GALaxy
ELEVATOR CONTROL

SIMPLE
HYDRAULIC ELEVATOR CONTROLLER
MANUAL

GAL

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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 2.0 March 2016)

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IMPORTANT WARNINGS AND NOTES

The label **WARNING** denotes operating procedures and practices that may result in personal injury and/or equipment damage if not correctly followed.
The label **Note** denotes procedures, practices or information which is intended to be immediately helpful and informative.

WARNING: Installation and wiring must be in accordance with the national electrical code, all local codes, and elevator codes and regulations. The 3 phase A.C. power supply to the equipment must come 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 done 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. Flat cable connectors pin #1 (arrow symbol on connector) must match the red stripe on the cable.

WARNING: Elevator control products must be installed by experienced field personnel. This manual does not address code requirements. The field personnel must know all the rules and regulations pertaining to the safe installation and running of elevators, and local codes.

WARNING: This equipment is an O.E.M. product designed and built to comply with ASME A17.5 and national electrical code and must be installed by a qualified contractor. It is the responsibility of the contractor to make sure that the final installation complies with any local codes and is installed safely.

WARNING: Proper grounding is vitally important to the safe and successful operation of this system. Bring a separate ground wire for each controller from the building ground to the ground lug on the controller. You must choose the proper conductor size and minimize the resistance to ground by using shortest possible routing. See National electrical code article 250-95, or the related local applicable code.

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

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

NOTE: Keep the machine room clean. Do not install the controller in a dusty area. Do not install the controller in a carpeted area. Keep room 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 power line fluctuations are within +/- 10 percent.

Section 1 - GENERAL PRODUCT DESCRIPTION

1.1 INTRODUCTION

The **GALaxy** hydraulic 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 who work with this equipment familiarize themselves with this manual before attempting to install the equipment.

SPECIFICATIONS:

Environment:
35 °F to 110 °F ambient
12,000 ft. altitude
95% humidity

Standard Features:
CSA B44.1-96 ASME A17.1-1996, ASME 17.1-2000 Certified
Inspection Operation (car top and controller)
Access Operation
Independent Service
Earthquake Service
Emergency Power
Fire Service Phase I
Fire Service Phase I Alternate Return
Fire Service Phase II
Low Oil
On Board Diagnostic LEDs
On Board LCD Interface
Two Motor Protection Timers
Door Motor Protection Timer
Several Field Adjustable Parameters (Door Times, Lobby, etc.)
Elevator Duty Rated Nema Motor

Optional Features:
Attendant Service
Code Blue Hospital Service
Loss of Power Emergency Lowering Security
Remote Diagnostics

1.1.1 PHYSICAL LAYOUT OF THE CONTROLLER

Figure 1.1 shows a typical layout of the GALaxy controller in a standard G.A.L. cabinet. Below is a brief description of each block:

1. GALX-1039 Main Control Board: The main control board contains all the input and output devices, controller switches, fuses and field wiring 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 and parameters.

3. Main CPU: The computer board is a single board IBM compatible computer. It executes the program and turns on and off the Inputs and Outputs.

4. LCD: The LCD 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 over voltage, and short circuit protection.

6. Options: This section of the controller is provided to mount options items such as a PI display driver.

7. System Transformer: The system transformer is located in the lower part of the cabinet. It is usually a 500VA building power to 120 VAC transfer. It is used to convert the building power to a lower voltage for the signals and valve power.

8. Starter: The motor starter is an elevator duty rated Nema contactor or Soft start device.

9. Ground Terminal: The ground terminal block is where the earth ground is attached.

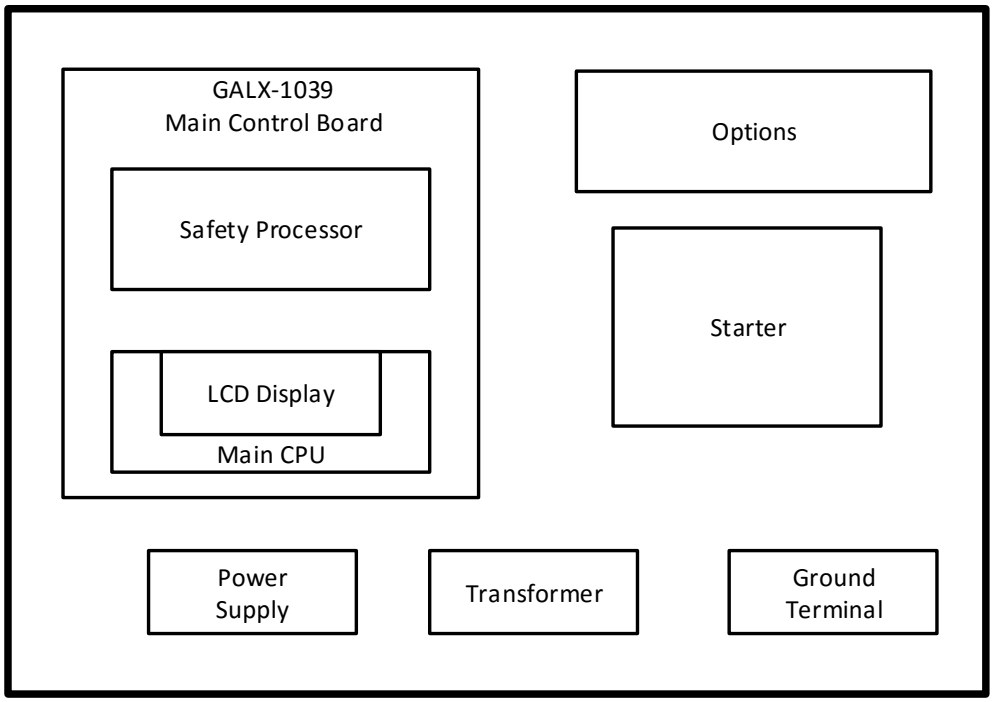


Figure 1.1 Typical Physical Layout

1.1.2 SELECTOR SYSTEM

The selector system for the GALaxy controller uses a 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 two smaller 4" magnets as slowdowns. 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 to the floor.

The tape is installed by first attaching it at the top of the hoistway approximately 12 inches from the rail, see Figure 1.2. 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 keep it taut. The selector is then mounted on the top of the car and is connected to the tape by the nylon guides. Figure 1.3 shows a typical mounting of the selector to the crosshead.

To install the floor magnets, the car is placed dead level to 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 so the tape can be accessed where the selector was sitting at floor level. A door zone template, provided by G.A.L., is placed at the mark and the door zone magnet and binary position preset magnets (if used) are placed at the appropriate locations in the template. The template is then removed from the tape. The slowdown magnets are then placed at the measured distance on the tape above and below the floor. The location of each magnet is shown in Figures1.4 when selector board A1011 is used or Figures 1.5 or 1.6 when selector board PCB-1011BN is used. Figures 1.3a and 1.3b show the two types of selector boards.

1.1.3 SLOWDOWN MAGNETS

The slowdown magnets are used to signal the CPU to transfer to leveling speed (to turn off the high speed output). Table 1.0 shows the slowdown magnet distances with respect to contract speed. All distances are show in inches. Distances are from the middle of the door zone magnet to the middle of US, DS magnets.

fpm	US, DS
100	20"
150	30"
200	40"
250	50"

Table 1.0: Slowdown Distances

1.1.4 SECONDARY SPEED FEEDBACK

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. The Safety Processor uses this velocity to verity that the car is traveling at a safe speed when slowdown limits are hit, when the car doors are open and when running on inspection.

There are three types of inputs used to verify the car speed at the terminal landing. Traction cars with distance feedback use the normal slowdown limits “UT & DT” and the emergency slowdown limits “UTS & DTS”. Hydro and traction non-distance feedback cars use the level sensors from the selector “UL & DL” at the terminal landings for the velocity check and are validated with “UTS & DTS” emergency slowdown limits. For all control systems, the “UT & DT” limits are used to verify the operation of “UTS & DTS”.

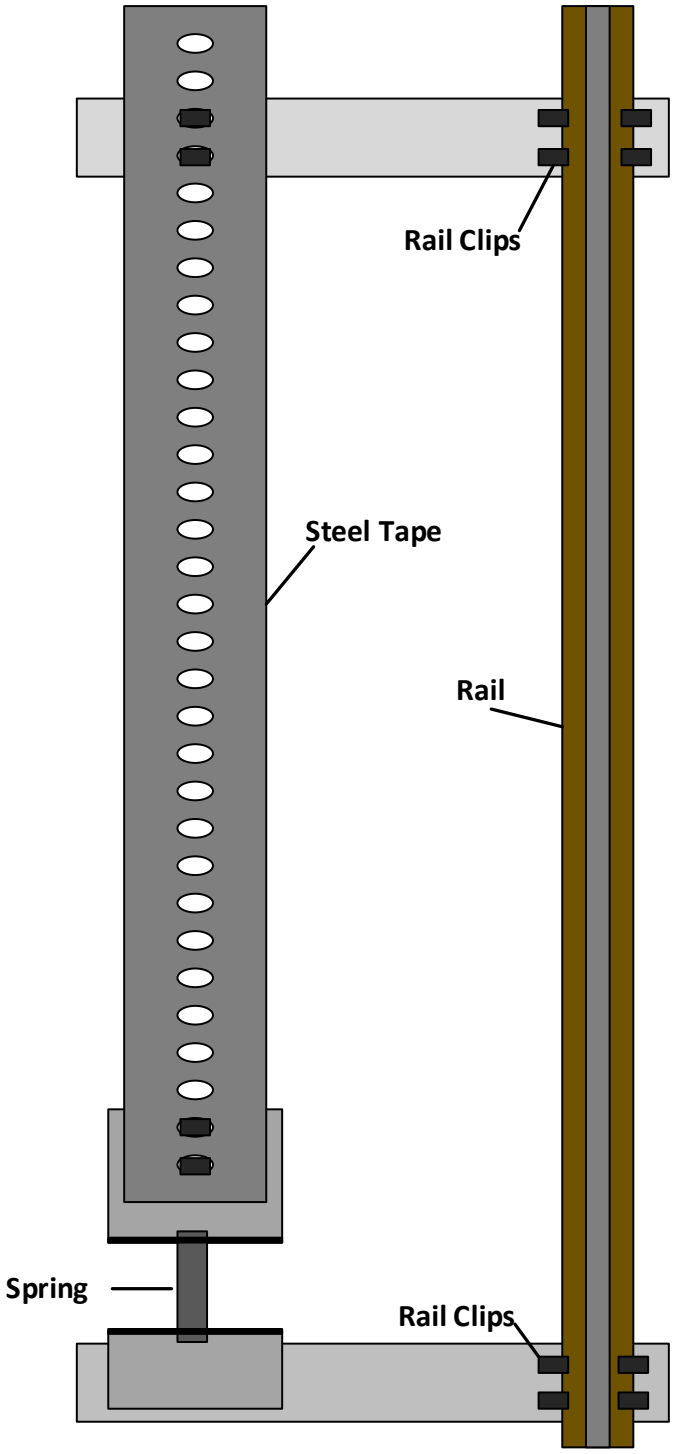


Figure 1.2: Typical Tape Mounting

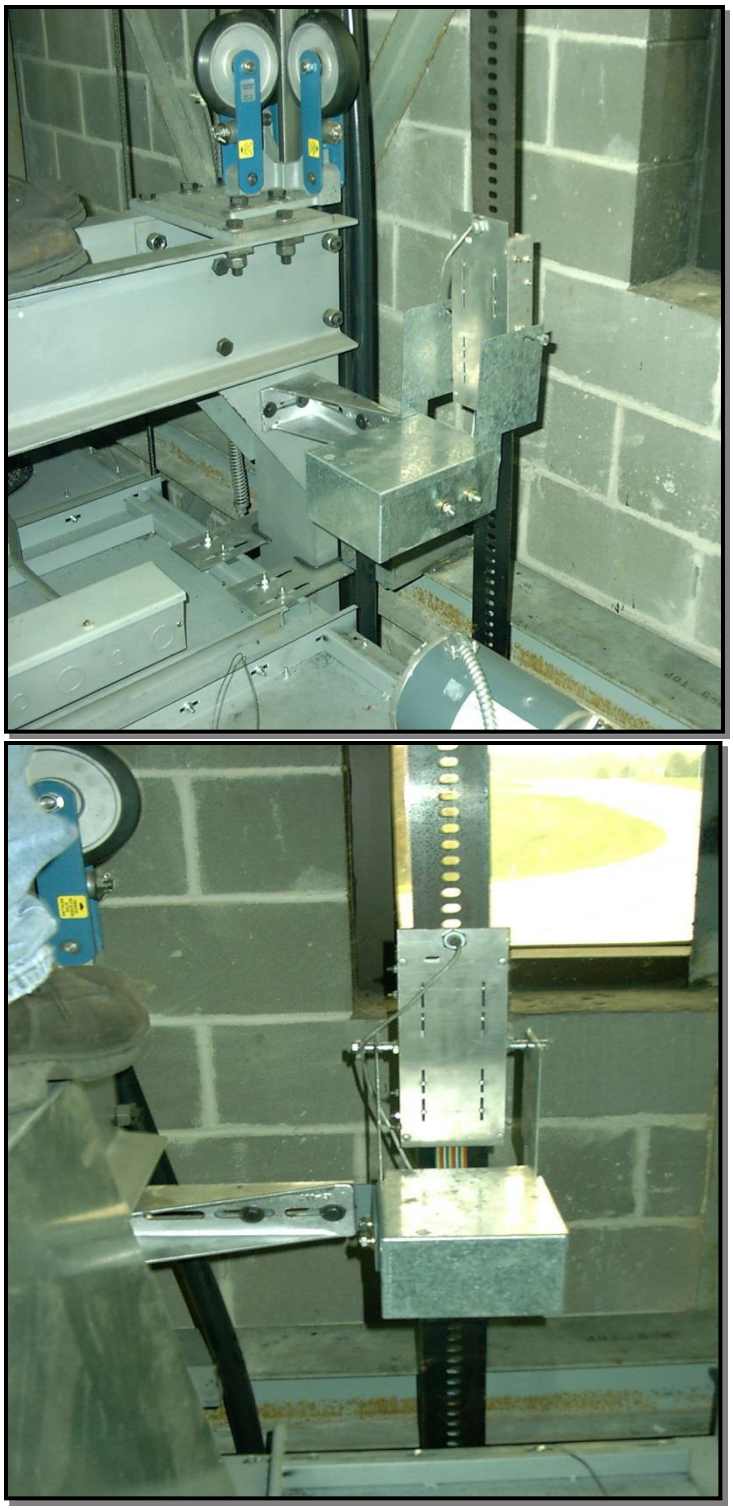
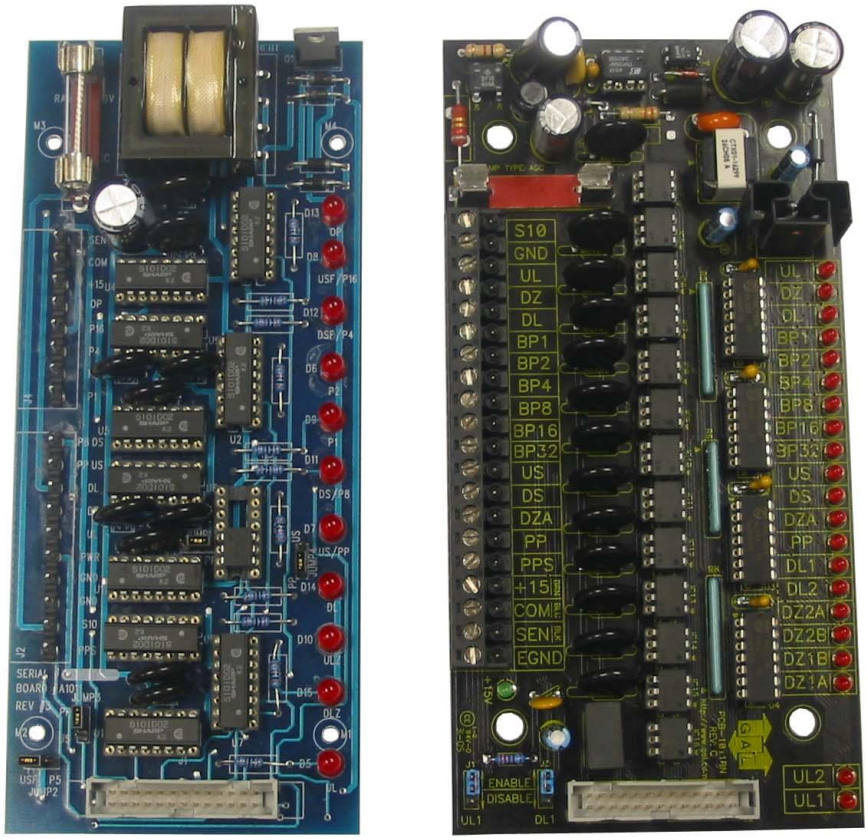


Figure 1.3: Typical Mounting of Selector



Figures 1.3a, b – Selector Board A1011 (1.3a left) Selector Board GALX-1011BN (1.3b right)

Depending on the type of selector board you have the selector magnet placement will vary. If you have the selector board A1011 in Figure 1.3a then you need to follow the selector magnet placement shown in Figure 1.4. If you have the selector board PCB-1011BN in Figure 1.3b then you need to follow the selector magnet placement shown in Figure 1.5. Binary preset inputs can only be used with the selector board (PCB-1011BN) in Figure 1.3b. Refer to Figure 1.6 for binary magnet placement. The selector board is located inside the selector box.

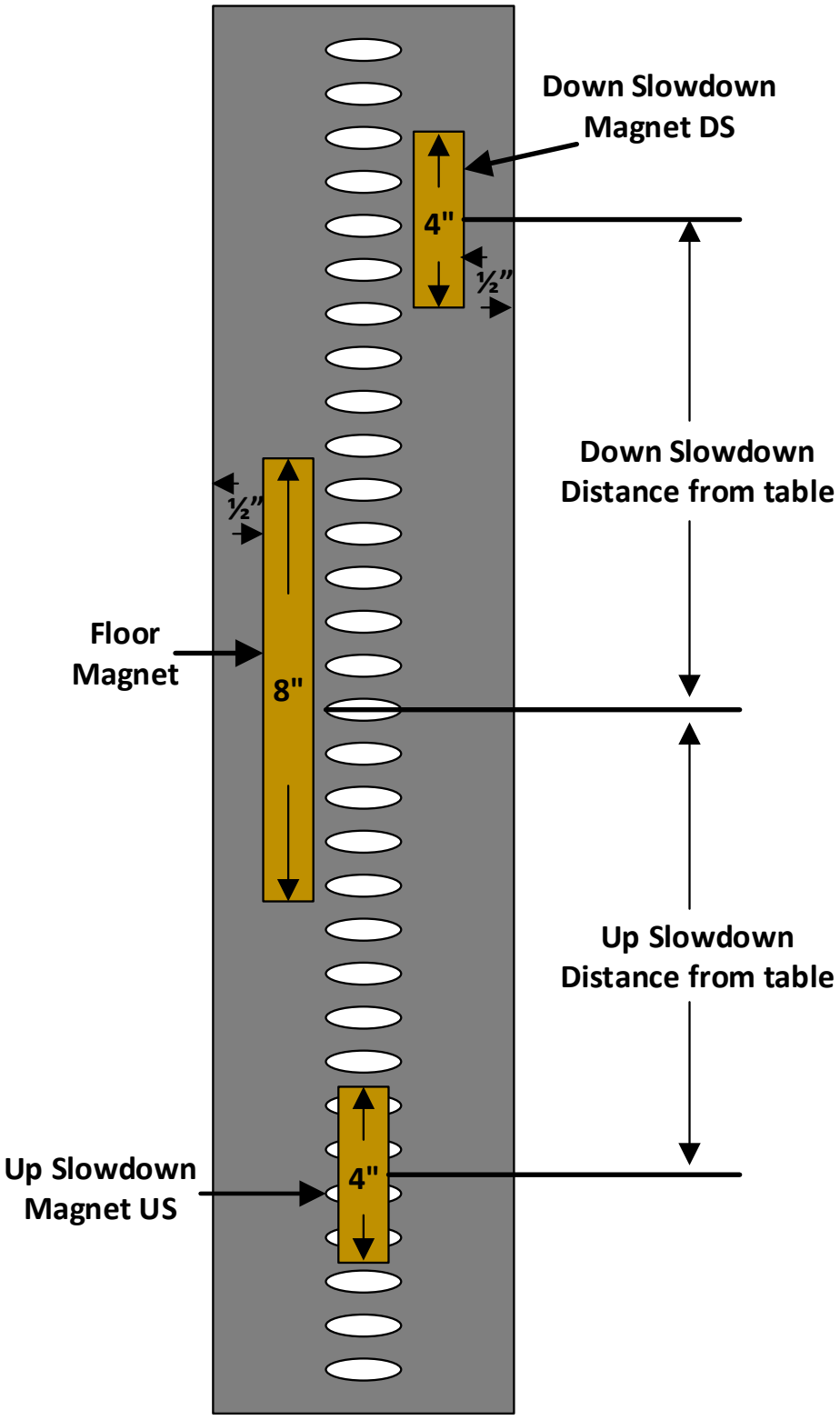


Figure 1.4: Selector Magnet Placement (A1011 board)

