracking properly in acceleration and deceleration. Adjust "Velocity Diff" based on Speed of the car.
Wrong Dir Pls Run Dn	Wrong Direction Pulses while car running down. The pulse counts should be counting down while the car is running down.	• Check the jumper on the encoder isolation board. If this car has been previously running properly, the encoder isolation board could be faulty. If during initial setup, change the jumpers for A and A not.
Wrong Dir Pls Run Up	Wrong Direction Pulses while car running up. The pulse counts should be counting up while the car is running up.	• Check the jumper on the encoder isolation board. If this car has been previously running properly, the encoder isolation board could be faulty. If during initial setup, change the jumpers for A and A not.
XBK Low DC Bus Volts	Aux Brake board low dc bus voltage fault -7	No yet implemented. Error should not occur.

Main CPU Faults		
Fault	Description	Possible Cause/Suggested Fix
XBK No Currnt w/Volt	Aux Brake board no current fault with voltage applied (4)	No yet implemented. Error should not occur.
XBK No DC Bus Volts	Aux Brake board no dc bus voltage fault (5)	No yet implemented. Error should not occur.
XBK No Output Volts	Aux Brake board not output voltage fault -6	No yet implemented. Error should not occur.
XBK Over Current Flt	Aux Brake board over current fault (brake error 2)	No yet implemented. Error should not occur.
XBK Over Voltage Flt	Aux Brake board over voltage fault (3)	No yet implemented. Error should not occur.
XBK Rq Volt > DC Bus	Aux Brake board dmd voltage greater than dc bus voltage fault (8)	No yet implemented. Error should not occur.
Zero Vel Decel Roll	Zero Velocity Deceleration Roll. The controller calculated a velocity value of zero during the roll in to constant deceleration.	• This fault should never occur. Please call the factory if this fault occurs.

Detailed Fault Data	
Detailed Fault Data	Description
SRV	SRV Service Flag 0 = Out of Service 1 = Automatic 2 = Independent 3 = Load Weighing Bypass 4 = Attendant 5 = Code Blue 6 = Fire Phase II 7 = Emergency Power 8 = Earthquake Emergency 9 = Fire Phase I Main Egress 10 = Fire Phase I Alternate Egress 11 = Homing 12 = Reset Run Up 13 = Reset Run Down 14 = Low Oil Operation 15 = Return to Lobby 16 = Load Overload 17 = Massachusetts Medical Emergency 18 = Calibrate load weigher 19 = CS Elevator Off 20 = HS Elevator Off 21 = Low Pressure Operation 22 = Hospital Service Operation 23 = VIP Service Operation 24 = Security Recall 25 = Sabbath service 26 = TUG Service operation

Detailed Fault Data	
Detailed Fault Data	Description
PRC	Process Flag 1 = Reset 2 = Inspection 3 = Motion: hsf=1, dir=1, Up Fast hsf=0, dir=1, ul=0, Up Transition hsf=0, dir=1, ul=1, Up Leveling hsf=1, dir=2, Down Fast hsf=0, dir=2, dl=0, Down Transition hsf=0, dir=2, dl=1, Down Leveling 4 = Motion Mode 1 – Soft Start 5 = Motion Mode 2 – Constant Acceleration 6 = Motion Mode 3 – Roll Over to Max Velocity 7 = Motion Mode 4 – Constant Velocity 8 = Motion Mode 5 – Roll Over to Deceleration 9 = Motion Mode 6 – Constant Deceleration 10 = Motion Mode 7 – Targeting Floor 11 = Motion Mode 8 – Emergency Slowdown 12 = Safety String 13 = Turned Off 14 = Parked 15 = Waiting Assignment 16 = Doors Operation 17 = Elevator Stalled (or Low Oil for Hydro) 18 = Elevator Resetting Hydro Jack 19 = Elevator on Low Oil Pressure mode 20 = Elevator is in Automatic Learn Hoistway 21 = Elevator is in Emergency Power Recovery
DRF	Front Door Flag 0 = Door Closed 1 = Door Opening 2 = Door Dwelling 3 = Door Closing 4 = Door Nudging Closed
RDF	Rear Door Flag 0 = Door Closed 1 = Door Opening 2 = Door Dwelling 3 = Door Closing 4 = Door Nudging Closed

Detailed Fault Data	
Detailed Fault Data	Description
DPR	Direction Preference Flag 0 = None 1 = Up 2 = Down
DIR	Car Direction Flag 0 = None 1 = Up 2 = Down
EMP	Emergency Power Flag 0 = Not on Emergency Power 1 = On Emergency Power Waiting 2 = On Emergency Power Waiting with Doors Open 3 = On Emergency Power Returning Home 4 = On Em. Power Returned Home with Doors Open 5 = On Em. Power Returned Home with Doors Closed 6 = On Emergency Power and Selected to Run 7 = On Emergency Power waiting with Doors Closed
MED	Medical Emergency 0 = No Medical Emergency Service 1 = Recall Car to Medical Emergency Recall Floor 2 = At Return Floor with Door Open (Return Complete) 4 = On EMS Car Call Service 5 = On EMS Car Hold Service (key off but not at the recall floor)
CBL	Code Blue Flag 0 = No Code Blue 1 = Recall to Emergency Floor 2 = At Code Blue Floor 3 = At Code Blue Floor with Door Open 4 = Finished Code Blue

Detailed Fault Data	
Detailed Fault Data	Description
EQU	Earthquake Flag 0 = Not on Earthquake Operation 1 = Earthquake Sensor Activated 2 = Counterweight Derailment Sensor Activated 3 = Recover Away From the Counterweight 4 = Stopped at a Floor
FIR	Fire Flag 0 = Not on Fire Service 1 = Phase I Main Egress Return 2 = Phase I Alternate Egress Return 3 = Phase I Completed 4 = Phase II Door Hold 5 = Phase II Constant Pressure Door Open 6 = Phase II Constant Pressure Door Close 7 = Phase II Door Hold 8 = Phase II Momentary DCB Door Close
RFI	Rear Fire Flag 0 = Not on Fire Service 1 = Phase I Main Rear Egress Return 2 = Phase I Alternate Rear Egress Return 3 = Phase I Completed 4 = Phase II Rear Door Hold 5 = Phase II Constant Pressure Rear Door Open 6 = Phase II Constant Pressure Rear Door Close 7 = Phase II Rear Door Hold 8 = Phase II Momentary DCB Rear Door Close
HSF	High Speed Flag 0 = No High Speed 1 = High Speed
STF	Start Flag 0 = Not valid Start 1 = Start of Run

Detailed Fault Data	
Detailed Fault Data	Description
CAL	Direction of Calls 0 = No Call 1 = Above Call 2 = Below Call 3 = Above and Below Calls
ESP	Emergency Stop Flag 1 = Emergency Stop
NST	Need to Stop Flag 1 = Car need to stop at next floor
RLV	Re-level Flag 1 = Car in re-leveling
STE	Step Flag 1 = Step to the next position (non-distance feedback)
PDO	Pre-open Door Flag 1 = Pre-open door
STO	Next Stop Floor Floor number of next stop
INS	Inspection Status Flag (Status bit set to “1” when switch is on) Bit 0: Car Top Inspection Bit 1: Machine Room Inspection Bit 2: Access Bit 3: In Car Inspection Bit 4: Lock Bypass Bit 5: Gate Bypass Bit 6: Not in Automatic (AUTO==0)

Detailed Fault Data	
Detailed Fault Data	Description
NDS	Next Car Up Sequence 0 = Initiate Next Up Door Open 1 = Opening Next Up Door 2 = Door full open on Next Up 3 = Allow door close for onward call 4 = Allow door close while on next up
GTM	Group Transmitter Empty
STATUSF	Control Status Flag (Status bit set to “1” when status active) Bit 0: NO LC power Bit 1: NO HC power Bit 2: NO SS input Bit 3: Drive not ready Bit 4: Gripper error Bit 5: I/O error during redundancy check Bit 6: Inspection or lock bypass fault Bit 7: Binary Position Input Error Bit 8: Position Error Bit 9: No automatic Doors Bit 10: Stop switch open Bit 11: Door Zone fault Bit 12: Gate or Door lock fault Bit 13: No Potential “P” Input Bit 14: No DCL Bit 15: No gate or lock Bit 16: Brake lift switch error Bit 17: Top of Car Communications Error Bit 18: Drive Communications Error Bit 19: Safety Processor Board Communications Error Bit 20: DB Resistor Temp. Error Bit 21: Shutdown (too many fault runs) Bit 22: Annual Safety Test Bit 23: Waiting for Car to be safe() Bit 24: UT,UTS,DT or DTS limit error Bit 25: GTS input off Bit 26: UL, DL and DZ off at floor Bit 27: Brake Board Can Error Bit 28: Fire Fighter Stop Switch Bit 29: Selector Can error Bit 30: UL or DL fault Bit 31: Leveling fault

Detailed Fault Data	
Detailed Fault Data	Description
DP	Position counts in pulses
TG	Target Count on pulses
Dmd	Velocity in feet per minute

The ***example*** below shows how to interpret the detailed fault data for the I/O blocks. This ***example*** shows what the I/O states are when:

IO3 = 3C

I/O BLOCK	**IO3**							
HEX VALUE	**3**				**C**			
BINARY 0 = OFF 1 = ON	0 MSB	0	1	1	1	1	0	0 LSB
I/O NAME	SS	HC	FS	BP	ALT	MES	MRS	HWS

In the example above, the number "3C" is a hexadecimal number representing 8 bits of data. The "3" represents 4 bits of data, and the "C" represents 4 bits of data. The data is read from left to right with the left-most bit being the MSB (Most Significant Bit) and the right-most bit being the LSB (Least Significant Bit). Each bit represents the state (on or off) of the corresponding I/O. The table below provides the HEX number and the associated Binary number.

CONVERSION TABLE

HEX	0	1	2	3	4	5	6	7	8	9
BINARY	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001

HEX	A	B	C	D	E	F
BINARY	1010	1011	1100	1101	1110	1111

I/O BLOCK	IO0							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	UT	UN	DT3	DT2	DT1	DTS	DT	DN

I/O BLOCK	IO1							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	RLM	DLT	DLM	DLB	UT3	UT2	UT1	UTS

I/O BLOCK	IO2							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	TAD	BAU	BAD	ACC	RLM-1	DLT-1	DLM-1	DLB-1

I/O BLOCK	IO3							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	SS	HC	FS	BP	ALT	MES	MRS	HWS

I/O BLOCK	IO4							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	5D	4D	DT5/3D	DT4/2D	4U	RTL/3U	UT5/2U	UT4/1U

I/O BLOCK	IO5							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	DL-1	UL-1	BKS	DEL	AD	IND	LBP	GBP

I/O BLOCK	IO6							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	INS	LC	GS-1	GS	DPM	DL	DZ	UL

I/O BLOCK	IO7							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	AUTO	MRID	MRIU	MRI	ICI	CS	ID	IU

I/O BLOCK	IO8							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	DON	BRKI	GTR2	GTR1	RDY	GTS	FST	P/RTL

I/O BLOCK	IO9							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	LVC	SECF/SVSD	RGS-1	RGS	MCAI	MCCI	RUNAI	RUNI

I/O BLOCK	IOA							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	PS	GOV	RDPM	CTS	UFI	UPI	DFI	DNI

I/O BLOCK	IOB							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	LWD	LWB	OVL	LWA	SE	EE	DCL	DOL

I/O BLOCK	IOC							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	DS	US	EP	BP16	BP8	BP4	BP2	BP1

I/O BLOCK	IOD							
HEX VALUE								
BINARY 0 = OFF 1 = 0N	MSB							LSB
I/O NAME	HB	FB/NB	FL	CDL	CUL	NUD	DC	DO

Section 12 Field Adjustable Variables

The following section contains all the field Adjustable Variables.

Table 1: Car Motion					
Field Variable	Min	Max	Initial	Units	Description
Inspect Speed	0	150	40	fpm	Inspection Speed. Maximum car speed while running on inspection.
Ins Decel Stop	50	480	300	fpm/s	Inspection deceleration rate. The rate for the elevator to decelerate from inspection speed to zero.
Pattern Delay	0	3	0	sec	Pattern Delay. Delay time before the speed profile will start.
Soft Start Jerk	50	480	125	fpm/s/s	Soft Start Jerk Rate. Maximum jerk rate to roll into constant acceleration from a dead stop.
Acceleration	50	300	92	fpm/s	Acceleration Rate. The constant acceleration rate to reach top speed.
Roll Over Jerk	50	480	125	fpm/s/s	Rollover Jerk Rate. Maximum roll jerk rate while rolling into top speed.
Top Speed	25	cons[speed]	0	fpm	Top Speed or contract speed of the car. If set to zero, or set to a value greater than top speed, it will use top speed in cons file
Decel Jerk	50	480	125	fpm/s/s	Deceleration Jerk Rate. Maximum jerk rate to roll from top speed to constant deceleration.
Decel Rate	50	300	92	fpm/s	Deceleration Rate. The constant deceleration rate from top speed to leveling speed when stopping for a floor.
Floor Targ Dis	1.2	25	12	inch	Floor Target Distance. Distance to start leveling mode into the floor. Increasing this distance will lower the jerk rate.
Leveling Speed	1	15	5		Leveling Speed. Maximum car speed while leveling into the floor.
Stop Decel Rate	5	225	50	fpm/s	Stop Deceleration Rate. Rate to bring the velocity from leveling speed to zero speed.

Table 1: Car Motion					
Field Variable	Min	Max	Initial	Units	Description
Soft Stop Time	0.2	30	1	sec	Soft Stop Time. For Hydraulic Elevators – time the motor is kept running after the valve is turned off. For Traction Elevators – time that zero speed is held until the brake is set.
Relev Pat Dly	0	3	0	sec	Relevel Pattern Delay. Delay time before speed profile will start on a relevel.
Relevel Speed	1	15	6		Re-level Speed. Maximum car speed during re-leveling operation.
Relev Strt Spd	0	15	0	fpm	Re-level Start Speed. Maximum starting velocity for a re-level. Car will stay in relevel Start speed for a time set by parameter " Relev St Time " and then switch to relevel Speed
Em Decel Rate	80	360	180	fpm/s	Emergency Deceleration Rate. The rate at which the elevator will decelerate when it is doing an emergency slowdown.
Relev St Time	0	2	0	sec	Relevel Start Velocity Hold Time. If relevel start speed is set to a non zero value, controller will use that value for the speed before going in relevel velocity This parameter controls how long we stay in Relevel Start Velocity
Recovery Speed	25	100	25	fpm	Recovery speed to the nearest floor.
EM Decel Lev	50	300	100	fpm/s	Emergency deceleration rate to leveling rate.
Overspeed Trip	110	125	110	%	Percentage of contract speed the controller will drop the rope gripper.

Table 1: Car Motion					
Field Variable	Min	Max	Initial	Units	Description
DON Start Ctrl	0	1	0	-	DON Start Ctrl. Drive ON Start Control. When set to 1 the controller starts the pattern delay after the drive on signal (DON) from the drive.
Field Weaken	60	110	110	% vel	Field Weakening Velocity. Percent of velocity above which the motor field is weakened to allow the car to reach top speed.
Preopen Delay	0	3200	0.5	sec	Preopen Delay. Delay time to preopen the door starting from when the car reaches 3 inches from dead level and the door can safely be opened.
Encoder PPR	256	20000	2048	PPR	Encoder Pulses Per Revolution. The number of pulses the motor encoder has per revolution.
Encoder RPM	1	3000	1050	RPM	Encoder Revolutions Per Minute. The number of revolutions per minute the motor makes at top speed.
Motor RPM	0	3000	0	RPM	Use only with KEB drive. This value should be the same as LF.11 (Motor nameplate RPM)
OpenCan Enc Dir	0	1	0		Encoder direction for Open can encoder. Set to zero or one during Setup to get correct direction of pulses for the can Open encoder
Drv Speed Mult	0.25	2	1	-	Used for KEB drive to adjust the speed of the elevator.
Balanced Load	0	100	40	%	Balanced Load. Percent load of the counterweight.
Torque Amount	0	100	0	gain	Torque Amount. Multiplier for the amount of torque proportional to the load. A value of 100 will give 100 percent torque with 100 percent load or 60 percent torque with an empty car.

Table 1: Car Motion					
Field Variable	Min	Max	Initial	Units	Description
Rope Comp Torq	0	50	0	offset	Rope Compensation Torque. Used primarily on gearless machines that do not have any compensation.
Torque Down Amt	0	100	0	gain	Torque Down Amount. Torque Amount for down direction of travel. Multiplier for the amount of torque proportional to the load. A value of 100 will give 100 percent torque with 100 percent load or 60 percent torque with an empty car. If this value is set to zero then the Torque Amount parameter above will be used for both up and down direction.
Torque Ramp Tim	0	1	0	sec	Torque Ramp Time. The amount of time for the torque to ramp up prior to the elevator leaving the floor during pattern delay.
Adv Pre-Torque	0	1	0	-	Advance pretorque. It is enabled to improve floor to floor times when pretorque is used. 0 = off 1 = on
Pos Count Upd	0	7	0	-	Position Count Update Flag. The pulse count is checked every time the DZ input is hit. +1=Update the DPP floor count as the elevator passes by a landing and hits DZ. +2=Interrupt the CPU when DZ hit otherwise the update is done during the loop time (roughly 1 msec). +4=Update every time the DZ is hit and the car is at constant speed regardless of the pulse count update error value.
Pls Err Delay	1	10000	5000	1/sec	Position Count Update Error Delay. This number is the time delay from when DZ is hit until the input is read. The time delay parameter, times the current speed of the car, is used to estimate the number of pulses the count will change during the “turn on time” of the DZ input.

Table 1: Car Motion					
Field Variable	Min	Max	Initial	Units	Description
Pls Cnt Upd Err	0	2	f	inches	Position Count Update Error. If the count is off by more than this value and the update flag is enabled, the position pulse count is updated. If this value is set to zero and the update flag is enabled, then the pulse count is updated every time the DZ is hit at high speed.
Stop On Pos Cnt	0	1	0	-	Enable to stop the elevator on position pulse count. Used only for tapeless application. It requires cons file setting to be enabled and readjustment of leveling sensors for it to work.
Brake Drop Del	0	5	0.1	sec	Brake Drop Delay. Delay time to drop the brake after the car has stopped and is dead level at the floor.
Brake Pick Del	0	5	0	sec	Brake Pick Delay. Delay time to pick the brake after the run relay is energized.

Table 2. Car Brake					
Field Variable	Min	Max	Initial	Units	Description
Brk Pick Start	0	400	0	volts	Brake Pick Start Voltage. Initial DC Voltage to pick the brake. Brake voltage will ramp to pick voltage.
Brake Pick Volt	20	400	230	volts	Brake Pick Voltage. DC Voltage to pick the brake. Brake voltage will start at start voltage and then ramp to pick voltage.
Brk Pick Rate	0	2	0	sec	Brake Pick Rate Time. Time value for brake to ramp from start voltage to pick voltage.
Brake Pick Time	0.1	6	3	sec	Brake Pick Time. Duration of applied brake pick voltage before changing to the hold voltage.
Brake Hold Volt	20	400	160	volts	Brake Hold Voltage. Voltage to hold the brake for the remainder of the run.
Brk Drop Volt	0	200	0	volts	Brake initial drop Voltage. DC Voltage to start the brake drop. Brake voltage will start at this value ramp down to zero volts.
Brk Drop Rate	0	5	0	sec	Brake Drop Rate Time. Time value for brake to ramp from start voltage to zero.
Brk Drop Start	0	1	0	-	Brake Drop timing during Leveling. 0 = Normal brake drop 1 = Early drop selected
Brk AC L-L Volt	80	300	240	volts	Brake AC Line to Line Voltage. AC input voltage to the brake board.
Brk Resistance	0.1	500	283	F	Brake Resistance. Resistance value measured on the brake coil on ohms.

Table 2. Car Brake					
Field Variable	Min	Max	Initial	Units	Description
Relev Brk Delay	0	5	0	sec	Relevel Brake Delay. Time delay to lift the brake during a relevel.
Brk Relev Start	0	400	0	volts	Brake Relevel Start Voltage. Initial DC Voltage to pick the brake on a relevel. Brake voltage will ramp to relevel voltage.
Brk Relev Volt	10	400	230	volts	Brake Relevel Voltage. Brake voltage applied on the brake coil during a relevel. This parameter useful to have a partial brake lift on relevel. Relevel brake voltage will start at relevel start voltage and then ramp to relevel voltage.
Brk Relev Rate	0	2	0	sec	Brake Relevel Rate Time. Time value for brake to ramp from relevel start voltage to relevel voltage.
Relev Brk LowV	0	1	0	-	Relevel Brake Low Voltage. Set to a 1 to relevel the car with the hold voltage to create a partial pick of the brake.
Brake Opto Dly	0	7372	5500	3686/msec	Brake Opto Delay. The SCR Brake board trigger circuit uses optocoupler devices that have a turn on delay of roughly 1 millisecond but can vary from part to part and vary from different input filtering. This parameter is used to compensate for different turn on delays to start of triggering of the SCRs. Only change this value at the advice of a G.A.L. Technician.

