GALaxy
ELEVATOR CONTROL

HYDRAULIC ELEVATOR CONTROLLER MANUAL

GAL

GAL Manufacturing Corp
50 E 153rd Street
Bronx NY 10451

FORWARD

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. February 9th, 2006)

TABLE OF CONTENTS

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 that 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

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 Display Interface
Two Motor Protection Timers
Door Motor Protection Timer
Several Field Adjustable Parameters (Door Times, Lobby, etc.)
Elevator Duty Rated Nema Motor

Optional Features:

Selective Rear Doors
Attendant Service
Code Blue Hospital Service
Loss of Power Emergency Lowering
Security
Remote Diagnostics

1.2 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. 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 display 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 Display: The LCD display 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.

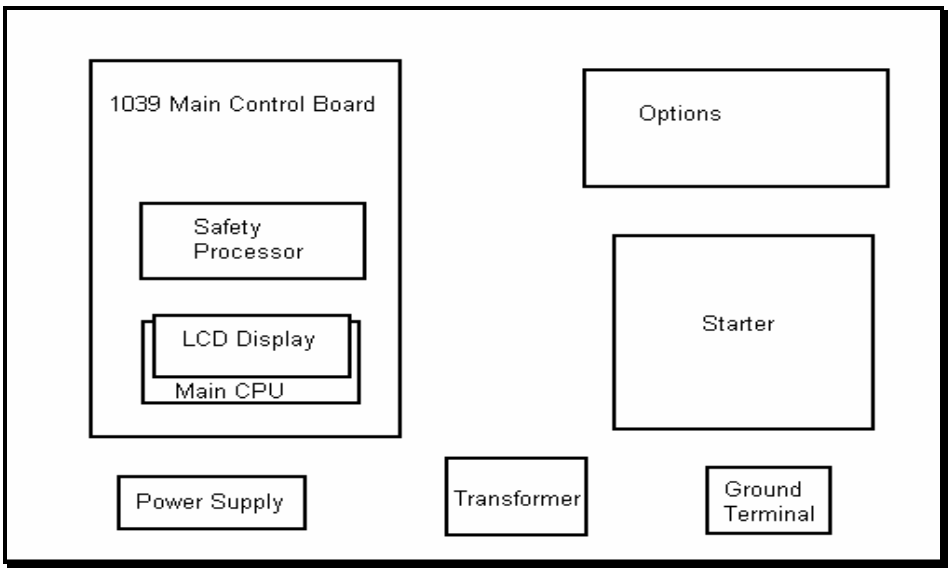


Figure 1.1 Typical Physical Layout

1.3 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 is 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 Figure 1.4 and Figure 1.5 according to the model selector supplied with the controller.

1.3.1 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.

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

Table 1.0: Slowdown Distances

1.3.2 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 type 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".