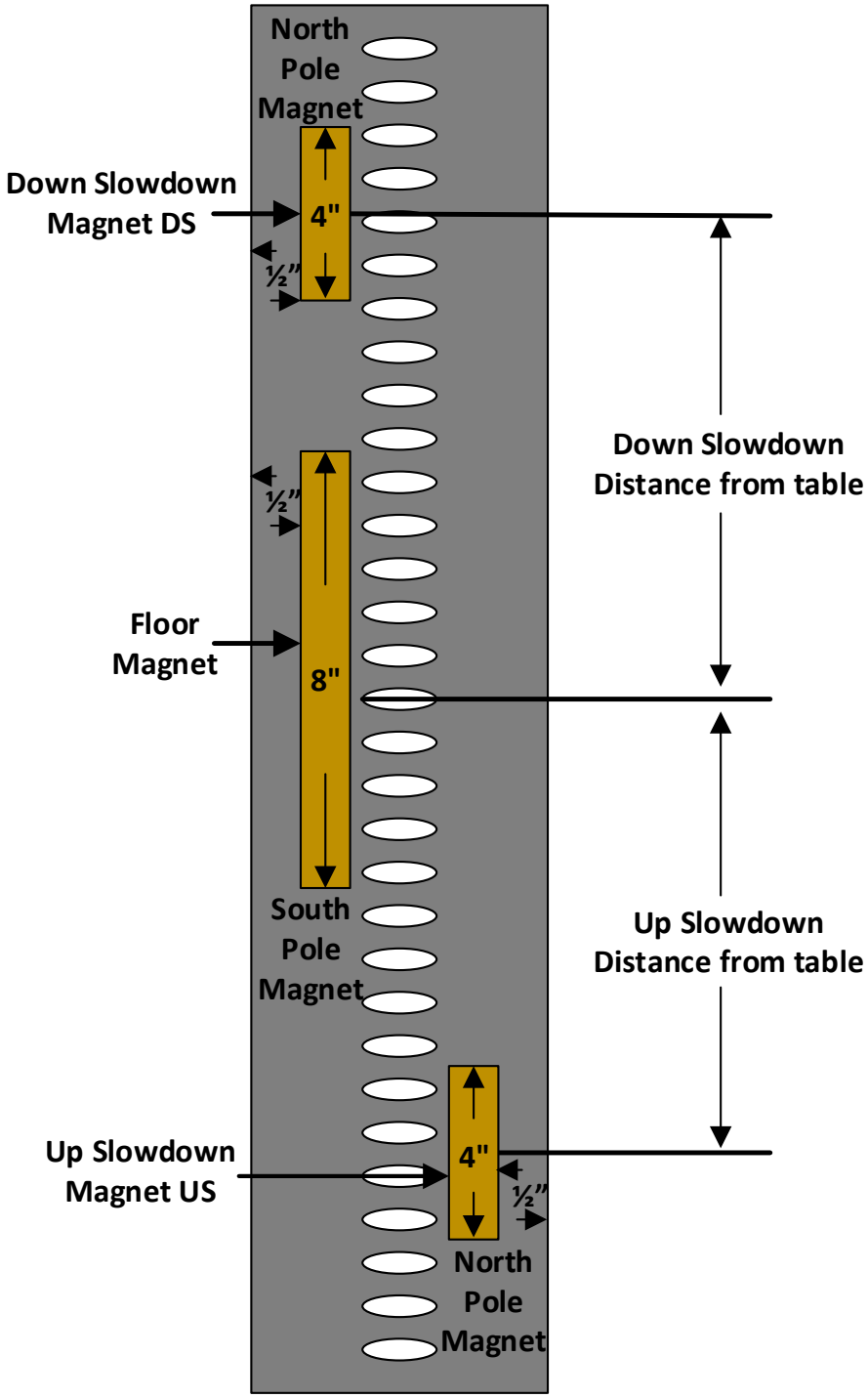


Figure 1.5: Selector Magnet Placement (GALX-1011BN board)

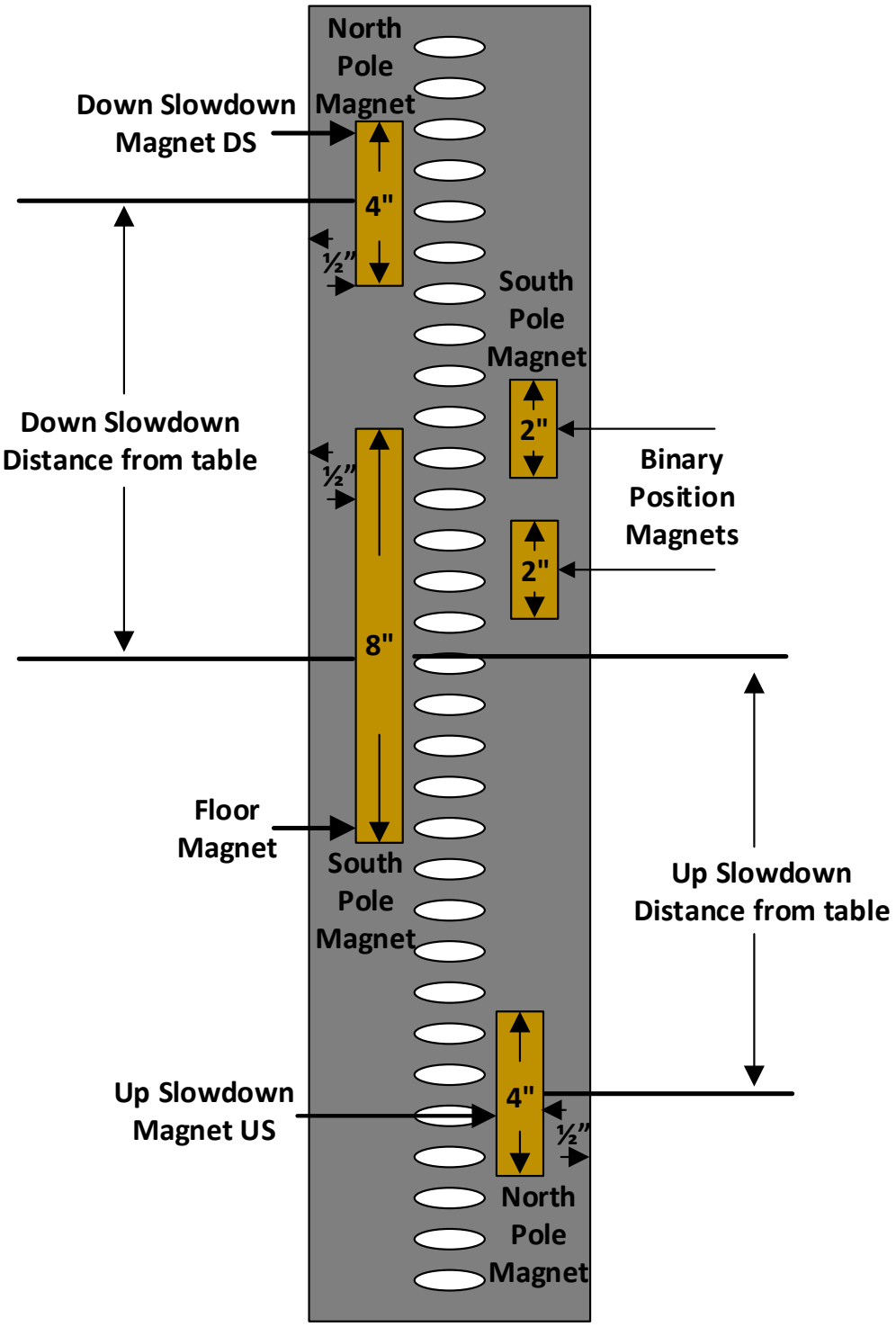


Figure 1.6: Selector Magnet Placement (GALX-1011BN board) With Binary Presets

1.1.5 BINARY PRESET MAGNETS

Binary preset magnets used on the "Hydro S" do not follow conventional placement. Since this hydro product accommodates a maximum of five floors, only two preset magnets are used. The DT slowdown limit is used for the preset on the bottom floor, the UT slowdown limit is used for the top floor and the binary preset magnet BP1 and BP2 are used for the intermediate floors if not the top floor. Tables of the binary preset values are shown below:

5 Floors:

Floor	Binary Value	Slowdown Limit
1		DT
2	1 BP1	
3	2 BP2	
4	3 BP1+BP2	
5		UT

4 Floors:

Floor	Binary Value	Slowdown Limit
1		DT
2	1 BP1	
3	2 BP2	
4		UT

3 Floors:

Floor	Binary Value	Slowdown Limit
1		DT
2	1 BP1	
3		UT

2 Floors:

Floor	Binary Value	Slowdown Limit
1		DT
2		UT

1.1.6 MODES OF OPERATION

1.1.6.1 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 open 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 run 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.

1.1.6.2 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 tests are: is the safety string made, is the elevator on inspection operation, is the door close limit open, are the interlocks made up, and whether the controller knows where the elevator car is within the hoistway. If all the safeties are made up, and the elevator is on automatic operation, and it is floor level, the elevator will go into automatic mode. If the elevator is not at floor level, it will perform a home run to either the top or bottom landing. If the elevator is on the down terminal slowdown, and not on the leveling magnet, it will go to the top landing. If the elevator is anywhere else, it will reset to the bottom floor.

1.1.6.3 SAFETY STRING OPEN MODE

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

- The reverse phase relay
- The top final
- The bottom final
- The pit switch
- The car top stop switch

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

1.1.6.4 CONTROLLER INSPECTION MODE

The controller inspection mode is initiated by placing the “INS” switch on the GALX-1039 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 “UP” and “DOWN” pushbuttons.
- Door locks are active and must be closed to move the car.
- Pressing the controller “UP” pushbutton causes elevator to move at inspection speed in the up direction.
- Pressing the controller “DOWN” pushbutton causes the elevator to move at inspection speed in the down direction.

1.1.6.5 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 inspection up and down pushbuttons. Enables the car top inspection station up and down pushbuttons.
- Door locks are active and must be closed to move the car.
- Pressing the inspection station up and safe pushbuttons causes the elevator to move at inspection speed in the up direction.
- Pressing the inspection station down and safe pushbuttons causes the elevator to move at inspection speed in the down direction.

1.1.6.6 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 maintenance 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 operations:

- 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.

1.1.6.7 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.

1.1.6.8 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.

1.1.6.9 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.

1.1.6.10 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, 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 section 211.3 unless otherwise specified.

1.1.6.11 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, then go immediately to the alternate return floor.
- Turning the fire service key switch the bypass position will restore the elevator to normal service.

- The elevator will perform per ASME A17.1 section 211.3 unless otherwise specified.

1.1.6.12 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 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 for specific operation of fire service phase II.

1.1.6.13 EMERGENCY POWER

Emergency power is initiated when a connection is made between terminals “HC” and “EMP”. This mode is used in buildings that have a backup power system to run at least one elevator in Automatic mode. Emergency power 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.

1.1.6.14 EARTHQUAKE MODE

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

- If in motion the car will proceed to the nearest available floor.
- Open the doors and shut down.

1.1.6.15 STALLED (LOW OIL) 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:

- Turns off the pump motor and stops the elevator.
- The car is returned nonstop to the bottom floor.
- Upon reaching the bottom floor the doors cycle, then the elevator is shut down.
- The door open button remains active.

NOTE: Low Oil & Hot Oil *must* be reset in Elevator Setup->Reset Low Oil / Reset Hot Oil.

1.1.6.16 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 INSTALLATION OF THE GALaxy CONTROLLER

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 35 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, i.e. 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

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. A separate binder will be provided for each job containing a complete set of wiring schematics.

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. However, 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. Note that since the PP/US output on the selector cannot work for both PP and US at the same time, the US and DS functions are wired from USF and DSF on the selector to US and DS respectively on the controller.

2.4.7 SLOWDOWN LIMIT SWITCHES

There are two types of slowdown inputs used “UT & DT” and “UTS & DTS”. Slowdown switches “UT and DT” are used to open the “ON” command to the high-speed valve at the terminal landings independent of the control of the CPU.
The “UTS & DTS” limit switches are used as slowdown speed verification points by the Safety Processor board. If the car hits the velocity verification point at a speed greater than the preset speed, power is immediately removed from the pump motor and the motion valves are de-energized for an emergency stop.
The “UT & DT” limit switches are also used as speed verification points by the Safety Processor board. When the limit is first hit, the Safety Processor counts an adjustable number of pulse counts from that point to determine the velocity trip point. Since cars with only one slowdown limit would hit the limit at high speed when recovering from being lost, the extra pulse counts from the limit 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. On the next page, Table 2.0 shows the slowdown limit locations with respect to contract speed. All

distances are shown in inches.

2.4.8 NORMAL AND FINAL LIMIT SWITCHES

The up and down directional limit switches “UN & DN” should be set to open one inch 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	UT/DT	UT1,2,3/DT1,2,3	UTS/DTS
50	10”	Not Used	8”
100	20”	Not Used	10”
150	30”	Not Used	15”
200	40”	Not Used	20”

Table 2.0: Slowdown Distances from Terminal Landing

Section 3 - ADJUSTMENT OF THE GALaxy HYDRAULIC CONTROLLER

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. Valve pre-adjusted.
7. Familiarize yourself with all wiring schematics

3.1 INITIAL POWER-UP

3.1.1 CHECK MAIN-LINE VOLTAGE

With main-line disconnect in the off position, check the line-side voltage with a voltmeter to ensure the voltage matches the controller name tag "Input Power" voltage. Check to ensure all three phases are present. If voltage is incorrect or all three phases are not present, do not proceed until corrected. If voltage and phases are correct, proceed to the next step: 3.2.2 SET TOGGLE SWITCHES.

3.1.2 SET TOGGLE SWITCHES

Flip all toggle switches on the GALX-1039 board down except for the car gate bypass and the door lock bypass switches. Flip those two switches up.

3.1.3 MAKE SURE THE CAR IS SAFE

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

3.1.4 CHECK CONTROLLER VOLTAGE

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

3.1.5 VERIFY THE LCD GALaxy IS BLINKING

Check to make sure that the “axy” of GALaxy on the LCD is blinking. If the “axy” is blinking, continue to the next step. If not, check voltage at terminals 5V to 0V on the GALX-1039 board to ensure 5VDC. If 5VDC is present and the “axy” on the LCD is not blinking, then contact factory.

3.1.6 PRESET ADJUSTABLE VARIABLES ON SAFETY PROCESSOR BOARD

The safety processor (GALX-1066N) 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 6 of this manual for the operation of the safety processor board LCD interface. The following adjustment variables must be set properly:

Top Spd	(contract speed)
Enc RPM	(Not Used)
Enc PPR	(Not Used)
Fdbk Typ	(0=tape, 1=enc)
Ctrl Typ	(0 = Hydro)
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 top speed)
DT Vel	(Set to top speed)
UL Count	(Set to 12, 16 counts/ft.)
DL Count	(Set to 12, 16 counts/ft.)
Dmd Mult	(Not used)
SoftStop	(Set higher than the soft stop time on the main CPU)

Note that the velocity variables will be changed once the car is running on automatic.

3.1.7 PLACE STOP SWICTH IN RUN POSITION

Flip the “STOP” toggle switch on the GALX-1039 board to the up position. Verify that input LEDs for “LC, HC, DN, UN, SS and CS” are all on. If not, then correct field wiring.

3.1.8 PUMP MOTOR ROTATION

To check for proper rotation of pump motor, press the inspection “UP” push-button on the GALX-1039 board just long enough for the motor to begin turning. If rotation is correct, continue to the next step. If rotation is wrong, then swap any two of the three legs feeding

terminals “L1, L2, & L3" on the “DEL” contactor. Check to ensure rotation is correct and then continue.

3.1.9 READY TO RUN ON INSPECTION

The car should be ready to run on inspection if all terminals are wired correctly. Select the “Elevator Status” on the main CPU board LCD. The display should show “Out of Service” on the first line and “Inspection Mode” on the second. The LCD 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 on the Safety Processor.

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 (not on inspection).

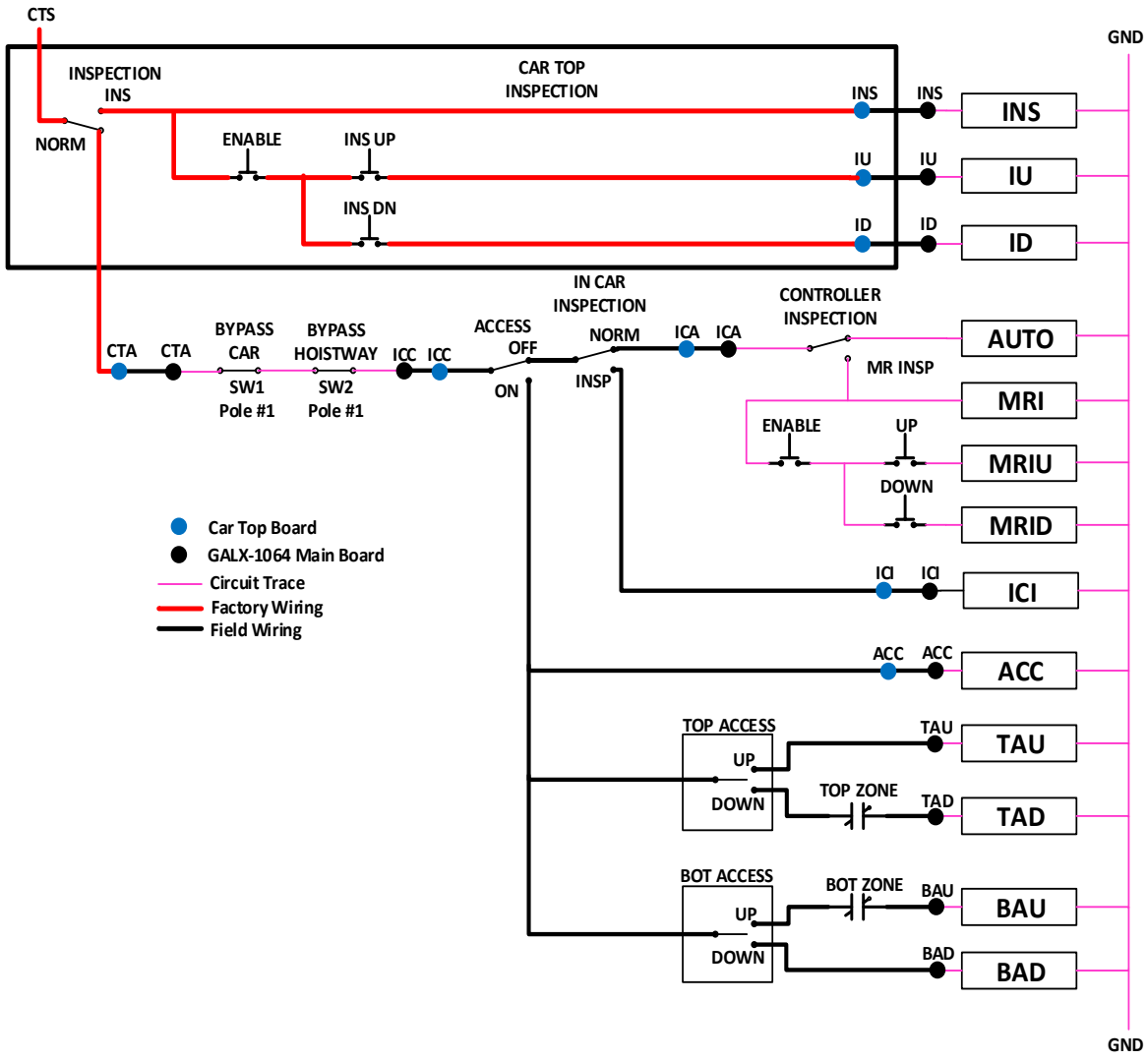


Figure 3.1. Inspection String

Note that if more than one inspection input is on, if no inspection input is on or if a gate or lock bypass switch is open and the car is not on car top inspection, an inspection error will be displayed on the Safety Processor LCD. If the controller is not on motor room inspection at this point, then verify all switch positions and wiring before proceeding.

3.1.10 CHECK SELECTOR INPUTS

Run elevator on controller inspection to verify proper inputs from the selector. At each floor level the “UL, DL, & DZ” input LEDs should be on. The “US, & DS” input LEDs should come on when the up & down slowdown magnets are passed.

3.1.11 VERIFY SLOWDOWN LIMITS

As the car is running 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.

3.1.12 VERIFY CAR SPEED ON SAFETY PROCESSOR BOARD

Run the car in either direction and check the car speed on the safety processor LCD. 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 the secondary feedback comes from an encoder go to “Correct Car Speed When Using an Encoder”. If the correct speed is shown proceed to the “Final Adjustment” section.

3.1.13 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 INDICATION 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”.

3.1.14 CORRECT CAR SPEED WHEN USING AN ENCODER

When using an encoder for the secondary speed feedback, make sure that the adjustable variables on the safety processor board are set properly. Set the feedback type to 1 for encoder and set the encoder RPM and PPR appropriately for how the encoder is driven. If the correct velocity is not obtained, contact the factory. If the correct speed is shown proceed to the next step.

3.2 FINAL ADJUSTMENT

3.2.1 AUTOMATIC RUN

Run the elevator on controller inspection down until it stops on the down normal limit switch. All toggle switches on the GALX-1039 board should still be in the down position except the "STOP" toggle switch, which should be in the up position. The valve should be pre-adjusted to provide the quickest transitions possible and leveling speeds at approximately 5 to 6 fpm.

With the elevator on controller inspection and on the down normal limit switch, flip the "INS" toggle switch to the up position. If all is correct, the elevator should level up to floor level at the bottom floor. If elevator does level up and stop at the bottom floor then proceed to the next step.

If the elevator does not level up to the floor then verify that the "INS" input LED is on. If "INS" input LED is on, and the elevator does not level up, then check the selector and limit switches verifying proper input signals back to the controller.

3.2.2 SET FLOOR DEAD ZONE

The elevator should now be at floor level at the bottom floor. When at floor level the "UL, DL, & DZ" input LEDs should be on. If elevator continually tries to seek floor level by leveling up and down, then adjust valve and selector "dead zone" for proper stop. The selector "dead zone" is increased by moving the selector sensor boards closer together. Proceed to the next step.

3.2.3 ADJUST VALVE

Setup a car call, either from the LCD Interface or from simulating a pushbutton with jumper wire. The elevator should start up, accelerate to high speed, decelerate when slowdown point is reached, and level into floor. The doors will not open because toggle switches "IND & AD" are still in the down position. Continue to run elevator by setting up car calls. Adjust valve for smooth accel, decel, and final stop in both up and down directions. Proceed to the next step.

3.2.4 ADJUST SAFETY PROCESSOR BOARD SPEED CLAMPS

Make a one floor run to the top floor. The car must reach top speed on a one floor run. After the car stops, record the velocity the car hit the "UT, DT, UTS & DTS" slowdown limits. The velocity value is shown from the LIM VEL menu on the safety processor board LCD.

The velocity value shown on the display for the "UT or DT" limit is the value after the car hits the limit then counts the adjustable number of counts set from "UT Count" or "DT Count". When using a tape feedback, there are 16 pulse counts per foot or 1.333 pulses per inch. If the

limit is set to 40” from the terminal, to set the checkpoint at 20” use a count value of 26.6 (20 * 1.333). Round up and set the UT and DT count to 27. If the UT or DT Counts are modified, the limit velocity has to be rechecked.

Make a one floor run to the bottom floor and record the limit velocity when the car stops.

Take the speed value for the up or down terminal slowdown limit, add 15 fpm and then set the new value in the corresponding variable from the ADJ VAR menu.

3.2.5 VERIFY INSPECTION VELOCITY CLAMP ON SAFETY PROCESSOR BOARD

With the car on inspection, set the inspection speed on the safety processor board to 25 fpm (Refer to Safety Processor Adjustable Variables in section 6). Set the inspection speed on the main CPU to 50 fpm (Refer to Adjustable Variables in section 5). Run the car in either direction on inspection. The car will shut down when the speed goes above 25 fpm. Reset the inspection speed on main CPU to the desired inspection speed and set the inspection speed on the Safety Processor to 140 fpm or lower. Make sure the car will run on inspection without shutting down.