Table 2. Car Brake					
Field Variable	Min	Max	Initial	Units	Description
EmBk Pick Volt	0	400	230	volts	Only if two brake boards are installed. Emergency Brake Pick Voltage. DC Voltage to pick the emergency brake. Brake voltage will start at start voltage and then ramp to pick voltage.
EmBk Pick Rate	0	2	0	sec	Only if two brake boards are installed. Brake Pick Rate Time. Time value for emergency brake to ramp from start voltage to pick voltage.
EmBk Pick Tim	0	10	3	sec	Only if two brake boards are installed. Emergency Brake Pick Time. Duration of applied brake emergency pick voltage before changing to the hold voltage.
EmBk Hold Volt	0	400	160	volts	Emergency Brake Hold Voltage. Voltage to hold the emergency brake for the remainder of the run.
EmBk Drop Dly	0	360	0	sec	Brake Drop Delay. Delay time to drop the brake after the car has stopped and is dead level at the floor.
EmBk Drop Rate	0	1.5	0	sec	Emergency Brake Drop Rate Time. Time value for brake to ramp from start voltage to zero.
EmBk L-L VAC	80	300	240	volts	Brake AC Line to Line Voltage. AC input voltage to the brake board.

Table 2. Car Brake					
Field Variable	Min	Max	Initial	Units	Description
EmBk Opto Dly	0	7372	5500	3686/msec	Emergency Brake Opto Delay. The SCR Brake board trigger circuit uses optocoupler devices that have a turn on delay of roughly 1 millisecond but can vary from part to part and vary from different input filtering. This parameter is used to compensate for different turn on delays to start of triggering of the SCRs. Only change this value at the advice of a G.A.L. Technician.
Pwl Brk On Tim	0	5	1	sec	When Pwl Bk On Tim and Pwl Bk Off Tim are set to a non-zero value, we will use this timers to pulse the brake output on and off while recovering the car with Power loss brake option
Pwl Bk Off Tim	0	5	0	sec	When Pwl Bk On Tim and Pwl Bk Off Tim are set to a non-zero value, we will use this timers to pulse the brake output on and off while recovering the car with Power loss brake option
Brake Drop Del	0	5	0.1	sec	Brake Drop Delay. Delay time to drop the brake after the car has stopped and is dead level at the floor.
Brake Pick Del	0	5	0	sec	Brake Pick Delay. Delay time to pick the brake after the run relay is energized.

Table 3: Modified Motion					
Field Variable	Min	Max	Initial	Units	Description
Short Fl Dist	10	72	30	inches	Short Floor Distance. Any floor less than this distance is considered a short floor. The short floor flag gets set and if preopening is enabled, it can be specifically disabled for the short floor run.
ShFl SoftSt Jrk	50	480		fpm/s/s	Short Floor Soft Start Jerk Rate. Maximum jerk rate to roll into constant acceleration from a dead stop.
ShFl Accel Rate	50	300	92	fpm/s	Short Floor Acceleration Rate. The constant acceleration rate to reach top speed.
ShrtFl Roll Jrk	50	480	125	fpm/s/s	Short Floor Rollover Jerk Rate. Maximum roll jerk rate while rolling into top speed.
ShrtFl Decl Jrk	50	480	125	fpm/s/s	Short Floor Deceleration Jerk Rate. Maximum jerk rate to roll from top speed to constant deceleration.
ShFl Decel Rate	50	300	92	fpm/s	Short Floor Deceleration Rate. The constant deceleration rate from top speed to leveling speed when stopping for a floor.
ShrtFl Targ Dis	1.2	25	8	inches	Short Floor Target Distance. Distance to start leveling mode into the floor. Increasing this distance will lower the jerk rate.
Short Fl Cntrl	0	7	0	-	Short Floor Control. 0=relevel. +1=Car will make a run between very short floors instead of re-leveling. +2=Slowdown magnets between short floor (non-distance feedback). +4=Slowdown

Table 3: Modified Motion					
Field Variable	Min	Max	Initial	Units	Description
EP Recov Speed	10	100	25	fpm	Emergency power recovery speed.
EP Top Speed	10	cons[speed]	100	fpm	Top Speed for Emergency Power
EP SoftSt Jerk	50	480	125	fpm/s/s	Emergency Power Soft Start Jerk
EP Accel Rate	50	300	92	fpm/s	Emergency Power Accel Rate
EP Roll Jerk	50	480	125	fpm/s/s	Emergency Power Roll Jerk rate
EP Decel Jerk	50	480	125	fpm/s/s	Emergency Power Decel Jerk rate
EP Decel Rate	50	300	92	fpm/s	Emergency Power Decel Rate
EP Target Dist	1.2	25	12	inches	Emergency Power Floor Target Distance

Table 4: Car Timers					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Y Delta Time	0	5	1.5	sec	Transfer time to change motor from Y start to Delta run.
Fault Time	0	10	2	sec	Fault Time. Delay time before allowing the car to run after a fault occurs.
Reset Time	0	10	5	sec	Reset Time. Delay time in the reset mode before allowing the car to run.
Lant On Time	0	2	0.7	sec	Lantern On time. Used for double stroke gongs. The lantern will turn on, turn off and then turn on again. The Lantern on time is the delay time from when the lantern first turns on until it turns on the second time.
Lant Off Time	0	2	0.2	sec	Lantern Off Time. Used for double stroke gongs. The lantern off time is the delay time after the lantern first turns on until it turns off.
Pas Chime Time	0.2	2	0.5	sec	Floor Passing Chime Time. Length of time the floor passing chime will sound when a floor is passed.
Chime onCC Time	0.1	2	0.2	sec	Handicap buzzer on CC. Length of beep time
Door Fail Time	10	3200	25	sec	Door Fail Time. Time with power on the door without getting the door open limit.
Nudging Time	20	3200	60	sec	Nudging Time. Delay time for a door to be held before going into nudging.
Car Call Dwell	1	60	2	sec	Car Call Dwell. Door open dwell time when answering a car call only.
Hall Call Dwell	1	60	4	sec	Hall Call Dwell. Door open dwell time when answering a hall call or both a hall and car call.
Lobby Dwell	1	60	5	sec	Lobby Dwell. Door open dwell time for a car at the lobby.
Handicap Dwell	1	120	25	sec	Handicap Dwell. Extended door time from pressing the ED button in the car.

Table 4: Car Timers					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Short Dwell Tim	0	60	1		Short Door Dwell Time. Door open dwell time when the doors re-open on a door open button, electric eye, safety edge or door hold button.
RTL Dwell Time	1	60	8	sec	If Return To Lobby is set to cycled doors at the lobby, use this timer to control how long they will dwell before closing in return to lobby mode.
CB Door Time	1	3200	60	sec	Door time for Code blue operation once elevator is at the emergency floor before EMS is energized
Non Interfer T	1	60	2	sec	Non-Interference Time. Time between when you stop and when you can run again.
Stall Time	30	3200	60		Stall Time. Maximum time a run is requested but the car is not moving.
Learn HW Stall	1	3200	30	sec	Automatic Hoistway Learn Stall Time. The time required for a hoistway learn is calculated by the number of floor at an average height of 12.5 feet. This stall time value is added to the calculated value for the maximum time allowed for the auto hoist way learn to run. If floor heights are taller or if there is a blind shaft,this timer may need to be increased to the additional floor height times 1.2 (multiplier for car running at 30fpm). For a blind shaft of 50 feet then use a timer value of 50 * 1.2 = 60.0 seconds.
Gen/Lt/Fan Time	30	3200	360		Generator Run/Cab Light/Fan Time. Length of time to leave the generator running or the Cab light and fan on after there is no longer a demand to run.
Att Buz Delay	0	900	60		Attendant Buzzer Delay. Buzzer sounds if a hall call is entered and the car has not started moving within this delay time. This function is disabled when set to zero.
AttBuz Off Time	0	30	0	sec	Attendant Buzzer Off Time. Cycle off time to turn attendant buzzer on and off once attendant delay time function has been meet (See ATT Buz Delay). Buzzer will stay on continuously if this timer set to zero.

Table 4: Car Timers					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
AttBuz On Time	1	30	5	sec	Attendant Buzzer On Time. Cycle on timer to turn attendant buzzer on and off once attendant delay time function has been meet (See ATTBuz Delay).
Door Delay Time	0	1.5	0		Door Delay Time. Delay time between DO and DC to switch when opening or closing the door.
ManDoor Buz Dly	0	900	0	sec	Manual Door Buzzer Delay. On a car with manual doors,sound the buzzer if the door is left open and a call is entered after this time delay. This function is disabled when set to zero.
RC Pick Delay	0	5	0	sec	The amount of delay time for the retiring cam to pick once the doors are closed.
RC dropfail Tim	0.5	5.5	0.5	sec	Retiring cam drop fail safe delay for manual doors. Time it waits when car arrives to the floor before it drops the output.
Grip/EBK Rset T	0	20	4	sec	The amount of time it takes for the rope gripper to reset on power-up.
Relev Dly Tim	0	2	1	sec	The amount of delay time before the car will re-level. This would be used for jobs that have excessive rope stretch.
EE Time-out	0	3200	40	sec	Electric Eye Time-out time. If the Electric Eye or detector edge is on continuously for this amount of time,it will be flagged as timed-out and the controller will ignore the EE input and close the door on nudging. When set to zero, this feature is disabled.
VIP Door Time	1	3200	20	sec	VIP door time. The amount of time the car will park at the VIP recall floor prior to going to automatic service.
FR DC Time-out	1	3200	1	sec	The amount of time prior to closing the doors on automatic freight door operation.
FR Pwr DO Time	0	30	2	sec	The amount of time to turn on the power door open relay on automatic freight door operation.

Table 4: Car Timers					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Adv Door En Tim	0	240	0	sec	Door open advance enable for non simultaneous doors.
Run Cycle Time	0	300	0	hours	Used to initiate a run when the elevator has been sitting idle for a period of time. Used for jobs that have high friction bearing machines.
Sabbath Dwell	1	60	10	sec	Sabbath Door Dwell Time: car will wait this amount of time on every floor for Sabbath operation except at the lobby where it will follow the handicap dwell door time (separate timer)
Sabb Buzz Delay	1	10	5	sec	Sabbath Door Buzzer timer prior to doors closing: jobs where the light curtain is disabled in Sabbath operation required a buzzer prior to the door closing sequence. This timer warns people the light curtains are about to be enabled (output name: SABUZ)
Hall Lant Dly	0	15	0	sec	By default, when set to zero, hall lanterns go off as soon as the car starts to slow down to arrive at a floor. When set to a nonzero value, this will be used as a timer for the hall lantern to go off prior to arrive at the floor. For example, if set to three seconds, hall lanterns will turn on approximately three seconds before the car arrives to the floor regardless of the speed of the car. We recommend to set this parameter for high speed cars.
Max Door Hld T	0	3200	0	sec	Maximum door hold time to be allowed when the extended dwelling input (ED) is pressed. If set to zero, there will be no limit on how long the car will be held on ED. When set to a value, this will be the maximum allowed time for the car to held by ED input, then car will go on regular dwelling timers (car or hall call dwelling timers)
OSER Ncall Tim	0	900	600	sec	timer to control oser control option 1 for "not responding to calls" (=1)
OSER BTFlr Tim	0	900	60	sec	timer to control oser control option 1 for "between floors for over a minute" (=2)

Table 4: Car Timers					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
OSER Sopen Tim	0	900	60	sec	timer to control oser control option 1 for " SS open" (=4)
F1 DC Time-out	10	60	20	sec	The amount of time it will take before the car doors start to close while the car is on Independent or Attendant service prior to recalling the elevator on Fire Phase 1.

Table 5: Car Options					
Field Variable	Min	Max	Initial	Units	Description
Brake Lift Sw	0	2	1		Brake Lift Switch. If set to 1 or 2 a brake lift switch fault is detected. The car is prevented from running if the brake does not drop or if the brake did not pick on the previous run. The car is allowed to run after the brake drops. If set to 2 the rope gripper will set if the brake does not drop and the can only be reset by placing the car on inspection and back to automatic.
Invert BLS	0	1	0		Invert Brake Lift Switch. When set inverts the logic for the brake lift switch to use a normally close switch instead of normally open.
EM Brake Sw	0	1	0		Emergency Brake Switch Control 0 = don't start if brake switch does not pick, 1 = ignore brake switch on start
Invert ISER	0	7	0		Invert In Service Output. When set to 1, the in service light output is turned off when the car is in service instead of turned on. When set to a 2 the ISER output will function as an elevator in use light. When set to a 4, this output functions as out of service from a shutdown and does not include independent, inspection or recovery mode.
OSERL OutCtrl 1	0	7	0		Out of Service Light control +1 = not responding to calls; +2 = between floors for over a minute +4 = SS open. When this parameter as well as OSERL OutCtrl 2 is set to zero, the output will just operate as an Out of service light.
OSERL OutCtrl 2	0	1	0		Out of Service Light control + 1= Alarm. When this parameter as well as OSERL OutCtrl 2 is set to zero, the output will just operate as an Out of service light.

Table 5: Car Options					
Field Variable	Min	Max	Initial	Units	Description
Invert CLF	0	1	1		Invert the logic for the car light fan. If set to 0 car light fan is normally open. If set to 1 car light fan is normally closed.
Double Stroke	0	1	1		Select 1 or 2 gongs for down hall calls. 0 = 1 gong and 1 = 2 gongs.
NCU Lant Ctrl	0	3	0		Next Up Direction Lantern Control. +1=Turn off hall lantern after next up time. +2=Turn off cab lantern after next up time.
NCU Pref Ctrl	0	1	0		Next Up Preference Control. When set allows direction preference to change before the door starts to close after the next up door time.
Secnd Risr Lant	0	1	0		Turn on cab lantern only when IR call answered. If this parameter is set cab lanterns will only turn on when answering second riser calls.
Cab Lant Ctrl	0	2	0		Cab Lantern control. The default is for the cab lanterns to go off when the door is fully open. This allows the cab lanterns to go off earlier. +1 ring cab lanterns as soon as door starts to open, + 2 ring the cab lanterns when the door reaches DPM point.
Arrival Lant	0	1	0		Arrival Lantern, 1 = activate lant/gong without onward call
Lant Pref Dly	0	3	0	sec	Lantern preference change delay. When the direction preference for the elevator changes, we clear the lanterns and wait for this amount of time before the lanterns are turned on again.

Table 5: Car Options

Field Variable	Min	Max	Initial	Units	Description
HB/PI Dis NV Fl	0	1	0		Handicap Buzzer/PI Display Control. When set to 1, do not sound HB or update floor PI when passing an invalid floor.
DOB Over Nudg	0	1	0		DOB Over Nudging. If set the door open button will open the door when the door is nudging closed.
Nudge No Calls	0	1	0		If set to a 1 the doors will close on nudging even if the elevator has no onward calls.
Nudge Dis Ctl	0	7	0		If set to a 1 then do not close the doors on nudging. If set to a 2 then re-open the doors fully on nudging. If set to a 4 sound the nudging buzzer but do not close the doors on nudging.
DO No Actv DOL	0	1	0		Door Open Output when no Active DOL. When the door is fully open and hits the DOL, the DO is turned off and stays off even if the door drifts off of DOL. With this bit set, the DO output will turn on any time the DOL is lost.
DCB Canc Dwell	0	1	0		Setting this option to 1 will cancel the door dwell timing if the door close button is pressed.
EE Cancel Dwell	0	1	0		By turning this parameter on you disable the short dwelling door time from the electric eye signal (EE). By default the short dwelling time is enabled.

Table 5: Car Options					
Field Variable	Min	Max	Initial	Units	Description
Non-Simul Doors	0	2	0		If set to 0 then both front and rear doors will open at the same time if there is a demand at both the front and rear openings. If set to a 1 the front doors will open first before the rear doors open if there is a demand to open. If set to a 2 the rear doors will open first before the front doors open if there is a demand to open.
Preopen Doors	0	3	0		Setting this option to a 1 will enable preopening of the doors. If retiring cam used with auto door, RCM will also turn on at the preopening point.
Cl Gate No Pref	0	1	0		Close Gate (Swing Door) when No Onward Preference. The gate on a swing door normally stays open until a call is placed. This bit causes the gate to close while the car is setting at the floor.
No HC Door Reop	0	1	0		No Hall Call Button Door Reopen. When set do not reopen the door from an at floor hall call.
Behind CC Canc	0	1	0		When enabled the elevator will not latch any car calls in the opposite direction of travel.
RCM Control	0	3	0		Retiring Cam Control. When set to 1, hold the retiring cam up at the floor if there is no pilot to open the door (manual doors). The retiring cam will drop after 5 minutes. When set to 2, RCM output turns on when DZ hit to advance the RCM ahead of the door open (auto door with retiring cam) otherwise RCM turns on when dead level. If preopening is set RCM and DO turn on when DZ hit.

Table 5: Car Options					
Field Variable	Min	Max	Initial	Units	Description
COP/Remote CC	0	7	0		COP/Remote Car Call Select. 0=Bo: Both COP and Remote Car Call Station used to enter calls. 1=Separate: COP only or Remote CC only used to enter car calls.+2=C-R: Car calls entered on the COP sets the acknowledgment light on the Remote station. +4=R-C: Car calls entered on the Remote station sets the acknowledgment light on the COP.
Griper/EBK Trip	0	3	3		0 – Off, 1 – Safety processor speed 2 – Overspeed
GOV Gripper/EBK	0	1	0		Governor Switch Gripper Trip Control. Sets and latches a gripper fault immediately when the governor switch is opened. 1=Latches the gripper fault only if the governor switch is opened while the car is traveling at contract speed or above 150 fpm. When the gripper fault is latched it must be reset from the LCD interface for the car to run.
Griper/EBK Buz	0	1	0		Turn on buzzer if you have an active rope gripper or emergency break fault
Level Fault Cnt	3	10	3		Level Fault Count. Maximum count of consecutive re-level tries when a re-level error is detected. A relevel error is detected when the brake is dropped and the car moves out the level zone.
Binary Preset	0	1	0		1 = Always update the car position count based on binary preset when the position doesn't not match. 0 = Update the car position count based on the binary preset when the car recovers into a floor.

Table 5: Car Options					
Field Variable	Min	Max	Initial	Units	Description
Drive Rdy Flts	1	10	5		Drive Ready Fault Reset Count. Number of times the drive can be reset in a 20 minute time period.
DoorOpenL Ctrl	0	16	0		To enable output for door open light. It turns on when door is open and finished : +1 fire recall; +2 RTL recall; +4 Emergency power recall. If set to 8, it will turn on every time the door is open
Sabbath En Ctl	0	7	0		Sabbath Enable control variable. Set to zero disables all options. +1 = Allow IR momentarily to override Sabbath operation. +2 = Lobby Dwell time in Sabbath follows handicap door dwell time instead of the lobby dwell time.
Sabbath En Ctl2	0	3	0		Sabbath Enable control: +1 when the car is placed on Sabbath operation, it waits to go to the lobby before switching to Sabbath Operation, +2 used the cab lanterns as directional arrows. This allows people on the hall ways to know direction of travel for the elevator
Sabbath Dis Ctl	0	7	0		Sabbath disable control variable - Add all numbers of the features you want to disable while in Sabbath operation: +1=PIs, +2=Lanterns, +4=directional arrows
Low Line Volt	0	600	198	Vrms	Settings for Line Voltage Monitor Board. It sets the value of voltage for a "Low Line Voltage Fault" to be triggered.
Low Door Volt	0	600	198	Vrms	Settings for Line Voltage Monitor Board. It sets the value of voltage for “Door Low Voltage Fault” to be triggered.

Table 5: Car Options					
Field Variable	Min	Max	Initial	Units	Description
Hndcap Time Flr	cons[bottom floor]	cons[top floor]	1		If the job is configured to have an extended door input at a hall station, this parameter configures the floor number when parameter will change door timing. Follows fvexd t timer. It will operate for EDHL only
Velocity Diff	50	300	150	fpm	Maximum velocity difference between Encoder feedback and demand velocity. When the difference exceeds this setting, "Velocity Diff Fault" will occur.
Vel Diff Dis	0	1	0		Velocity difference fault disable. Default is enable (=0). Set 1 to disables fault
SPB Dir Flt Dis	0	1	0		SPB direction fault disable. Default is enable (=0). Set 1 to disables fault
Slip Vel Diff	0	300	150	fpm	Slip velocity difference fault trip value. This parameter determines Maximum allowable difference between Safety processor speed and controller speed.
Slip Det Dis	0	1	0		Slip velocity difference disable. Default is enable (=0). Set 1 to disables fault
Lim Dir Flt Dis	0	1	0		Limit direction fault disable. Default is enable (=0). Set 1 to disables fault
Enc Dir Flt Dis	0	1	0		Encoder direction fault disable. Default is enable (=0). Set 1 to disables fault
ULDL DirFlt Dis	0	1	0		UL/DL direction fault disable. Default is enable (=0). Set 1 to disables fault

Table 5: Car Options					
Field Variable	Min	Max	Initial	Units	Description
RCF out enable	0	1	0		Retiring Cam for freight output enable. When you Turn on this parameter. It shows a retiring cam output in controller. RCF that mirrors the signal from RCM. You need to reboot CPU every time you change parameter for change to take effect.
Rad Pos Ind	6	48	6	inches	Radial Position Indicator. Used for radial Position indicator output. It adjusts the range for the distance from the floor where the position indicator outputs should turn on and off
Leveling Fault	0	1	0		Leveling fault effect. Set to 0=drop everything, 1= set emergency brake or gripper when a leveling fault occurs. It will have to be manually reset.