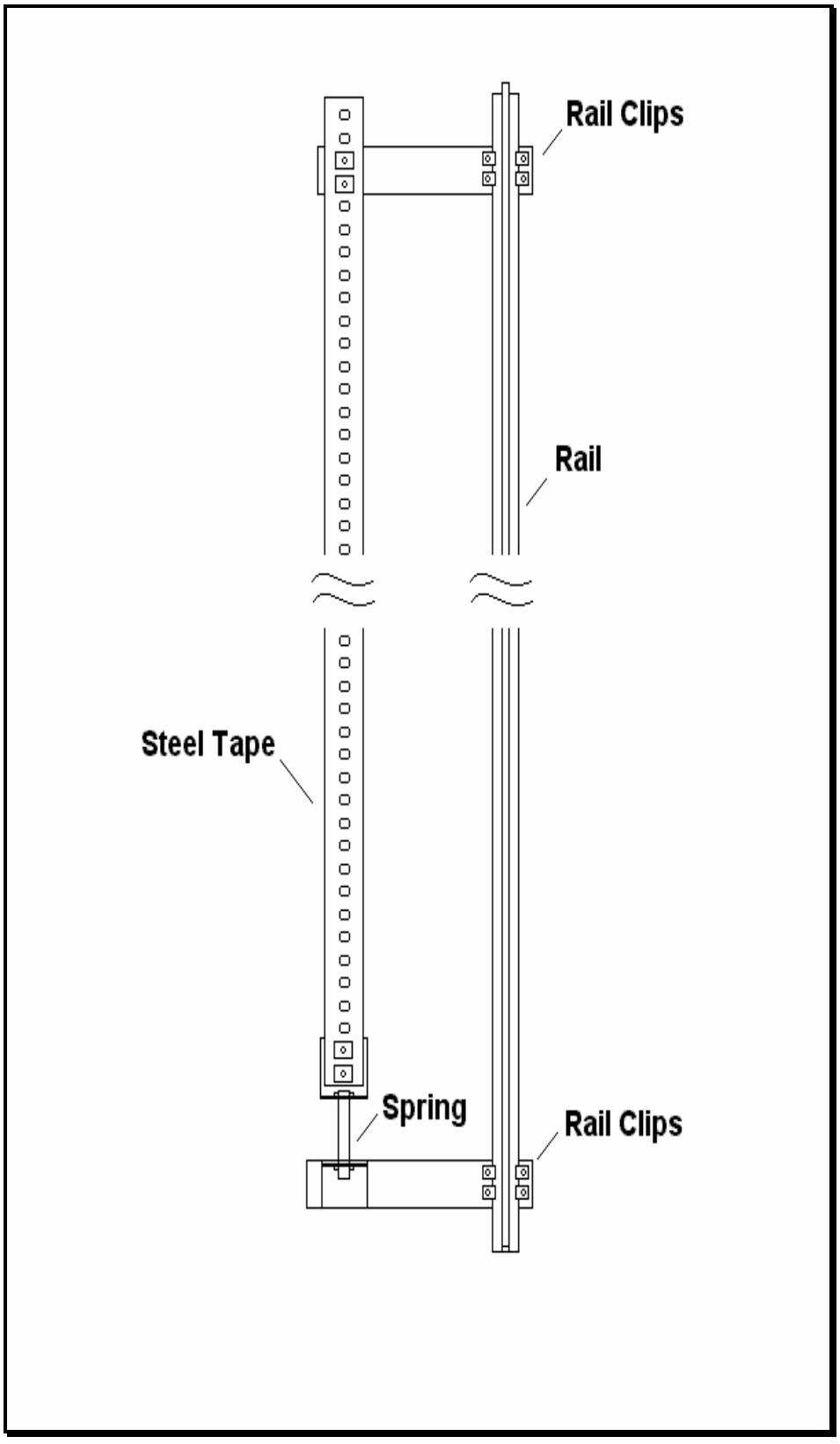


Figure 1.2: Typical Tape Mounting

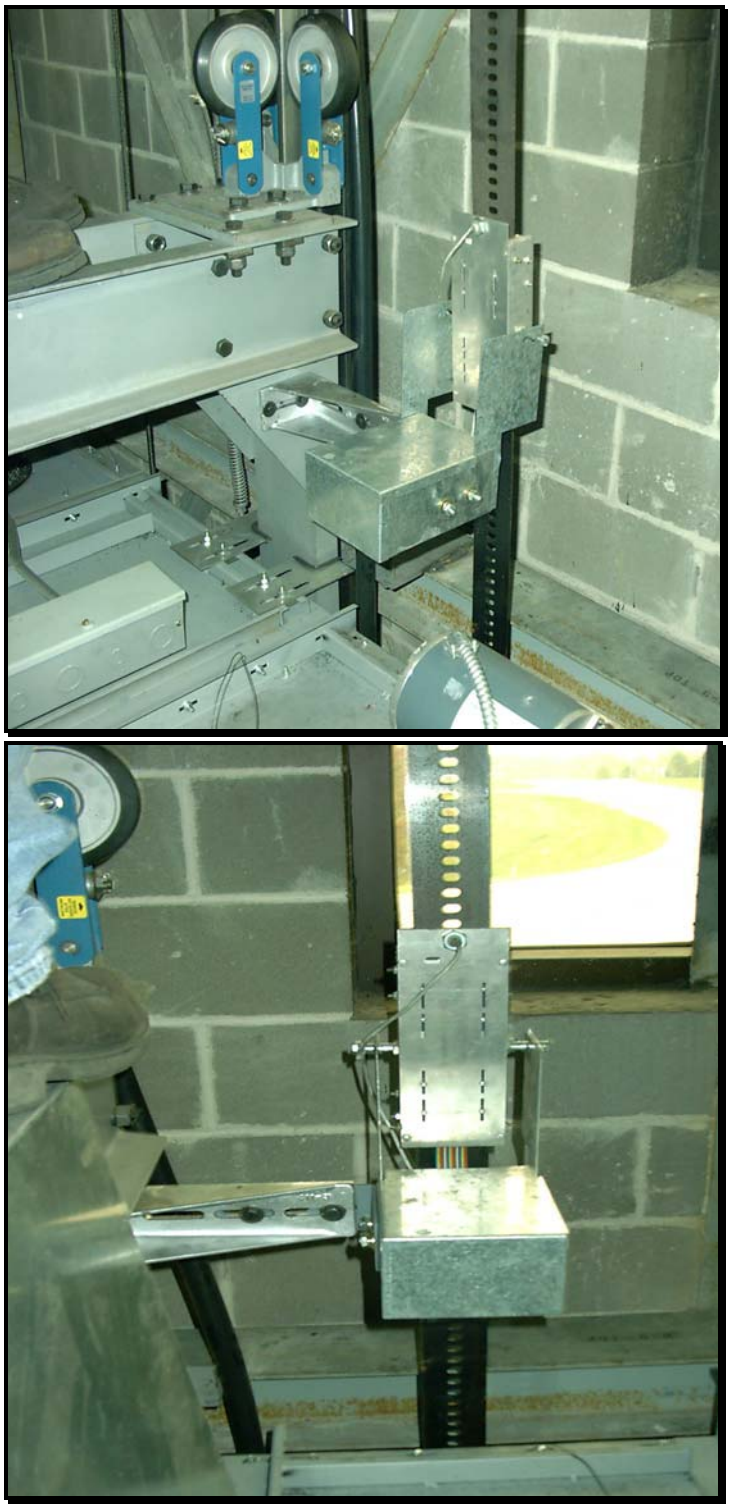


Figure 1.3: Typical Mounting of Selector

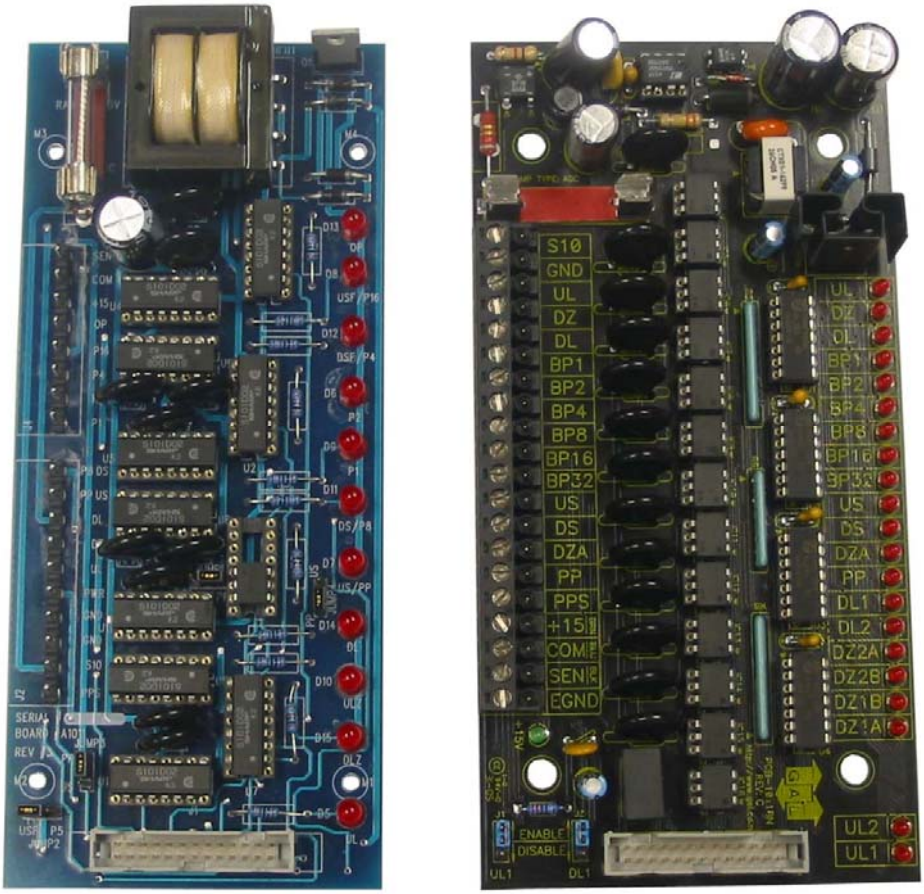


Figure 1.3a – Selector Boards

Depending on the type of selector board you have the selector magnet placement will vary. If you have the selector board on the left in Figure 1.3a then you need to follow the selector magnet placement shown in Figure 1.4. If you have the selector board on the right in Figure 1.3a then you need to follow the selector magnet placement shown in Figure 1.5. The selector board can be located inside the selector box..