3.2.6 ENABLE DOORS

Before proceeding re-check all safety circuits and door lock circuits for proper operation. If all safety circuits and door locks are operating properly then flip the “AD” toggle switch to the up position, and the doors should open and remain open. The elevator is now on independent service. If the doors do not open, then check door operator wiring. Adjust door operator for proper operation. Proceed to the next step.

3.2.7 FINE TUNE RIDE AND STOPS

Run elevator to all floors. “Fine tune” all floor level magnets so that elevator stops level at all floors. Check all signals for proper operation. Flip the “IND” toggle switch to the up position. All four toggle switches should now be in the up position. Elevator doors should close and now be in full automatic operation. Check all hall buttons for proper operation. Proceed to the next step.

3.2.8 FINE TUNE PARAMETERS

Check all field adjustable parameters from the LCD Interface and set as desired.

Section 4 - TROUBLESHOOTING

4.1 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 LEDs to monitor the state of the input. The controller is also equipped with an LCD interface discussed in sections 5, and an LCD interface on the Safety Processor Board discussed in section 6. In this section the basic points of troubleshooting will be detailed.

4.2 MICROPROCESSOR CPU

The CPU is very reliable and normally trouble-free. With power turned on, the "axy" in GALaxy on the 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 GALX-1039 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 not field adjustable are stored in FLASH memory. All job parameters that are field adjustable are stored in battery backed-up RAM. This battery is designed to back-up the RAM for one year with no power to the system. Under normal operating and maintenance procedures, the battery should last indefinitely. If, however, a battery were to go bad, the field adjustable parameters will return to the default settings when the main power is turned off.

4.3 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 or DC.
It is very important that the wiring schematics are reviewed in order to determine the voltages for which the controller was designed before power is applied. 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 LCD interface. Using the previous example, select the “Inputs and Outputs” menu on the LCD interface. Scroll through the I/O list until “UT” is located. It will show “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 LCD interface could be used to view if the CPU is turning the “P1” output on. From the LCD “Inputs and Outputs” menu, scroll through the I/O list until the “P1” is located. The display will show “P1=1” 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/Os are optically isolated between the high voltage section and the low voltage section. The input opto-isolators and output solid-state relays are socketed ICs labeled “**Uxx**” on the silk screens of the different I/O boards. 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 opto-isolator 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 ICs 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 ICs are listed in the wiring schematics.

4.4 RUN SEQUENCE

The following diagram in figure 4.1 shows the run sequence of the controller.

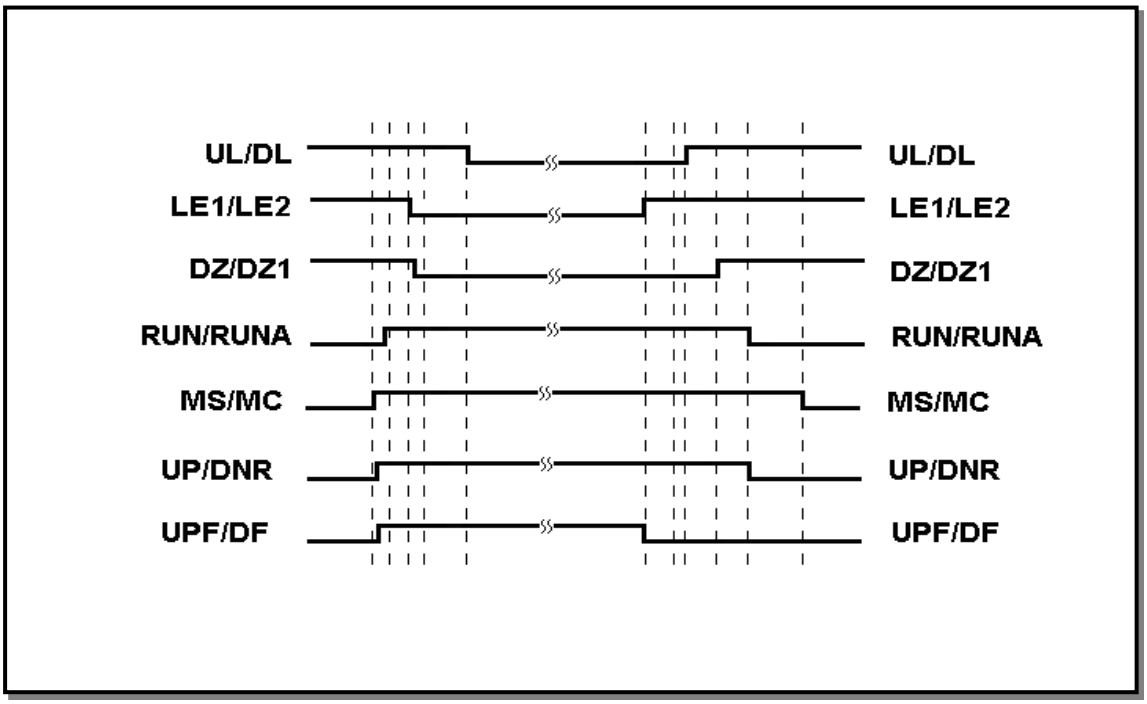


Figure 4.1: Run Sequence.

4.5 THE SAFETY PROCESSOR BOARD

The Safety Processor Board has two fault LEDs, 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 4.1a).

Important: When either LED is on, this board will prevent the car from running.

The Safety Processor Board verifies the speed of the car when hitting the terminal limits, that the doors are closed when they should be and that the car is safe to run. It also verifies all inspection operations and that the car is not traveling at a speed greater than 150 fpm with a door open in the door zone.

While the Safety Processor Board cannot turn on any run control signals, it can turn off the following signals from the main CPU: RUNA, 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 cause by a condition while the car speed is too high such as hitting the DTS terminal limit at a speed greater than the speed setting for that limit. Both type 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.
- View the inputs "Inp/Out" for an incorrect input status. See the Safety Processor LCD Interface section for all the input and output signals.
- View the fault log "Faults" for recorded faults. The Safety Processor Board faults are recorded in ram and will be lost when power is turned off.

Of the signals that the Safety Processor Board can turn off, the RUNA is turned on first in a start sequence. Since the Safety Processor and the main CPU run independent of each other, a RUNA Off error on the main CPU 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.

Even though we take every precaution to detect an error and display the appropriate error code, sometimes the sequence of inputs and output change so quickly that correct error is not recorded. Usually the fault table data will lead to the circuit where the error was detected but, in addition, it is also necessary to look ahead of the circuit for possible causes.
Additional fault information is shown in the next section of system faults.

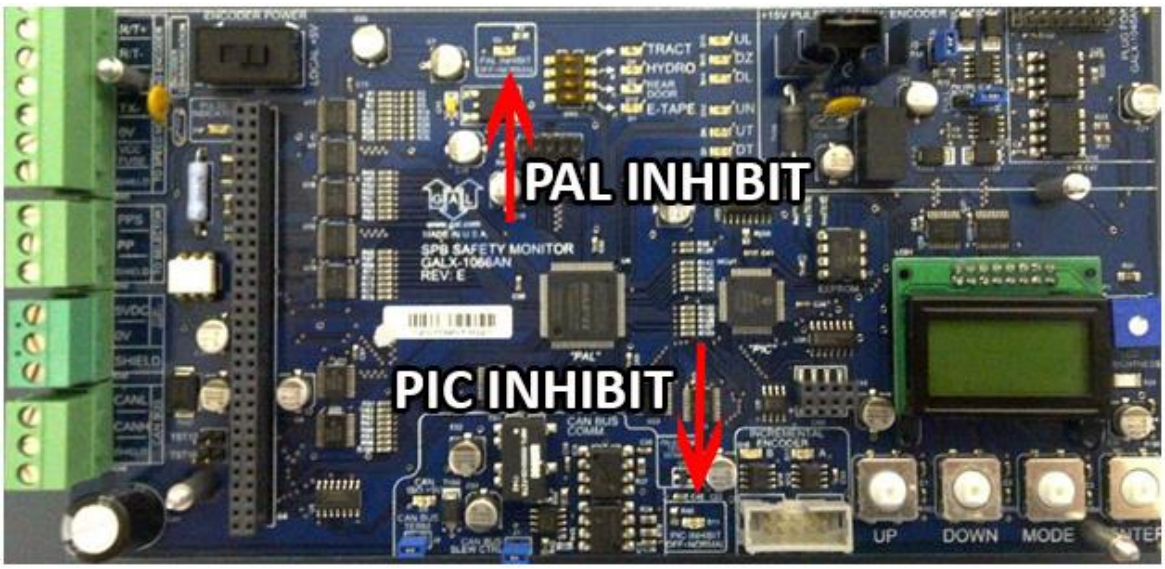


Figure 4.1a: Safety Processor Board (GALX-1066)

System fault information is displayed on the LCD from the "Elevator Status" and the "View Fault Log" menus on the main CPU. Fault information can also be obtained from the Safety Processor LCD under

the “Fault” menu. Below is a list of system faults logged by the main CPU and possible reasons for each fault.

4.6 MAIN CPU FAULTS

Faults	Description	Possible Cause/Suggested Fix
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.
At Floor Shutdown	At floor shutdown	• Car faulted out while at floor. Look at the fault log for a different fault at the same time to determine cause of failure.
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. • Faulty BP1, BP2 or BP4 input • Improper wiring between selector and the Top of Car board.
Bot 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
Car 1 Comm Loss	The group car is not communicating with Car 1.	• Faulty wiring from R/T+ and R/T- from car to car. • Faulty U6 driver chip on 1100 board or 1036 com memory board. • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
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 1100 board or 1036 com memory board. • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
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 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

Faults	Description	Possible Cause/Suggested Fix
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.
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.
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/Os 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.
DF I/O Failed Off	The DF (SDF) input or output has failed off	• Fault on Safety Processor Board. The Safety Processor Board can disable the run control to the DF (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. • Faulty wiring to the SC common on the MAIN I/O board. • Faulty wiring to the SDF terminal on the MAIN I/O board. • Faulty wiring to the Down Fast valve. • Faulty DFi (SDFi) input (replace input chip). • Faulty DF (SDF) output (replace output chip).
DF I/O Failed On	The DF (SDF) input or output has failed on.	• Faulty DFi (SDFi) input (replace input chip). • Faulty DF (SDF) output (replace output chip).
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).
Dn 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.

Faults	Description	Possible Cause/Suggested Fix
DNR I/O Failed Off	The DNR (SD) input or output has failed off.	• Fault on Safety Processor. The Safety Processor is located on the MAIN I/O board. This device can disable the run control to the DNR output chip. Check if the SAF-PROC or SAF-PAL FAULT LEDs turn on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor status of the LCD Interface. • Faulty wiring to the SC common on the MAIN I/O board. • Faulty wiring to the SD terminal on the MAIN I/O board. • Faulty wiring to the Down valve. • Faulty DNR (SD) output or DNRi (SDi) input. Replace the DNR (SD) output and DNRi (SDi) input chip. • RUN outputs or MC auxiliary contact not making properly. Verify the operation and contact integrity.
DNR I/O Failed On	The DNR (SD) input or output has failed on.	• Faulty DNR (SD) output. Replace the DNR (SD) output chip. • Faulty DNRi (SDi) input. Replace DNRi (SDi) input chip.
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 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 Main I/O board failed. Replace DZA input on the Main I/O 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 Main I/O board failed. Replace DZ input on the Main I/O board.
Door Zone On Fault	The door zone input failed on.	• DZ output on selector board did not turn off. (Replace DZ output on selector driver board). • One or both of the DZ sensors on the selector sensor board failed. Replace selector sensor board. • DZA input on the Main I/O board failed. Replace DZA input on the Main I/O 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 Main I/O board failed. Replace DZA input on the Main I/O board.

Faults	Description	Possible Cause/Suggested Fix
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. DPM should turn on before the Gate Switch is made. • 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.
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.
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 state of DT is compared to that of DTS. • The DTS limit did not break at the bottom terminal landing. Adjust the DTS magnet. • Faulty DTS input. Replace the DTS input chip on the Main I/O board.
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.
Estop Fault	An emergency stop occurred while moving or attempting to move.	The 'P' input did not drop from MC contactor being energized. • 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. • An emergency power recall was initiated while the car was running up. • The pulse count stopped counting
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.	The software has been updated to a newer version that required parameters to be relocated. This is normal and should only occur once. If an older version software 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.
FST I/O Failed Off	The FST input on the Main I/O board did not pick up when expected.	• Faulty FST output chip. Replace output chip. • Faulty FSTI input chip. Replace input chip.

Faults	Description	Possible Cause/Suggested Fix
FST I/O Failed On	The FST input on the Main I/O 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 Main I/O 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 Main I/O 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 Main I/O board.
Gate/Lock Byp Sw Flt	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 Main I/O board is in the on position. • Gate or Lock bypass input failed on. Replace GBP OR LBP input chip on Main I/O board.
Group Comm Loss	The car that was acting as the group car has stopped communicating.	• Faulty wiring from TX+/TX- from car to car. • Faulty 75176 driver chip U6 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.
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.
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.
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.
Hot Oil Fault	Hot Oil Fault	• Hydro only - Job is configured for hot oil detect. TPH input turned ON. Check for defective input.
Inspection Input Flt	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

Faults	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, MRIU, 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
LC Fuse Blown Fault	The LC input is off. No power on LC.	• Short from LC to GND.
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.
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.
Mid 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 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.
P Input Off Fault	The normally closed contacts on MC 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. 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 contactors are energized.	• Faulty contactor or auxiliary contacts on MC. Replace auxiliary contacts or entire contactor • C contactor on the soft starter did not pick. Faulty contact or contactor. Faulty C contact or contactor.
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. Replace PFC relay.

Faults	Description	Possible Cause/Suggested Fix
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. 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 Main I/O board failed. Replace DZ input on Main I/O board. • Check leveling magnet.
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
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.
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.
Run Fault: Shutdown	Run Fault: Shutdown. If the car attempts to run 4 consecutive times and incurs an emergency stop without making a successful run, the car is shut down and this error code is shown.	• Verify that the car can run without stalling. • Check the fault log for faults that occurred prior to this fault.
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 O/RUN I Failed	RUN output failed off or RUNi input failed on	• Faulty RUNi input chip. Replace input chip. • Faulty RUN output chip. Replace output chip.
RUN O/RUNA I Failed	RUN output failed off or RUNAi input failed on	• Faulty RUNAi input chip. Replace input chip. • Faulty RUN output chip. Replace output chip.

Faults	Description	Possible Cause/Suggested Fix
RUNA I/O Failed Off	The RUNA input or output has failed off.	• Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the Main I/O 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	• Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the Main I/O 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.
RUNA O/RUN I Failed	RUNA output or RUNI input failed	• RUNA output failed off. Replace the RUNA output chip. • RUNI input failed off. Replace the RUNI input chip.
Safety String Fault	Safety string fault occurs from the safety string being open (SS input 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.
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. Replace SFC relay.
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. Replace SFC relay.
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. Set the timer to allow the car to run the entire hoistway at the recovery speed. • Faulty or improperly adjusted valve. • Faulty pump motor.
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.
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
UPF I/O Failed On	The UF (SUF) input or output has failed on.	• Faulty UFi (SUFi) input (replace input chip). • Faulty UF (SUF) output (replace output chip).
UL and DL Off 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.

Faults	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 Main I/O board and verify that LED goes out. Correct short condition. • UL inputs failed on. Replace the selector driver 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.
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 (SU) input or output has failed off	• Fault on Safety Processor. The Safety Processor is located on the MAIN I/O board. This device can disable the run control to the DNR output chip. Check if the SAF-PROC or SAF-PAL FAULT LEDs turn on when the car attempts to run. Check the elevator service, faults, and inputs/outputs on the Safety Processor status of the LCD Interface. • Faulty wiring to the SC common on the MAIN I/O board. • Faulty wiring to the SU terminal on the MAIN I/O board. • Faulty wiring to the Up valve • Faulty UP (SU) output or UPi (SUi) input. Replace the UP (SU) output and UPi (SUi) input chip. • RUN outputs or MC auxiliary contact not making properly. Verify the operation and contact integrity.
UP I/O Failed On	The UP (SU) input or output has failed on.	• Faulty UP (SU) output. Replace the UP (SU) output chip. • Faulty UPi (SUi) input. Replace UPi (SUi) input chip.
UPF I/O Failed Off	The UPF (SUF) input or output has failed off.	• Fault on 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. • Faulty wiring to the SC common on the MAIN I/O board. • Faulty wiring to the SUF terminal on the MAIN I/O board. • Faulty wiring to the Up Fast valve • Faulty SDFi input (replace input chip). • Faulty SDF output (replace output chip).
UPF I/O Failed On	The UPF (SUF) input or output has failed on.	• Faulty UFi (SUFi) input (replace input chip). • Faulty UF (SUF) output (replace output chip).

Faults	Description	Possible Cause/Suggested Fix
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.
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 state of UT is compared to that of UTS. • The UTS limit did not break at the top terminal landing. Adjust the UTS magnet. • Faulty UTS input. Replace the UTS input chip on the Main I/O board.

4.6.1 DETAILED FAULT DATA

SRV Service Flag

0 = Out of Service
1 = Automatic
2 = Independent
3 = Load Weighing Bypass
4 = Attendant
5 = Code Blue
6 = Fire Phase 2
7 = Emergency Power
8 = Earthquake Emergency
9 = Fire Phase 1 Main Egress
10 = Fire Phase 1 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

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

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

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

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 1 Main Egress Return
2 = Phase 1 Alternate Egress Return
3 = Phase 1 Completed
4 = Phase 2 Door Hold
5 = Phase 2 Constant Pressure Door Open
6 = Phase 2 Constant Pressure Door Close
7 = Phase 2 Door Hold

RFI Rear Fire Flag
0 = Not on Fire Service
1 = Phase 1 Main Rear Egress Return
2 = Phase 1 Alternate Rear Egress Return
3 = Phase 1 Completed
4 = Phase 2 Rear Door Hold
5 = Phase 2 Constant Pressure Rear Door Open
6 = Phase 2 Constant Pressure Rear Door Close
7 = Phase 2 Rear Door Hold

HSF High Speed Flag
0 = No High Speed
1 = High Speed

STF Start Flag
0 = Not valid Start
1 = Start of Run

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)

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

DEV – Boards not communicating. **See page 53.**

TXE - Transmitter Buffer (1 = Transmit Buffer Empty)
CS1 - Communication 1 Source # = Interrupt status for com port # 1
CS2 - Communication 2 Source # = Com port # 1 status
CS3 - Communication 3 Source 0 = Group transmit buffer empty
1 = Group transmit buffer not empty

GCS - Group Communication Source # = Interrupt status for group com port

STATUSF Control Status Flag. (Status bit set to "1" when status active) See page 55.
Example: 00000400 = BIT10: Stop Switch open
(Third set of bits -- BIT 8=Binary 1 / Bit 9=Binary 2 / Bit 10=Binary 4 / Bit 11=Binary 8)

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 Comm 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

IO0 to IOD - See page 56 & 57.

Boards not communicating.

Look for DEV=xxh in the detailed fault log, find that **HEX** number below, in the **RED** column. The board address to the right of the HEX number refers to the dip switch address of the I/O board (if the board has a dip switch – the car top board for example has a permanent address of "9").

Device (HEX) Description of the Device

02h // Can start index
02h // Encoded Tape Selector
03h // Emergency Brake
04h // Brake Board
05h // Safety processor board
06h // Selector board
07h // Front Door board
08h // Rear Door Board
09h // Load Weigher
0Ah // Voltage Sensor
0Bh // Serial I/O Expansion board address 1
0Ch // Serial I/O Expansion board address 2
0Dh // Serial I/O Expansion board address 3
0Eh // Serial I/O Expansion board address 4
0Fh // Serial I/O Expansion board address 5
10h // Serial I/O Expansion board address 6
11h // Serial I/O Expansion board address 7
12h // Serial I/O Expansion board address 8
13h // Serial I/O TOC Top of Car Board address 9
14h // Serial PI and Lantern (global address for all pi and lantern devices)
14h // Serial I/O Expansion board address 10 (Uses special address)
15h // Serial I/O Expansion board address 11
16h // Serial I/O Expansion board address 12
17h // Serial I/O Expansion board address 13
18h // Serial I/O Expansion board address 14
19h // Serial I/O Expansion board address 15
1Ah // Serial I/O Expansion board address 16
1Bh // Serial I/O Expansion board address 17
1Ch // Serial I/O Expansion board address 18
1Dh // Serial I/O Expansion board address 19
1Eh // Serial I/O Expansion board address 20
1Fh // Serial I/O Expansion board address 21
20h // Serial I/O Expansion board address 22
20h // Last can device
29h // Special address for SEB 10 since it conflicts with PI address
32h // ID to swap to standard address for pi/lantern board 20
FFh // Global can address

Decoding IO0 - IOD

IO1 = 2C h

0	1	2	3	4	5	6	7
0000	0001	0010	0011	0100	0101	0110	0111
8	9	A	B	C	D	E	F
1000	1001	1010	1011	1100	1101	1110	1111

IO1							
0	0	1	0	1	1	0	0
RLM	DLT	DLM	DLB	UT3	UT2	UT1	UTS

In the example below we are illustrating IO1=2Ch. The "h" signifies that the number is in hexadecimal notation, the actual hexadecimal number is "2C" and the "h" can be ignored.

The "2C" is converted to binary using the chart above (green) and the binary values transferred to the appropriate IO line, IO1 in our example (blue). In binary notation we count from the right - LSB – (Least Significant Bit) to the left – MSB - (Most significant Bit), which is why binary "1" is written as 0001 – it begins at the right.

A binary "1" indicates a high input or output, meaning it is "ON". A binary "0" indicates the input or output is low, meaning it is "OFF".

In our example above we can see that UTS, UT1, DLB, DLT and RLM are all low, or OFF, and UT2, UT3, and DLM are all ON.

Decoding "Statusf"

Satusf is 32 bits long and each digit in "=0000 0000" is four bits.

Example: Statusf=0000 D000 = 0000 0000 0000 0000 1101 0000 0000 0000

8th Digit → Statusf = 0000 D000 ← 1st Digit; 4th Digit

0	1	2	3	4	5	6	7
0000	0001	0010	0011	0100	0101	0110	0111
8	9	A	B	C	D	E	F
1000	1001	1010	1011	1100	1101	1110	1111

STATUSF Control Status Flag			
8th Digit → 0000 0000 ← 1st Digit			
		4th Digit	
1	1	0	1
No Gate or Lock	No DCL	No Potential "P" Input	Gate or Door Lock Flt

Starting from the right it can be seen that there is a "Gate or Door Lock Fault", a "No DCL" fault, and a "No Gate or Lock" fault.
"Safety Processor Status" and "Inspection Status" work similarly.