Table 6: Service Options					
Field Variable	Min	Max	Initial	Units	Description
Return To Lobby	0	7	0		Return to Lobby Option. +1=cycle door at lobby, +2=cancel car calls when activated, +4=cycle door on reversal.
Stop At Lobby	0	15	0		1 = The car will stop at the lobby when the car is traveling up and the car is below the lobby floor. 2 = The car will stop at the lobby when the car is traveling down and the car is above the lobby floor. 3 = The car will stop at the lobby when traveling in either direction.
EP Recovery Dir	0	1	0		Recover to the nearest floor on emergency power. 0 = based on movement of the car when brake is picked. 1 = based on load weighing device.
Med Em Floor	cons[bottom floor]	cons[top floor]	1		Medical Emergency Return floor.
Med Em Sw Loc	0	1	0		Medical Emergency Switch Location. 0 = Medical Emergency is located at front door. 1 = Switch is located at rear door.
Med Door Reopen	0	2	0		When car is in medical Service, this parameter determines the door open sequence for re-open: 0=Stop, 1=Constant pressure, 2=momentary to DOL
Med Ind Ovrride	0	2	0		Medical Service overrides independent control: 0=Immediate, 1=After Delay, 2=No override

Table 6: Service Options					
Field Variable	Min	Max	Initial	Units	Description
Ind Over Sec	0	1	0		Independent Overrides Security. Set to 1 to allow independent service to override security car call lockouts.
IND Door Cl CC	0	1	0		1 = will close the doors from a car call when the elevator is on independent.
Ins Door Close	0	1	0		Inspection Door Close. When set to 1, the door close output will turn on when the up or down inspection run button is pressed.
LW Anti-nuisan	0	50	0		Load Weighing Anti-nuisance. Set to the maximum number of car calls that can been entered before all car calls are canceled without the load switch LWA input on. Once the load switch is on, all car calls will stay latched. If set to 0, this function is disabled.
No Psg Run Cnt	0	10	0		No Passenger Run Count. When set to a number other than zero, the car call antinuisance feature is activated. This count is the number of times the car will run from a car call without detecting that a passenger has broken the detector edge. Once the count is reached, all remaining car calls will be canceled.
Load Bypass	0	100	60		Load Bypass. Percent load when above this se point will cause the car to bypass hall calls. This function is disabled when set to zero.
Load Antinuisan	0	100	20		Load Anti-nuisance. Percent load when below this set point will cause the car to drop its car calls. This function is disabled when set to zero.

Table 6: Service Options

Field Variable	Min	Max	Initial	Units	Description
Load Dispatch	0	100	40		Load Dispatch. This set point is used as a trigger to activate Up Peak operations in the group. Each time the car leaves the lobby with a load greater than this value, the group will increment the Up Peak Trigger. This function is disabled when set to zero.
Code Blue Car#2	0	cons[number of cars]	0		When a code blue call is initiated, this will be the car to be sent to respond in the event that first "Code Blue Car" is not available, see variables "Code Blue Car#1" and "CB Rcll Any Car" for more options.
Load Overload	0	125	110		Load Overload. Percent load when above this set point will cause the car to go on overload operation (sit at the floor with the door open and the overload light on). When the load goes below this value, the car will automatically return to service. This function is disabled when set to zero.
Handicap Load	0	100	40		Handicap Car Capacity. Percent load when above this value, the car my not have enough room for a person in a wheelchair. Cars with loads below this value would be given a preference to get an assignment at a floor requested by a handicap person.
Security Recall	0	15	0		Security Recall Selection. 0=No: No Recall, +1=Recl: Recall to Security Floor on activation of security. +2=fD: Cycle front door once recalled to the Security Floor. +4=rD: Cycle rear door once recalled to the Security Floor.
Sec Recall 2	0	2	0		Security recall control 2. 0 = out of group on first recall. 1 = out of group on all recalls. 2= no out of group recalls.

Table 6: Service Options					
Field Variable	Min	Max	Initial	Units	Description
Security Floor	0	cons[top floor]	1	flr	Security Floor. The security recall floor. This is the floor where the security guard would be stationed. This floor would not be locked out when on security.
INSEC Outp Ctl	0	1	0		INSEC - in security Output invert. Output locate in the car call security Board
DOB Over Sec	0	1	0		DOB Override Security. When set to 1, the DOB will be allowed to open the door at a secured floor.
Att CC from HC	0	1	0		When set to 1 and the car is on Attendant service the respective car call will register when a hall call is registered.
Manual Dir En	0	4	0		Attendant manual direction enable if set to 1, it works in conjunction to the ATTUP and ATTDN to determine direction of travel if set to 2, it reads the ATTUP input and use it as a START button if set to 4, it will not allow car calls to be registered until the door is fully closed
Flash CB Light	0	1	0		When set to 1 the code blue light inside the car station will flash.
CB Buzzer Ctrl	0	1	0		Code blue Buzzer Control: 1 = Turn on while in code blue recall
CB Over Ind	0	1	0		Code Blue Override Independent 1 = wait for timer to expire and then recall the car

Table 6: Service Options					
Field Variable	Min	Max	Initial	Units	Description
EMS/HS after CB	0	1	0		Code Blue Bypass Control. When set to zero car goes from Auto to Hospital service bypassing the code blue sequence when EMS turns on. When set to 1, Hospital service only activates after a code blue recall.
HSV Door Cl CC	0	1	0		Close the doors from a car call when the car is on Hospital Service.
Vip Lant Ctrl	0	3	0		Vip lantern control: 0 = Do not ring lanterns on VIP, 1 = ring up and down at VIP floor
Elev Off Ctl	0	7	0		Elevator Off Control. +1=Recall car when key switch activated. +2=Keep door open at the shutdown floor. +4=Allow the cab light and fan to time-out even though the door is open but the car is shut down.
Elev Off Ctl 2	0	3	0		Elevator Off Options 2: +1= Keep doors Closed (do not cycle) +2 = do not blink ELOO
Elev Off Ret Fl	0	cons[top floor]	0	flr	Related to HEOF input. This setting is to be used in conjunction with "Elev Off Ctl = +1". If the elevator is configured to recall, this parameter will determine what floor the car should be recalled to in elevator off mode. if Parameter is set to zero, car will be returned to the Lobby.
HEOF Over Ind	0	1	0		Hall Elevator off override independent 1 = wait for timer to expire and then recall the car

Table 6: Service Options					
Field Variable	Min	Max	Initial	Units	Description
PI Serv Msg 1	0	30	0		PI Service Message 1. When the car service matches this number, user message 1 is sent to the PI display. This will correspond to user PI display message 17.
PI Serv Msg 2	0	30	0		PI Service Message 2. When the car service matches this number, user message 2 is sent to the PI display. This will correspond to user PI display message 18.
PI Serv Msg 3	0	0	0		Service message 3 display. Used for Custom messages. Need to be programmed by CE electronics / and GAL for special messages
Door Hold Msg	0	1	0		Extended Door Time Message Indicator in CE Driver board
Access Top Fl	cons[bottom floor]	cons[top floor]	2		Floor for top access
Access Bot Fl	cons[bottom floor]	cons[top floor]	1		Floor for bottom access
Access Door Cls	0	1	0		When on access operation the car runs with the Door Lock and GS open. By turning this parameter on, the car needs to have the gate switch signal ON in order to run. It should be used on hoistways where the car door will physically hit something if moved on access operation
HC Acknwldg Bzz	0	3	0		HC Acknowledge Attendant Buzzer - Buzz once (for one sec) every time a call comes in 0 = disable 1 = enable

Table 6: Service Options					
Field Variable	Min	Max	Initial	Units	Description
Lobby Floor	cons[bottom floor]	cons[top floor]	1		Lobby Floor.
Emerg Dispatch	0	1	0		Emergency Dispatch. If set and hall call power lost, the group will set down hall calls above the lobby and up hall call at and below the lobby. Also if communication is lost to a particular hall call board, hall calls are set for the affected floors.
VIP Operation	0	3	0		Vip (Priority Call) Operation. +1=Cancel hall call if no cars available for VIP call. +2= Cancel car call upon initiation of being selected as the VIP car.
Leveling Fault	0	1	0		Leveling fault effect. Set to 0=drop everything, 1= set emergency brake or gripper when a leveling fault occurs. It will have to be manually reset.
Em Power Floor	cons[bottom floor]	cons[top floor]	1	flr	Emergency Power Recall Floor.

Table 7: Fire Options					
Field Variable	Min	Max	Initial	Units	Description
Fire Main Floor	cons[bottom floor]	cons[top floor]	1		Fire Main Floor.
ALT Fire Floor	cons[bottom floor]	cons[top floor]	2		Alternate Fire Floor.
Fire Sw Loc	0	3	0	FFF	Fire Switch Location. Location of fire hall switch. 0 = Main/Alt Front, 1 = Main Rear/Alt Front, 2 = Main Front/Alt Rear, 3 = Main/Alt Rear.
Aux. Fire Sw.	0	1	0		Auxiliary Fire Switch. When set, the controller expects an auxiliary hall fire switch to be used.
Rcl from F1 Alt	0	1	0		Recall from Fire Phase I Alternate floor. If the car has return to the alternate floor from a smoke sensor and when two fire hall switch are used, both must be on to recall the car from the alternate floor to the main floor. When this flag is set to 1, the car will recall from the alternate floor to the main floor from either hall fire key switch. (Set to 1 for Mass. fire service).
Hall Fire Light	0	4	0		Hall Fire Light. The variable controls the FSO output on the controller so it can be used for a hall fire light or a fire security override. 0=PH1&2: FSO output on for both phase I andII fire service. 1=PH1: FSO output on while phase I fire is in effect. +2=flash: FSO is flashed at a 1 second interval while activated.
MachRm Fire Ret	0	1	0		Machine Room Fire Sensor Return Floor Selection. 0 = Return to the Main fire floor, 1 = Return to the Alternate fire floor.

Table 7: Fire Options					
Field Variable	Min	Max	Initial	Units	Description
Hoistw Fire Ret	0	1	0		Hoistway Fire Sensor Return Floor Selection. 0 = Return to the Main fire floor, 1 = Return to the Alternate fire floor.
HWS 2 Fire Ret	0	1	0		Second hoistway fire service sensor return option. 0 = Main recall floor 1 = Alternate recall floor.
HWS 2 Fire Loc	0	1	50		Fire service hoistway HWS2 sensor location 0 = same HW 1 = Separate hoistway
Recall Rese	0	2	0		Recall Reset Selection. 0 = Reset fire service phase 1 after hall switch is turned off and car returns to fire floor. 1 = Reset phase I immediately after hall switch is turned off.
Fire Option	0	3	0		Recall Reset Selection. 0 = Reset fire service phase 1 after hall switch is turned off and car returns to fire floor. 1 = Reset phase I immediately after hall switch is turned off.
Fire Option 2	0	3	1		Fire Option 2. +1=Initiate a phase II recall only when the door is open (Chicago fire). +2=Disable flashing FL on phase II (Chicago fire).
Alt Rcl FS Off	0	3	0		Add +1 to have the elevator recall back to the alternate floor when the lobby fire switch is turned to the off position and car recalled to the main fire floor. +2 allows the car to return to the alternate landing even if sensor was reset
FireL Emer Pwr	0	1	1		Fire Light control during emergency power – Set to one cause the fire light FL to turn off if the car is not selected to run.

Table 7: Fire Options					
Field Variable	Min	Max	Initial	Units	Description
FireL OTS Ret	0	1	0		Fire light control for Out of Service cars: enabling this parameter will turn off the fire light in the event the car cannot recall for being out of service. It could be in Earthquake, low oil, stall, etc.
F2 DOB ovr DCB	0	1	0		When set to 1, it allows Door Open Button to override Door Close Button on phase II (for Miami)
Cl Door F1 Rcl	0	1	0		When set to 1, elevator will close the doors after phase I recall and reopen from a hall call (Denver Fire service amendment)
F1 Door Dwell	1	90	60	sec	Fire Service Phase one complete dwell time when "Cl Door F1 Rcl" parameter is set. (Denver FS phase1 dwell time)
F1 DC Time-out	10	60	20	sec	The amount of time it will take before the car doors start to close while the car is on Independent or Attendant service prior to recalling the elevator on Fire Phase I.

Table 8: Group Dispatch					
Field Variable	Min	Max	Initial	Units	Description
Parking	0	cons[number of cars]	1		Number of Cars to Park. One car is parked at the lobby. The remaining cars are parked at the most used floors of the building. If set to zero, no cars are parked.
Park Delay Time	0	120	8		Parking Delay Time. Time delay an idle car waits before being parked.
Parking floor 1	0	cons[top floor]	0		Parking Floor 1. Floor to park the idle car. If set to zero, the group will use number of hall call history to decide where to park the car. The parking variable must be set to at least 1 for this function to work.
Parking floor 2	0	cons[top floor]	0		Parking Floor 2. Floor to park the idle car. If set to zero, the group will use number of hall call history to decide where to park the car. The parking variable must be set to at least 2 for this function to work.
Parking floor 3	0	cons[top floor]	0		Parking Floor 3. Floor to park the idle car. If set to zero, the group will use number of hall call history to decide where to park the car. The parking variable must be set to at least 3 for this function to work.
Parking floor 4	0	cons[top floor]	0		Parking Floor 4. Floor to park the idle car. If set to zero, the group will use number of hall call history to decide where to park the car. The parking variable must be set to at least 4 for this function to work.

Table 8: Group Dispatch					
Field Variable	Min	Max	Initial	Units	Description
Parking floor 5	0	cons[top floor]	0		Parking Floor 5. Floor to park the idle car. If set to zero, the group will use number of hall call history to decide where to park the car. The parking variable must be set to at least 5 for this function to work.
Parking floor 6	0	cons[top floor]	0		Parking Floor 6. Floor to park the idle car. If set to zero, the group will use number of hall call history to decide where to park the car. The parking variable must be set to at least 6 for this function to work.
Parking floor 7	0	cons[top floor]	0		Parking Floor 7. Floor to park the idle car. If set to zero, the group will use number of hall call history to decide where to park the car. The parking variable must be set to at least 7 for this function to work.
Parking Width	0	cons[top floor]	0		Parking Width. The number of floor that a car is within to be considered parked at the parking floor.
Parking Type	0	3	0		Parking Type. Determines the type of parking operation that is implemented by the group. 0=park free cars to floors with the most hall calls for that 15 minute period. 1=Divide the hoistway by the number of cars and place a car in each zone starting with the lobby. 2=Park cars according to the adjustable variable parking floor. Note that during parking, a car is always parked at the Lobby except when the option for alternate parking floor is selected through an input.
Alt Parking Fl	1	cons[top floor]	1		Alternate parking floor

Table 8: Group Dispatch					
Field Variable	Min	Max	Initial	Units	Description
Grp Timer Park	0	cons[number of cars]	0		Group service number of parking cars.
Asgn Park Fl DO	0	1	0		By default we only park cars that have the doors closed after a time delay. this parameters allows to re-assign parking to cars with doors open as long as they do not have a direction to run.
Alt Lobby Floor	1	cons[top floor]	1		Galaxy groups could be configured to have an alternate lobby. Switching between regular lobby and alternate lobby could be done by means of liftnet, Galileo, controller input or service timer. Once the alternate lobby is enabled, controllers will use this landing as the lobby floor for all dispatching purposes.
Lobby Request	0	cons[number of cars]	0		Lobby Request. Number of Cars Requested to the Lobby floor. Used with Next Car Up operation.
Lobby Req Cntrl	0	1	0		Lobby Request Control. If the lobby request variable is set to non-zero, then that is how many cars are requested to the lobby all the time. When this flag is set to 1, the lobby request is only used when next up is active. Next Up can be active all the time, from a dedicated input or from Up Peak.

Table 8: Group Dispatch					
Field Variable	Min	Max	Initial	Units	Description
Next Car Up	0	7	0		Next Car Up. Set to 1 or 2 will activate the Next Car Up operation. If set to 1 the next up car will open its door at the lobby and keep it open. The car is allowed to leave the floor after the Lobby Dwell time expires but will remain at the floor with the door open until an onward call is assigned to it. If set to 2 the next up car will close its door after the Lobby Dwell time expires and go off of next up but will remain at the lobby. An up hall call at the lobby will cause the car to open its door and go on next up. When set to 4, Next up is activated on Up Peak detection only. Next up can also be activated from an input.
Up Pk Trig Time	0	3200	60		Up Peak Trigger Time. The time interval to count the number of up peak triggers.
Up Pk Trig Cnt	1	100	3		Up Peak Trigger Count. The number of up peak triggers that are set within the up peak trigger time to activate up peak operation. Up peak triggers are counted when the car leaves the lobby with the load dispatch input set or with the more car calls than the up peak car call count.
Up Pk CC Count	1	40	3		Up Peak Car Call Count. Number of car calls the car must have when leaving the lobby to count as an up peak trigger.
Up Peak Time	0	3200	180		Up Peak Duration Time. The duration time for up peak operation once up peak is activated. If set to zero, up peak operation will never turn on.
Up Peak Contrl	0	1	0		Up peak control 0 = Normal up peak 1 = Heavy up peak

Table 8: Group Dispatch					
Field Variable	Min	Max	Initial	Units	Description
Up Peak Pool	0	cons[number of cars]	1		Number of cars to be utilized for up peak.
Dn Pk Trig Time	0	3200	60		Down Peak Trigger Time. The time interval to count the number of down hall calls above the lobby to activate down peak operation.
Dn Pk Trig Cnt	1	100	12		Down Peak Trigger Count. Number of down hall calls above the lobby that are set within the down peak trigger time to place the system on down peak operation.
Down Peak Time	0	3200	180		Down Peak Duration Time. The duration time for down peak operation once down peak is activated.
Dn Peak Contrl	0	1	0		Down peak control 0 = Normal down peak 1 = Heavy down peak
Down Peak Pool	0	cons[number of cars]	0		Number of cars to be utilized for down peak.
ETA Min Time	0	60	6		ETA Minimum Time. For a hall call to be assigned to a new car, the difference in ETA must be greater than the ETA Minimum Time.
ETA Co CC Time	0	60	15		TA Coincident Car Call Time. Hall calls will be assigned to the car with the coincident car call unless the car without the coincident car call can reach the call faster than ETA Coincident Car Call Time.

Table 8: Group Dispatch					
Field Variable	Min	Max	Initial	Units	Description
Lobby Floor	cons[bottom floor]	cons[top floor]	1		Lobby Floor.

Table 9: Group Options					
Field Variable	Min	Max	Initial	Units	Description
Em Power Cars	1	cons[number of cars]	1		Number of Emergency Power Cars that can run at the same time on the emergency power source.
1st Recall Car	0	cons[number of cars]	1		First Recall Car. This is the first car allowed to recall during the recall sequence. The recall sequence continues in consecutive order and then loops around until all cars are recalled.
1st Rcl EPSF 2	0	cons[number of cars]	2		First Return Car to be recalled in Emergency Power (the rest are done sequentially in a loop) for power feeder 2
1st EP Run Car	0	cons[number of cars]	1		First Emergency Power Run Car. This is the first car selected to run. If this car cannot run, the next consecutive car is selected.
1st Run EPSF 2	0	cons[number of cars]	2		First Car Selected in Emergency Power (the rest are done sequentially in a loop) for power feeder 2
EP Recall Delay	0	3200	15	sec	Emergency power recall delay time.
Recall Timeout	1	600	60		Recall Time-out. The time allowed for the car to reach the recall floor. If this timer expires, the next car is selected to recall.

Table 9: Group Options					
Field Variable	Min	Max	Initial	Units	Description
EP Recover Tim	1	60	20	sec	When elevators are in Emergency Power recall, this is the time that the dispatcher will wait for each car to recover to a floor. If the car is in the middle of a blind shaft, you need to calculate the time each car may take to get to a floor in emergency power recovery speed.
EP Man Sel En	0	3	1		Emergency Power Manual Select Enable: +1 makes the car recall when it is deselecting from emergency power service. If set to zero, it will wait at the floor with the doors open. Setting this variable to 2 makes the all the cars go to the sequence again before any other car can be selected to run in emergency power.
Skip Car@RcFLDO	0	1	0		While on Emergency Power Recall sequence: if enabled, out of service cars at the Emergency Power Recall floor with door open will be given a chance to run, 0=override immediately, 1=override after time-delay. Time delay defined by variable "EP Recover Tim”
SkipCarN@Rc FLDO	0	1	0		While on Emergency Power Recall sequence: if enabled, out of service cars at the Emergency Power Recall floor with door open will be given a chance to run, 0=override immediately, 1=override after time-delay. Time delay defined by variable "EP Recover Tim”

Table 9: Group Options					
Field Variable	Min	Max	Initial	Units	Description
EmPwr Op Output	0	3	0		Emergency Power Operation LED. This parameter controls the group outputs for emergency power status for each car. 0=Outputs are on for cars that are operational. 1=Outputs on for cars on normal power. 2=Outputs on for car on emergency power. 3=Outputs on for cars that are being recalled.
EmPwr Pk Output	0	1	0		Emergency Power Park LED. This parameter controls the group outputs for emergency power parked status for each car. 0 = cars are parked on emergency power. 1=cars are parked or selected to run.
EMP ATT car 1st	0	1	0		Select and Prioritize the attendant car for running on emergency power service. It won't be recalled. After recall is complete for the group, It recovers and goes back in service
EP Rcl Out en	0	1	0		Emergency cars finished Recalling Output enable. It enables an output in the hall call board for Emergency Power Complete (EPCOM). This setting is only read in power up so after changing this setting you need to reboot the controller.
Code Blue Car	0	cons[number of cars]	0		When a code blue call is initiated, this will be the first car to be sent to respond. If car is not available, see variables "Code Blue Car#2" and "CB Rcll Any Car" for more options.