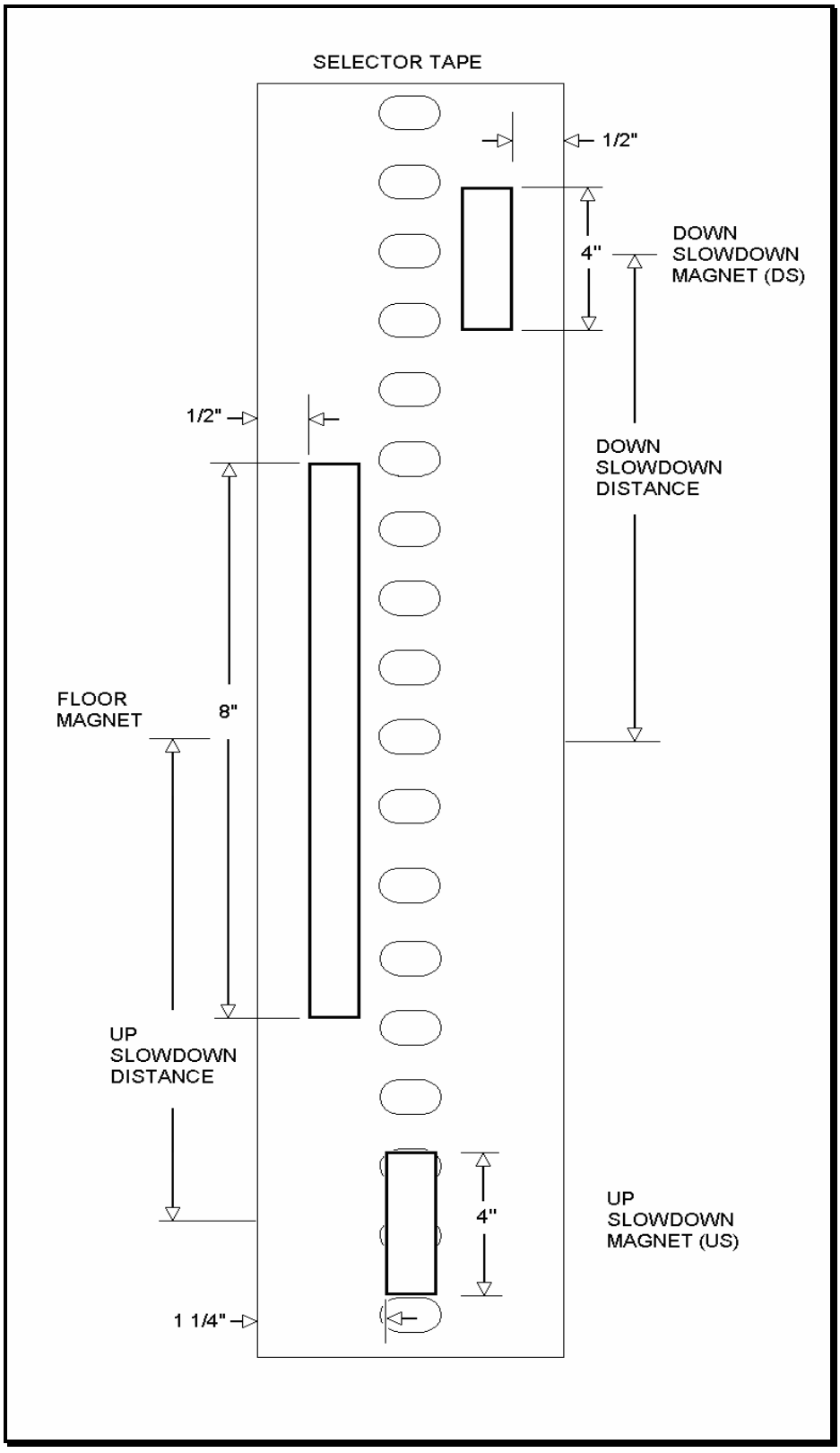


Figure 1.4: Selector Magnet Placement

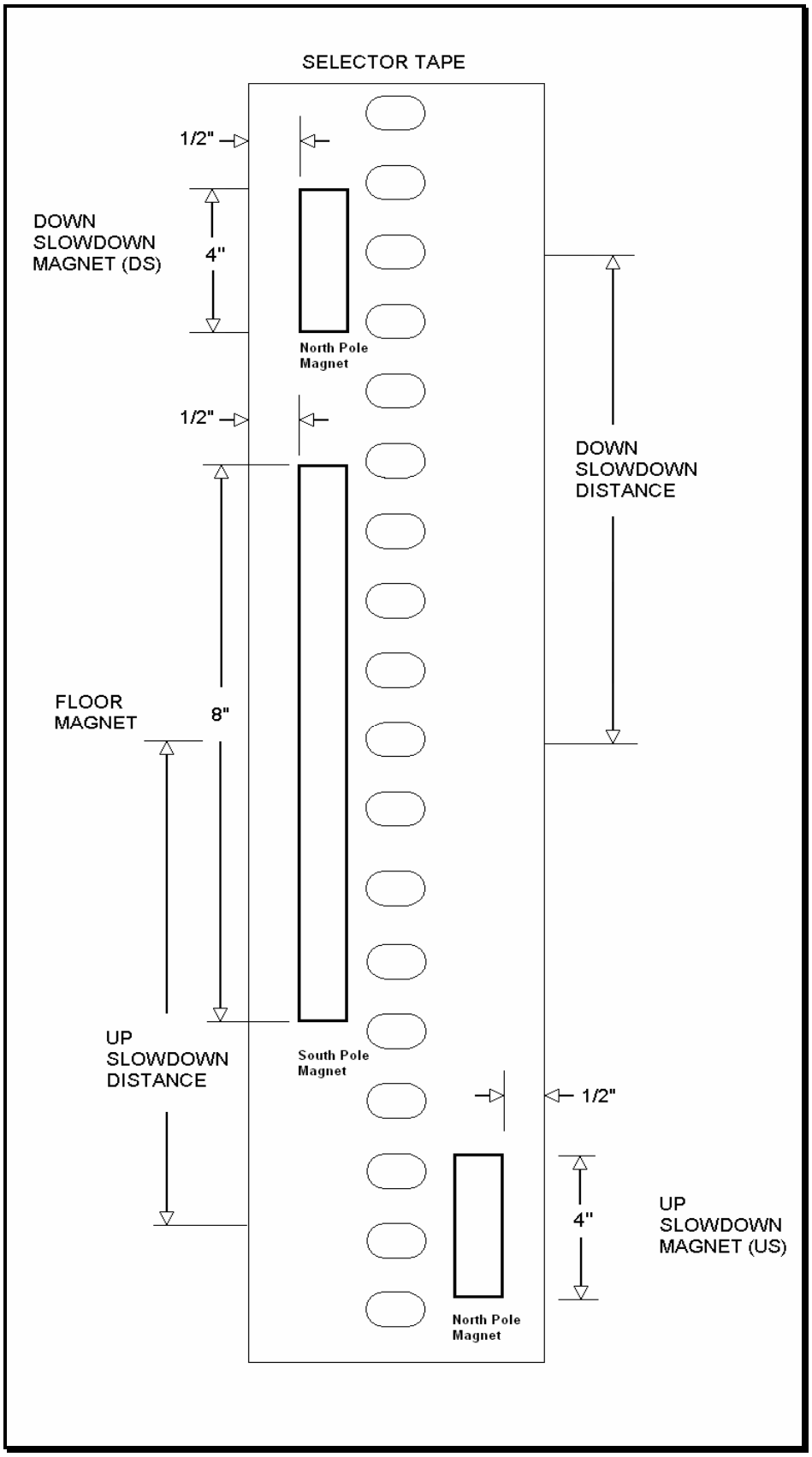


Figure: 1.5: New Selector Magnet Placement

1.4 MODES OF OPERATION

1.4.1 OPERATING SEQUENCE

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

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

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

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

- Actual elevator floor to floor 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.