0	1	2	3	4	5	6	7
0000	0001	0010	0011	0100	0101	0110	0111
8	9	A	B	C	D	E	F
1000	1001	1010	1011	1100	1101	1110	1111
STATUSF Control Status Flag							
8th Digit → 0000 0000 ← 1st Digit							
1st Digit =							
Drive Not Ready		NO SS Input		NO HC Power		NO LC Power	
2nd Digit =							
Binary Position Err		Ins or Lock Bypass Error		IO Error - Redundancy		Gripper Error	
3rd Digit =							
Door Zone Fault		Stop Sw Open		No Automatic Doors		Position Error	
4th Digit =							
No Gate or Lock		No DCL		No Potential "P" Input		Gate or Door Lock Flt	
5th Digit =							
Safety Proc Comm Err		Drive Comm Error		TOC Comm Error		Brake Lift Sw Err	
6th Digit =							
Waiting For Safe		Annual Safety Test		Too Many Flt Runs		DB Resistor Temp Err	
7th Digit =							
Brake Board CAN Err		UL, DL, DZ Off At Floor		GTS Input Off		UT, UTS, DT, DTS Lim Err	
8th Digit =							
Leveling Fault		UL or DL Fault		Selector Can Err		Fire Fighter Stop Sw	

0	1	2	3	4	5	6	7
0000	0001	0010	0011	0100	0101	0110	0111
8	**9**	**A**	**B**	**C**	**D**	**E**	**F**
1000	1001	1010	1011	1100	1101	1110	1111
IO0 =							
DLM	DLB	UTS	UT	UN	DTS	DT	DN
IO1 =							
FSX/EQ	SS	TAU	TAD	BAU	BAD	ACC	DLT
IO2 =							
CTS	EMP	LPS/EMH	EQR	GS-1	DLT-1	DLM-1	DLB-1
IO3 =							
DDA	UDA	MST	FB	FL	FSO	EML/DNO	EQL/DNO
IO4 =							
TPL	FS	BP	ALT	MES	MRS	HWS	HC
IO5 =							
SUFI	SUI	SDFI	SDI	MCAI	MCCI	RUNAI	RUNI
IO6 =							
AUTO	MRIU	MRID	MRI	AD	IND	LBP	GBP
IO7=							
DZA	BP2	BP1	DS	US	DL	DZ	UL
IO8 =							
FST1	FST	HB	NUD	DC	DO	RUN	RUNA
IO9 =							
IU	INS	LC	GS	DPM	EE	DCL	DOL
IOA =							
EMS	FS2H	FS2C	FS2	ICI	CS	SE	ID
IOB =							
ED/AB	ATD	ATU	ATT	DL-1	UL-1	FSTI	P
IOC =							
P5	P4	P3	P2	P1	MCC	MCA	PFC

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
0000	0001	0010	0011	0100	0101	0110	0111
8	**9**	**A**	**B**	**C**	**D**	**E**	**F**
1000	1001	1010	1011	1100	1101	1110	1111
IOD =							
CUL	DZDE	LU		SUF	SU	SDF	SD
(*Note: IO3, IO8, I0C, I0D are outputs. When outputs are off the bits are set when all outputs are off value is FF)							

4.6.2 SAFETY PROCESSOR FAULTS

	DESCRIPTION AND CAUSE
No Flt	No fault is recorded in this index location.
Invalid	Invalid fault number. (This can only be caused by a programming error in the chip).
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.
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.
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.
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.
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.
INS Sp	Inspection Speed Fault. The car exceeded the INS Velocity adjustable variable while running on inspection. The car will immediately shut down.
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.
DL/GS	Door Lock/Gate Switch Fault. Car is moving outside the door zone with the door open. The car will immediately shut down.
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: 1. All inspection inputs and the auto input are off. 2. More than one inspection or auto input is on at the same time. 3. A bypass input is on while the car is not on Car top inspection. 4. 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.
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.
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: 1. Improper connection for PP and PPS. Refer to the job specific prints. 2. PP and PPS field wires need to be swapped. 3. Photocoupler in selector is faulty. Call the Factory. 4. Voltage from PP to 0V on the Safety Processor Board is less than 10 VDC with the PP and PPS wires disconnected. Call the Factory.

Section 5 - LCD INTERFACE

5.1 OPERATING THE LCD INTERFACE

The LCD 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 below:


UP

UP button is used to scroll up to the next menu item or to increment a data value.


DOWN

DOWN button is used to scroll down to the next menu item or to decrement a data value.


MODE

MODE button is used to go back to the previous menu or to select a digit of a data value.


ENTER

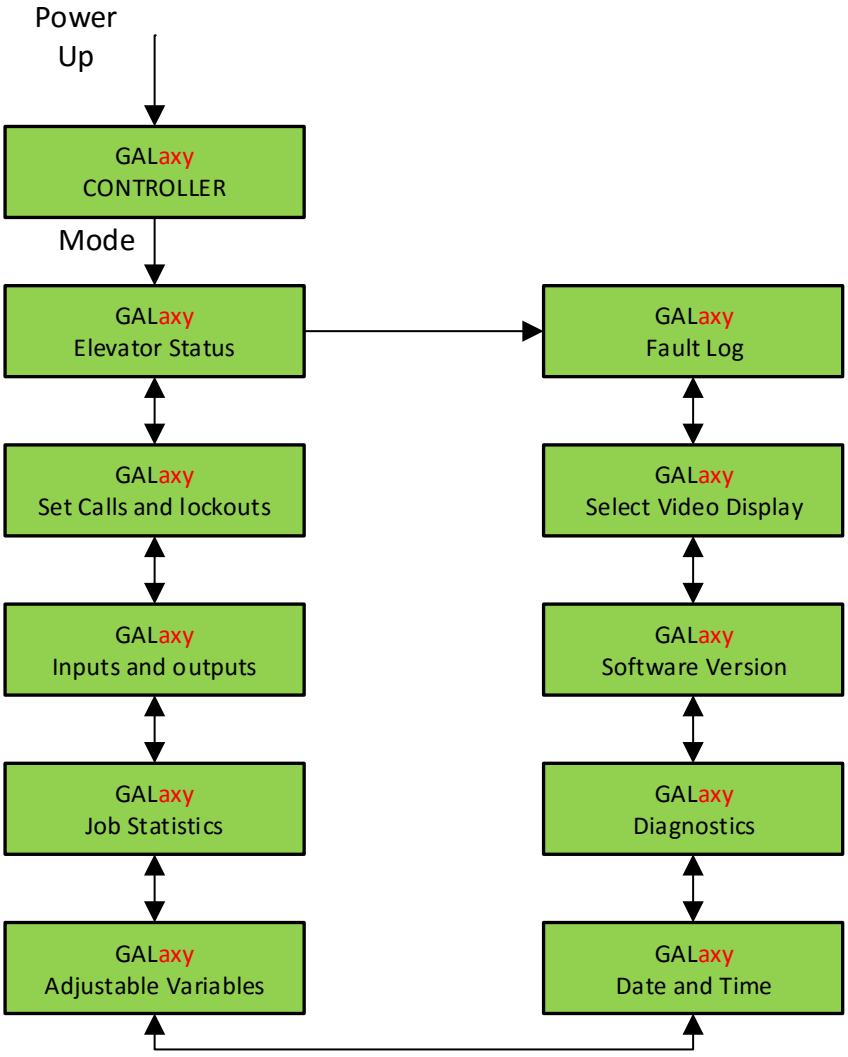
ENTER button is used to select the menu item or to complete the operation of changing a data value.

The potentiometer is used to adjust the viewing angle. It will make the display lighter or darker.

The four inputs buttons used with the LCD 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.

5.2 THE LCD MENU STRUCTURE

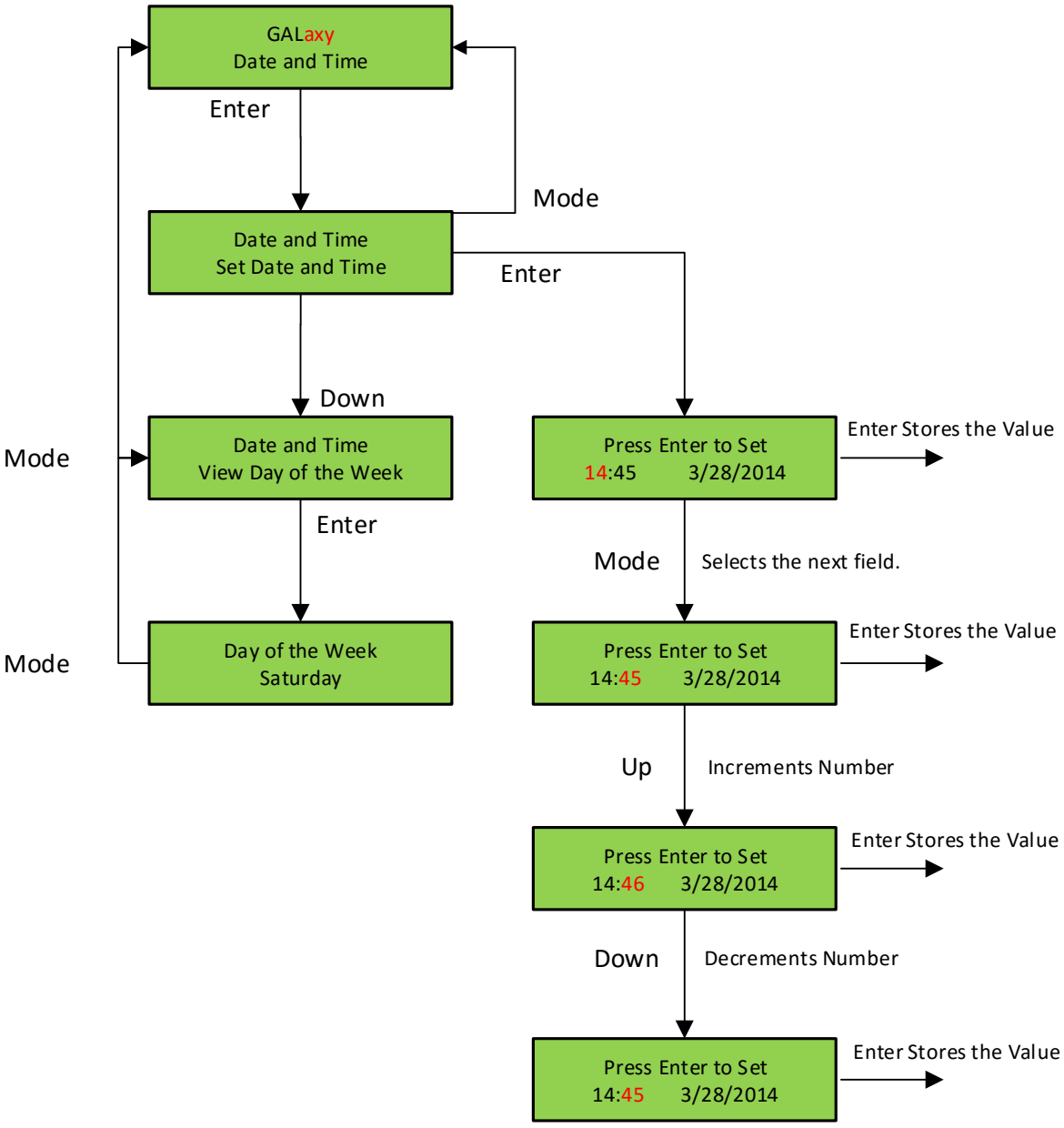
LCD Interface Main Menu



5.3 SET DATE AND TIME

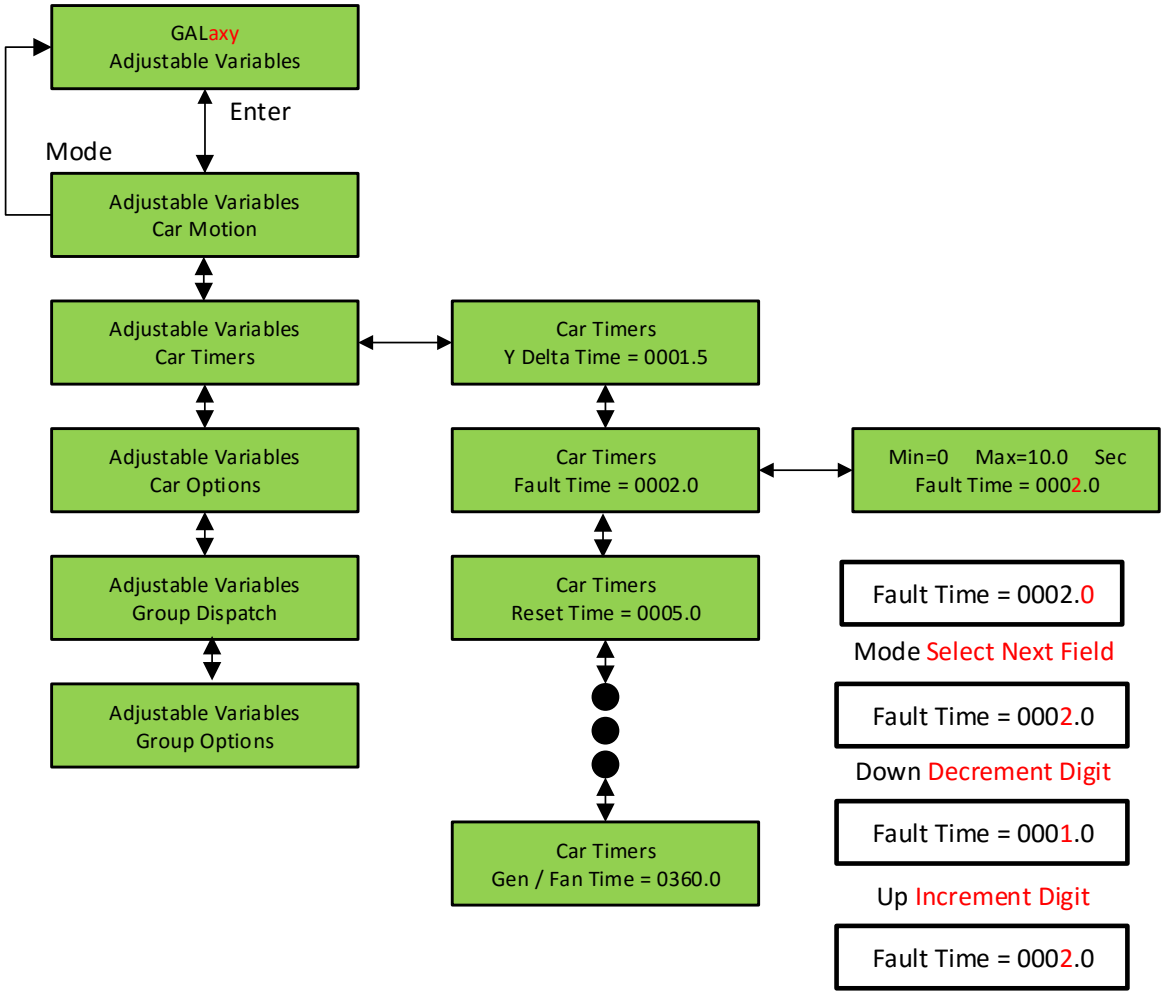
It is important to set the date and time on the controller clock so that the fault log shows the correct time sequence that faults occur.

Set Date and Time



5.3 ADJUSTABLE VARIABLES

LCD Interface Main Menu
Adjustable Variables



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 and the minimum and maximum values for each is shown below:

5.4 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.
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.
Relev Dly Tim	0	2	1	sec	**Relevel Delay Time.** The amount of delay time before the car will re-level. This would be used for jobs that have excessive rope stretch.
Short Fl Cntrl	0	7	0	-	**Short Floor Control.** 0 = Default is that the car relevels to the short floor. +1 = Car will make a run between very short floors instead of re- leveling. +2 = Short floor slowdown magnets between short floors (non-distance feedback). +4 = Mid Short floor slowdown magnets between short floors (non-distance feedback).
Short Fl hsf	0	1	0	-	**Short Floor hsf (High Speed Flag) With No high Speed Valve.** Controller makes a run but only with one valve. 0 = HS Output, 1 = No HS Out
Shrt Fl Dn SD	0	30	0	sec	**Short Floor Down Slowdown.** Hydro - There are no slow down magnets between short floors. This is a timer to run down high speed in seconds. If the timer is set to zero, controller will immediately level looking for the other zone. This should only be used if second selector is utilized.

Shrt Fl Up SD	0	30	0	sec	**Short Floor Up Slowdown.** Hydro - There are no slow down magnets between short floors. This is timer to run up high speed in seconds. If the timer is set to zero, controller will immediately level looking for the other zone. This should only be used if second selector is utilized.

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.
Inspect Speed ISER	0	150	40	fpm	**Inspection Speed.** When this value is set greater than or equal to the contract speed the ISER output will turn on to allow the car to run higher than leveling speed on inspection. Appropriate valve setup is required for this function to work.

Table 2: Car Timers					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Att Buz Delay	0	900	60	sec	**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.
Car Call Dwell	1	60	2	sec	**Car Call Dwell.** Door open dwell time when answering a car call only.
CB Door Time	1	3200	60	sec	**Code Blue Door Time.** Door time for Code blue operation once elevator is at the emergency floor before EMS is energized.
Door Delay Time	0	1.5	0	sec	**Door Delay Time.** Delay time between DO and DC to switch when opening or closing the door.
Door Fail Time	10	3200	25	sec	**Door Fail Time.** Time with power on the door without getting the door open limit.
Fault Time	0	10	2	sec	**Fault Time.** Delay time before allowing the car to run after a fault occurs.
Gen/Lt/Fan Time	30	3200	360	sec	**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.
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.
Handicap Dwell	1	120	25	sec	**Handicap Dwell.** Extended door time from pressing the ED button in the car.
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.

Table 2: Car Timers					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
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.
Lobby Dwell	1	60	5	sec	**Lobby Dwell.** Door open dwell time for a car at the lobby.
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.
Non Interfer T	1	60	2	sec	**Non-Interference Time.** Time between when you stop and when you can run again.
Nudging Time	20	3200	60	sec	**Nudging Time.** Delay time for a door to be held before going into nudging.
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.
Reset Time	0	10	5	sec	**Reset Time.** Delay time in the reset mode before allowing the car to run.
Run Cycle Time	0	300	0	hours	**Run Cycle Time.** 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.
Short Dwell Tim	0	60	1	sec	**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.
Stall Time	20	3200	60	sec	**Stall Time.** Maximum time a run is requested but the car is not moving.

Table 2: Car Timers					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Video Time out	0	3200	0	sec	**Video Time-out.** Turn off the machine room video after this timer times out. This function is disabled when set to zero.
Y Delta Time	1	5	1.5	sec	**Y-Delta Time.** Transfer time to change motor from Y start to Delta run. Timer also used for DEL or MCX turn on time with controllers without y-delta starters.

Table 3: Car Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Behind CC Canc	0	1	0	-	**Behind Car Call Cancel.** When enabled the elevator will not latch any car calls in the opposite direction of travel.
COM 1 Baud Rate	0	9	6	bps	**Com 1 User Interface Baud Rate.** Selects the bit rate of the COM 1 serial port. 0 = 2400 bps, 1 = 4800 bps, 2 = 9600 bps, 3 = 19200 bps, 4 = 38400 bps, 5 = 57600 bps, 6 = 115200 bps, 7 = 219254 bps, 8 = 226562.5 bps, 9 = 234375 bps
DCB Canc Dwell	0	1	0	-	**Door Close Button Cancel Dwell Time.** When this parameter is set to 1 we do not allow DCB to cancel the door dwell time. It basically disables DCB to shorten door dwell time.
Dis GL Test NY	0	0	0	-	**Disable Gate and Lock Test (New York City).** If this option is set to a 1 it will disable the gate and lock test. This option was implemented but is not used on GALaxy IV controllers.
DO No Actv DOL	0	1	0		**Door Open Output When Not 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.
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.
Double Stroke	0	1	1	-	**Double Stroke Gong Selection** Select 1 or 2 gongs for down hall calls. 0 = 1 gong and 1 = 2 gongs.

Table 3: Car Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Invert ISER	0	7	0	-	**Invert In Service Output.** 1 = The in service light output is turned off when the car is in service instead of turned on. 2 = The ISER output will function as an elevator in use light. 4 = This output functions as out of service from a shutdown and does not include independent, inspection or recovery mode.
Invert LOS	0	1	0	-	**Invert Low Oil Switch** (LOS)
Invert LPS	0	1	0	-	**Invert Low Pressure Switch** (LPS)
Invert TPL	0	1	0	-	**Invert Temperature Low Switch** (TPL)
Nudge Dis Ctl	0	7	0	-	**Nudging Disable Control.** +1 = Do not turn on the NUD output when doors are in nudging close mode, basically you are disabling nudging output. +2 When doors are in nudging close mode and SE input is ON, keep doors open and also keep FB/NB output latched. +4 = Sound the nudging buzzer but do not close the doors on nudging.
Nudge No Calls	0	1	0	-	**Nudge with No Calls.** If set to a 1 the doors will close on nudging even if the elevator has no onward calls.
Preopen Doors	0	3	0	-	**Preopen Doors.** +1 = Will enable preopening of the doors. If retiring cam used with auto door, RCM will also turn on at the preopening point. +2 = Exclude short floors.
Safe Test Day	1	31	0	day	**Safety Test Day.**
Safe Test Month	1	12	0	month	**Safety Test Month.**
Safe Test Year	2000	2999	0	year	**Safety Test Year.**

Table 4: Service Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Att CC from HC	0	1	0	-	**Attendant Car Call from Hall Call.** When set to 1 and the car is on Attendant service the respective car call will register when a hall call is registered.
DOB Over Sec	0	5	0	-	**DOB Override Security.** This parameter allows the car to open the door at a secured floor when the car is secured from the following conditions: 1 = The DOB will be allowed to open the door at any secured floor. 2 = The DOB can open the door at floors secured from group security floor mask table. 3 = Allows the DOB to open the front door at floors secured by car call lockout security (switches or card reader). 4 = Allows the DOB to open the rear door at floors secured from rear car call lockout security. 5 = Allows the DOB to open the door at floors locked out by group security floor mask tables when the car is also on independent.
Elev Off Ret Fl	0	Top Floor	0	floor	**Elevator Off Return Floor.** 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 this parameter is set to zero, car will be returned to the Lobby.
Em Power Floor	Bottom Floor	Top Floor	1	floor	**Emergency Power Recall Floor.**
Flash CB Light	0	1	0	-	**Flash Code Blue Light.** When set to 1 the code blue light inside the car station will flash.
HEOF Control	0	7	0	-	**Hall 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.