Table 9: Group Options					
Field Variable	Min	Max	Initial	Units	Description
CB Rcll Any Car	0	1	0		0= Disable; =1 enables dispatcher to recall any car If Code Blue Cars 1 and 2 are not available. If you want to select any car as your primary option, make Code Blue Cars 1 and 2 equal to zero and enable this setting.
CB SRiser Car	0	cons[number of cars]	0		Code Blue second riser car select
CB Req Ind Car	0	1	0		Code blue request for car in independent operation. Set to 1 in dispatcher in all cars so the car could be requested (flash EML) if the car is in independent mode.
CB Button Loc	0	2	0		Code Blue Location: 0=CB on CB, 1 = CB on HCB, 2 = CB on IR
CB Sel IR Car	0	1	0		Code blue over IR car
CB IR Penalty	0	60	10	sec	IR Car Code Blue penalty time. It is used to calculate and give preference to cars in fully automatic operation
IR Car	0	cons[number of cars]	0		Inconspicuous Riser Car. This car is assigned all the IR hall calls.
2nd IR Car	0	cons[number of cars]	0		Set this option to have a second car answer the Inconspicuous Risers.

Table 9: Group Options					
Field Variable	Min	Max	Initial	Units	Description
IR Control	0	7	0		Inconspicuous Riser Control. This variable is used to set the automatic activation of IR service. Add each number to activate the option. 1 = IREn: Enable IR automatic activation. +2=AnCB4S: Answer all Car calls Before Starting IR service. +4=AnCB4F: Answer all Car calls Before Finishing IR service.
Vid Pos Car 1	1	cons[number of cars]	1		Video Position Car 1. The column where the car is displayed on the dispatch screen starts from left to right for positions 1 through 6 (8 for high rise cars). Car 1 through 6 positions are defaulted to display positions 1 through 6 respectively. Changing the car's video position changes the column where the car is displayed.
Vid Pos Car 2	1	cons[number of cars]	2		Video Position Car 2. See Video Position Car 1 for an explanation.
Vid Pos Car 3	1	cons[number of cars]	3		Video Position Car 3. See Video Position Car 1 for an explanation.
Vid Pos Car 4	1	cons[number of cars]	4		Video Position Car 4. See Video Position Car 1 for an explanation.
Vid Pos Car 5	1	cons[number of cars]	5		Video Position Car 5. See Video Position Car 1 for an explanation.
Vid Pos Car 6	1	cons[number of cars]	6		Video Position Car 6. See Video Position Car 1 for an explanation.

Table 9: Group Options					
Field Variable	Min	Max	Initial	Units	Description
HC X-Assign En	0	2	0		Hall Call Cross Assignment Enable. When set to 1, hall call cross assignment is enabled. The group will look for cross assignment calls as well as hall calls. Power should be cycled on controller after this variable is modified so all communications to all devices are made. When set to 2, then hall calls are not canceled when all cars are out of service when using cross cancellation.
HC X-Assign ETA	0	500	60		Hall Call Cross Assignment ETA limit. If ETA for hall call assignment is greater than this ETA limit, the hall call will be cross-assigned to the old group controller.
X-Assign Cars	0	cons[number of cars]	0		Number of cars in the old group to assign calls using cross assignment system.
Dispatcher Car	0	cons[number of cars]	0		Dispatcher Car. If set to 1, this car is allowed to become the dispatcher. In normal operation, this variable would be set to zero and car #1 would be the dispatcher. If car #1 is shut down, car #2 automatically becomes the dispatcher. During installation, it may be necessary to force car #3 or above to be the dispatcher until car #1 or #2 are brought on line.
Single Auto PB	0	2	0		0 – Manual Doors. 1 – Enable for automatic doors. 2– Disable this feature. This feature allows only hall calls and car calls to register when the doors are closed.
OTS No HC Canc	0	1	0		Do not cancel hall calls if cars are out of service. This is used in accordance with cross assignment feature.

Table 9: Group Options					
Field Variable	Min	Max	Initial	Units	Description
Secnd Risr Ctl	0	3	0		Second Riser Control. Defines the second riser operation. 0=Car defined for second riser answer second riser call and standard hall calls. 1=Car defined for second riser answer only second riser calls. 2=Second riser call or'ed with standard riser calls if second riser operation not selected from input.
ATT Pref Time	0	60	0	sec	Attendant ETA Preference. When set to non-zero, the car not on attendant service has this time added to its ETA time. This causes the attendant car to be given a preference for the hall call.
Number Vip Cars	0	cons[number of cars]	1		Number of VIP Cars. Number of cars allow to service VIP (priority service) calls at one time.
Vip Button Loc	0	2	0		Vip Location 0 = vip on vip, 1 = Vip on HCB, 2 = Vip on IR
Handicap Wait	0	255	0	sec	Handicap Car Capacity. Percent load when above this value, the car my not have enough room for a person in a wheelchair. Cars with loads below this value would be given a preference to get an assignment at a floor requested by a handicap person.
Grp CC Sec OvrT	1	240	60	sec	Group car call security override timer.

Table 9: Group Options					
Field Variable	Min	Max	Initial	Units	Description
Grp CC Ovrride	0	1	0		For visitor access (Group Car Call Override), this parameter blocks the outputs from energizing. Set to 1 for Key Switch Direct. No outputs will come on the board.
Sabbath Restart	0	3200	8	sec	The amount of time after the elevator answered the last Sabbath call to restart the process.
HC Asg SecType	0	15	0		Use with Special Priority Service. Determines what hall calls should be given a special priority. Settings are 1=up, 2=dn, 4=upr, 8=dnr
HC Securty ctrl	0	2	0		Hall call security control 0 = only standard hall calls; 1 = standard hall calls and Second Riser hall calls ; 2 = only Second Riser hall calls
Emerg Dispatch	0	1	0		Emergency Dispatch. If set and hall call power lost, the group will set down hall calls above the lobby and up hall call at and below the lobby. Also if communication is lost to a particular hall call board, hall calls are set for the affected floors.
VIP Operation	0	3	0		Vip (Priority Call) Operation. +1=Cancel hall call if no cars available for VIP call. +2= Cancel car call upon initiation of being selected as the VIP car.
Em Power Floor	cons[bottom floor]	cons[top floor]	1	flr	Emergency Power Recall Floor.

Table 10: CC & COP Lights					
Field Variable	Min	Max	Initial	Units	Description
CC On Color	0	15	15		Car Call Button On Color 0 Based on RGB intensity parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
CC On Bright	0	100	100	%	Car Call output on brightness for led
CC On Red	0	100	62.5	%	Car Call On red intensity
CC On Green	0	100	100	%	Car Call On green intensity
CC On Blue	0	100	50	%	Car Call On blue intensity

Table 10: CC & COP Lights					
Field Variable	Min	Max	Initial	Units	Description
CC Off Color	0	15	15		Car Call Button Off Color 0 Based on RGB intensity parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
CC Off Bright	0	100	20	%	Car Call output off brightness for led
CC Off Red	0	100	62.5	%	Car Call Off red intensity
CC Off Green	0	100	100	%	Car Call Off green intensity
CC Off Blue	0	100	50	%	Car Call Off blue intensity

Table 10: CC & COP Lights					
Field Variable	Min	Max	Initial	Units	Description
CC Sec Color	0	15	15		Car Call Button Security Color 0 Based on RGB intensity parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
CC Sec Bright	0	100	100	%	Car Call Security brightness
CC Sec Red	0	100	100	%	Car Call Security red intensity
CC Sec Green	0	100	0	%	Car Call Security green intensity
CC Sec Blue	0	100	100	%	Car Call Security blue intensity

Table 10: CC & COP Lights					
Field Variable	Min	Max	Initial	Units	Description
CC AttUp Color	0	15	0		Car Call Button Attendant Up Color: 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
CC AttUp Bright	0	100	100	%	Car Call Button Attendant Up brightness
CC AttUp Red	0	100	0	%	Car Call Button Attendant Up red intensity
CC AttUp Green	0	100	100	%	Car Call Button Attendant Up green intensity
CC AttUp Blue	0	100	0	%	Car Call Button Attendant Up blue intensity

Table 10: CC & COP Lights					
Field Variable	Min	Max	Initial	Units	Description
CC AttDn Color	0	15	0		Car Call Button Attendant Dn Color: 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
CC AttDn Bright	0	100	100	%	Car Call Button Attendant Dn brightness
CC AttDn Red	0	100	100	%	Car Call Button Attendant Dn red intensity
CC AttDn Green	0	100	0	%	Car Call Button Attendant Dn green intensity
CC AttDn Blue	0	100	0	%	Car Call Button Attendant Dn blue intensity
CC Light Ctl	0	3	0		This configures the options for flashing car call lights: +1 = Flash Car Call Security, +2= Flash Attendant Annunciator Sequence

Table 10: CC & COP Lights					
Field Variable	Min	Max	Initial	Units	Description
Fire Lt Color	0	15	0		Fire light Color: 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
Fire Lt Bright	0	100	100	%	Fire light brightness
Fire Lt Red	0	100	62.5	%	Fire light red intensity
Fire Lt Green	0	100	100	%	Fire light green intensity
Fire Lt Blue	0	100	50	%	Fire light blue intensity

Table 10: CC & COP Lights					
Field Variable	Min	Max	Initial	Units	Description
Med Lt Color	0	15	0		Medical light Color: 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
Med Lt Bright	0	100	100	%	Medical light brightness
Med Lt Red	0	100	0	%	Medical light red intensity
Med Lt Green	0	100	0	%	Medical light green intensity
Med Lt Blue	0	100	100	%	Medical light blue intensity

Table 10: CC & COP Lights

Field Variable	Min	Max	Initial	Units	Description
Emer Lt Color	0	15	0		Emergency light Color 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
Emer Lt Bright	0	100	100	%	Emergency light brightness
Emer Lt Red	0	100	75	%	Emergency light red intensity
Emer Lt Green	0	100	100	%	Emergency light green intensity
Emer Lt Blue	0	100	0	%	Emergency light blue intensity

Table 10: CC & COP Lights					
Field Variable	Min	Max	Initial	Units	Description
OTS Lt Color	0	15	0		Out of Service light Color 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
OTS Lt Bright	0	100	100	%	Out of Service light brightness
OTS Lt Red	0	100	100	%	Out of Service light red intensity
OTS Lt Green	0	100	40	%	Out of Service light green intensity
OTS Lt Blue	0	100	0	%	Out of Service light blue intensity

Table 10: CC & COP Lights					
Field Variable	Min	Max	Initial	Units	Description
Backlight Lt	0	63	0		Enable Backlight Output Lights for RGB style output lights in COP Bit0: Fire, Bit1: Medical, Bit2: Emergency, Bit3: OTS, Bit4: Att Up/Dn Light, Bit5: Non-CC

Table 11: HC & IR Call Lights					
Field Variable	Min	Max	Initial	Units	Description
HC On Brght	0	100	100	%	Hall call light on brightness for LED hall call buttons. Used only with GAL serial hall button fixtures.
HC Off Bright	0	100	20	%	Select what color LED to illuminate on hall call button when button is NOT pressed. Used only with GAL serial hall button fixtures.
HCUp On Color	0	15	15		Hall Call Button Up On Color 0 Based on RGB intensity parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
HCUp On Bright	0	100	0	%	Hall Call output Up on brightness for led (higher number is brighter)
HCUp On Red	0	100	62.5	%	Hall Call Up On red intensity
HCUp On Green	0	100	100	%	Hall Call Up On green intensity

Table 11: HC & IR Call Lights					
Field Variable	Min	Max	Initial	Units	Description
HCUp On Blue	0	100	50	%	Hall Call UP On blue intensity
HCUp Off Color	0	15	15		Hall Call Button Up Off Color 0 Based on RGB intensity parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
HCUp Off Brght	0	100	20	%	Hall Call output off brightness for led (higher number is brighter)
HCUp Off Red	0	100	62.5	%	Hall Call Up Off red intensity
HCUp Off Green	0	100	100	%	Hall Call Up Off green intensity
HCUp Off Blue	0	100	50	%	Hall Call Up Off blue intensity

Table 11: HC & IR Call Lights					
Field Variable	Min	Max	Initial	Units	Description
HCDn On Color	0	15	15		Select what color LED to illuminate on hall call button when button is pressed. Used only with GAL serial hall button fixtures.
HCDn On Bright	0	100	100	%	Hall call light on brightness for LED hall call buttons. Used only with GAL serial hall button fixtures.
HCDn On Red	0	100	62.5		Hall call light on red intensity. Used only with GAL serial hall button fixtures.
HCDn On Green	0	100	100	%	Hall call light on green intensity. Used only with GAL serial hall button fixtures.
HCDn On Blue	0	100	50	%	Hall call light on blue intensity. Used only with GAL serial hall button fixtures.
HCDn Off Color	0	15	15		Select what color LED to illuminate on hall call button when button is NOT pressed. Used only with GAL serial hall button fixtures.
HCDn Off Brght	0	100	20	%	Hall call light off brightness for LED hall call buttons. Used only with GAL serial hall button fixtures.
HCDn Off Red	0	100	62.5	%	Hall call light off red intensity. Used only with GAL serial hall button fixtures.
HCDn Off Green	0	100	100	%	Hall call light off green intensity. Used only with GAL serial hall button fixtures.
HCDn Off Blue	0	100	50	%	Hall call light off blue intensity. Used only with GAL serial hall button fixtures.

Table 11: HC & IR Call Lights

Field Variable	Min	Max	Initial	Units	Description
IRUp On Color	0	15	15		Hall Call IR Up On color 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
IRUp On Bright	0	100	100	%	Hall Call IR Up On brightness
IRUp On Red	0	100	62.5	%	Hall Call IR Up On red intensity
IRUp On Green	0	100	100	%	Hall Call IR Up On green intensity
IRUp On Blue	0	100	50	%	Hall Call IR Up On blue intensity

Table 11: HC & IR Call Lights					
Field Variable	Min	Max	Initial	Units	Description
IRUp Off Color	0	15	15		Hall Call IR Up Off color 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
IRUp Off Brght	0	100	100	%	Hall Call IR Up Off brightness
IRUp Off Red	0	100	62.5	%	Hall Call IR Up Off red intensity
IRUp Off Green	0	100	100	%	Hall Call IR Up Off green intensity
IRUp Off Blue	0	100	50	%	Hall Call IR Up Off blue intensity

Table 11: HC & IR Call Lights					
Field Variable	Min	Max	Initial	Units	Description
IRDn On Color	0	15	15		Hall Call IR Dn On color 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
IRDn On Bright	0	100	20	%	Hall Call IR Dn On brightness
IRDn On Red	0	100	62.5	%	Hall Call IR Dn On red intensity
IRDn On Green	0	100	100	%	Hall Call IR Dn On green intensity
IRDn On Blue	0	100	50	%	Hall Call IR Dn On blue intensity

Table 11: HC & IR Call Lights					
Field Variable	Min	Max	Initial	Units	Description
IRDn Off Color	0	15	15		Hall Call IR Dn Off color 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
IRDn Off Brght	0	100	20	%	Hall Call IR Dn Off brightness
IRDn Off Red	0	100	62.5	%	Hall Call IR Dn Off red intensity
IRDn Off Green	0	100	100	%	Hall Call IR Dn Off green intensity
IRDn Off Blue	0	100	50	%	Hall Call IR Dn Off blue intensity
IR Color Ctrl	0	1	0		IR light color control: 0=IR Color, 1=HC Color until IR activated

Table 12: CB, VIP & HSec Call Lights					
Field Variable	Min	Max	Initial	Units	Call Lights
CB On Color	0	15	0		Hall Call CB On color: 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
CB On Bright	0	100	100	%	Hall Call CB On brightness
CB On Red	0	100	0	%	Hall Call CB On red intensity
CB On Green	0	100	0	%	Hall Call CB On green intensity
CB On Blue	0	100	100	%	Hall Call CB On blue intensity

Table 12: CB, VIP & HSec Call Lights					
Field Variable	Min	Max	Initial	Units	Call Lights
CB Off Color	0	15	0		Hall Call CB Off color 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
CB Off Bright	0	100	20	%	Hall Call CB Off brightness
CB Off Red	0	100	0	%	Hall Call CB Off red intensity
CB Off Green	0	100	0	%	Hall Call CB Off green intensity
CB Off Blue	0	100	100	%	Hall Call CB Off blue intensity

Table 12: CB, VIP & HSec Call Lights					
Field Variable	Min	Max	Initial	Units	Call Lights
Vip On Color	0	15	0		Hall Call Vip On color 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
Vip On Bright	0	100	100	%	Hall Call Vip On brightness
Vip On Red	0	100	100	%	Hall Call Vip On red intensity
Vip On Green	0	100	40	%	Hall Call Vip On green intensity
Vip On Blue	0	100	0	%	Hall Call Vip On blue intensity

Table 12: CB, VIP & HSec Call Lights

Field Variable	Min	Max	Initial	Units	Call Lights
Vip Off Color	0	15	0		Hall Call Vip Off color 0 Based on parameters 1 Red 2 Orange 3 Yellow 4 Chartreuse 5 Green 6 Aquamarine 7 Cyan 8 Azure 9 Blue 10 Violet 11 Magenta 12 Rose 13 Rose white 14 Warm white 15 Cool white
Vip Off Bright	0	100	20	%	Hall Call Vip Off brightness
Vip Off Red	0	100	100	%	Hall Call Vip Off red intensity
Vip Off Green	0	100	40	%	Hall Call Vip Off green intensity
Vip Off Blue	0	100	0	%	Hall Call Vip Off blue intensity
HC Sec Color	0	15	15		Select what color to illuminate the hall buttons when the system is on security. Used only with GAL serial hall button fixtures.

Table 12: CB, VIP & HSec Call Lights					
Field Variable	Min	Max	Initial	Units	Call Lights
HC Sec Bright	0	100	100	%	Hall Call Security Brightness for Secured Floors
HC Sec Red	0	100	100	%	Hall call light red intensity when on security. Used only with GAL serial hall button fixtures.
HC Sec Green	0	100	0	%	Hall call light green intensity when on security. Used only with GAL serial hall button fixtures.
HC Sec Blue	0	100	100	%	Hall call light blue intensity when on security. Used only with GAL serial hall button fixtures.
HC Sec Ctl	0	7	0		Hall call button security light. 1 = invert security, +2 = flash security

Table 13: System Options

Field Variable	Min	Max	Initial	Units	Description
Drive Baud Rate	0	4	0		Drive Baud Rate. 0=19200 (HPV-900, DSD-412, HPV-600 and Quattro Drives). 1=38400, 2=57600, 3=11500, 4=9600.
Drv Update Rate	0	2	0		Drive Command Update Rate. 0=10 msec (HPV-900, DSD-412, HPV-600 and Quattro Drives), 1=15 msec, 2=20 msec. Rate at which commands are sent to the drive.
Drive Modbus	0	5	0		Modbus protocol 0-5 = N1, N2, E1, E2, O1, O2 (Always 8 data bits, parity, stop bits). Used for Delta drive.
CAN Baud Rate	0	1	0		Set to zero and do not change. Special jobs utilize a different baud rate for CAN bus. All devices need to be reconfigured for new rate. Can Baud Rate, 0=115.2K, 1=57.6K
User Baud Rate	0	3	0		User Interface Baud Rate. 0=2400, 1=4800, 2=9600 and 3=19200 bits per second.
Safe Test Year	2000	2999	0		Safety Test Year.
Safe Test Month	1	12	0		Safety Test Month.
Safe Test Day	1	31	0		Safety Test Day.

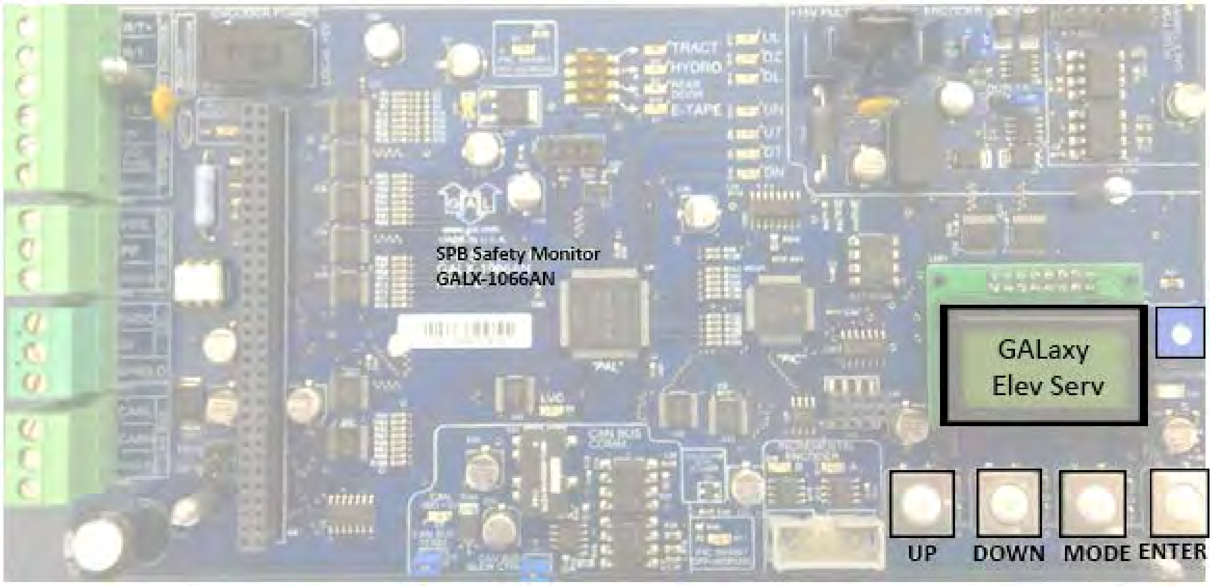
Table 13: System Options					
Field Variable	Min	Max	Initial	Units	Description
Auto Fault Dpy	0	1	0		Enable to automatically display a fault on the LCD screen.
Password	0	9999	0		Password code to modify and adjust field variables
Pword Time-out	0	3200	300	sec	The amount of inactive time for the LCD to lock out the field variables.
Video Time out	0	3200	0		Video Time-out. Turn off the machine room video after this timer times out. This function is disabled when set to zero.
Low Bat Cap Lev	0	101	50	%	For UPS systems, this is the battery level at which the controller will fault out due to Low Battery Capacity.
Can Sync Count	0	7	4		Frequency to update Can devices. Units are 1/4 seconds. It sets Synchronization Count in 250 millisecond increments
Exclusion FLT 1	0	378	0		Exclusion fault: Set to fault code number. This prevents faults from being recorded in the fault log. It should only be set for nuisance and noncritical faults. Controller stills goes through all the logic for each fault code except, a call is not recorded in the fault log
Excl FLT 1 Ctrl	0	2	0		Exclusion fault: Set to fault code number. This prevents faults from being recorded in the fault log. It should only be set for nuisance and noncritical faults. Controller stills goes through all the logic for each fault code except, a call is not recorded in the fault log

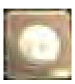
Table 13: System Options					
Field Variable	Min	Max	Initial	Units	Description
Exclusion FLT 2	0	378	0		Exclusion fault: Set to fault code number. This prevents faults from being recorded in the fault log. It should only be set for nuisance and noncritical faults. Controller stills goes through all the logic for each fault code except, a call is not recorded in the fault log
Excl FLT 2 Ctrl	0	2	0		Exclusion fault: Set to fault code number. This prevents faults from being recorded in the fault log. It should only be set for nuisance and noncritical faults. Controller stills goes through all the logic for each fault code except, a call is not recorded in the fault log
Exclusion FLT 3	0	378	0		Exclusion fault: Set to fault code number. This prevents faults from being recorded in the fault log. It should only be set for nuisance and noncritical faults. Controller stills goes through all the logic for each fault code except, a call is not recorded in the fault log
Excl FLT 3 Ctrl	0	2	0		Exclusion fault: Set to fault code number. This prevents faults from being recorded in the fault log. It should only be set for nuisance and noncritical faults. Controller stills goes through all the logic for each fault code except, a call is not recorded in the fault log
Encoder Intrvl	1	5	3		Defines the intervals for sampling the encoder reads for calculating speed. Default values should work in all jobs.
Encoder Sample	2	10	10		Determines the samples used to calculate the speed from the encoder. Default values should work in all jobs.