1.4.2 RESET MODE

Reset mode is initiated when the elevator power is first turned on, or when the system is reset. When the reset mode is initiated, the controller program is automatically loaded, and internal tests are run to ensure that both the car and controller are electrically operational before putting the car into service. The car will not move until reset mode is completed. Some of the 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.

1.4.3 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.

1.4.4 CONTROLLER INSPECTION MODE

The controller inspection mode is initiated by placing the "INS" switch on the 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.

1.4.5 CAR TOP INSPECTION MODE

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

- Disables access top and access bottom hall switches. Disables the controller 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.

1.4.6 ACCESS MODE

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

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

1.4.7 INDEPENDENT SERVICE MODE

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

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

1.4.8 ATTENDANT SERVICE MODE

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

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

1.4.9 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.

1.4.10 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.

1.4.11 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 non stop 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.

1.4.12 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.

1.4.13 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.

1.4.14 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.

1.4.15 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 non stop to the bottom floor.
- Upon reaching the bottom floor the doors cycle, then the elevator is shut down.
- The door open button remains active.

1.4.16 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

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. For example NEMA 4, NEMA 12, or NEMA 4X.

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

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

2.4 WIRING GUIDELINES AND INSTRUCTIONS

2.4.1 THE WIRING PRINTS

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.

2.5 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 slowdown 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. Below, Table 2.0 shows the slowdown limit locations with respect to contract speed. All distances are show in inches.

2.6 NORMAL AND FINAL LIMIT SWITCHES

The up and down directional limit switches "UN & DN" should be set to open 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

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

3.2 INITIAL POWER-UP

3.2.1 CHECK MAIN-LINE VOLTAGE

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

3.2.2 SET TOGGLE SWITCHES

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

3.2.3 MAKE SURE THE CAR IS SAFE

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

3.2.4 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.

3.2.5 VERIFY THE LCD GALaxy IS BLINKING

Check to make sure that the "axy" of GALaxy on the LCD display is blinking. If the "axy" is blinking, continue to the next step. If not, check voltage at terminals 5V to 0V on the 1010D board to insure 5VDC. If 5VDC is present and the "axy" on the LCD display is not blinking, then contact factory.

3.2.6 PRESET ADJUSTABLE VARIABLES ON SAFETY PROCESSOR BOARD

The safety processor (1028N) 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 display 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 = Hidro, 1=Tr NDF, 2=Tract DF)
2 Stop (0=Mult, 1=2 stop)
RearDoor (0=Front only, 1=Rear)
UTS Vel (Set to top speed)
DTS Vel (Set to top speed)
INS Vel (Set to 140)
LEV Vel (Set to 140)
UT Vel (Set to 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 to the soft stop time on the main CPU)

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

3.2.7 PLACE STOP SWICTH IN RUN POSITION

Flip the "STOP" toggle switch on the 1039 board to the up position. Verify that input LED's for "LC, HC, DN, UN, SS and CS" are all on. If not, then correct field wiring.

3.2.8 PUMP MOTOR ROTATION

To check for proper rotation of pump motor, press the inspection "UP" push-button on the 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 insure rotation is correct and then continue.

3.2.9 READY TO RUN ON INSPECTION

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

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

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

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

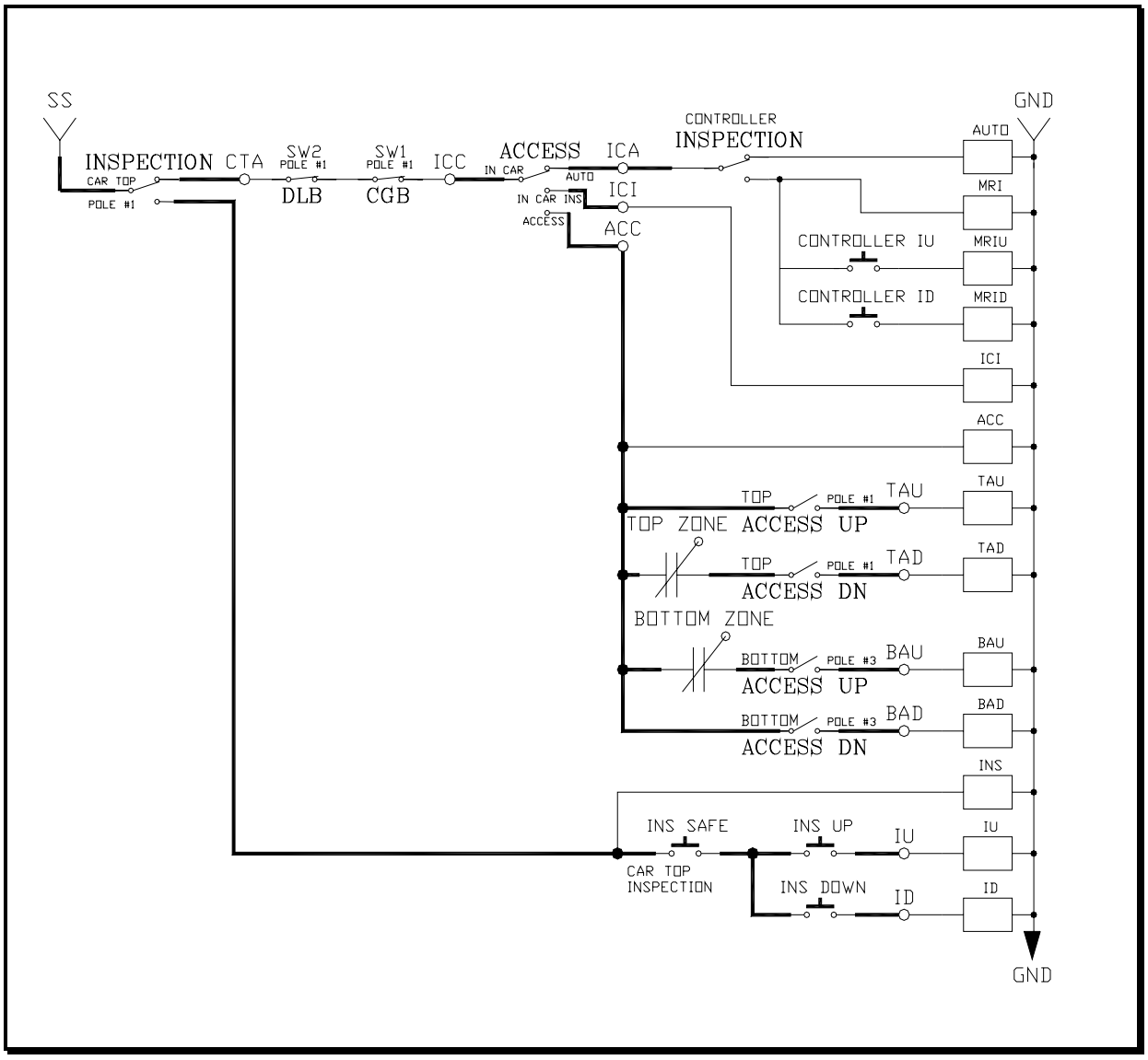


Figure 3.1.