Table 4: Service Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
HSV Door Cl CC	0	1	0	-	**Hospital Service Close door Car Call.** Close the doors from a car call when the car is on Hospital Service.
IND Door Cl CC	0	1	0	-	**Independent Door Close Car Call.** Enable closing the doors from a car call when the elevator is on independent.
Ind Over Sec	0	7	0	-	**Independent Overrides Security.** 1 = Allow independent service to override security car call lockouts. 2 = Override Security Floor Mask configurations 4 = Override remote car call station.
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	count	**Load Weighing Anti-nuisance.** Set to the maximum number of car calls that can been entered before all car calls are cancelled 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.
Med Em Floor	Bottom Floor	Top Floor	1	floor	**Medical Emergency Return Floor.**
Med Em Sw Loc	0	1	0	-	**Medical Emergency Switch Location.** Selects the switch location for the front or rear door.
No Psg Run Cnt	0	10	0	count	**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 cancelled.

Table 4: 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.
Security Floor	0	Top Floor	1	floor	**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.*
Security Recall	0	15	0	-	**Security Recall Selection.** 0 = No: No Recall, +1 = Recall to Security Floor on activation of security. +2 = Cycle front door once recalled to the Security Floor. +4 = Cycle rear door once recalled to the Security Floor. +8 = Always recall to security floor after each run.
Stop At Lobby	0	15	0	-	**Stop at Lobby.** 0 = Do not automatically stop at lobby, +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. +4=Stop at lobby with any onward call past the lobby. +8=Recall to the lobby

Table 5: Fire Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
ALT Fire Floor	Bottom Floor	Top Floor	2	floor	**Alternate Fire Floor.**
Alt Rcl FS Off	0	3	0	-	**Alternate Floor Recall Fire Service Off.** +1 = 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.
Aux. Fire Sw.	0	1	0	-	**Auxiliary Fire Switch.** When set, the controller expects an auxiliary hall fire switch to be used.
F1 DC Time-out	10	60	20	sec	**Fire phase 1 Door Close Time-out.** 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.
Fire Main Floor	Bottom Floor	Top Floor	1	floor	**Fire Main Floor.**
Fire Option	0	3	0	-	**Fire Option.** Recall Reset Selection: 0 = Reset fire service phase 1 after hall switch is turned off and car returns to fire floor. 1 = Reset phase 1 immediately after hall switch is turned off.
Fire Option 2	0	3	1	-	**Fire Option 2.** +1 = Initiate a phase 2 recall only when the door is open (Chicago fire). +2 = Disable flashing FL on phase 2 (Chicago fire).
Fire Sw Loc	0	4	0	-	**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, 4 = Set from Dispatcher Car selection.

Table 5: Fire Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Hall Fire Light	0	4	0	-	**Hall Fire Light.** This variable controls the FSO output on the controller so it can be used for a hall fire light or a fire security override. The default operations is that FSO turns on while the car is on phase 1 or phase 2 fire service. +1 = On while phase 1 is in effect, +2 = Flash FSO at 1 second intervals while activated, +4 = FSO follows the Fire Light (FL) logic.
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 Loc	0	1	50	-	**Fire Service Hoistway HWS2 Sensor Location** 0 = same HW 1 = Separate hoistway
HWS 2 Fire Ret	0	1	0	-	**Second Hoistway Fire Service Sensor Return Option.** 0 = Main recall floor 1 = Alternate recall floor.
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.
Rcl from F1 Alt	0	1	0	-	**Recall From Fire Phase 1 Alternate Floor.** If the car has returned 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).

Table 5: Fire Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Recall Reset	0	3	0	-	**Recall Reset Selection.** 0 = Reset fire service phase 1 after hall switch cycled through reset and turned off and car returns to fire floor. 1 = Reset phase 1 immediately after hall switch is cycled through reset and then turned off. 2 = reset fire service without cycling fire switch through reset but turned off only if the smoke sensors were not activated.

Table 6: Group Dispatch					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Dn Pk Trig Cnt	1	100	12	count	**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.
Dn Pk Trig Time	0	3200	60	sec	**Down Peak Trigger Time.** The time interval to count the number of down hall calls above the lobby to activate down peak operation.
Down Peak Time	0	3200	180	sec	**Down Peak Duration Time.** The duration time for down peak operation once down peak is activated.
ETA Co CC Time	0	60	15	sec	**ETA 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.
ETA Min Time	0	60	6	sec	**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.
Lobby Floor	Bottom Floor	Top Floor	1	floor	**Lobby Floor.**
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 6: 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. 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. 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. 4 = Next up is activated on Up Peak detection only. Next up can also be activated from an input.
Park Delay Time	0	120	8	sec	**Parking Delay Time.** Time delay an idle car waits before being parked.
Parking	0	Number Cars	1	car	**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.
Parking floor 1	0	Top Floor	0	floor	**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. See also Parking Type.
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.

Table 6: Group Dispatch					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Parking Width	0	Top Floor	0	floor	**Parking Width.** The number of floors that a car is within to be considered parked at the parking floor. See also Parking Type.
Up Peak Time	0	3200	180	sec	**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 Pk CC Count	1	40	3	count	**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 Pk Trig Cnt	1	100	3	count	**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 Trig Time	0	3200	60	sec	**Up Peak Trigger Time.** The time interval to count the number of up peak triggers.

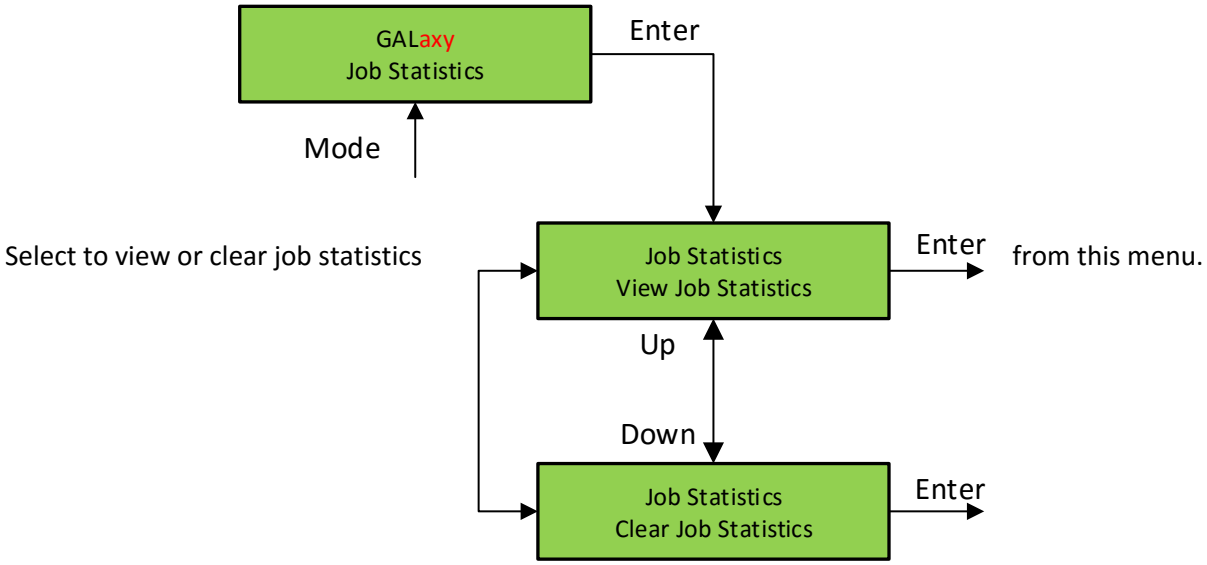
Table 7: Group Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
1st EP Run Car	0	Number Cars	1	car	**First Emergency Power Run Car.** This is the first car selected to run. If this car cannot run, the next consecutive car is selected.
1st Recall Car	0	Number Cars	1	car	**First Recall Car.** This is the first car allowed to recall during the emergency power recall sequence. The recall sequence continues in consecutive order and then loops around until all cars are recalled.
CB Req Ind Car	0	1	0	-	**Code Blue Request Independent Car.** Code blue request for car on 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.
Code Blue Car	0	Number Cars	0	car	**Code Blue Car.** 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.
Dis Opp HC Time	10	30	10	sec	**Disable Opposite Hall Call Time** Specify amount of time the opposite hall call will be disabled.
Em Power Cars	1	Number Cars	1	car	**Number of Emergency Power Cars** Number of cars that can run at the same time on the emergency power source.
Emerg Dispatch	0	7	0	-	**Emergency Dispatch.** This parameter is applied to both the car that is selected as the dispatcher and also the non-dispatcher cars. If set to 1 and hall call power is lost, the dispatcher car will set down hall calls above the lobby and up hall call at and below the lobby. For the non-dispatcher cars, if set to a 1, and communications is lost to the dispatcher car, the car will dispatch itself to down hall calls above the lobby and up hall calls below the lobby. The front hall call and rear hall call bits settings are only used for the dispatcher car and when set, if communication is lost to a particular hall call board, hall calls are set for the affected floors.

Table 7: Group Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
HC X-Assign En	0	5	0	-	**Hall Call Cross Assignment Enable.** 1 = Front hall call cross assignment is enabled, 4 = Rear hall call cross assignment 5 = Front and rear hall call cross assignment. 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.*** 2 = Hall calls cross cancellation is used and hall calls are not cancelled when all cars are out of service. A setting of 3 for both hall call assignment and cancellation is not valid and may cause unpredictable results.
HC X-Assign ETA	0	500	60	sec	**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.
IR Car	0	Number Cars	0	car	**Inconspicuous Riser Car.** This car is assigned all the IR hall calls.
IR Control	0	7	0	-	**Inconspicuous Riser Control.** This parameter alters how IR riser service is activated or deactivated. 0 = IR active from ICR or RICR input. +1 = IR activated when any IR call is activated. +2 = Finish car calls then answer IR calls, +4 = Finish car call before going off IR.
OTS No HC Canc	0	1	0	-	**Out of Service No Hall Call Cancelled.** Do not cancel hall calls if cars are out of service. This is used in accordance with cross assignment feature.
Recall Timeout	1	600	60	sec	**Recall Time-out.** The time allowed for the car to reach the recall floor during the emergency power recall sequence. If this timer expires, the next car is selected to recall.

Table 7: Group Options					
Field Variable	**Min**	**Max**	**Initial**	**Units**	**Description**
Single Auto PB	0	5	0	-	**Single Automatic Push Button Operation.** 0 = Manual Doors (this would be the normal operation for cars with manual doors). 1 = Enable SAPB operation for simplex car with automatic doors. 2 = Disable SAPB operation for cars with manual doors. 3 = Invalid setting. 4 = Allow only one car call to be entered at floor for cars with manual doors regardless of the door position. 5 = Allow only one car call to be entered at floor for cars with automatic doors. This feature normally allows only hall calls and car calls to register when the doors are closed.
Vid Pos Car 1	1	Number Cars	1	car	**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	Number Cars	2	car	**Video Position Car 2.** See Video Position Car 1 for an explanation.

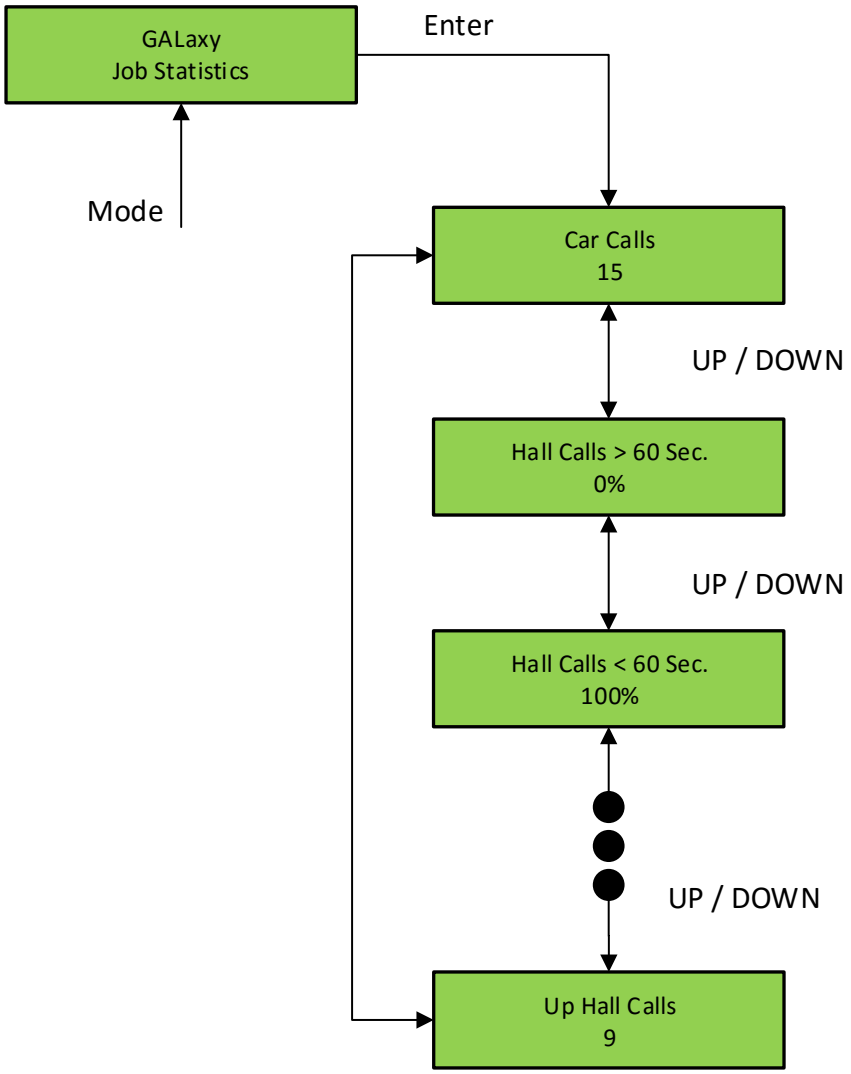
5.5 JOB STATISTICS

LCD Interface Main Menu
Job Statistics



5.6 VIEW JOB STATISTICS

LCD Interface Main Menu
View Job Statistics

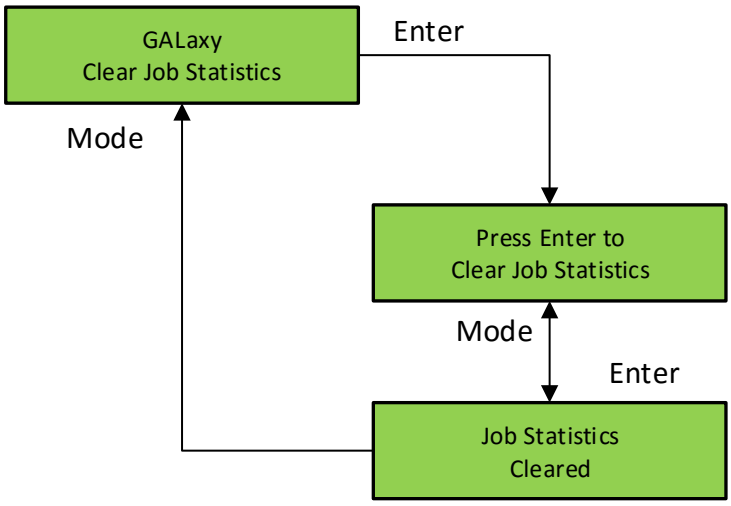


The Job Statistics shows the number car calls and the number and percent of hall calls serviced since the job was started or since the job statistics were cleared. Below is a list of all the categories maintained:

- 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

5.7 CLEAR JOB STATISTICS

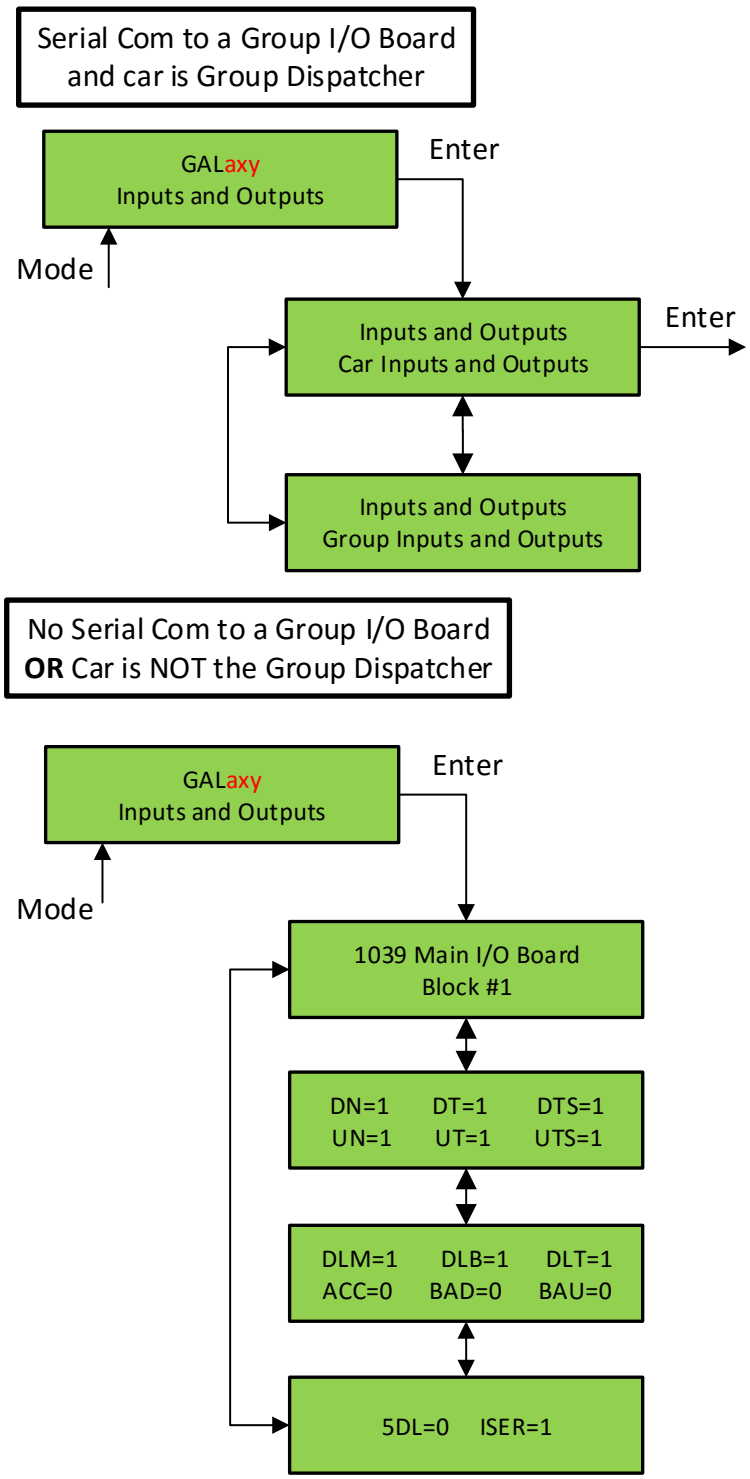
LCD Main Menu
Clear Job Statistics



This operation will set all the job statistics data to zero.

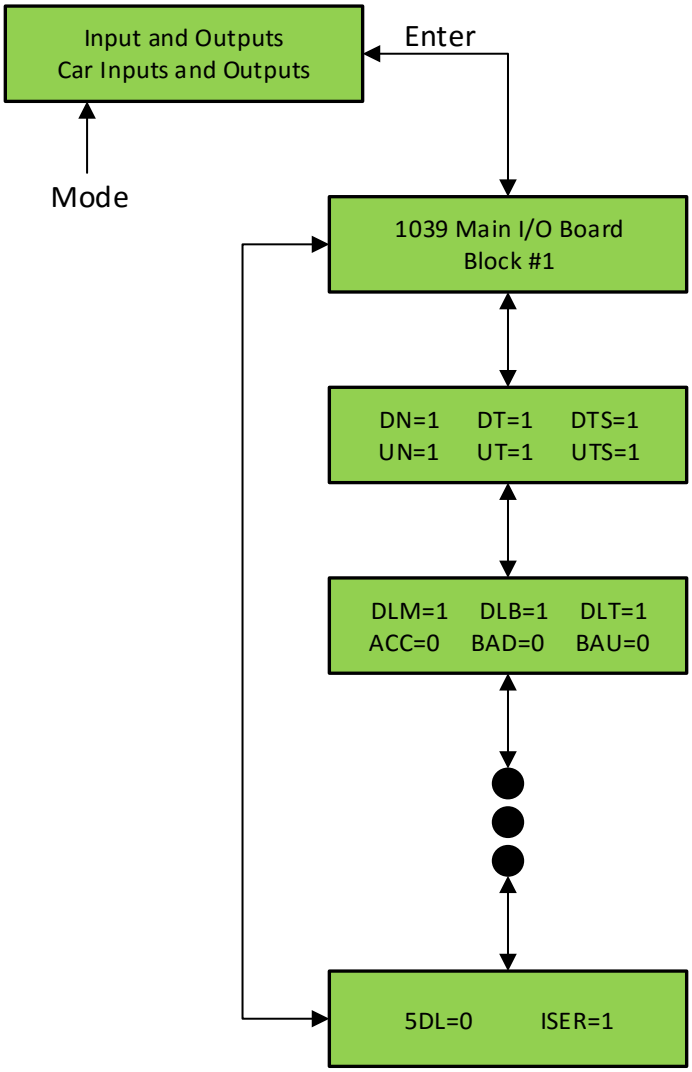
5.8 INPUTS AND OUTPUTS

Inputs and Outputs



5.9 CAR INPUTS AND OUTPUTS

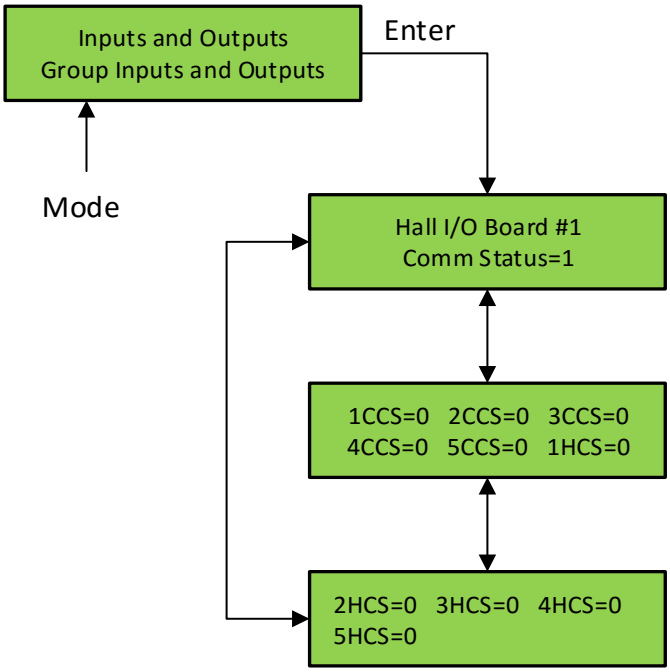
Car Inputs and Outputs



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.