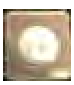
Table 13: System Options					
Field Variable	Min	Max	Initial	Units	Description
Service UPS	0	1	0		Service UPS mode. Turning this parameter disables UPS faults. It should only be used in Construction mode or while servicing the UPS
UPS Baud Rate	0	3	0		UPS baud rate: 0=2400,1=4800,2=9600,3=19200
Diagnostic LED	0	1	0		

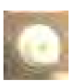
Section 13 - Safety Processor 1066 LCD Interface

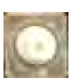
11.1 Operating the 1066 LCD Interface




UP button is used to scroll up to the next menu item or to increment a data value.


DOWN button is used to scroll down to the next menu item or to decrement a data value.

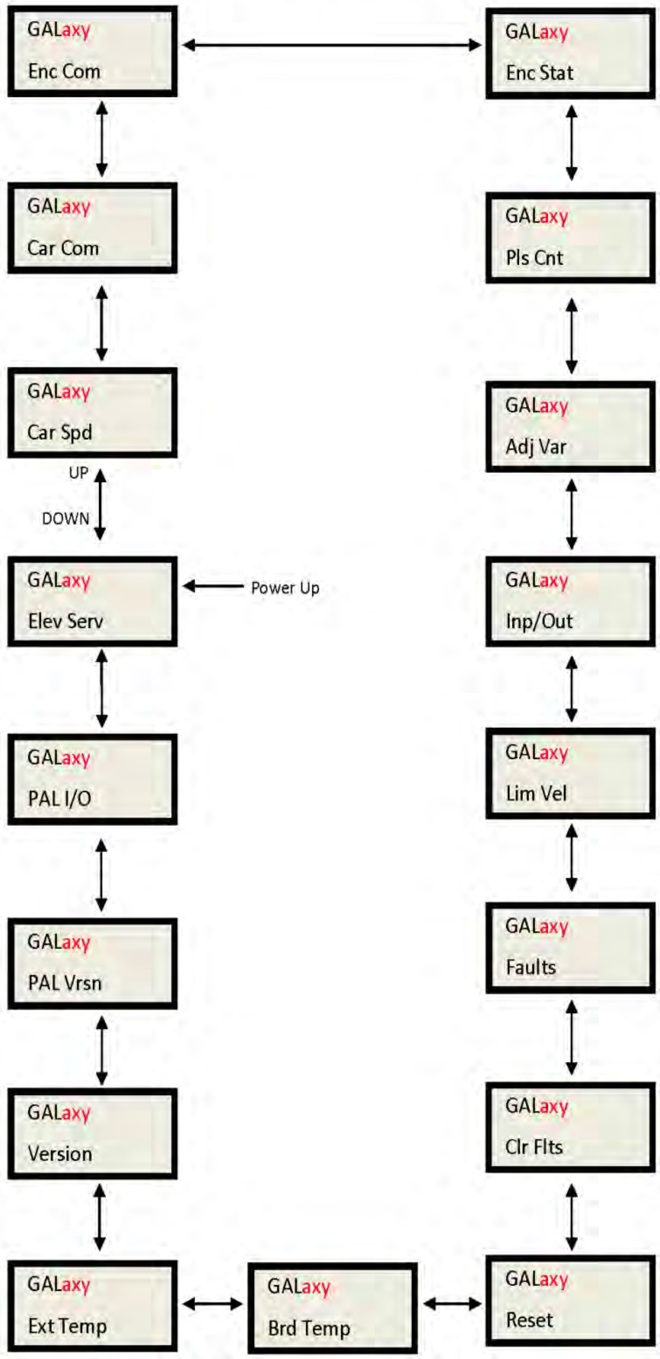

MODE button is used to go back to the previous menu or to select a digit of a data value.


ENTER button is used to select the menu item or to complete the operation of changing a data value.


Potentiometer is used to adjust the viewing angle. It will make the display lighter or darker.

The four inputs buttons used with the 1066 LCD interface are, UP, DOWN, MODE and ENTER. The UP and DOWN buttons are used to scroll up and down to each menu item. When an appropriate menu item is reached, the ENTER button is used to select the item. Some menu items, once selected, show a second menu. Again, use the UP and DOWN buttons to scroll through the menu items and the ENTER button to select a particular item. The MODE button is used to go back to the previous menu. When a menu item is an adjustable variable, select the item with the ENTER button and change the variable with the UP or DOWN button. The MODE button is used to move the cursor to the next digit. When the appropriate value is reached, used the ENTER button to complete the variable change operation and return to the current menu.

1066 LCD Interface Main Menu
Menu Structure



This screen shows the current operation type based on the state of the inspection inputs and the gate and lock bypass switch inputs. It also displays the door status based on the condition of the gate and lock inputs. If any inputs are in error, the error status is displayed. The list below describes the different types of errors displayed.

1066 LCD Interface Main Menu
Elevator Service

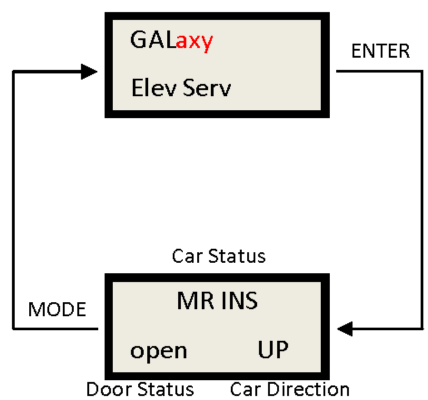
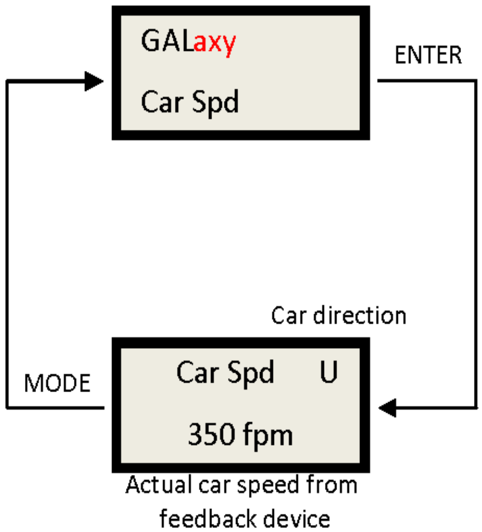


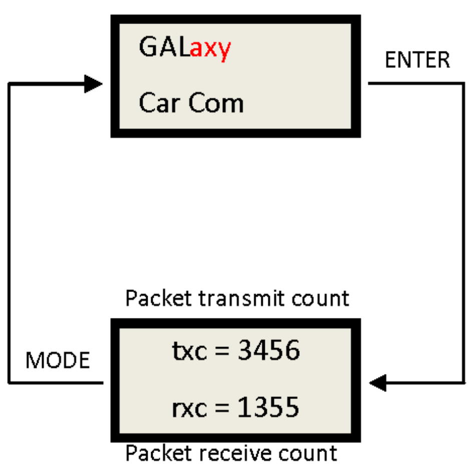
Table 1: Safety processor Elevator Service

Table 1: Safety Processor Elevator Service	
Elevator Service	Condition for Service
AUTO	Auto input is on and all inspection inputs are off.
CT INS	Car is on car top inspection
GATE BYP	Car is on car top inspection and the gate bypass switch is on.
LOCK BYP	Car is on car top inspection and the lock bypass switch is on.
ACCESS	Car is on access operation.
MR INS	Car is on motor room inspection.
IC INS	Car is on in car inspection
INS ERR	An inspection error has occurred. There must be one and only one inspection or auto input on. All inputs are off or more than one input is on.
BYP ERR	A gate or lock bypass switch is on but the car is not on car top inspection.
VEL ERR	The car has a velocity error from inspection speed, leveling speed or a terminal slowdown speed.
UP ERR	The up output is on during power up.
DNR ERR	The down output is on during power up.
DNR/UP	Both up and down outputs are on during power up.
EEP ERR	Safety Processor board has an EEPROM error.
NO UTS	UTS input not detected at top terminal landing.
NO DTS	DTS input not detected at bottom terminal landing.

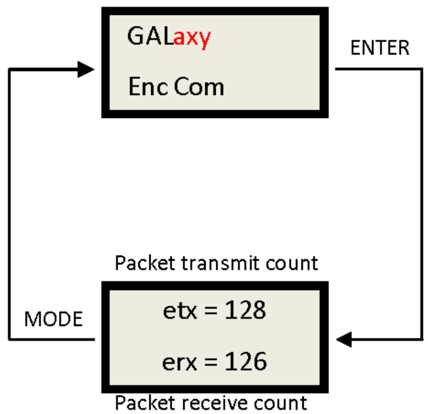
1066 LCD Interface Main Menu
Car Speed



1066 LCD Interface Main Menu
Car Comm

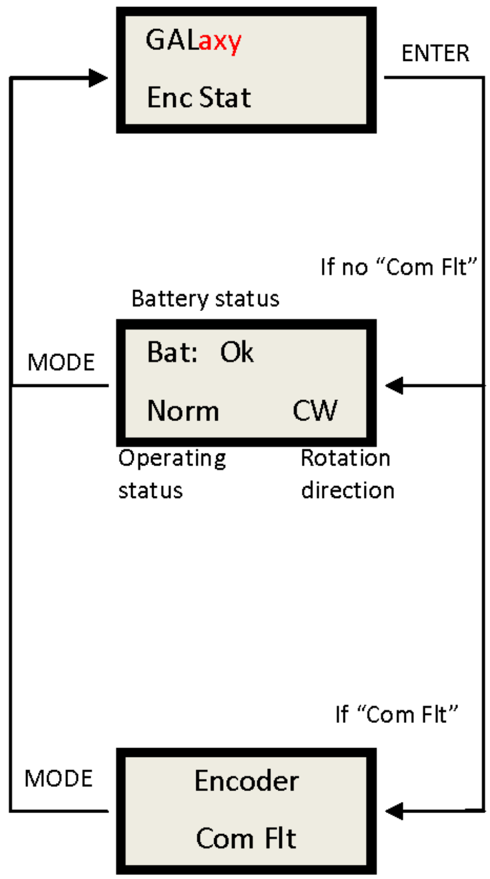


1066 LCD Interface Main Menu
Encoder Communication



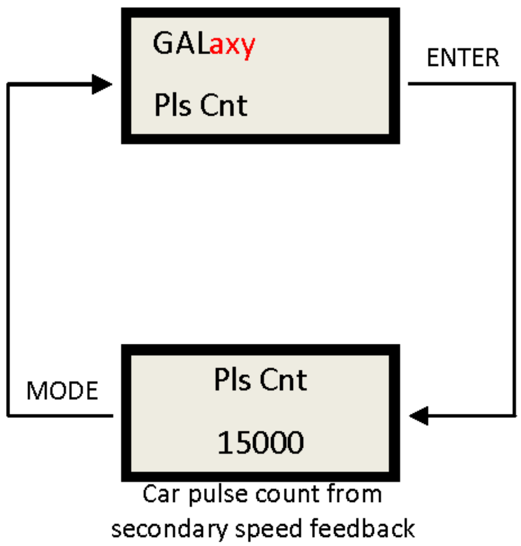
The Picture above shows the communications status between the Safety Processor Board and the Turck Absolute Encoder.

1066 LCD Interface Main Menu
Encoder Status



1066 LCD Interface Main Menu

Pulse Count



1066 LCD Interface Main Menu
Adjustable Variables

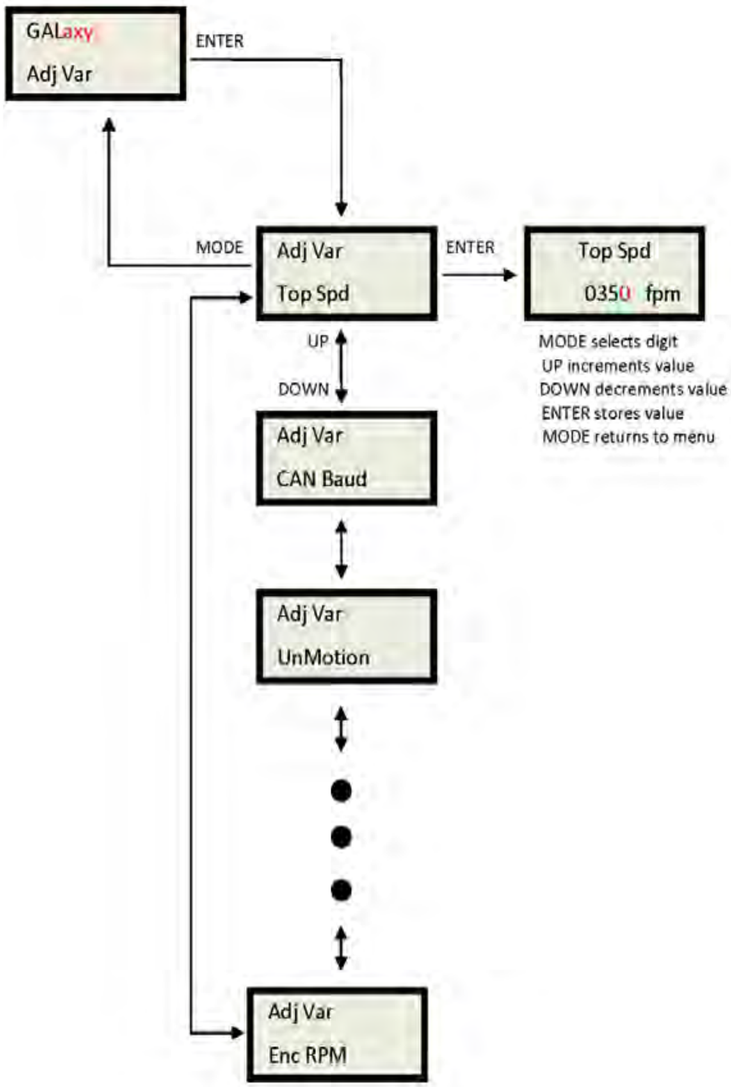


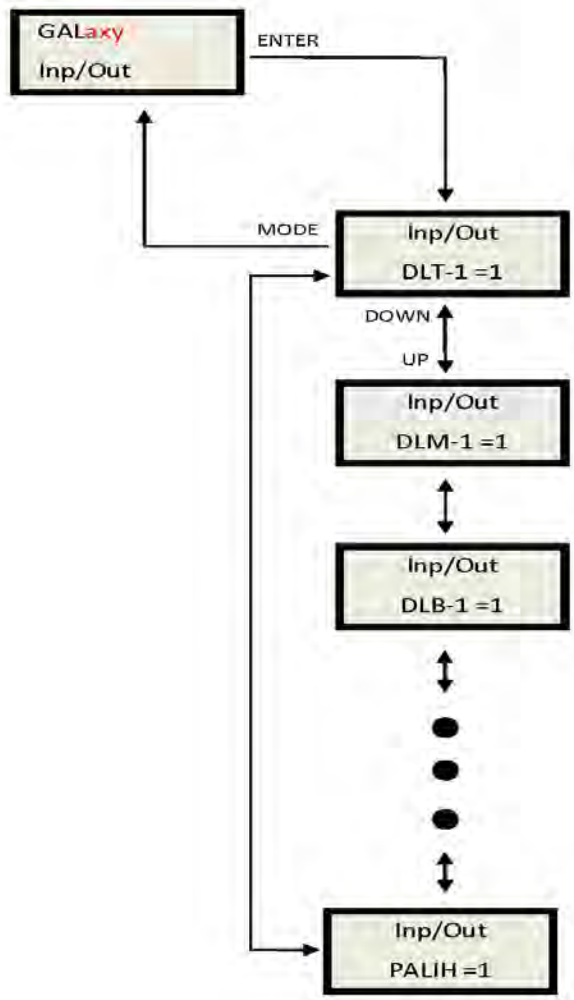
Table 2: Safety Processor Adjustable Variables					
Adjustable Variables	Min	Max	Initial	Units	Description
Top Spd	25	2000	200	Fpm	Top Speed or contract speed of the car.
Enc RPM	25	1800	1050	RPM	Encoder RPM. Revolutions per Minute of the Encoder.
Enc PPR	10	10000	2048	PPR	Encoder PPR. Pulses Per Revolution of the Encoder.
Fdbk Typ	0	2	0	_	Feedback Type. Type of feedback used by the Safety Processor to calculate the car's velocity. 0=Tape, 1=Encoder.
Ctrl Typ	0	2	0	–	Control Type. Type of controller used. 0=Hydro, 1=Traction Non-Distance Feedback, 2=Traction Distance Feedback.
2 Stop	0	1	0	–	2 Stop. Set to 1 if this car travels to only two landings. This parameter tells the Safety Processor that there are no middle door locks.
RearDoor	0	1	0	–	Rear Door. Indicates that the car has rear doors and the Safety Processor should verify the rear door gate and locks.
UTS Vel	0	1000	200	Fpm	Up Emergency Terminal Slowdown Velocity. Maximum velocity to hit the up terminal slowdown limit. Hitting the limit at a higher velocity will cause the Safety Processor board to shut the car down from a velocity error. For cars with speeds greater than 200 fpm.
DTS Vel	0	1000	200	Fpm	Down Emergency Terminal Slowdown Velocity. Maximum velocity to hit the down terminal slowdown limit. Hitting the limit at a higher velocity will cause the Safety Processor board to shut the car down from a velocity error. For cars with speeds greater than 200 fpm.

Table 2: Safety Processor Adjustable Variables					
Adjustable Variables	Min	Max	Initial	Units	Description
INS Vel	0	200	140	Fpm	Inspection Velocity. Maximum velocity the car is allowed to run on inspection.
LEV Vel	0	200	140	Fpm	Leveling Velocity. Maximum velocity the car is allowed to run while leveling with the door open.
UT Vel	0	500	200	Fpm	Up Terminal Slowdown Velocity. Maximum velocity to hit the up terminal slowdown “software” limit. The software limit is set when the car hits the UT limit then travels the UT Counts closer to the terminal. Hitting the limit at a higher velocity than set by this parameter will cause the Safety Processor board to shut the car down from a velocity error.
DT Vel	0	500	200	Fpm	Down Terminal Slowdown Velocity. Maximum velocity to hit the down terminal slowdown “software” limit. The software limit is set when the car hits the DT limit then travels the DT Counts closer to the terminal. Hitting the limit at a higher velocity than set by this parameter will cause the Safety Processor board to shut the car down from a velocity error.
UT Count	0	2000	12	Pulse Counts	Up Terminal Count. The number of counts after the UT limit is hit traveling toward the terminal landing for the UT software limit to become active. On cars with only one slowdown limit, the car would normally hit the limit at top speed during a recovery run. The UT Count allows the car time to slowdown before the Safety Processor can shut the car down from a limit velocity error.