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

3.2.10 CHECK SELECTOR INPUTS

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

3.2.11 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.

3.2.12 VERIFY CAR SPEED ON SAFETY PROCESSOR BOARD

Run the car in either direction and check the car speed on the safety processor LCD display. 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.

3.2.12.1 CORRECT CAR SPEED WHEN USING A TAPE

The tape has holes every 3/8" that are 3/8" in diameter. The safety processor measures the time between each pulse to calculate the velocity. If the velocity is not displayed correctly first make sure that the feedback type in the safety processor board adjustable variable is set to 0 for a tape application. Next, while the car is running, make sure that the XP 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".

3.2.12.2 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.

3.3 FINAL ADJUSTMENT

3.3.1 AUTOMATIC RUN

Run the elevator on controller inspection down until it stops on the down directional limit switch. All toggle switches on the 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 directional 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.

3.3.2 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 LED's 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.

3.3.3 ADJUST VALVE

Setup car call, either from the LCD Display 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 acel, decel, and final stop in both up and down directions. Proceed to the next step.

3.3.4 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 display.

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 (20 * 1.333) = 26.6. 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.

3.3.5 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 shutdown 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.

3.3.6 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.

3.3.7 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.

3.3.8 FINE TUNE PARAMETERS

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

SECTION - 4

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 LED's to monitor the state of the input. The controller is also equipped with an LCD Display interface discussed in sections 5, and an LCD Display 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 Display 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 1010D 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. 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 on 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. To check if the battery voltage is correct, measure the voltage from J17 on the CPU board to 0V on the 1010D board. This voltage should read approximately 3VDC. If not, the CPU board must be repaired by the factory.

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 viewed 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 LED's 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 16 diagnostic LED's on the main I/O board or 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 use 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/O's are optically isolated between the high voltage section and the low voltage section. The input opto-isolators are socketed IC's labeled "O_" on the silk screens of the different I/O boards. The output solid-state relays are socketed IC=s labeled "RLY_" 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 IC=s are replaced, the power should be turned off and care should be taken in removal of the old chip and replacement of the new one. All of the I/O and their associated IC's are listed in the wiring schematics.

4.4 RUN SEQUENCE

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

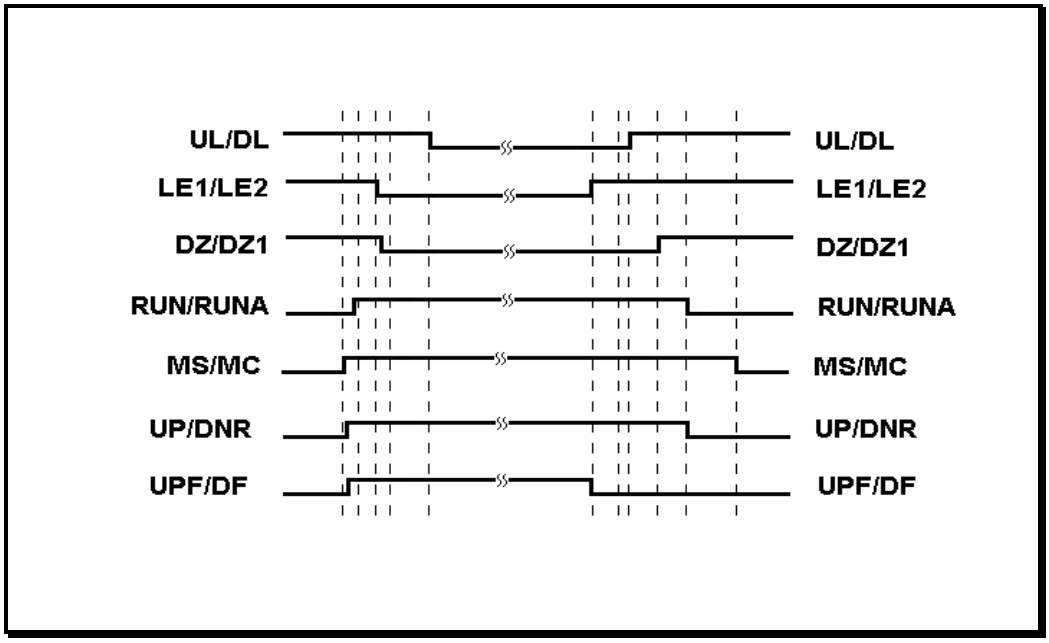


Figure 4.1: Run Sequence.

4.5 THE SAFETY PROCESSOR BOARD

The Safety Processor Board has two fault LED's, one on the top center and one on the bottom center of the board. The top center LED is for PAL inhibit and the bottom center one is for PIC inhibit (see Figure 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 follow 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 Display Interface section for all the input and output signals.

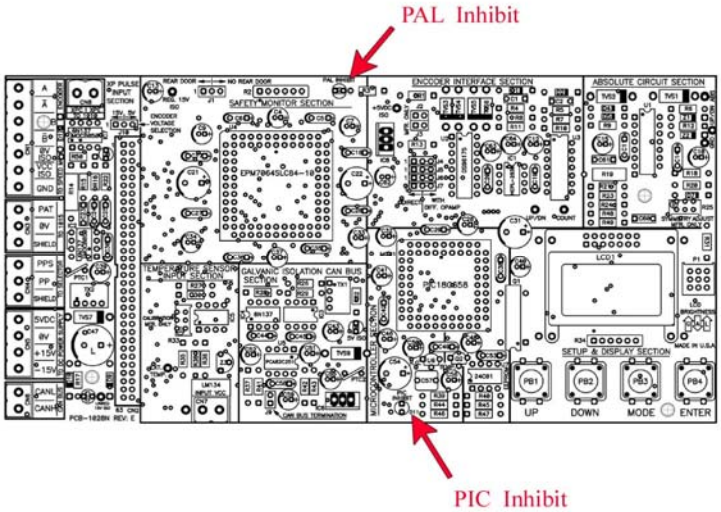


Figure 4.1a: Safety Processor board(1028)

- 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 loose 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.