5.10 GROUP INPUTS AND OUTPUTS

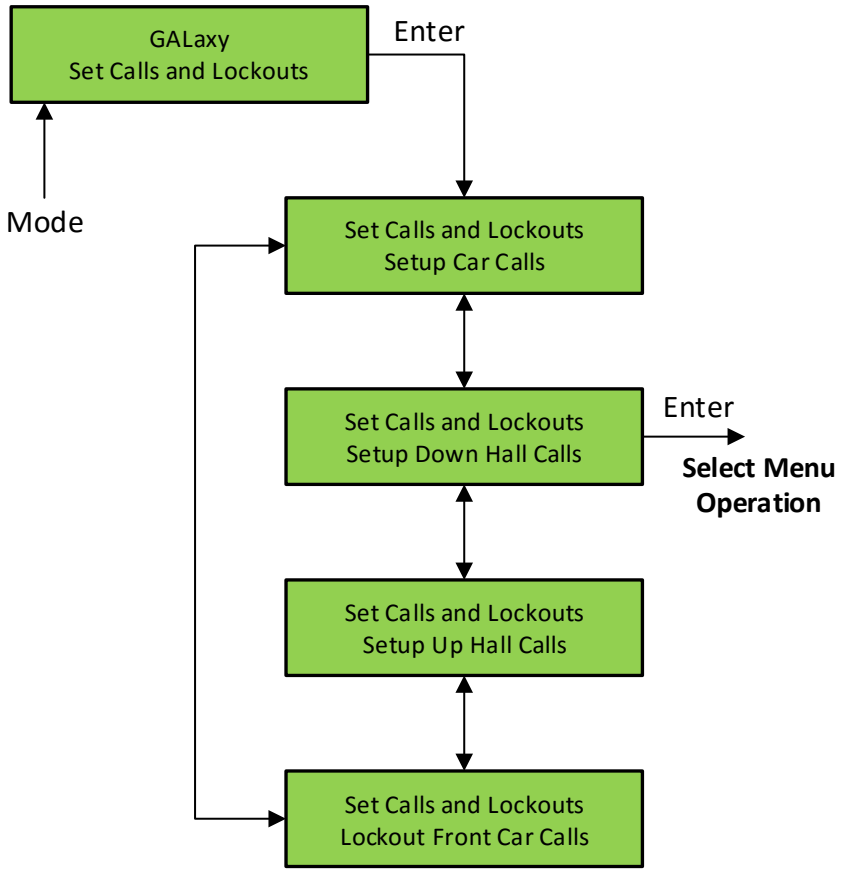
Group Inputs and Outputs



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 boards are used. It the hall calls are place 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/Os for a given board are displayed even if a particular I/O is not used.

5.11 SET CALLS AND LOCKOUTS

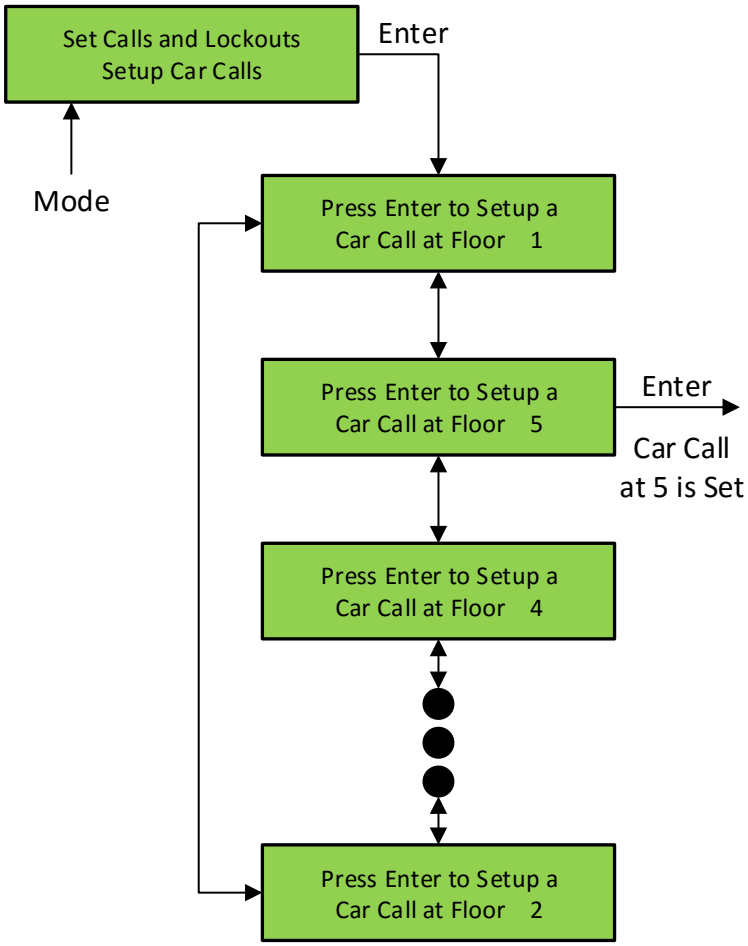
Set Calls and Lockouts



When a car is 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.

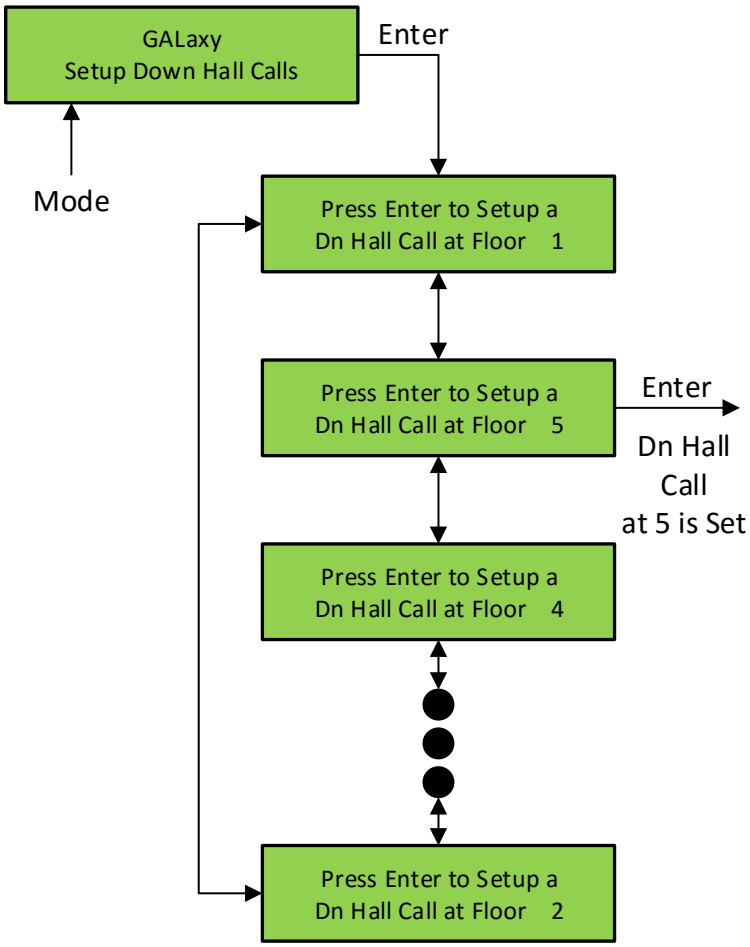
5.12 SETUP CAR CALLS

Setup Car Calls



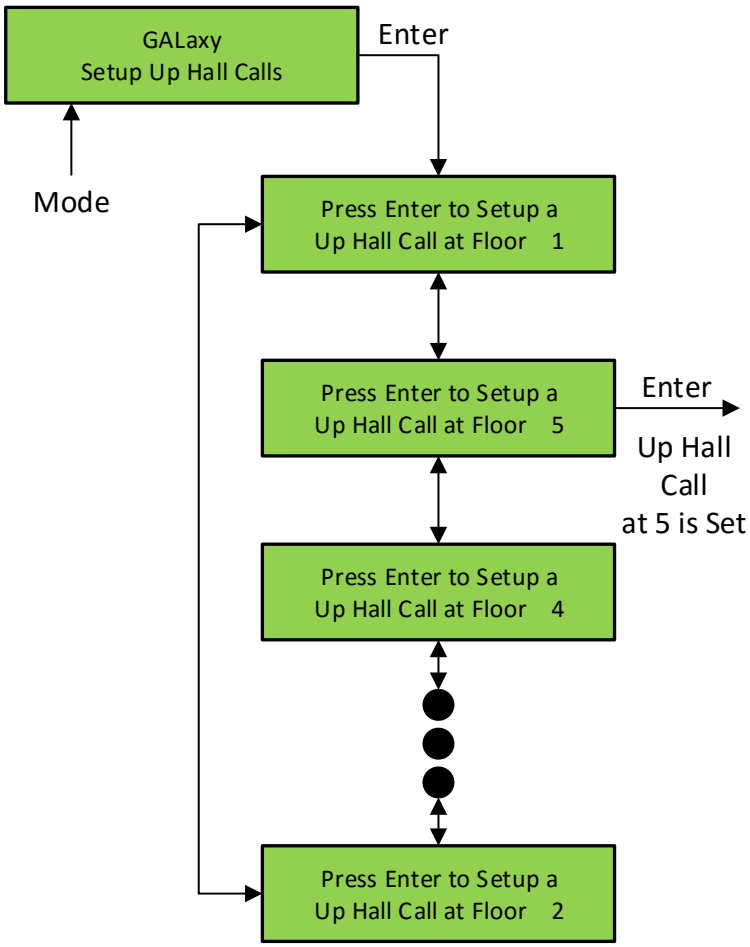
5.13 SETUP DOWN HALL CALLS

Setup Down Hall Calls



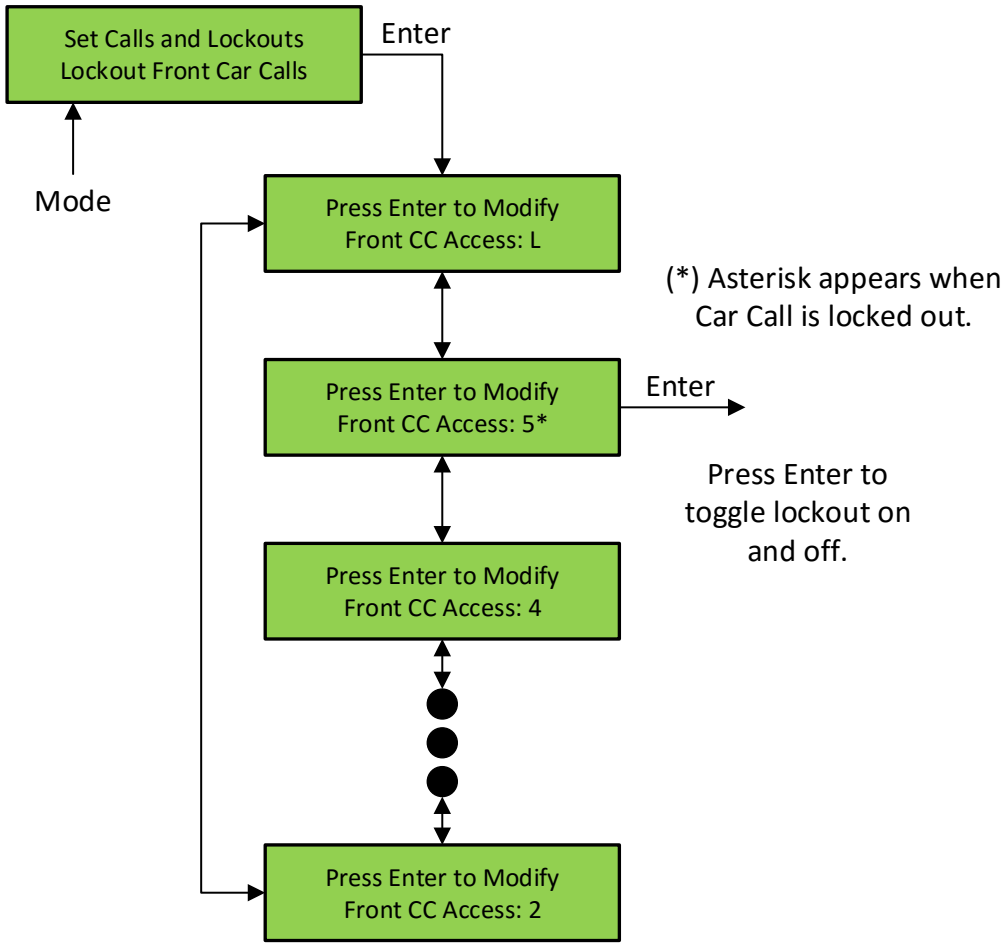
5.14 SETUP UP HALL CALLS

Setup Up Hall Calls



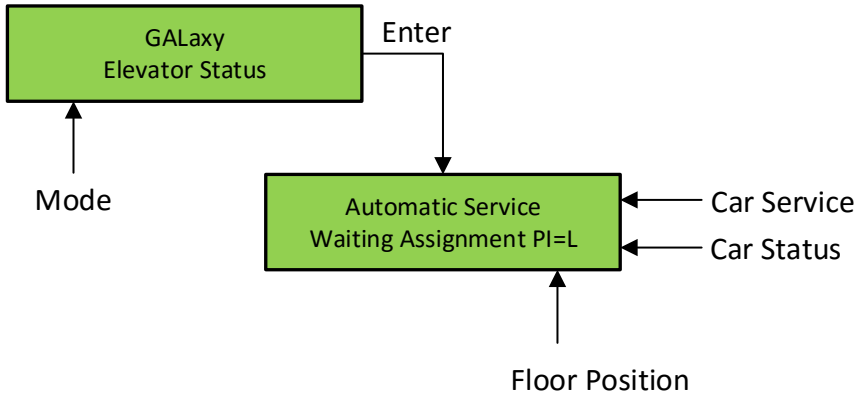
5.15 LOCKOUT FRONT CAR CALL

Lockout Front Car Calls



5.16 ELEVATOR STATUS

Elevator Status



The elevator status display continuously updates to show the current status and fault information. 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:

Elevator Service:

Out of Service
Automatic Service
Independent Service
Load Weighing By Pass
Attendant Service
Code Blue Service
Fire Service Phase 2
Emergency Power Service
Earth Quake Service
Fire Phase 1 Main Return
Fire Phase 1 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
Car Safe Fault
UL or DL off Fault
Delta off Fault
UT count Fault
DT count Fault
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
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
Estop Fault
Inspection Input Flt
Gate/Lock Byp Sw Flt

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 Decel	PI= 1
Constant Decel	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

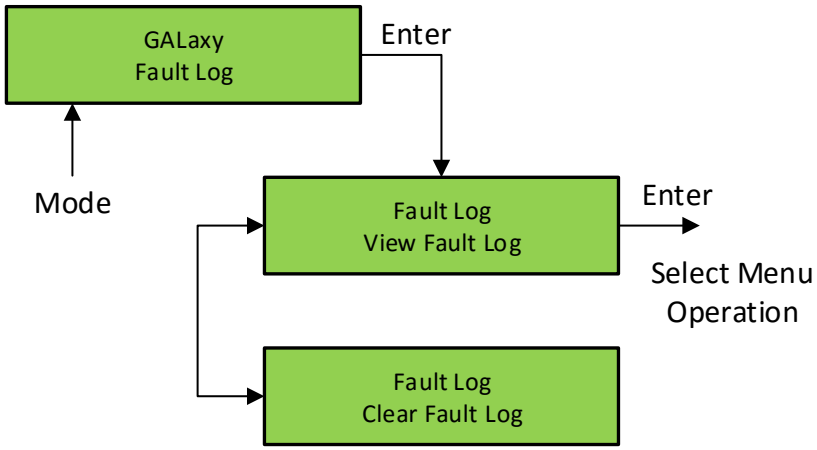
Door Status:

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

5.17 FAULT LOG

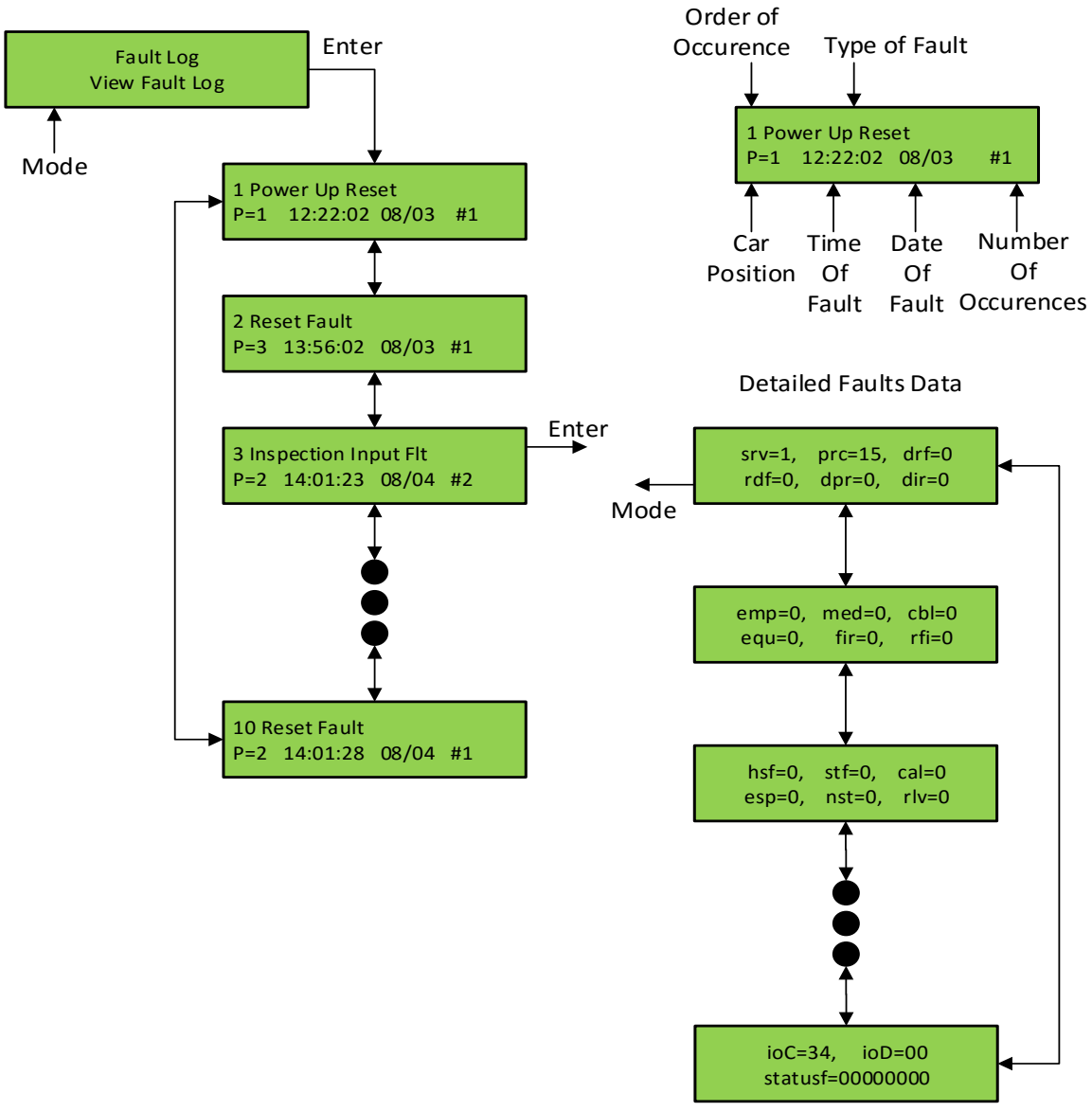
Fault Log



This menu allows the user to view or clear the fault log.

5.18 VIEW FAULT LOG

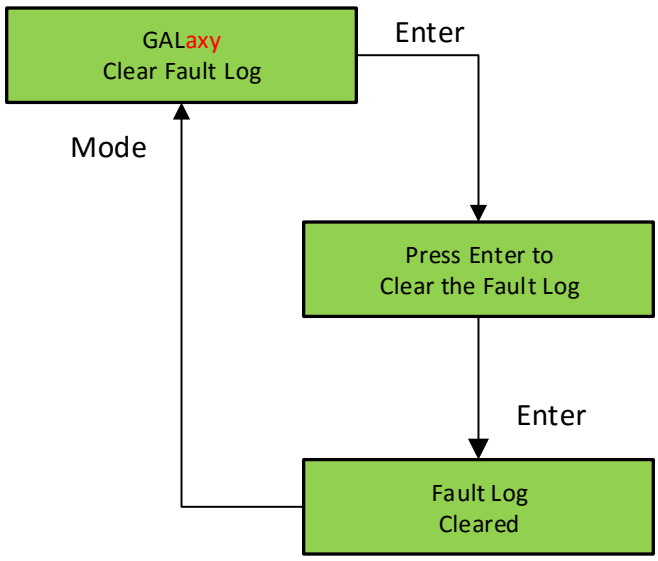
View Fault Log



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.

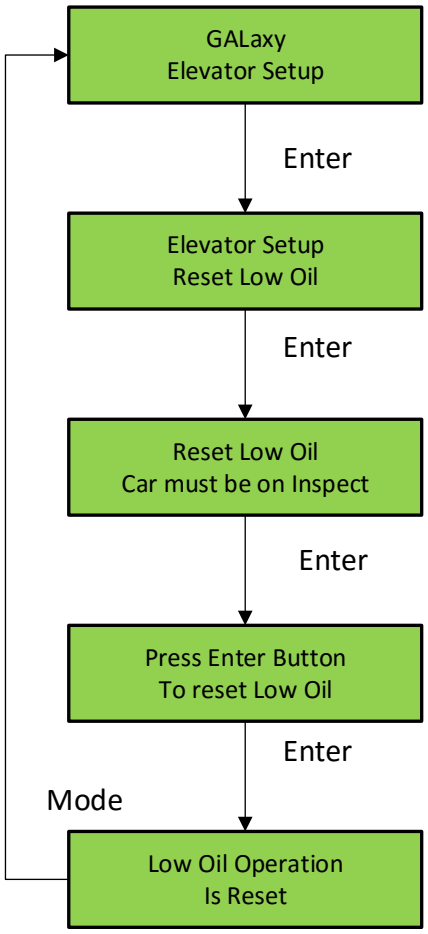
5.19 CLEAR FAULT LOG

Clear Fault Log



This operation clears the fault log. Once cleared, all faults will show “No Occurrences” until a new fault occurs.