Table 2: Safety Processor Adjustable Variables					
Adjustable Variables	Min	Max	Initial	Units	Description
DT Count	0	2000	12	Pulse Counts	Down Terminal Count. The number of counts after the DT limit is hit traveling toward the terminal landing for the DT software limit to become active. On cars with only one slowdown limit, the car would normally hit the limit at top speed during a recovery run. The DT Count allows the car time to slowdown before the Safety Processor can shut the car down from a limit velocity error.
Dmd Mult	0.5	1.5	1	_	Demand Multiplier. Multiplies the analog to digital input of the car's demand velocity. Increase or decrease the multiplier to display the exact speed of the car on the Car Demand screen.
SoftStop	1	10	1	Sec	Soft Start Timer. During a soft stop, the speed command is brought to zero, then the brake is dropped and finally the run outputs are turned off. This timer is used to keep the run outputs from timing out during a soft stop.
Pls Ftim	0	5.00	2.00	Sec	Pulse Count Fault Delay Time. Time delay to detect that the selector pulses have stopped.
Vel Ftim	0	0.500	0.180	Sec	Velocity Fault Delay Time. Time delay after a velocity fault to shut the car down.
Spd Chk	0	1	0	-	Speed Check. If the car speed is 150 fpm or less, the Safety Processor Speed Check can be disabled from this variable. If the speed is greater than 150 fpm, the variable can still be set but the speed check is made anyway. The speed check function, verifies the car speed on inspection, in leveling with the door open and when the UT, DT, UTS and DTS limits are hit. The Safety Processor will also shut the car down if it stops getting pulses while the car is running (has an up or down run signal).

Table 2: Safety Processor Adjustable Variables					
Adjustable Variables	Min	Max	Initial	Units	Description
Com Chk	0	1	0	-	Communications Check. This parameter disables the Can Bus communications check. This is variable allows a new Safety Processor Board to be used on older GALaxy I or II controllers that did not use Can Bus communications. On GALaxy III controllers, the main CPU must have Can Bus communications.
Enc Dir	0	1	0	Dir	Encoder Direction. Determines if rotation for the up direction is clockwise or counterclockwise. 0 = CW, 1=CCW.
UnMotion	0	1	0	Dir	Unintended motion check, 0=motion check 1=Disable unintended motion check

1066 LCD Interface Main Menu
Inputs and Outputs

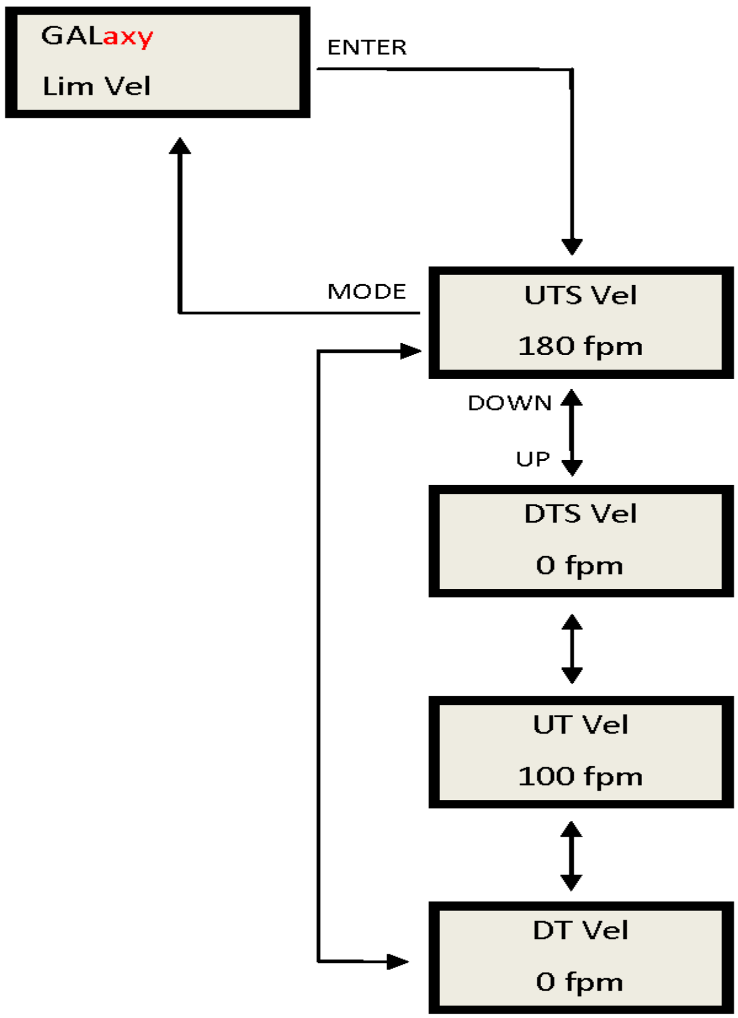


This display shows all of the inputs and outputs for the Safety Processor. The following table lists these I/Os and their associated descriptions.

Table 3: Safety Processor Inputs & Outputs	
Name	Description
DLT-1	Door Lock Top Secondary Input. Input equals 1 when the top door lock is made.
DLM-1	Door Lock Middle Secondary Input. Input equals 1 when the middle door locks are made.
DLB-1	Door Lock Bottom Secondary Input. Input equals 1 when the bottom door lock is made.
GS-1	Gate Switch Secondary Input. Input equals 1 when the front door gate switch is made.
RLM-1	Rear Lock Middle Input. Input equals 1 when the rear middle locks are made.
RGS	Rear Gate Switch. Input equals 1 when the rear door gate switch is made.
GBP	Gate Bypass. This is the input from the gate bypass switch. 1=bypass switch is on.
LBP	Lock Bypass. This is the input from the lock bypass switch. 1=bypass switch is on.
MRI	Motor Room Inspection. Input equals 1 when the car is on motor room inspection.
CTI	Car Top Inspection. Input equals 1 when the car is on car top inspection.
ACC	Access. Input equals 1 when the car is on access operation.
ICI	In Car Inspection. Input equals 1 when the car is on in-car inspection operation.
AUTO	Auto Input. Input equals 1 when the car is on automatic operation.
UL-1	Up Level Secondary Input. Input from the selector that the car is on the up level sensor in the door zone.
DL-1	Down Level Secondary Input. Input from the selector that the car is on the down level sensor in the door zone.
UP	Up Run Output. Output from the main CPU when the car is running up.
DNR	Down Run Output. Output from the main CPU when the car is running down.
UTS	Up Emergency Terminal Slowdown. Input goes low when the car is on the up emergency terminal slowdown limit.
DTS	Down Emergency Terminal Slowdown. Input goes low when the car is on the down emergency terminal slowdown limit.

Table 3: Safety Processor Inputs & Outputs	
Name	Description
UT	Up Terminal Slowdown. Input goes low when the car is on the up terminal slowdown limit.
DT	Down Terminal Slowdown. Input goes low when the car is on the down terminal slowdown limit.
LSCS	Leveling Speed Control. Output comes on when the car is traveling less than 150 fpm.
SFCO	Safety Fault Control Output. Output must be on to energize the SFC relay. When this relay is dropped out, the safety string will be opened.
PICEN	PIC Enable. The Safety Processor uses a PIC CPU. This is the enable line to the PAL device that allows the run outputs from main CPU. 1=OK to run.

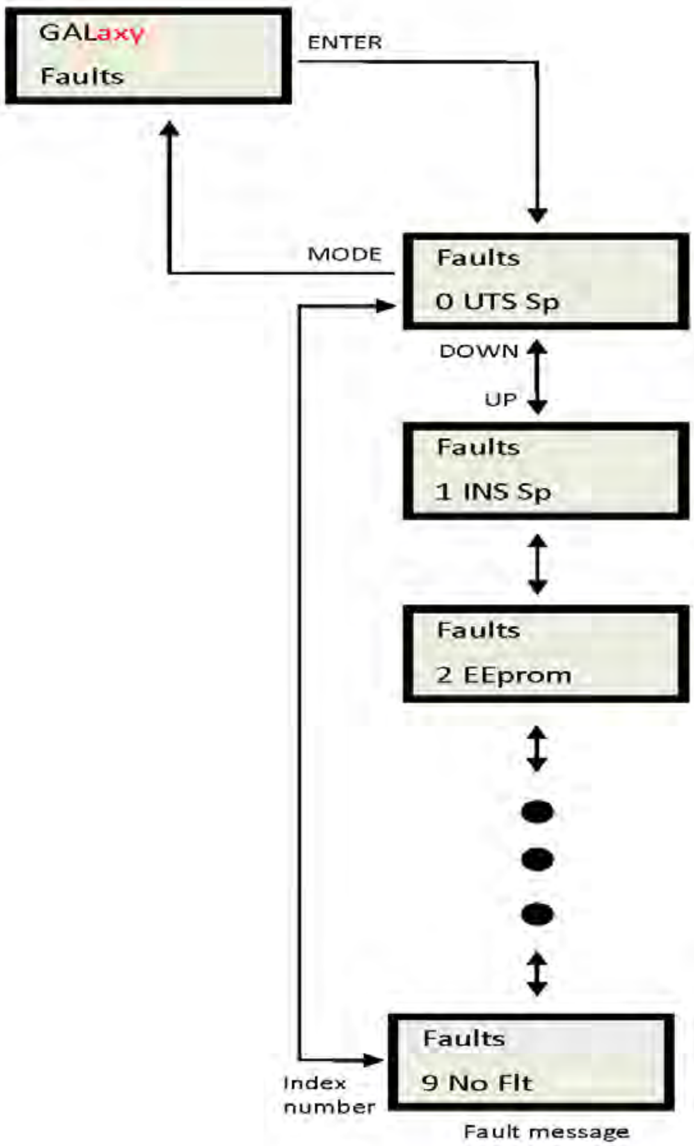
1066 LCD Interface Main Menu
Limit Velocity



When the car runs to the terminal landings and activates the terminal limit switches, the velocity of the car is recorded at each limit switch. This velocity value is cleared when the car runs in the opposite direction. This display is used to setup the Safety Processor Board speed clamps in the 1066 LCD interface, "Adj Var" menu. Once the car is running on automatic, send the car to the terminal landing and record the velocity values after the car stops. Begin with a one-floor run and increase the distance of the run by one floor until the car reaches top speed.

When the highest value is determined for each limit switch, add 20 fpm and enter those values in the 1066 LCD interface "Adj Var" menu, "UTS Vel", "UT Vel", "DTS Vel", and "DT Vel" respectively.

1066 LCD Interface Main Menu
Faults



Faults are displayed in the order that they occur with index 0 being the most recent. In the figure above, an EEprom fault occurred followed by an Inspection Speed fault followed by a UTS Speed fault. Any index location that does not yet contain a fault will show No Flt.

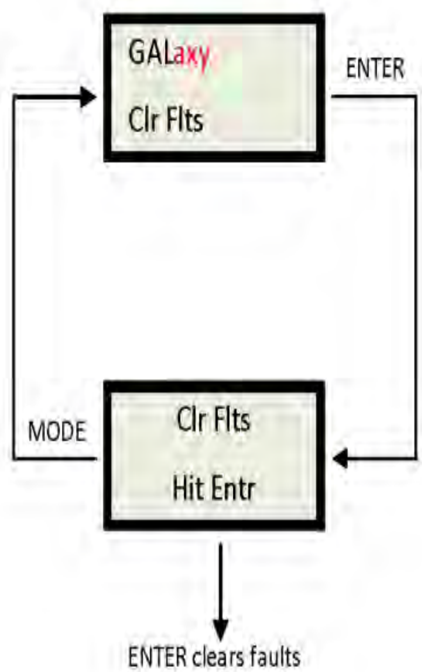
There are 10 fault locations all of which are cleared on power up or from the clear fault menu. Below is a list of faults and their causes.

Table 4: Safety Processor Faults	
Fault	Description and Cause
DL/GS	Door Lock/Gate Switch Fault. Car is moving outside the door zone with the door open. The car will immediately shut down.
Add Er	Address for Safety Processor Board should not be set internally to a value different than 5. Replace PIC micro controller unit
Com Er	CAN communication with CPU timed out. Safety Processor Board stopped receiving packages from the CPU. This fault always occurs once when the controller powers up.
DT Spd	DT Speed Fault. The car hit the DT limit at a higher velocity than the value set for the DT Velocity adjustable variable. The car will immediately shut down.
DTS Sp	DTS Speed Fault. The car hit the DTS limit at a higher velocity than the value set for the DTS Velocity adjustable variable. The car will immediately shut down.
EEprom	EEprom fault. Defective EEprom device or EEprom device is not installed. The car will not be able to run until the EEprom is installed or replaced.
EncBat	Encoder Battery Error. The encoder uses an internal battery to maintain position of the car when power is off. While the system is powered up and communicating, the Safety Processor Board monitors the status of the encoder battery. If the battery level is too low to maintain the position count, a battery error is declared. Replace the encoder.
EncCom	Encoder Communication Error. Encoder and Safety Processor Board stopped communicating. Possible causes: • Improper connection on SPB for R./T+ or R/T- • Faulty driver chip on Safety Processor Board • Improper connection on Encoder • Fault Encoder
EncFlt	Encoder Fault. The encoder has detected an internal fault. Replace the encoder.
EncIni	Encoder Initialization Error. On power up of the controller the Safety Processor Board will request the position count from the encoder. If the SPB is unable to receive the position count and the encoder is still communicating, an initialization error will be declared. See possible causes under EncCom error.

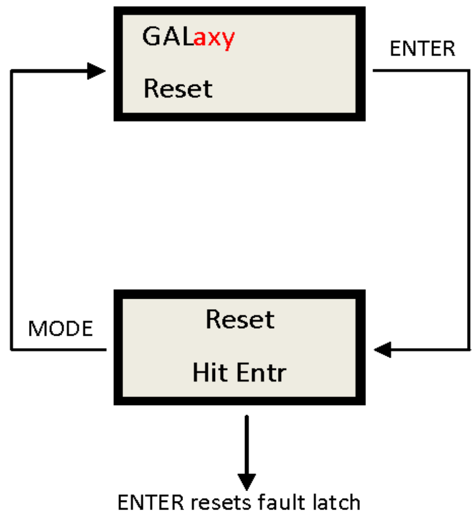
Table 4: Safety Processor Faults	
Fault	Description and Cause
EncPos	Encoder Position Error. Once the encoder position count has be initialized during the learn hoistway procedure, the Safety Processor Board will monitor that the count does not go above 30,000,000. If it does then a position error is declared. Possible causes: • Faulty encoder coupling to governor • Car was lost from fault UT or DT limit switch and ran down. If the count decrements past zero it will roll over to 35,000,000.
EncVel	Encoder Velocity Error. To calculate velocity from the encoder a position update must be received every 50 millisecond. If the SBP fails to receive 5 consecutive data packets from the encoder then the velocity cannot be calculated properly and you will get this error. See EncCom error for possible causes.
INS DO	Inspection Door Open Fault. A door is open while running on inspection and the gate and locks are not being bypassed. The car will immediately shut down.
INS Sp	Inspection Speed Fault. The car exceeded the INS Velocity adjustable variable while running on inspection. The car will immediately shut down.
Invalid	Invalid fault number. (This can only be caused by a programming error in the chip).
IO Flt	I/O Fault. An input is on in error. The Elev Serv display will show the I/O error. Possible causes are as follows: • All inspection inputs and the auto input are off. • More than one inspection or auto input is on at the same time. • A bypass input is on while the car is not on Car top inspection. • Both up and down run output from the main CPU are on at the same time. The car will not be able to run until the error is cleared.
LEV Sp	Leveling Speed Fault. The car exceeded the LEV Velocity adjustable variable while leveling with a door open. The car will immediately shut down.
No Flt	No fault is recorded in this index location.
PAL Er	• PAL chip not responding • Reset Safety Processor Board • Replace PAL chip • Replace Safety Processor

Table 4: Safety Processor Faults	
Fault	Description and Cause
Pls Er	Pulse Error. Not enough pulses have occurred during the Pulse Fault Time period. This error is detected only on automatic operation. Verify that the pulse LED on the Safety Processor board blinks while the car is running on inspection. Possible causes are as follows: • Improper connection for PP and PPS. Refer to the job specific prints. • PP and PPS field wires need to be swapped. • Photocoupler in selector is faulty. Call the Factory. • Voltage from PP to PPS on the Safety Processor Board is less than 15 VDC with the PP and PPS wires disconnected. Call the Factory.
UmotEr	Unintended motion detected. No up or down run signal and velocity greater than 75 fpm.
UT Spd	UT Speed Fault. The car hit the UT limit at a higher velocity than the value set for the UT Velocity adjustable variable. The car will immediately shut down.
UTS Sp	UTS Speed Fault. The car hit the UTS limit at a higher velocity than the value set for the UTS Velocity adjustable variable. The car will immediately shut down.

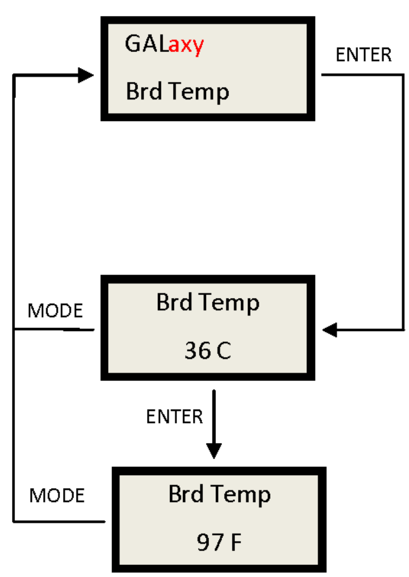
1066 LCD Interface Main Menu
Clear Faults



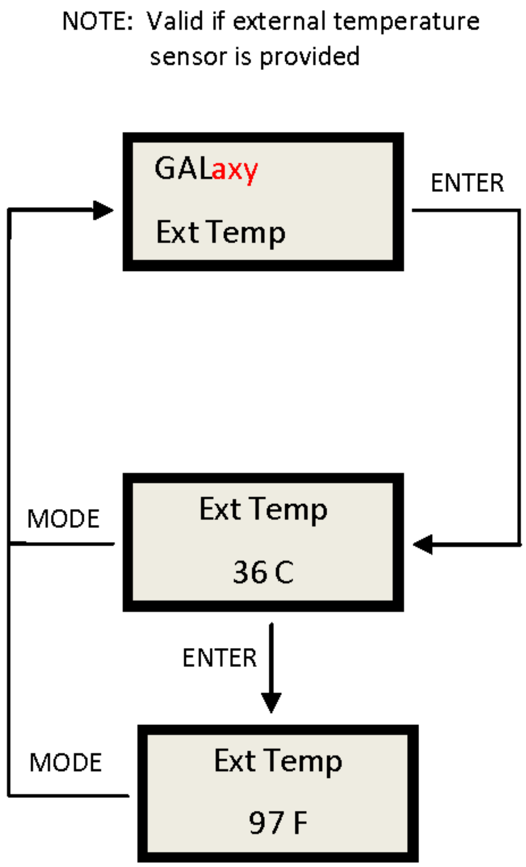
1066 LCD Interface Main Menu
Reset



1066 LCD Interface Main Menu
Board Temperature



1066 LCD Interface Main Menu
External Temperature



Appendix A

Appendix A will help with the indetification of common mnemonics.

Mnemonic	I/O Name
1C-29C	1st – 29th Floor Car Call Inputs
1CA-29CA	1st – 29th Floor Car Call Acknowledge Outputs
1CAR-29CAR	1st – 29th Floor Rear Car Call Acknowledge Outputs
1CR-29CR	1st – 29th Floor Rear Car Call Inputs
1U-28U	1st – 28th Floor Up Hall Call Inputs
1UA-28UA	1st – 28th Floor Up Hall Call Acknowledge Outputs
1UAR-28UAR	1st – 28th Floor Rear Up Hall Call Acknowledge Outputs
1UR-28UR	1st – 28th Floor Rear Up Hall Call Inputs
2D-29D	2nd – 29TH Floor Down Hall Call Inputs
2DA-29DA	2nd – 29th Floor Down Hall Call Acknowledge Outputs
2DAR-29DAR	2nd – 29th Floor Rear Down Hall Call Acknowledge Outputs
2DR-29DR	2nd – 29TH Floor Rear Down Hall Call Inputs
ACC	Access Operation Input.
AD	Automatic Door Switch Input
AD0-AD11	Analog to Digital Input Data
ALT	Alternate Fire Smoke Detector Sensor Input
ATT	Attendant Operation Input.
ATTDN	Attendant Down Input.
ATTUP	Attendant Up Input.
AUTO	Automatic Operation Input.
B16	Binary Position Sensor 16 Input
BAD	Bottom Access Down Input.

Mnemonic	I/O Name
BAU	Bottom Access Up Input.
BKC	Brake Cool Pilot Output
BKS	Brake Switch Input
BP	Fire Phase I Smoke Detector Bypass Input
BP1	Binary Position Sensor 1 Input
BP2	Binary Position Sensor 2 Input
BP4	Binary Position Sensor 4 Input
BP8	Binary Position Sensor 8 Input
BRK	Brake Pilot Output
BRKI	Brake Control Input.
CAR	Car number
CDL	Cab Down Lantern Output
CNV	DAC Convert Output
COL	Counter Weight Collision Switch Input (Traction Elevators)
CUL	Cab Up Lantern Output
DA0-DA7	Digital to Analog Output Data
DC	Door Close Output
DCB	Door Close Button Input
DCBR	Door Close Button Rear Input
DCC	DAC Clear Output
DCL	Door Close Limit Input
DCLR	Door Close Limit Rear Input
DCR	Door Close Rear Output

Mnemonic	I/O Name
DCS	DAC Chip Select Output
DDA	Down Direction Arrow Output
DEL	Delta Relay Input
DF	Down Fast Pilot Output
DFI	Down Fast Input
DL	Down Level Sensor Input
DL-1	Down Level Sensor Secondary Input.
DLB	Door Lock Bottom Input.
DLB-1	Door Lock Bottom Secondary Input
DLM	Door Lock Middle Input
DLM-1	Door Lock Middle Secondary Input
DLT	Door Lock Top Input.
DLT-1	Door Lock Top Secondary Input.
DN	Down Normal Limit Input
DNI	Down Relay Input
DNI	Down Run Input.
DNR	Down Pilot Output
DO	Door Open Output
DOB	Door Open Button Input
DOBR	Door Open Button Rear Input
DOL	Door Open Limit Input
DOLR	Door Open Limit Rear Input
DON	Drive On.