4.6 SYSTEM FAULTS

Fault information is displayed on the LCD display 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 display under the "Fault" menu. Below is a list of system faults logged by the main CPU and possible reasons for each fault.

4.6.1 MAIN CPU FAULTS

Fault	Description	Possible Cause
Binary Input Fault	The floor position, read from binary inputs on the selector, does not match the car position.	• Excessive ware on the selector guides. • Preset magnet is missing or misaligned. • Faulty hall effect sensor on sensor board. • Faulty output on selector driver board. • Improper wiring between selector and 1039. • Faulty BP1, BP2 or BP4 input.
Bottom Door Lock Fault	The Bottom Door Lock failed on while the door was open.	• Faulty door lock. • Jumper 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).
Car 2 Comm Loss	The group car is not communicating with Car 2.	• Faulty wiring from TX+/TX- from car to car. • Faulty 75176 driver chip on CPU board (next to COM1 label). • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
Car Com Device Reset	Serial Car board reset unexpectedly.	• Usually caused by loss of power to the individual board. Check for loose connection on power to board. • Faulty I/O board.
Car Safe Fault	The Car Safe Fault occurs from the wanting to run but does not have a critical input energized. Some of the conditions for a car safe fault will also cause other faults to be logged.	• The car does not have the gate or lock inputs and is running or trying to run • The gripper GTS input is not on. • The stop switch is open • An inspection string input fault. Only one input should be on in the inspection string (AUTO, CTI, ICI,

Fault	Description	Possible Cause
		ACC or MRI) • Gate or Lock Bypass switch is on when not on car top inspection
Car Safe Fault Preop	The car had a car safe fault while pre-opening the door.	• The car lost the DZ input while leveling into the floor and the door was open.
Car Safe Fault Start	The car had an onward call, had the door close limit but the car gate or door locks did not make after a 3 second time-out.	• The locks are not making properly when the door closes. • The door is not closing properly.
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
Delta on Fault	DEL input failed on when is should have been off. This would occur at the start of a run when the I/O's are checked.	• Faulty DEL input (failed on). Check the input and output status on the LCD interface. • Faulty contact for DEL input failed on.
DF I/O Failed Off	The DF input or output has failed off.	• Faulty wiring to the SC common on the 1039 board. • Faulty wiring to the SDF terminal on the 1039 board. • Faulty wiring to the Down Fast valve. • Faulty SDFi input (replace input chip). • Faulty SDF output (replace output chip).
DF I/O Failed On	The DF input or output has failed on.	• Faulty SDFi input (replace input chip). • Faulty SDF output (replace output chip).
DLB and DLB-1 Opposite	Input failure on one of the Door Lock Bottom (DLB) inputs.	• Faulty DLB or DLB-1 input (replace input chip).
DLM and DLM-1 Opposite	Input failure on one of the Door Lock Middle (DLM) inputs.	• Faulty DLM or DLM-1 input (replace input chip).
DLT and DLT-1 Opposite	Input failure on one of the Door Lock Top (DLT) inputs.	• Faulty DLT or DLT-1 input (replace input chip).
DNR I/O Failed Off	The DNR input or output has failed off.	• Faulty wiring to the SC common on the 1039 board. • Faulty wiring to the SD terminal on the 1039 board. • Faulty wiring to the Down valve.

Fault	Description	Possible Cause
		• Faulty SDi input (replace input chip). • Faulty SD output (replace output chip).
DNR I/O Failed On	The DNR input or output has failed on.	• Faulty SDi input (replace input chip). • Faulty SD output (replace output 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. • 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.
Door Zone Fault	Door Zone Fault occurs from the DZ input not turning on or turning off when expected.	• The car does not have DZ when it is expected to be level at the floor. • DZ output on selector board failed on or did not turn on. (Replace DZ output on selector driver board). • One or both of the DZ sensors on the selector sensor board failed. Replace selector sensor board. • DZ input on 1039 board failed on or off. Replace DZ input on 1039 board.
Down Directional Fault	Car unexpectedly hit the Down Normal Limit while running down.	• Faulty wiring for the DN limit. • The power common to the limit switches (CS) was lost. Check safety string prior to the CS terminal.
DPR Input Fault	The DPR input fault occurs when door is open, and the DPR input did not turn off.	• DPR switch not setup properly on the door operator. • DPR input failed. (Replace DPR input chip).
Drive Ready Fault	The drive ready input is not on.	• The drive has or had a fault. Check the drive fault log. • Faulty RDY input. (Replace the RDY input).
Estop Fault	An emergency stop occurred while moving or attempting to move.	• The "P" input did not drop from MC, BRK or RUN contactors being energized. • The drive on (DON) input did not energize or dropped out while running. • The BRK contactor did not energize or dropped out while running.

Fault	Description	Possible Cause
		• BRKI input did not turn on or dropped out while running. • The DEL contactor did not energize or dropped out while running • The DEL input did not turn on or dropped out while running. • The stop switch was pulled while running. • The car was not safe. See Car Safe Fault. • The stall protection timer timed-out. • (Hydro only) An emergency power recall was initiated while the car was running up. • The pulse count stopped counting.
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 1039 board).
Gate/Lock Bypass Switch Fault	The gate or lock bypass switch was on while the car was NOT on car top inspection.	• Gate or Lock bypass switch on the controller 1039 board is in the on position. • Gate or Lock bypass input failed on. (Replace GBP OR LBP input chip on 1039 board).
Group Comm Loss	Car 2 is not communicating with Car 1.	• Faulty wiring from TX+/TX- from car to car. • Faulty 75176 driver chip on CPU board (next to COM1 label). • Noise on shield wire. Connect shield only on one end. • Noise on the communication wires. Run wires in separate conduit.
GS and 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. • 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

Fault	Description	Possible Cause
		circuitry.
Inspection Input Fault	More than one input is on or no input 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
Inspection Up/Dn Sw	An up or down inspection run input was on when first entering into inspection operation.	• 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.
MCA I/O Failed Off	The MCA input or output has failed off.	• Faulty MCAi input chip (Replace input chip). • Faulty MCA output chip (Replace output chip).
MCA I/O Failed On	The MCA input or output has failed on.	• Faulty MCAi input chip (Replace input chip). • Faulty MCA output chip (Replace output chip).
MCC I/O Failed Off	The MCC input or output has failed off.	• Faulty MCCi input chip (Replace input chip). • Faulty MCC output chip (Replace output chip).
MCC I/O Failed On	The MCC input or output has failed on.	• Faulty MCCi input chip (Replace input chip). • Faulty MCC output chip (Replace output chip).
Middle Door Lock Fault	The Middle Door Lock failed on while the door was open.	• Faulty door lock. • Jumper on door lock circuit. • Faulty wiring to DLM input. • Faulty DLM and DLM-1 inputs (For this to occur both DLM and DLM-1 inputs must fail on).
Overspeed Fault	Car overspeed fault. If the car goes 15% over contract speed the fault will	• Encoder PPR incorrectly set. Set to match the Drive's Encoder Pulses.