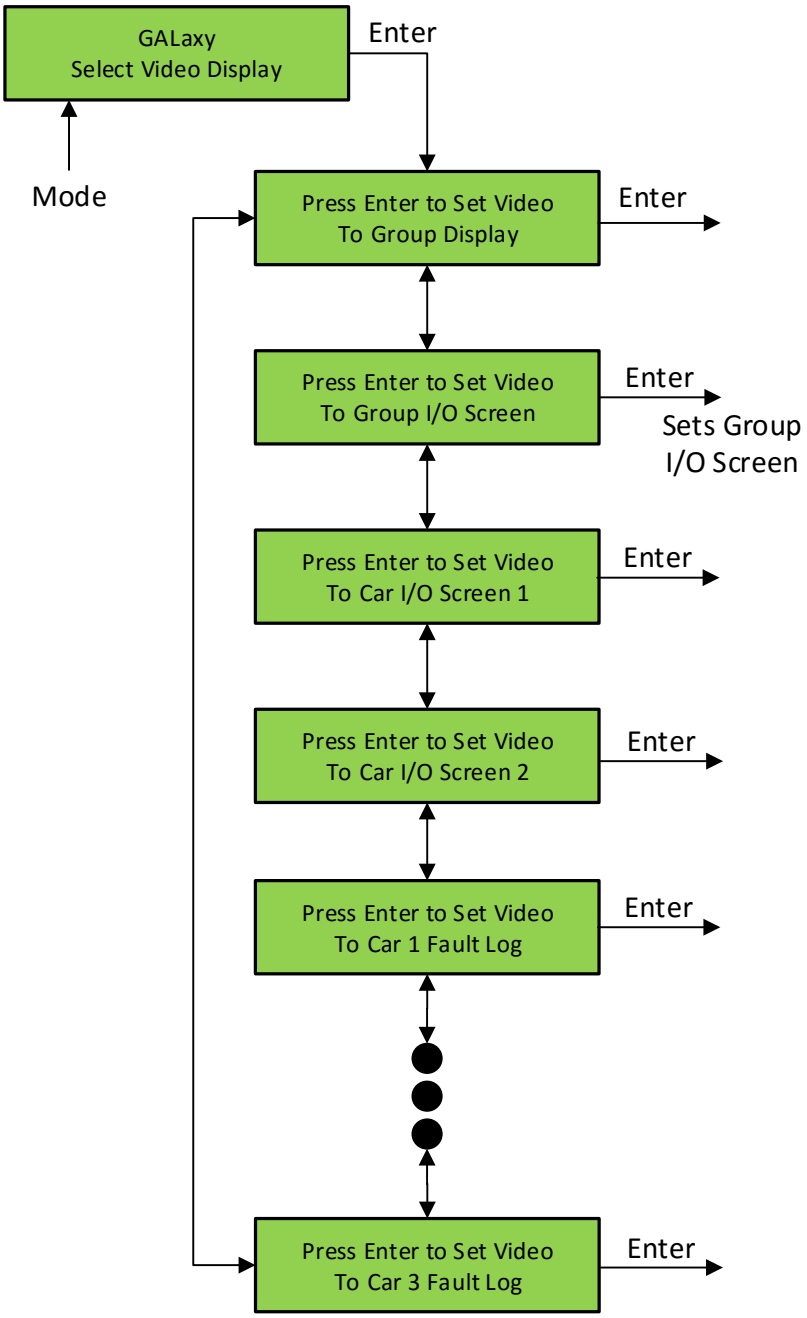
5.20 RESET LOW/HOT OIL



NOTE: Reset Hot Oil is similar.

5.21 SELECT VIDEO DISPLAY

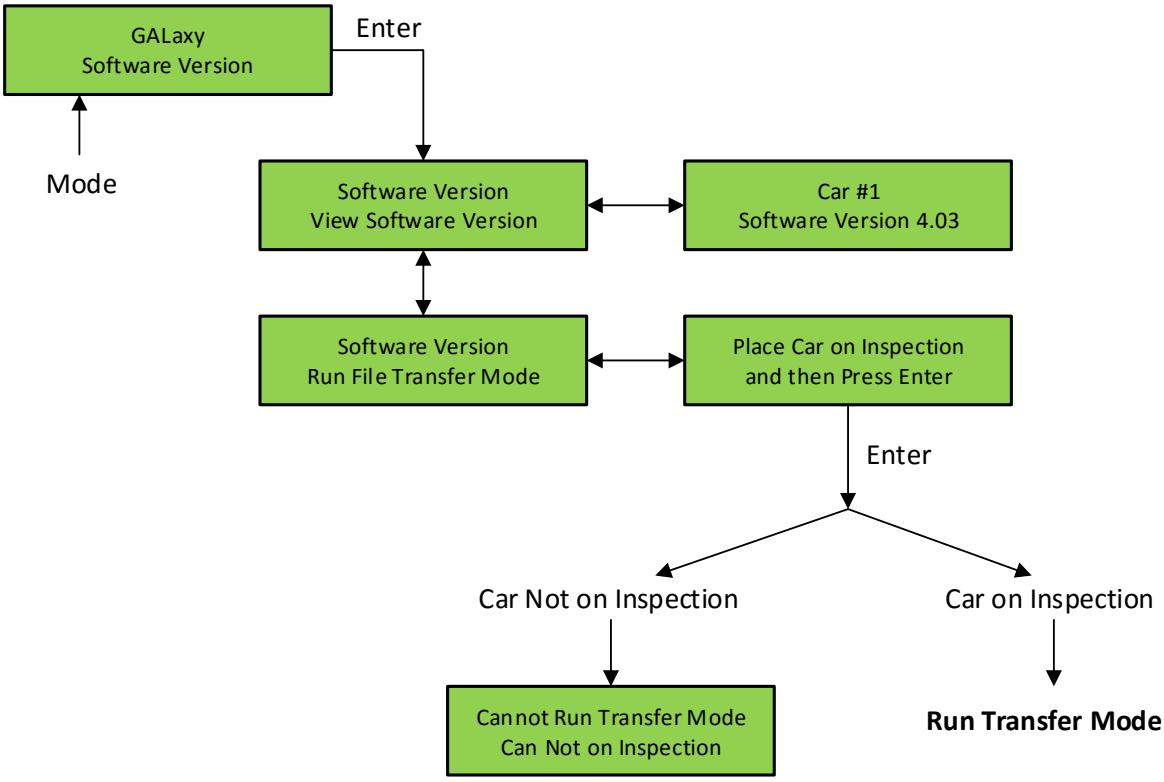
Select Video Display



On jobs with an optional video display, this menu allows the user to change video display screen from the group display and group I/O screen to each of the car I/O and fault displays. The group I/O screen is only viewable if this is the group car and the controller uses serial hall call boards. Depending on the number of floors, the number of car I/Os might not fit on one screen. To view the remaining I/Os, select I/O Screen 2.

5.22 SOFTWARE VERSION

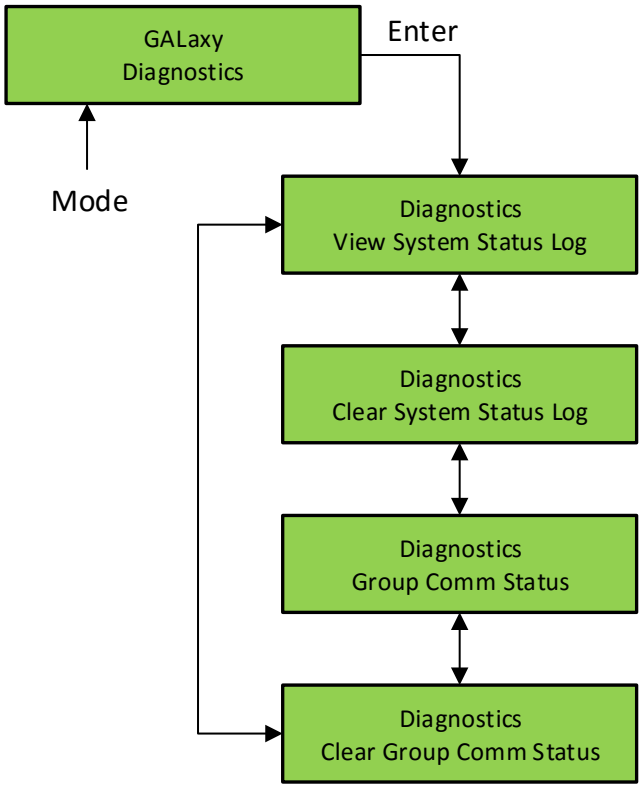
Software Version



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 4.03.

5.23 DIAGNOSTICS

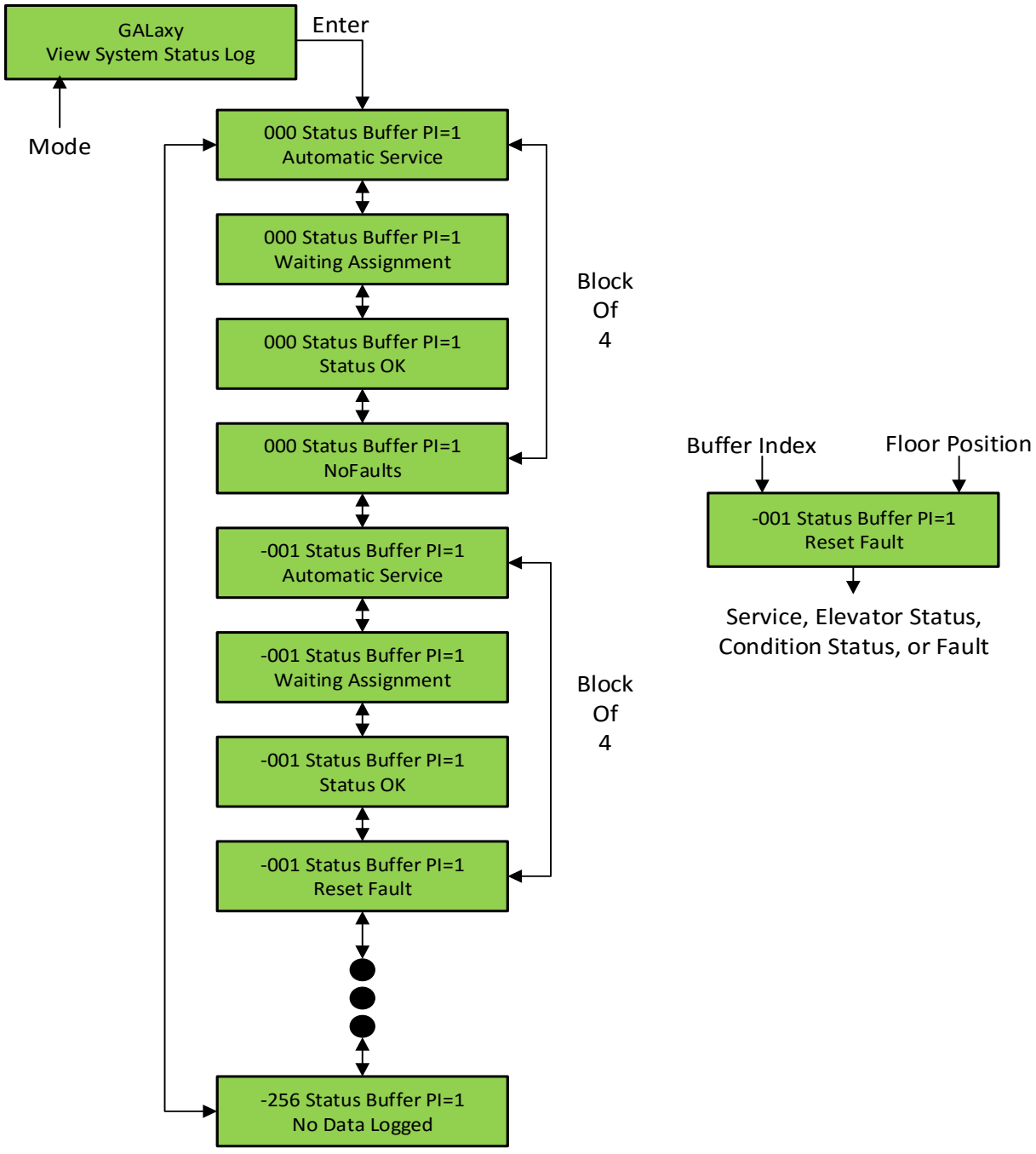
Diagnostics



This menu allows access to diagnostic information to help troubleshoot operational or communication errors.

5.24 VIEW SYSTEM STATUS LOG

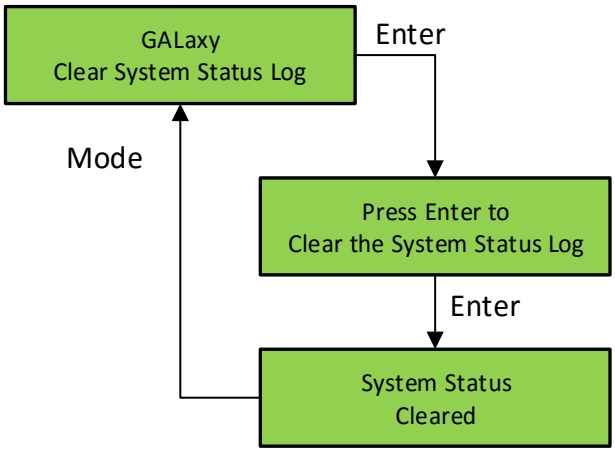
View System Status Log



System status information is stored in a circular buffer whenever the service, elevator status or a fault occurs. This buffer holds 256 blocks of data in the sequence in which the events occur. This data can be used to debug a sequence of events that cause a fault. The most recent block of information is always at location 000 and the event prior to the most recent is at block location –001. The event at block –002 happened before block –001 and also before block 000.

5.25 CLEAR SYSTEM STATUS LOG

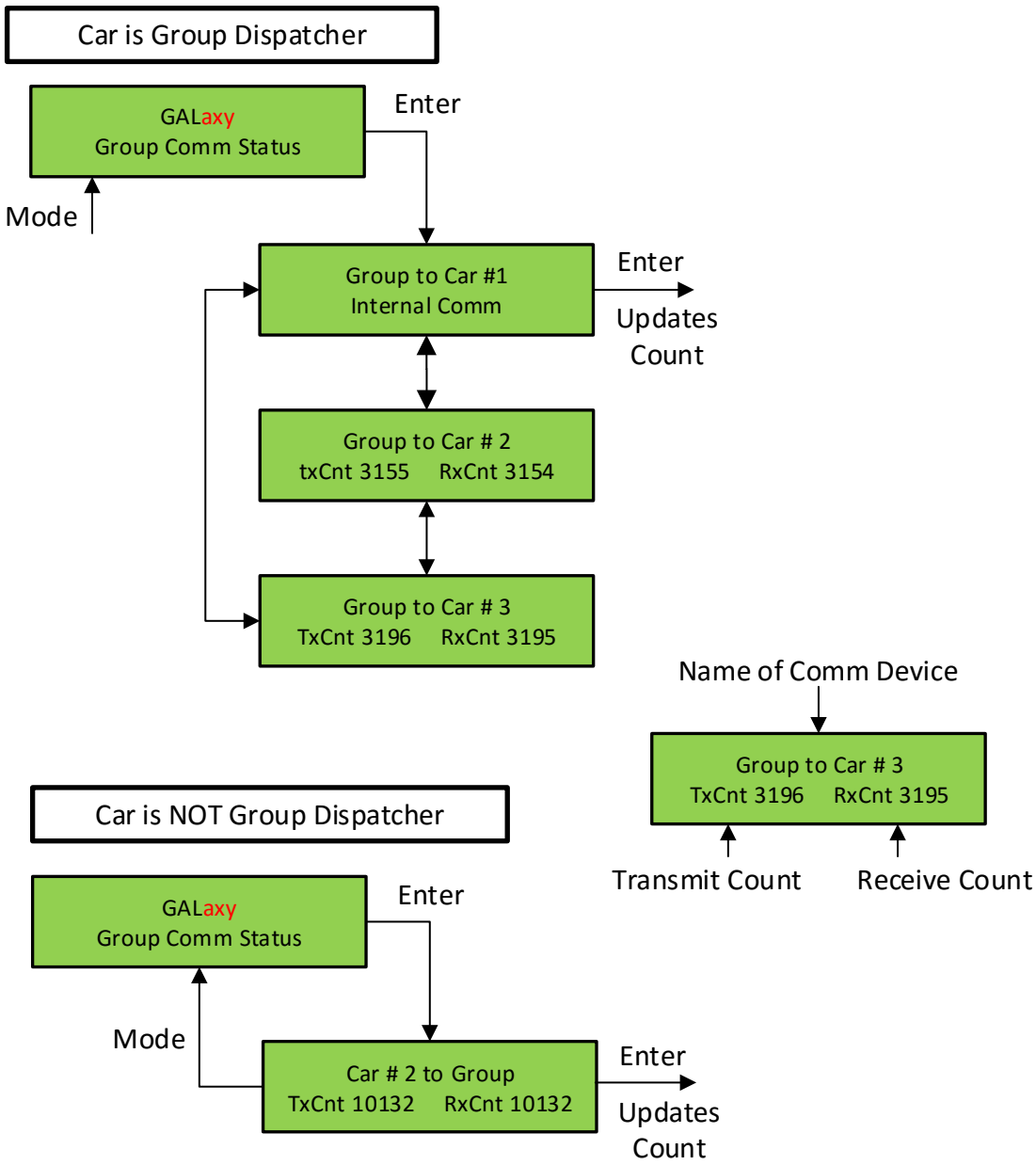
Clear System Status Log



The system log can be cleared to get a new starting point. When cleared, an empty block displays “No Data Logged”.

5.26 GROUP COMM STATUS

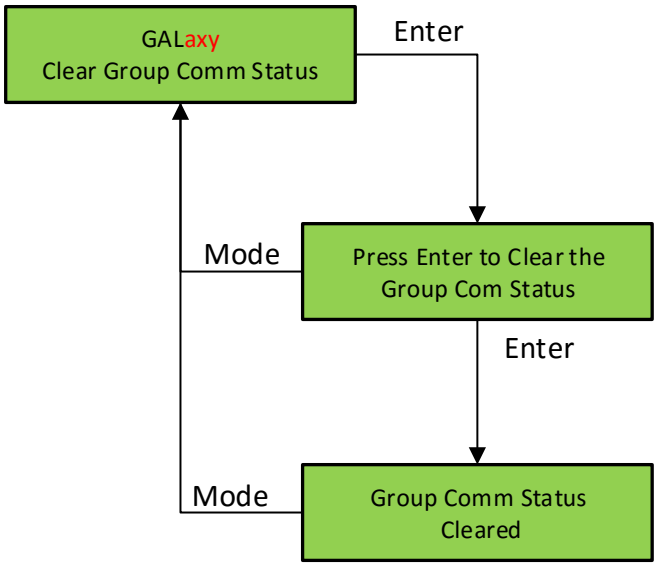
Group Comm Status



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.

5.27 CLEAR GROUP COMM STATUS

Clear Group Comm Status



This menu is used to clear the transmit and receive counters for the group to car serial communications.

Section 6 - SAFETY PROCESSOR LCD INTERFACE

6.1 OPERATING THE LCD INTERFACE

The Safety Processor Board LCD interface board uses a 2 line by 8 character display and four buttons. This interface allows the user access to the internal data and operation of the Safety Processor CPU such as setup and adjustment variables, and critical control and fault information. Upon power-up, the display shows a blinking GALaxy name to indicate the board is running


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.

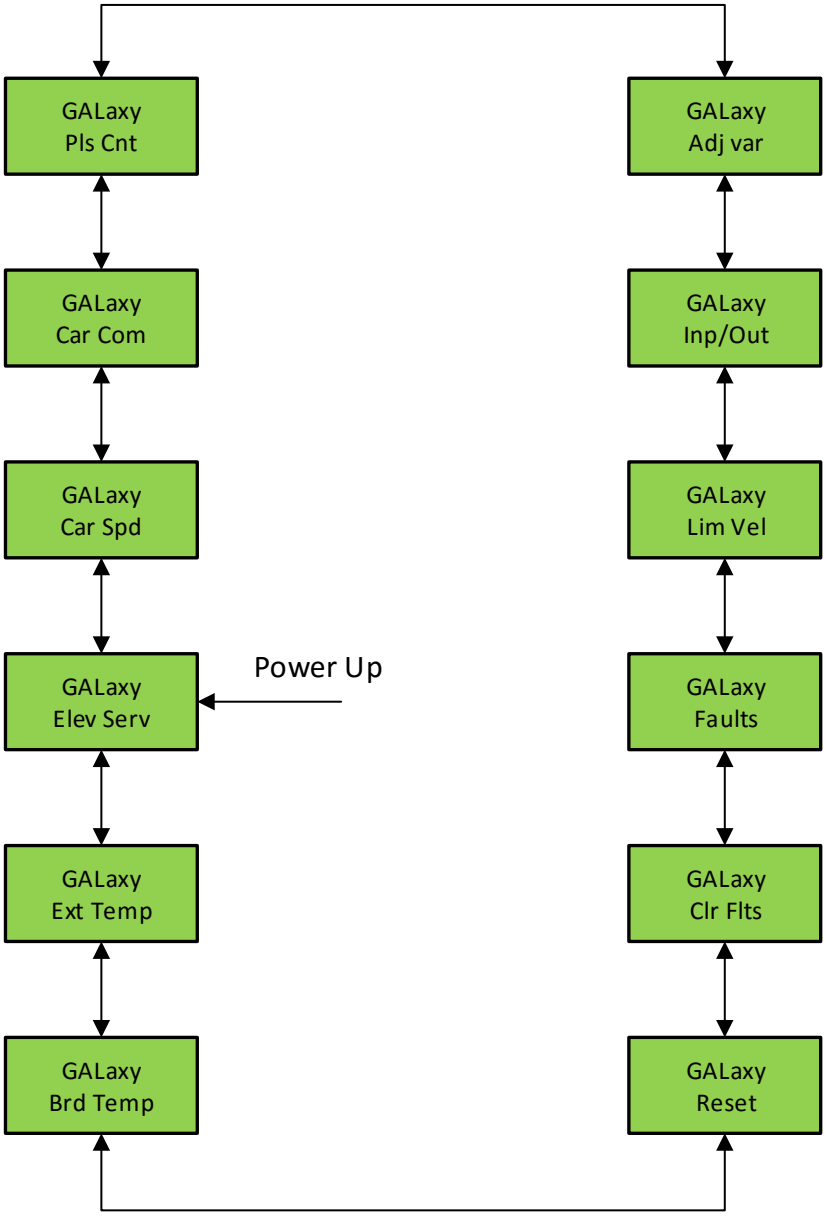

ENTER button is used to select the menu item or to complete the operation of changing a data value.