Mnemonic	I/O Name
DOR	Door Open Rear Output
DPR	Door Protect Relay Input
DS	Down Slowdown Sensor Input
DT	Down Terminal Limit Input
DT1	Down Terminal Input 1
DT2	Down Terminal Input 2
DT3	Down Terminal Input 3
DZ	Door Zone Relay Input
EE	Electric Eye Input
EER	Electric Eye Rear Input
EMP	Emergency Power Input
EPS	Emergency Power Select Input
EQ	Earthquake Sensor Input
FB	Fire Buzzer Output
FF	Full Field Pilot Output
FL	Fire Phase I Light Output
FS	Fire Phase I On Hall Switch Input
FS2	Fire Switch Phase II On Input
FS2C	Fire Switch Phase II Call Cancel Input
FS2H	Fire Switch Phase II Hold Input
FST	Fire Stop Switch Override Output
FSTP	Fire Stop Switch Override Output
GBP	Gate Switch Bypass Input.

Mnemonic	I/O Name
GR1R	Rope Gripper 1 Relay Output.
GR2R	Rope Gripper 2 Relay Output.
GRT1	Rope Gripper Test Switch Input 1.
GRT2	Rope Gripper Test Input 2.
GS	Car Gate Switch Input
GS-1	Gate Switch Secondary Input.
GTS	Rope Gripper Trip Switch Input.
HB	Handicap Buzzer Output
HBE	DAC High Byte Enable Output
HC	Hall Call Common Input
HWS	Hoistway Smoke Sensor Input
ICI	In-Car Inspection Input.
ICR	Inconspicuous Riser Input
ID	Car top Inspection Down Input
IND	Independent Input
INS	Car Top Inspection Input
ISER	In Service Output
IU	Car Top Inspection Down Input
LBE	DAC Low Byte Enable Output
LBP	Lock Bypass Input
LC	Logic Common Input
LD	Down Hall Lantern Output
LDR	Rear Down Hall Lantern Output

Mnemonic	I/O Name
LE	Level Enable Output
LE1	Level Enable 1 Output.
LE2	Level Enable 2 Output.
LOA	DAC Load Output
LU	Up Hall Lantern Output
LUR	Rear Up Hall Lantern Output
LW	Load Weighing Bypass Input
MCA	Motor Contactor Output
MCAI	Motor Contactor Input.
MES	Main Egress Smoke Detector Sensor Input
MRI	Motor Room Inspection Input.
MRID	Motor Room Inspection Down Input.
MRIU	Motor Room Inspection Up Input.
MRS	Motor Room Smoke Sensor Input
MCC	Motor Contactor Output
MCCI	Motor Contactor Input.
NB	Nudging Buzzer Output
NUD	Door Nudging Output
NUDR	Door Nudging Rear Output
OT1	OT1 Job Specific Output 1/Fire Service On Output
OT2	OT2 Job Specific Output 2/Motor Starter Timer Relay Output
OT3	OT3 Job Specific Output 3/Generator Pilot Output
OT4	OT4 Job Specific Output 4/Field Weakening Pilot Output

Mnemonic	I/O Name
OVL	Overload Input
P	Potential (Run Contactor) Input
P1-P29	1ST – 29th Discrete Floor Position Indicator Outputs
PFC	Primary Fault Control Output.
RDY	Drive Ready Input
RGS	Rear Car Gate Switch Input.
RGS-1	Rear Car Gate Switch Secondary Input.
RLM	Rear Lock Middle Input.
RLM-1	Rear Lock Middle Secondary Input.
RST	Reset Drive Output
RTL	Return to lobby Input
RUN	Run Pilot Output
RUNAI	Run Auxiliary Input.
RUNI	Run Input.
SC1	Speed Clamp 1 Output (Used by CPU for setup)
SC2	Speed Clamp 2 Output (Used by CPU for setup)
SC3	Speed Clamp 3 Output (Used by CPU for setup)
SC4	Speed Clamp 4 Output (Used by CPU for setup)
SC5	Speed Clamp 5 Output (Used by CPU for setup)
SE	Safety Edge Input
SER	Safety Edge Rear Input
SPI#	Spare Input, # references input number
SPO#	Spare Output, # references output number

Mnemonic	I/O Name
SS	Safety String Input
CS	In Car Stop Switch Input
TAD	Top Access Down Input.
TAU	Top Access Up Input.
TPL	Temp Low Input (Hydraulic Elevators)
UDA	Up Direction Arrow Output
UFI	Up Fast Input
UL	Up Level Sensor Input
UL-1	Up Level Sensor Secondary Input
UN	Up Normal Limit Input
UP	Up Pilot Output
UPF	Up Fast Pilot Output
UPI	Up Relay Input
UPI	Up Run Input.
US	Up Slowdown Sensor Input
UT	Up Terminal Limit Input
UT1	Up Terminal Input 1
UT2	Up Terminal Input 2
UT3	Up Terminal Input 3

Appendix B

Appendix B is an useful guide to performing common compliance tests.

Appendix B - Inspection Tests

1.1 Overspeed Test on a DSD-412 Drive

To perform an overspeed test, the mechanic should follow the required precautions and procedures set forth in the local and national elevator codes.

1. With the car on automatic, run the car to the top or bottom (away from the desired test run direction).
2. Access the Overspeed Reference Multiplier parameter (Function #81) in the drive and set to the desired multiplier value (1.25 for 125%).
3. Set the Overspeed % (Function #12) fault trip value to a number greater than the desired over speed.
4. Set the Overspeed Test flag (Function #80) in the drive. This will cause the drive to run over speed for one run.
5. Please note that the "Weak Field Current" parameter (Function #49) may need to be adjusted to allow the car to reach the desired overspeed velocity.
6. On the controller main LCD interface select "Run Overspeed Test" under the Elevator Setup menu. Follow the directions on the LCD display to make sure the automatic door switch is off and the car is level at the floor on automatic operation. Enabling the overspeed test will prevent the CPU from detecting an overspeed condition for one run.
7. Place a car call to run the car in the desired direction to perform the overspeed test.
8. Place the car on inspection and inspect the car.
9. Reset the Overspeed % (Function #12) back to the original setting.
10. When the test is complete, return the car to automatic operation.

If there is any uncertainty about performing this tests with a GALaxy controller, please call G.A.L. toll free at 1 (877) 425-7763 for free technical assistance.

2.1 Buffer Test

To perform a buffer test, the mechanic should follow the required precautions and procedures set forth in the local and national elevator codes. The following test procedure is written to show how to override the car's position system so that it will run into the terminal landing at contract speed but is not intended to circumvent any procedure mandated by the elevator code.

Inspect and prepare the car according to the "Elevator Industry Inspection Handbook".
Make sure that the car is loaded properly for the test and that the appropriate car or counterweight safety is tied.

1. For the car buffer test, jump DT, DT1, DT2, DT3 and DTS terminal limits to SFC (110VAC). For the counterweight buffer test, jump UT, UT1, UT2, UT3 and UTS terminal limits also to SFC. Refer to the job schematics specific terminal wiring locations.
2. From the Controller's LCD display, select the "Elevator Setup" menu and then select "Car Buffer Test" or Counterweight Buffer Test".
3. Turn off the automatic door switch. To execute the test, the car must be level at the floor and on automatic operation.
4. The test also cannot be started from a terminal landing. If the car is at a terminal landing, the LCD display will show "To position the car press Enter". Pressing "Enter" will place a car call in the middle of the hoistway. If the car is already positioned properly for the run, the display will give the option to position the car or the skip to the next step.
5. Once the car is located in the correct starting position, select "Run Buffer Test". When the "Enter" button is pressed, the car's position will be modified internally to the top of the hoistway for a car buffer test or to the bottom of the hoistway for a counterweight buffer test. The car will

then run high speed to the appropriate buffer.

6. While the car is in motion, the LCD display will change to “Press Enter Button to Cancel Buffer Test”. Pressing the “Enter” button will cause the car to execute an emergency slowdown.
7. After the test is complete, place the car on inspection and inspect the car and buffer.
8. **Remove all jumpers, remove load weights and untie the car or counterweight safeties if previously tied.**
9. Return the car to automatic operation.

If there is any uncertainty about performing this tests with a GALaxy controller, please call G.A.L. toll free at 1 (877) 425-7778 for free technical assistance.

3.1 Normal Terminal Slowdown Test

To perform a normal terminal slowdown test, the mechanic should follow the required precautions and procedures set forth in the local and national elevator codes. The following test procedure is written to show how to override the car’s position system so that it will run into the terminal landing at contract speed but is not intended to circumvent any procedure mandated by the elevator code.

Inspect and prepare the car according to the “Elevator Industry Inspection Handbook”. Make sure that the car is loaded properly for the test.

1. For the bottom normal terminal slowdown test, jump DTS terminal limit to SFC (110VAC). For the top normal terminal slowdown limit test jump UTS terminal limit also to SFC. Refer to the job schematics for specific terminal wiring locations.
2. From the Controller’s LCD display, select the “Elevator Setup” menu and then select “Car Buffer Test” to perform a bottom normal terminal slowdown test or “Counterweight Buffer Test” to perform a top terminal slowdown limit test.
3. Turn off the automatic door switch. To execute the test, the car must be level at the floor and on automatic operation.
4. For this test only adjust parameters UT Vel and DT Vel on the Safety Processor Board to contract speed.
5. The test also cannot be started from a terminal landing. If the car is at a terminal landing, the LCD display will show “To position the car press Enter”. Pressing “Enter” will place a car call in the middle of the hoistway. If the car is already positioned properly for the run, the display will give the option to position the car or the skip to the next step.
6. Once the car is located in the correct starting position, select “Run Buffer Test”. When the “Enter” button is pressed, the car’s position will be modified internally to the top of the hoistway for a car buffer test or to the bottom of the hoistway for a counterweight buffer test. The car will then run once high speed to the appropriate limit.
7. While the car is in motion, the LCD display will change to “Press Enter Button to Cancel Buffer Test”. Pressing the “Enter” button will cause the car to execute an emergency slowdown.
8. **After the test is complete remove all jumpers and adjust the UT Vel and DT Vel parameters on the Safety Processor Board back to their original values.**

If there is any uncertainty about performing this tests with a GALaxy controller, please call G.A.L. toll free at 1 (877) 425-7778 for free technical assistance.

4.1 Emergency Terminal Limit Test

To perform an emergency terminal limit test, the mechanic should follow the required precautions and procedures set forth in the local and national elevator codes. The following test procedure is written to show how to override the car's position system so that it will run into the terminal landing at contract speed but is not intended to circumvent any procedure mandated by the elevator code.

Inspect and prepare the car according to the "Elevator Industry Inspection Handbook".
Make sure that the car is loaded properly for the test.

1. For the bottom emergency terminal limit test, jump the bottom normal terminal slowdown limit switches DT, DT1, DT2, DT3 depending on how many normal slowdown switches the job has to SFC (110VAC). For the top emergency terminal limit test jump the top normal terminal slowdown limit switches UT, UT1, UT2, UT3 also to SFC. Refer to the job schematics specific terminal wiring locations.
2. From the Controller's LCD display, select the "Elevator Setup" menu and then select "Car Buffer Test" to perform a bottom emergency terminal limit test or "Counterweight Buffer Test" to perform a top emergency terminal limit test.
3. Turn off the automatic door switch. To execute the test, the car must be level at the floor and on automatic operation.
4. The test also cannot be started from a terminal landing. If the car is at a terminal landing, the LCD display will show "To position the car press Enter". Pressing "Enter" will place a car call in the middle of the hoistway. If the car is already positioned properly for the run, the display will give the option to position the car or the skip to the next step.
5. Once the car is located in the correct starting position, select "Run Buffer Test".
   When the "Enter" button is pressed, the car's position will be modified internally to the top of the hoistway for a car buffer test or to the bottom of the hoistway for a counterweight buffer test. The car will then run once high speed to the appropriate limit.
6. While the car is in motion, the LCD display will change to "Press Enter Button to Cancel Buffer Test". Pressing the "Enter" button will cause the car to execute an emergency slowdown.
7. **After the test is complete remove all jumpers.**

If there is any uncertainty about performing this tests with a GALaxy controller, please call G.A.L. toll free at 1 (877) 425-7763 for free technical assistance.

5.1 Reset Gripper Fault or Emergency Brake Fault

To reset a rope gripper fault, first verify that the cause of the rope gripper fault has been corrected and then follow the directions below:

1. Place the car on machine room inspection.

2. From the LCD Interface, select the Elevator Setup menu and press the enter button.

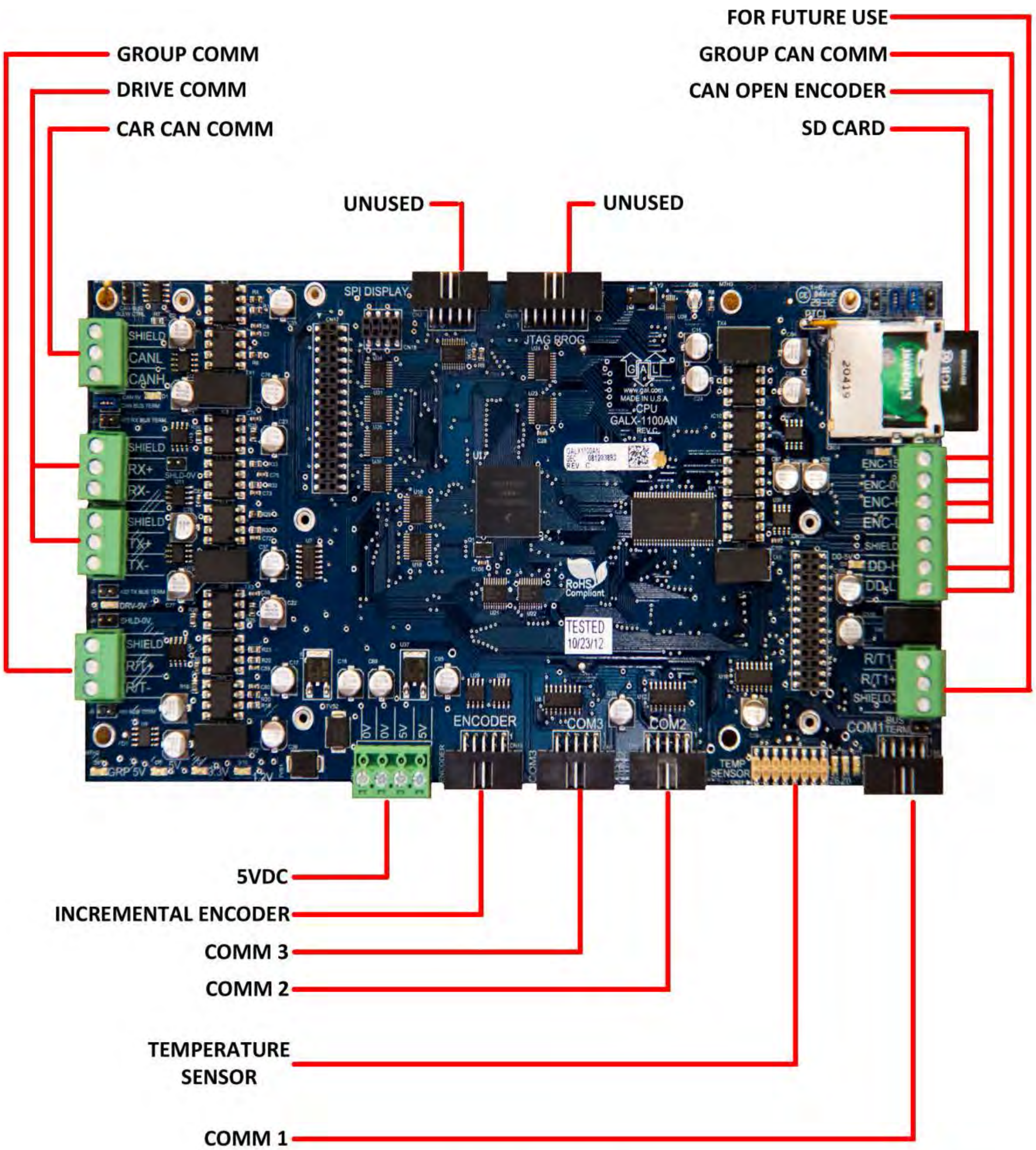
3. Use the up or down button to select the "Reset Rope Gripper" menu and press enter.

4. Follow the directions on the screen to press and hold the enter button to reset the gripper.

The enter button must be held for approximately 10 seconds. If the car moves unexpectedly within the 10 second delay time, releasing the enter button will cause the gripper to re-engage. When the gripper is full reset the screen will display "Gripper is Reset".

Appendix C

Appendix C is a guide for the latest GAL CPU, the GALX-1100. Please note that this CPU is backwards compatible with previous versions.


GROUP COMM
DRIVE COMM
CAR CAN COMM
UNUSED
UNUSED
FOR FUTURE USE
GROUP CAN COMM
CAN OPEN ENCODER
SD CARD
5VDC
INCREMENTAL ENCODER
COMM 3
COMM 2
TEMPERATURE SENSOR
COMM 1

GALX-1100AN

GALX-1100 CPU (Replacement CPU for TS-5300 board)

1.1 GALX-1100 CPU

The GALaxy GALX-1100 CPU has been implemented as the replacement board for the previously used TS-5300 CPU (now obsolete). The new CPU uses a dual-core 32-bit Freescale CPU that include all the components and features used on the GALX-1036 COMM Memory Board, the GALX-1092 Encoder Board, the TS-SER2 serial expansion board and the existing TS-5300 CPU. It uses Secured Digital Card storage instead of Compact Flash so that program upgrades and data/parameter storage can be easily transferred to any device that can copy text files from an SD Card file.

The TS-9500 VGA board and GALX-1021 board combination is replaced with a single GALX-1101 LCD/VGA board. The single GALX-1021 LCD board is replaced with a GALX-1005 LCD board.

1.2 GALX-1100 CPU Board Replacement-Installation

Items required for installations: Laptop (to copy configuration file from CF card to SD card), small common screwdriver, USB Card Reader to read and write CF card and SD card, GALX-1100 CPU board, 10-pin encoder cable (supplied with CPU), GALX-1101 LCD/VGA board or GALX-1005 LCD board, SD card with one of the following controller files: tract.mot, tracthr.mot or hydro.mot files.

The procedure to replace an existing CPU, COMM Memory board and Encoder board is as follows:

1. Place the car on inspection.
2. Power the controller off.
3. Remove the CF card from the existing CPU and copy the cons.dat or conshr.dat file to the SD card for the GALX-1100 CPU.
4. Disconnect the encoder connector from the encoder board on the stack and then remove all boards off the stack except the 1036 comm memory board.
5. Disconnect the comm connectors from 1036 board.
6. Plug in the new CPU on to PC-104 connector on top of the 1036 board.
7. Install spacers onto new CPU board to support the LCD or LCD/VGA display board and plug in the display board.
8. Wire the power connector to the new CPU board and then power up the controller.
9. From the LCD screen, select the Software Utilities menu and then select to "Load 1036 Field Variables". If data is read successful, the field variables are now stored in the new CPU. If not, the parameters must be added manually and the car must be re-adjusted.
10. From the LCD screen select the menu "Load 1036 Hoistway Setup". If data is read successful, the hoistway setup data and the load weigher data is now stored in the new CPU. If not, the load weigher must be setup and a hoistway learn must be done once the 1036 board is removed. It is recommended to do a hoistway learn regardless of the outcome of the hoistway read.
11. Once both the parameter and hoistway data tables are read from the 1036 board, power down the controller, remove the LCD or LCD/VGA board, remove the new CPU and then remove the 1036 board.

12. Re-install the new CPU adding the required screws and then re-install the LCD or LCD/VGA board also adding the required screws.
13. Connect the communications connectors that were previously on the 1036 board to the new CPU board.
14. The new CPU board is supplied with an encoder cable. If the existing system had used a 1092 board, plug in the encoder cable from the 1092 board to the CPU board encoder connector (left most 10-pin connector on the board). If the existing system used a 4I30 encoder, replace the encoder cable with the supplied cable from the encoder isolation board to the CPU board.
15. Power up the controller.
16. Run the car on inspection making sure the CPU pulse count is incrementing or decrementing in the correct direction. If the direction needs to be reversed, then change the “Encoder Dir” parameter to the opposite value under the “Car Motion” menu listed under the “Adjustable Variables” menu.
17. Run the hoistway learn setup procedure. (Recommended)
18. Place the car on automatic with the door service turned off and run the car to verify all is good.
19. Once the car operation is verified, place the car on inspection and from the “Software Utilities” menu; select the “SD Card Read/Write Data” menu. Select the following menus to save the field variables, job setup, hoistway table, security and timer information to the SD card: “Write Field Variables”, “Write Job Setup Data”, “Write Hoistway Data”, “Write Service Timers”, and “Write Security Data”.
20. Remove the SD Card and copy the data to a laptop using and SD card reader.
21. Replace the SD Card back into the controller CPU. The SD card must be installed in the CPU SD card slot in order for the car to power up properly. The car will not run after power up if the SD card is not installed.
22. Place the car on automatic service and enable door operation.