Fault	Description	Possible Cause
	be logged and the car will do an emergency stop.	• Encoder RPM incorrectly set. Set to match the Motor's RPM. • The drive is not controlling the hoist machine motor. Check the response setting on the drive.
Position Fault	The Terminal limits do not match the car position (UT or DT is hit but the car position is not at the top or bottom floor).	• Car is out of step from faulty selector inputs. Check that the DZ, UL and DL selector inputs work properly at each floor. • Car missed a slowdown input magnet. Check that the US and DS selector inputs work properly prior to each landing. • UT or DT input lost from the safety string being opened. • Improper adjustment of UT or DT limit switches.
Possible DRV/1028 Er	The controller CPU lost the stop switch input, but has the SS and GTS inputs ON indicating that the drive or Safety Processor (1028) board has opened the safety string.	• View the faults on the Safety Processor board display and debug from the fault code listed. • View the drive faults log or led status and debug as directed from the drive manual.
Power Up Reset	Whenever power is cycled on the controller this error will indicate that the controller CPU was reset.	• This error code is normal for a power loss. If power was not lost and the CPU re-boots, verify the +5VDC on the CPU power connector reads in the range of 4.90 and 5.1 VDC. If out of range, adjust the 5VDC supply pot for the correct voltage.
Reset Fault	Anytime the system powers up, goes from inspection to automatic, from safeties to automatic or does a recovery run to find its location, 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.
RUN I/O Failed Off	The RUNi input or RUN output has failed off.	• Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1039 board is connected properly. • Faulty RUNi input. Replace the RUNi input chip. • Faulty RUN output. Replace the

Fault	Description	Possible Cause
		RUN output chip.
RUN I/O Failed On	The RUNi input or RUN output has failed on.	• Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1039 board is connected properly. • Faulty RUNi input. Replace the RUNi input chip. • Faulty RUN output. Replace the RUN output chip.
RUN, RUNA, DNR Failure	The RUNi input or RUN output, the RUNA output or the SD output failed to turn on.	• Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1039 board is connected properly. • Faulty wiring at the SD terminal. Verify that the down valve is wired to the SD terminal on the 1039 board. • Faulty SDi input (replace input chip). • Faulty SD output (replace output chip). • Faulty RUNi input. Replace the RUNi input chip. • Faulty RUN output. Replace the RUN output chip.
RUN, RUNA, UP Failure	The RUNi input or RUN output, the RUNA output or the SU output failed to trun on.	• Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1039 board is connected properly. • Faulty wiring at the SU terminal. Verify that the down valve is wired to the SU terminal on the 1039 board. • Faulty SUi input (replace input chip). • Faulty SU output (replace output chip). • Faulty RUNi input. Replace the RUNi input chip. • Faulty RUN output. Replace the RUN output chip.
RUNA I/O Failed Off	The RUNAi input or RUNA output has failed off.	• Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1039 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.

Fault	Description	Possible Cause
RUNA I/O Failed On	The RUNAi input or RUNA output has failed on. Verify that the valve common SC terminal on the 1039 board is connected properly.	• Faulty wiring at the SC terminal. Verify that the valve common SC terminal on the 1039 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.
Safety String Fault	Safety string fault occurs from loosing voltage from any point above the SS input.	• The safety string is open (SS input if off). Refer to the job prints and check all circuits ahead of the SS input.
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.	• Low oil. • Improper valve adjustment
Stop Switch Fault	Stop switch is pulled while the car is in motion.	• Stop switch is pulled. • Faulty 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. • Faulty wiring to DLT input. • Faulty DLT and DLT-1 inputs (For this to occur both DLT and DLT-1 inputs must fail on).
UL or DL Fault	Both UL and DL level sensors are off when car is at a floor.	• Faulty adjustment of the selector head. • Worn selector guides. Replace selector guides. • Faulty Door Zone Magnet. If this fault occurs at one particular floor, replace the door zone magnet at the floor. • Faulty sensor board. Replace the selector sensor board.
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 SUi input or SU output has failed off.	• Faulty wiring to the SC common on the 1039 board. • Faulty wiring to the SU terminal on the 1039 board. • Faulty wiring to the Up valve. • Faulty SUi input (replace input chip).

Fault	Description	Possible Cause
		• Faulty SU output (replace output chip).
UP I/O Failed On	The SUi input or SU output has failed on.	• Faulty SUi input (replace input chip). • Faulty SU output (replace output chip).
UPF I/O Failed Off	The SUFi input or SUF output has failed off.	• Faulty wiring to the SC common on the 1039 board. • Faulty wiring to the SUF terminal on the 1039 board. • Faulty wiring to the Up Fast valve. • Faulty SUFi input (replace input chip). • Faulty SUF output (replace output chip).
UPF I/O Failed On	The SUFi input or SUF output has failed on.	• Faulty SUFi input (replace input chip). • Faulty SUF output (replace output chip).

4.6.2 DETAILED FAULT DATA

Detailed Fault Data	**Description**
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
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 12 = Safety String 13 = Turned Off 14 = Parked 15 = Waiting Assignment 16 = Doors Operation 17 = Elevator Stalled (or Low Oil for Hydro)
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

Detailed Fault Data	Description	
		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
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 Gloor 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 8 = Phase 2 Momentary DCB Door Close
RFI	Rear Fire Flag	(Not Used)
HSF	High Speed Flag	1 = High Speed
STF	Start Flag	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
ST0	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: Lock Bypass

<table>
<tr><th>Detailed Fault Data</th><th>Description</th></tr>
<tr><td></td><td>Bit 4: Gate Bypass
Bit 5: Automatic</td></tr>
<tr><td>NDS</td><td>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</td></tr>
<tr><td>GTM</td><td>Group Transmitter Empty 1 = Transmit Buffer Empty</td></tr>
<tr><td>IO0</td><td>1039 I/O Block 1, Byte 0: Listed in order of Bits 0-7
<table><tr><th>1039 Main I/O
Block 1</th></tr><tr><td>DN</td></tr><tr><td>DT</td></tr><tr><td>DTS</td></tr><tr><td>UN</td></tr><tr><td>UT</td></tr><tr><td>UTS</td></tr><tr><td>DLB</td></tr><tr><td>DLM</td></tr></table></td></tr>
<tr><td>IO1</td><td>1039 I/O Block 1, Byte 1: Listed in order of Bits 0-7
<table><tr><th>1039 Main I/O
Block 1</th></tr><tr><td>DLT</td></tr><tr><td>ACC</td></tr><tr><td>BAD</td></tr><tr><td>BAU</td></tr><tr><td>TAD</td></tr><tr><td>TAU</td></tr><tr><td>SS</td></tr><tr><td>EQ</td></tr></table></td></tr>
<tr><td>IO2</td><td>1039 I/O Block 1, Byte 2: Listed in order of Bits 0-7
<table><tr><th>1039 Main I/O
Block 1</th></tr><tr><td>DLB-1</td></tr><tr><td>DLM-1</td></tr><tr><td>DLT-1</td></tr><tr><td>GS-1</td></tr><tr><td>EQR</td></tr><tr><td>EMH</td></tr><tr><td>EMP</td></tr><tr><td>EPS</td></tr></table></td></tr>
<tr><td>IO3</td><td>1039 I/O Block 2, Byte 0: Listed in order of Bits 0-7
<table><tr><th>1039 Main I/O
Block 2</th></tr><tr><td>EQL</td></tr><tr><td>EML</td></tr><tr><td>FSO</td></tr><tr><td>FL</td></tr><tr><td>FB</td></tr><tr><td>MST</td></tr><tr><td>UDA</td></tr><tr><td>DDA</td></tr></table></td></tr>
</table>