The potentiometer is used to adjust the viewing angle. It will make the display lighter or darker.

The four inputs buttons used with the LCD 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.

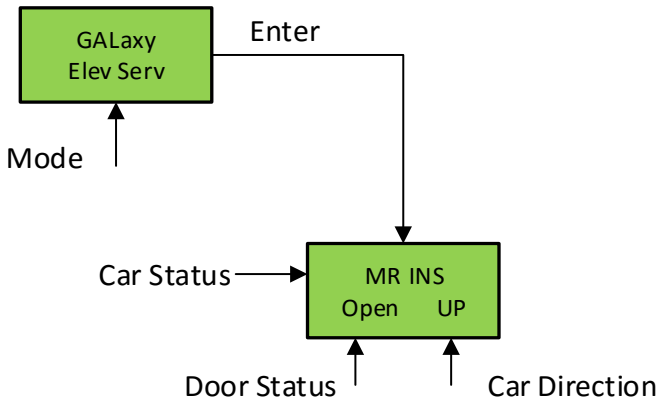
6.2 THE SAFETY PROCESSOR BOARD LCD MENU STRUCTURE

Safety Processor LCD Display Menu



6.3 ELEVATOR SERVICE

Elevator Service

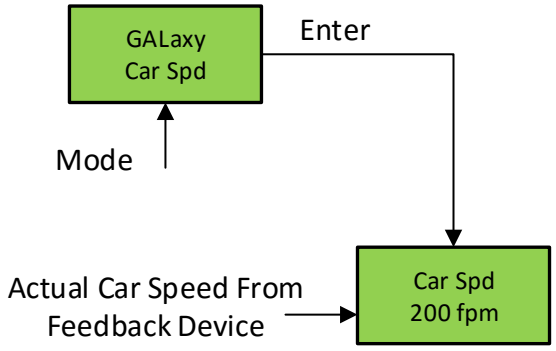


This screen shows the service the car should be on from the inspection inputs, the gate and lock bypass switch inputs and the gate and lock inputs. If any inputs are in error, the error status is displayed. Below shows a list of what is displayed and the condition for it.

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.

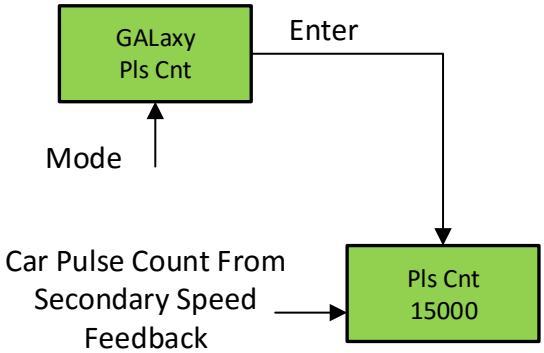
6.4 CAR SPEED

Car Speed



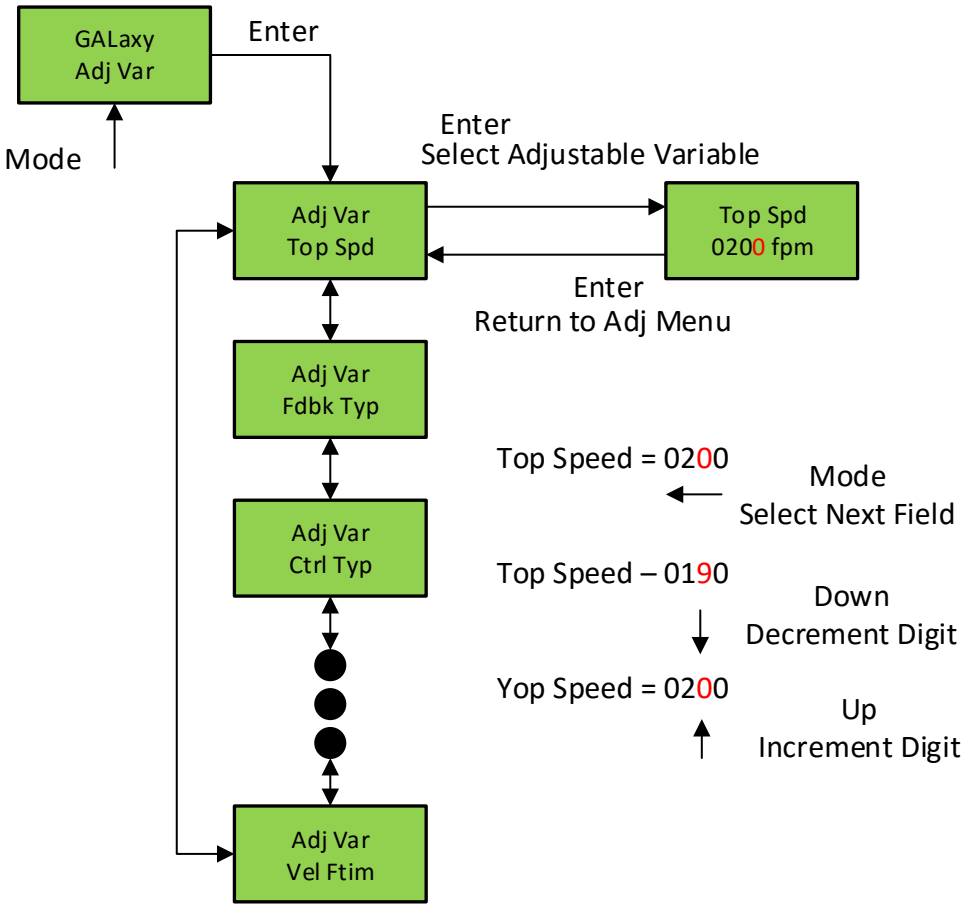
6.5 SAFETY PROCESSOR PULSE COUNT

Safety Processor Pulse Count



6.6 SAFETY PROCESSOR ADJUSTABLE VARIABLES

Safety Processor Adjustable Variables



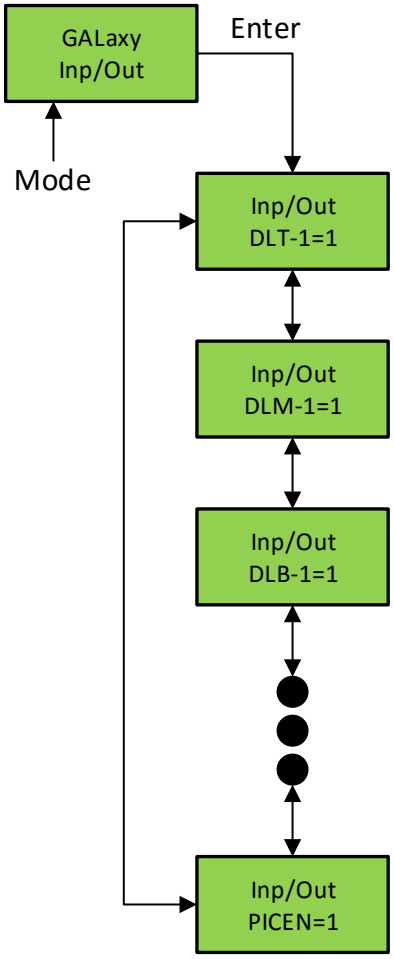
6.7 SAFETY PROCESSOR ADJUSTABLE VARIABLES

Adjustable Variable	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.
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.

Adjustable Variable	Min	Max	Initial	Units	Description
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 slow down before the Safety Processor can shut the car down from a limit velocity error.
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 slow down 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.

6.8 SAFETY PROCESSOR INPUTS AND OUTPUTS

Safety Processor Inputs and Outputs

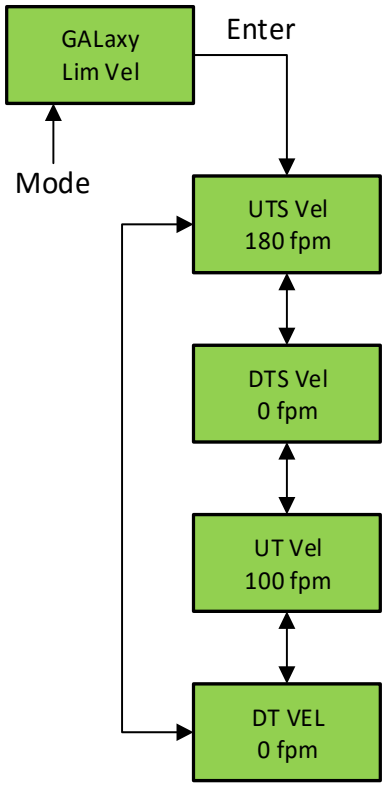


This display shows all the inputs and outputs of the Safety Processor. The following table shows the name description for each I/O.

Safety Processor I/O 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.
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.

6.9 LIMIT VELOCITY

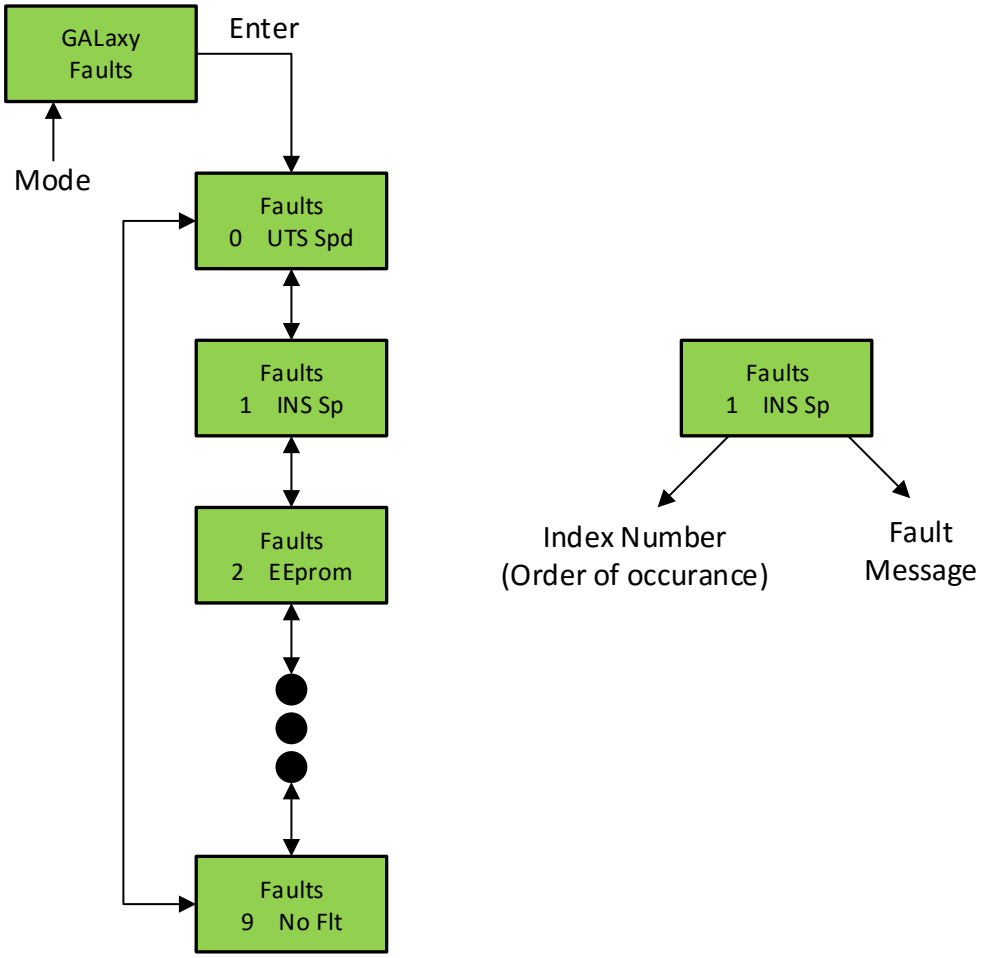
Limit Velocity



Each time the car hits a limit while running, the velocity for that limit is stored in ram and can be displayed. This velocity value is cleared on a run in the opposite direction.
This display is used to setup the slowdown velocity adjustable variables. Once the car is running on automatic, send the car to the terminal limit and record the velocity value after the car stops. Start with a one-floor run and increase the distance of the run by one floor until the car reaches top speed. Use the highest velocity value for that limit as the adjustable variable value.

6.10 SAFETY PROCESSOR FAULTS

Safety Processor Faults

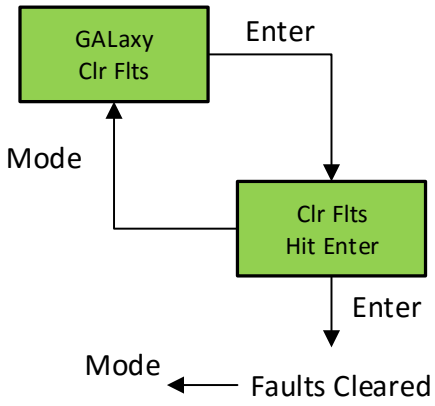


Faults are displayed in the order that they occur with index 0 being the most recent. In the figure above, an EEprom fault occurred followed by an Inspection Speed fault followed by a UTS Speed fault. Any index location that does not yet contain a fault will show No Flt.
There are 10 fault locations all of which are cleared on power up or from the clear fault menu. The following is a list of faults and their causes.

SAFETY PROCESSOR FAULT	DESCRIPTION AND CAUSE
No Flt	No fault is recorded in this index location.
Invalid	Invalid fault number. (This can only be caused by a programming error in the chip).
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.
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.
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.
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.
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.
INS Sp	Inspection Speed Fault. The car exceeded the INS Velocity adjustable variable while running on inspection. The car will immediately shut down.
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.
DL/GS	Door Lock/Gate Switch Fault. Car is moving outside the door zone with the door open. The car will immediately shut down.
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: 5. All inspection inputs and the auto input are off. 6. More than one inspection or auto input is on at the same time. 7. A bypass input is on while the car is not on Car top inspection. 8. 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.
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.
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: 5. Improper connection for PP and PPS. Refer to the job specific prints. 6. PP and PPS field wires need to be swapped. 7. Photocoupler in selector is faulty. Call the Factory. 8. Voltage from PP to 0V on the Safety Processor Board is less than 10 VDC with the PP and PPS wires disconnected. Call the Factory.

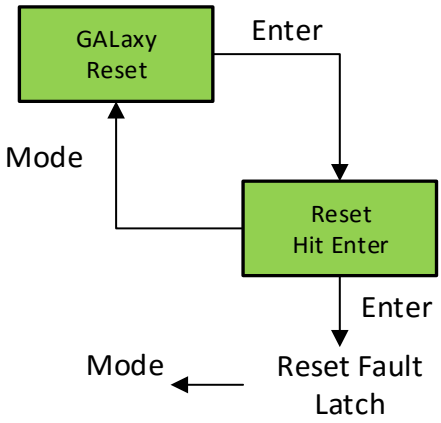
6.11 CLEAR FAULTS

Clear Faults



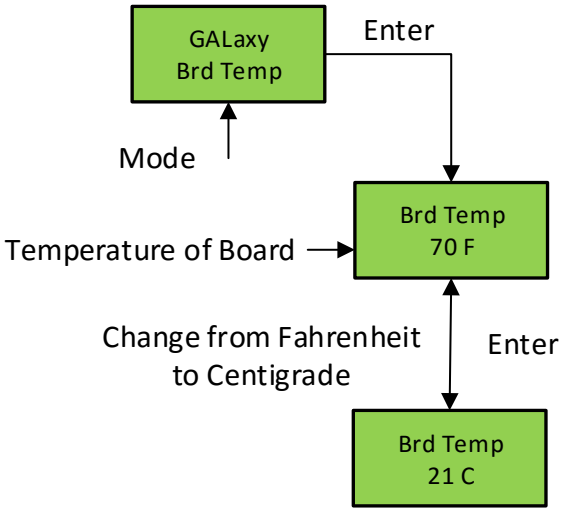
6.12 RESET SAFETY PROCESSOR FAULT LATCH

Reset Fault Latch



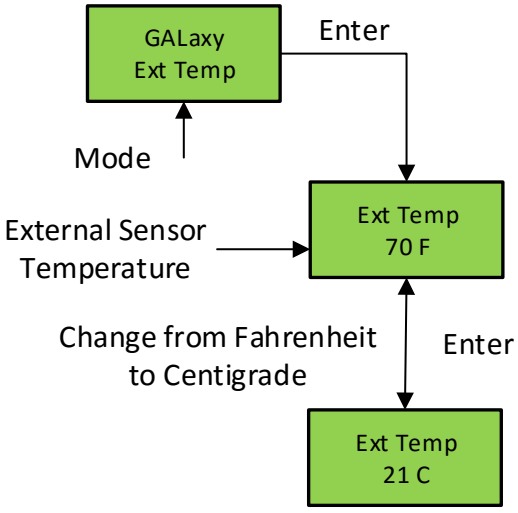
6.13 SAFETY PROCESSOR BOARD TEMPERATURE

Board Temperature



6.14 SAFETY PROCESSOR EXTERNAL TEMPERATURE

External Temperature



Appendix A

Description of I/O Mnemonics

Mnemonic	I/O Name
1C-5C	1st – 5th Floor Car Call Inputs
1CA-5CA	1st – 5th Floor Car Call Acknowledge Outputs
1U-4U	1st – 4th Floor Up Hall Call Inputs
1UA-4UA	1st – 4th Floor Up Hall Call Acknowledge Outputs
1UL-4UL	
2D-5D	2nd – 5th Floor Down Hall Call Inputs
2DA-5DA	2nd – 5th Floor Down Hall Call Acknowledge Outputs
2DL-5DL	
ACC	Access Operation Input
AD	Automatic Door Switch Input
ALT	Alternate Fire Smoke Detector Sensor Input
ATD	Attendant Down Input
ATT	Attendant Operation Input
ATU	Attendant Up Input
AUTO	Automatic Operation Input
BAD	Bottom Access Down Input
BAU	Bottom Access Up Input
BDC	Bottom Door Close Input
BP	Fire Phase I Smoke Detector Bypass Input
BP1	Binary Position Sensor 1 Input
BP2	Binary Position Sensor 2 Input
CDL	Cab Down Lantern Output
CS	In Car Stop Switch Input
CTS	Car Top Stop Switch Input
CUL	Cab up Lantern Output
DC	Door Close Output
DCB	Door Close Button Input
DCL	Door Close Limit Input
DDA	Down Direction Arrow Output
DEL	Delta Relay 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

Mnemonic	I/O Name
DLT-1	Door Lock Top Secondary Input
DN	Down Normal Limit Input
DNML	Down Micro Leveling Output
DNO	Down Normal Override Output (used for jack alignment reset)
DO	Door Open Output
DOB	Door Open Button Input
DOL	Door Open Limit Input
DPM	Door Protection Monitor Input
DS	Down Slowdown Sensor Input
DT	Down Terminal Limit Input
DTR	Door Transfer Relay Output
DTR2	Door Transfer Second Relay Output
DZ	Door Zone Relay Input
DZA	Door Zone Aux. Input
DZDE	Door Zone Door Enable Output
ED/AB	Extended Door / Attendant Bypass Input
EDL	Extended Door Time Light Output
EE	Electric Eye Input
ELOO	Elevator Off Output
EML	Emergency Medical Hall Light Output
EMP	Emergency Power Input
EMS	Emergency Medical Service Car Switch Input
EMSH	Emergency Medical Service Hall Input
EOR	Elevator Off Reset Input
EPS	Emergency Power Select Input
EPT	Emergency Power Transfer Input
EQ	Earthquake Sensor Input
EQL	Earthquake Light Output
EQR	Earthquake Operation Reset Input
FB	Fire Buzzer 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
FSO	Fire Service Output
FST	Fire Stop Switch Override Output
FST1	Fire Stop Switch Aux. Input
FSTi	Fire Stop Switch Input
FSX	Alternate Fire Switch Input
GBL	Gate Bypass Light Output

Mnemonic	I/O Name
GBP	Gate Switch Bypass Input
GS	Car Gate Switch Input
GS-1	Gate Switch Secondary Input
HB	Handicap Buzzer Output
HBE	Handicap Buzzer Enable Output
HC	Hall Call Common Input
HEOF	Hall Switch Elevator Off Input
HWS	Hoistway Smoke Sensor Input
HWS2	Hoistway Smoke Second Sensor Input
ICI	In-Car Inspection Input
ID	Car top Inspection Down Input
IND	Independent Input
INS	Car Top Inspection Input
ISER	In Service Output
IU	Car Top Inspection Up Input
LBL	Door Lock Bypass Light Output
LBP	Lock Bypass Input
LC	Logic Common Input
LD	Down Hall Lantern Output
LOS	Low Oil Switch Input
LPS	Low Pressure Switch Input
LU	Up Hall Lantern Output
MCA	Motor Contactor Output
MCAi	Motor Contactor Input
MCC	Motor Contactor Output
MCCi	Motor Contactor Input
MDC	Middle Door Close Input
MES	Main Egress Smoke Detector Sensor Input
MRI	Motor Room Inspection Input
MRID	Motor Room Inspection Down Input
MRIE	Motor Room Inspection Enable Input
MRIU	Motor Room Inspection Up Input
MRS	Motor Room Smoke Sensor Input
MST	Motor Start Output
NUD	Door Nudging Output
P	Potential (Run Contactor) Input
P1-P5	1^{st} – 5^{th} Discrete Floor Position Indicator Outputs
PFC	Primary Fault Control Output
PKE	Parking Enable Input
RCM	Retiring Cam Output
RTL	Return to Lobby Input

Mnemonic	I/O Name
RUN	Run Pilot Output
RUNA	Run Aux Output
RUNAi	Run Auxiliary Input
RUNi	Run Input
SD	Solenoid Down Output
SDF	Solenoid Down Fast Output
SDFi	Solenoid Down Fast Input
SDi	Solenoid Down Input
SE	Safety Edge Input
SS	Safety String Input
SU	Solenoid Up Output
SUF	Solenoid Up Fast Output
SUFi	Solenoid Up Fast Input
SUi	Solenoid Up Input
TAD	Top Access Down Input
TAU	Top Access Up Input
TDC	Top Door Close Input
TPH	Temp High Input
TPL	Temp Low Input
UDA	Up Direction Arrow Output
UL	Up Level Sensor Input
UL-1	Up Level Sensor Secondary Input
UN	Up Normal Limit Input
UPML	Up Micro Leveling Output
US	Up Slowdown Sensor Input
UT	Up Terminal Limit Input