1.3 How to load job software to CPU

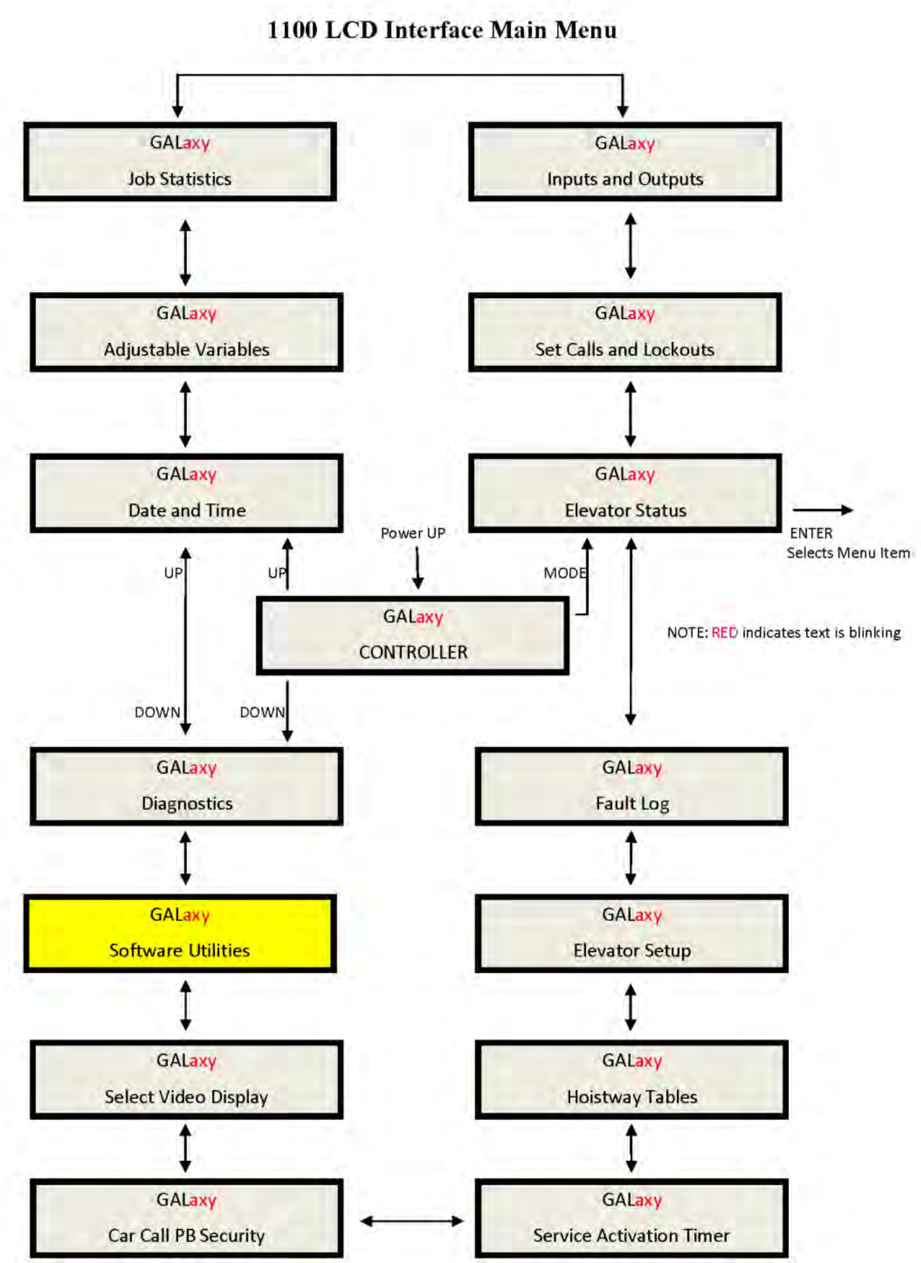
The following procedure is used to load the job software to the new CPU:

1. When the CPU is powered up, the program must be operating in the Power-Up Mode and have an SD Card with the appropriate ".dat" and ".mot" files installed. If controller software is already copied into Flash, either place the car on inspection and from the Software Utilities menu, select to run Power-Up Mode or cycle power on the CPU board while pressing the Mode and Enter button on the LCD Display.
2. Disconnect the Car to Car communications cable. While the CPU flash is being programmed, the output pins for the Car to Car communications port may be left in an unfavorable state that can prevent it from working properly. It is best to disconnect the cable to avoid loss of communications between the remaining cars.
3. Once in Power-Up Mode, select the "Update/Verify Program" menu and then select the "Load Program from SDCard" menu.
4. Press the Enter button to begin the file transfer when prompted to do so. The flash memory will be erased and then the new program will be copied to the onboard flash. Power must be kept on the CPU throughout the entire process.
5. The display will show "Operation Complete" once the load is finished.
6. Cycle power on the CPU or hit the Mode button and then select the "Run Controller Program" menu, to run the controller software.

LCD Display

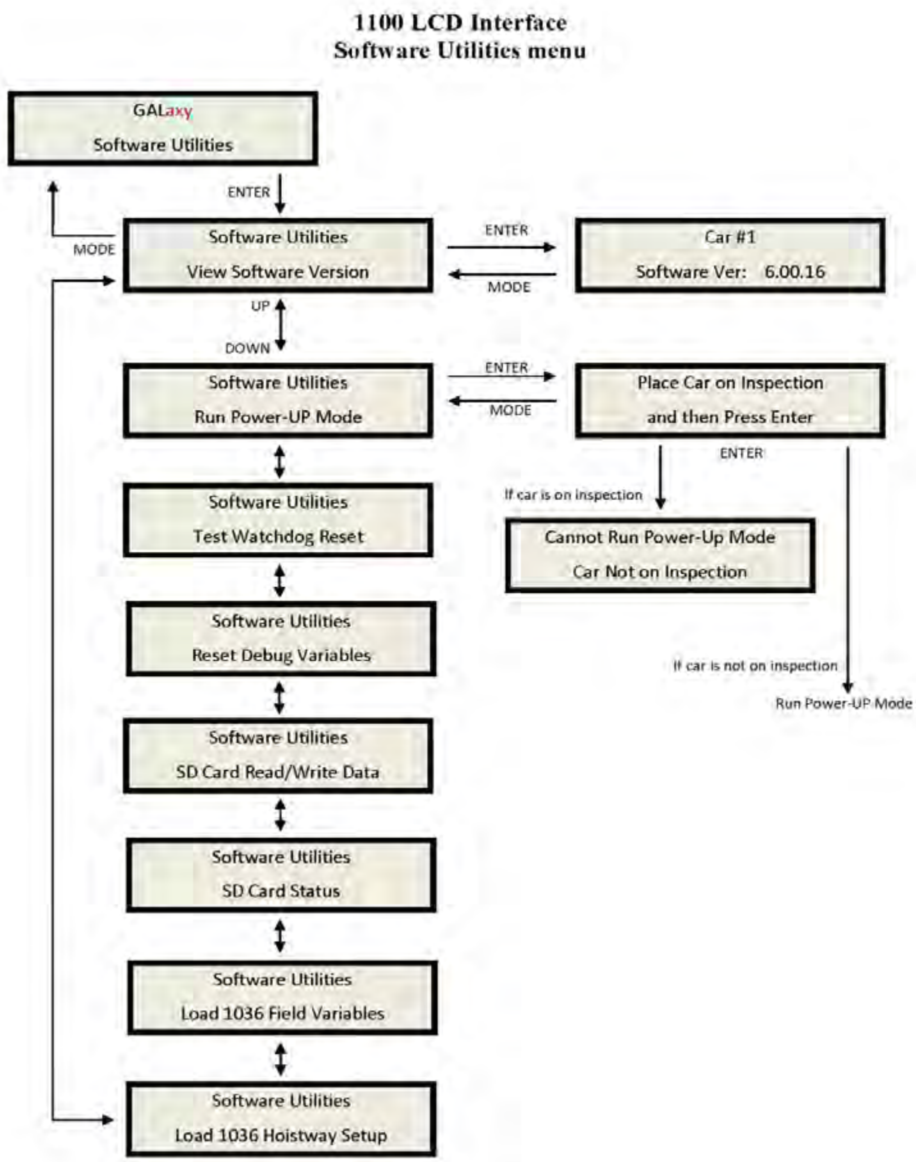
1.3.1 LCD Display

The main menu on the LCD display now shows Software Utilities instead of Software Version to allow for additional features implemented with the new GALX-1100 CPU board. The diagram below shows the new menu items, in yellow, and also includes the latest menu changes.



1.3.2 Software Utilities Menu

The Software Utilities menu provides access to special functions that do not directly affect the adjustment and setup of the controller. Most functions in this menu require that the car be on inspection to execute the operation. The diagram of this menu is shown below:



Below is a list of the Software Utilities menu items and the function of each menu:

- **View Software Version** – Display the software version, revision and interim revision in the form 6.00.18.

- **Run Power-Up Mode** – The Power-Up Mode is a program that executes first upon power up of the controller. It checks that there is a valid controller program in memory and that a valid cons.dat file is on the SD Card. Once this is validated, the power up program runs the controller program. If the power up program is executed from the controller program or if during power up, the user presses and holds the enter and mode buttons, this routine does not run the controller program but stays in the power up routine to allow for updates of the controller program.

- **Test Watchdog Reset** – The watchdog is a CPU timer that must be updated periodically in software to confirm that the program is still running correctly. If the watchdog is not updated, the timer will expire and cause the CPU to do a hard reset to allow the program to restart. To test the watchdog timer, when the command is given, the controller program sits in an infinite software loop without updating the watchdog time to test that the reset function works.

- **Reset Debug Variables** – The debug variables are set by a software engineer to aid in debugging a software problem. Some problems are especially difficult to catch because they occur infrequently or at seemingly random times. The debug variables are displayed in the detailed Elevator Status Menu so that a mechanic view the variable and report back to the software engineer. The reset debug variables menu allows the mechanic to reset the variables to zero to aid in debugging.

- **SD Card Read/Write Data** – This menu item allows the user to read and write controller data to and from the SD Card. This menu is explained in detail in the next section.

- **SD Card Status** – This is the Secured Digital Card Status showing if the card has been initialized (Init=1), if it is standard or High Capacity (HC=1), and if it can operate at an acceptable voltage level (VStat=1).

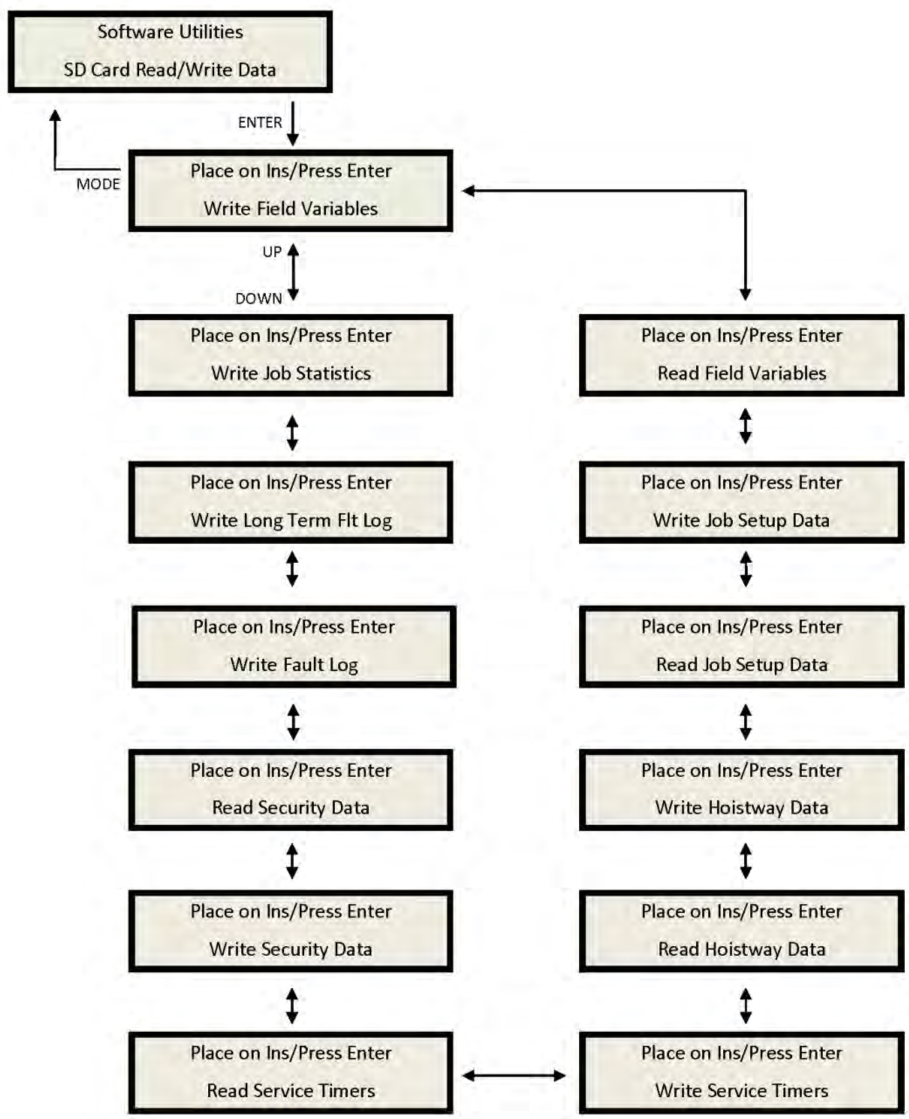
- **Load 1036 Field Variables** – If replacing a TS-5300 CPU board with a GALX-1100 CPU board, the user can have the GALX-1100 CPU read the Adjustable Field Variables from the 1036 board memory before removing the 1036 board.

- **Load 1036 Hoistway Setup** – If replacing a TS-5300 CPU board with a GALX-1100 CPU board, the user can have the GALX-1100 CPU read the Hoistway Setup Data from the 1036 board memory before removing the 1036 board. The Hoistway Data includes the floor position counts, the normal slowdown limit counts, the selector top and bottom counts, the DZU and DZD distances, the up and down floor level distances, the floor offset values, the speed clamp data, the car call security mask, the load weigher setup data and the service timers.

1.3.3 SD Card Read/Write Data

The SD Card Read/Write Data Menu give the user the ability to store, retrieve and transfer controller data, to and from the controller, the SD Card and to a PC or Laptop. The SD Card Read/Write Data menu is shown below:

1100 LCD Interface
SD Read/Write Data Sub-menu



Below is a list of the “SD Card Read/Write Data” menu items and the purpose of each menu. The files written to the SD Card are text files that can be viewed from a Windows text editor such as Note Pad or Word Pad.

- **Write Field Variables** – Write Adjustable Field Variables to a text file, fvars.txt, on the SD Card.

- **Read Field Variables** – Read Adjustable Field Variables from the text file, fvars.txt, on the SD Card.

- **Write Job Setup Data** – Write the job setup data to the setup.txt file on the SD Card. The job setup data includes the speed clamp data, car call security mask and load weigher setup data.

- **Read Job Setup Data** – Read the job setup data from the setup.txt file on the SD Card.

- **Write Hoistway Data** – Write the learned hoistway data to the hoistway.txt file on the SD Card. The hoistway data includes the floor position counts, the normal slowdown limit counts, the selector top and bottom counts, the DZU and DZD distances, the up and down floor level distances, and the floor offset values.

- **Read Hoistway Data** – Read the hoistway data from the hoistway.txt file on the SD Card.

- **Write Service Timers** – Write the service timer tables to the SD Card file, svctmr.txt.

- **Read Service Timers** – Read the service timer tables from the SD Card file svctmr.txt.

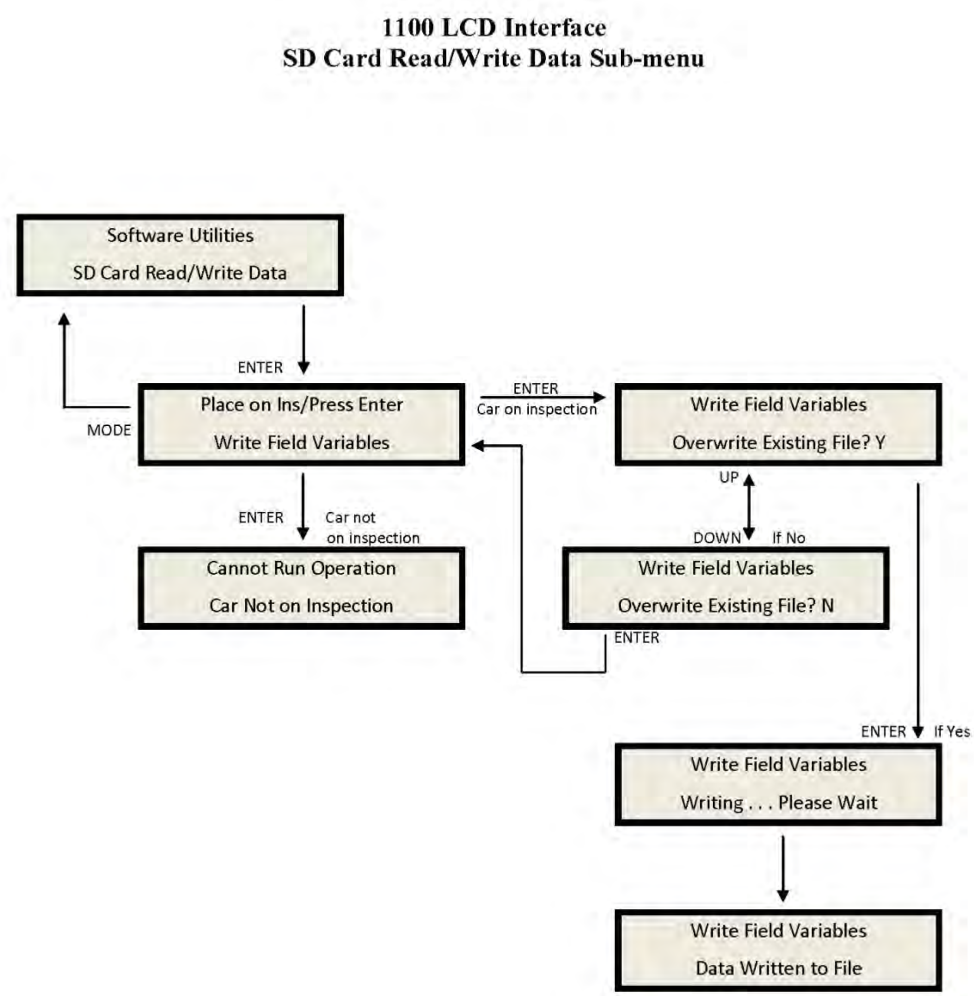
- **Write Security Data** – Write the security data to the security.txt file on the SD Card. This data is the codes tables for each floor for the Push Button Car Call Security option. There are 200 codes per floor.

- **Read Security Data** – Read the security data from the security.txt file on the SD Card.

- **Write Fault Log** – Write the detailed fault data from the standard 50 fault buffer to the SD Card file fault.txt.

- **Write Long Term Fault Log** – Write the long term detailed data to the SD Card file ltfault.txt. Each time a fault occurs, the fault data is stored in the 50 fault buffer and in the long term fault buffer. The long term fault buffer stores the data for 600 faults in a circular buffer that cannot be erased. Since there is so much data, the only way to view the data is by writing the fault data to the SD Card, copying the data to a PC or Laptop and then viewing the data with Note Pad or Word Pad.

Below is an example of the “Write Field Variables” Menu. All other SD Card Read/Write Data menus function in a similar manor.



1.4 Detailed Fault Data

The Detailed Fault Data includes additional information from the Safety Processor Board. The typical Detailed Fault would be written to the SD Card as follows:

3 Position Fault 11:18:06 6/05/2007 Position = 1 Occurrences = 1
srv=001, prc=015, drf=000, rdf=000, dpr=000, dir=000, emp=000, med=000
cbl=000, equ=000, fir=000, rfi=000, hsf=000, stf=000, cal=000, esp=000
nst=000, rlv=000, ste=001, pdo=000, st0=000, ins=00h, nds=000, dev=00h
pf1=00h, pf2=00h, dv2=00h, io0=02h, io1=f0h, io2=0fh, io3=dch, io4=00h
io5=e8h, io6=7fh, io7=84h, io8=3dh, io9=30h, ioA=d0h, ioB=21h, ioC=01h
ioD=ffh, statusf=00000100h
DPP Count = 4831446, Target = 815660, Dmd Vel = 0, Enc Vel = 0
SPB Poscnt = 504433, SPB Serv = 0h, SPB Vel = 0, SPB Stat = 0h

The additional Safety Processor data include in the fault log is described in the table below:

Detailed Fault Data	Description
SPB Poscnt	Safety Processor Board Position Count
SPB Serv	Safety Processor Board Service: 0: Automatic 1: Car Top Inspection 2: Gate Bypass operation 3: Lock Bypass Operation 4: Access 5: Motor Room Inspection 6: In Car Inspection 7: Inspection Error 8: Gate or Lock Bypass Err 9: Velocity Error 10: UP Error on pwrup 11: DNR Error on pwrup 12: Both UNI and DNI inputs 13: EEprom Error 14: No UTS error 15: No DTS error 16: Pulse Error 17: Unintended Motion Error
SPB Vel	Safety Processor Board Velocity in fpm
SPB Stat	Safety Processor Board Status: Bit 0: Secondary Fault Control (SFC Relay 0 = On) Bit 1: Pic Enable (SPB CPU 1=Okay) Bit 2: Leveling Speed Control (1=Speed < 150 fpm) Bit 3: Comm Fault (1=fault) Bit 4: Velocity Fault (1=fault)

	Bit 5: Position Count Initialized (1=initialized) Bit 6: Active Fault (1=fault) Bit 7: Position Count updated (1=count updated)