<table>
<tr><th>Detailed Fault Data</th><th>Description</th></tr>
<tr><td></td><td></td></tr>
<tr><td>IO4</td><td>1039 I/O Block 2, Byte 1: Listed in order of Bits 0-7

<table><tr><th>1039 Main I/O Block 2</th></tr><tr><td>HC</td></tr><tr><td>HWS</td></tr><tr><td>MRS</td></tr><tr><td>MES</td></tr><tr><td>ALT</td></tr><tr><td>BP</td></tr><tr><td>FS</td></tr><tr><td>TPL</td></tr></table></td></tr>
<tr><td>IO5</td><td>1039 I/O Block 3, Byte 0: Listed in order of Bits 0-7

<table><tr><th>1039 Main I/O Block 3</th></tr><tr><td>RUNI</td></tr><tr><td>RUNAI</td></tr><tr><td>MCCI</td></tr><tr><td>MCAI</td></tr><tr><td>DNI</td></tr><tr><td>DFI</td></tr><tr><td>UPI</td></tr><tr><td>UFI</td></tr></table></td></tr>
<tr><td>IO6</td><td>1039 I/O Block 3, Byte 1: Listed in order of Bits 0-7

<table><tr><th>1039 Main I/O Block 3</th></tr><tr><td>GBP</td></tr><tr><td>LBP</td></tr><tr><td>IND</td></tr><tr><td>AD</td></tr><tr><td>MRI</td></tr><tr><td>MRIU</td></tr><tr><td>MRID</td></tr><tr><td>AUTO</td></tr></table></td></tr>
<tr><td>IO7</td><td>1039 I/O Block 4, Byte 0: Listed in order of Bits 0-7

<table><tr><th>1039 Main I/O Block 4</th></tr><tr><td>UL</td></tr><tr><td>DZ</td></tr><tr><td>DL</td></tr><tr><td>US</td></tr><tr><td>DS</td></tr><tr><td>BP1</td></tr><tr><td>BP2</td></tr><tr><td>BP4</td></tr></table></td></tr>
<tr><td>IO8</td><td>1039 I/O Block 4, Byte 1: Listed in order of Bits 0-7

<table><tr><th>1039 Board Block 4</th></tr></table></td></tr>
</table>

Detailed Fault Data	Description
	RUNA RUN DO DC NUD HB FSTP FSTP1
IO9	1039 I/O Block 4, Byte 2: Listed in order of Bits 0-7 **1039 Board** **Block 4** DOL DCL EE DPM GS LC INS IU
IOA	1039 I/O Block 5, Byte 0: Listed in order of Bits 0-7 **1039 Board** **Block 5** ID SE CS ICI FS2 FS2C FS2H EMS
IOB	1039 I/O Block 6, Byte 0: Listed in order of Bits 0-7 **1039 Board** **Block 6** P FST UL-1 DL-1 ATT ATTU ATTD ATTB
IOC	1039 I/O Block 6, Byte 1: Listed in order of Bits 0-7 **1039 Board** **Block 6** PFC MCA MCC P1 P2 P3 P4 P5

Detailed Fault Data	Description
IOD	1039 I/O Block 6, Byte 2: Listed in order of Bits 0-7 **1039 Board** **Block 6** DNR DNF UP UPF 1UL 2UL 3UL 4UL
STATUSF	Control Status Flag (Status bit set to "1" when status active) Bit 0: NO LC power Bit 1: NO HC power Bit 2: NO SS input Bit 3: Drive not ready Bit 4: Gripper error Bit 5: I/O error during redundancy check Bit 6: Inspection or lock bypass fault Bit 7: Binary Position Input Error Bit 8: Position Error Bit 9: No automatic Doors Bit 10: Stop switch open Bit 11: Door Zone fault Bit 12: Gate or Door lock fault Bit 13: No Potential "P" Input Bit 14: No DCL Bit 15: No gate or lock Bit 16: Brake lift switch error

4.6.3 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.

	DESCRIPTION AND CAUSE
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.

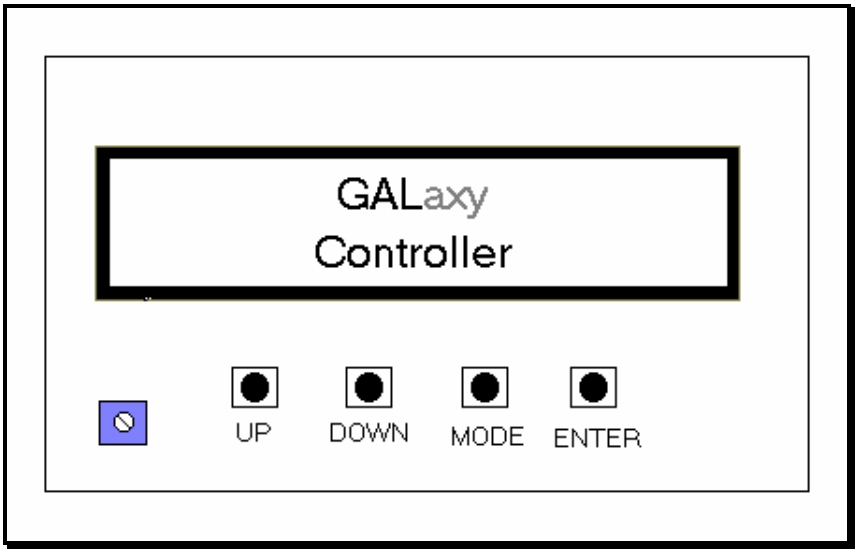
	DESCRIPTION AND CAUSE
	3. Photocoupler in selector is faulty. Call the Factory. 4. Voltage from PP to 0V on the Safety Processor Board is less than 10 VDC with the PP and PPS wires disconnected. Call the Factory.

SECTION - 5

5 LCD DISPLAY INTERFACE

5.1 OPERATING THE LCD INTERFACE

The LCD display interface board uses a 2 line by 24 character display and four buttons. This interface allows the user to adjust parameters, view critical controller information, to implement the controller setup and to view the elevator status. Upon power-up the display shows a blinking GALaxy name to indicate the controller is running as show below:



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

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

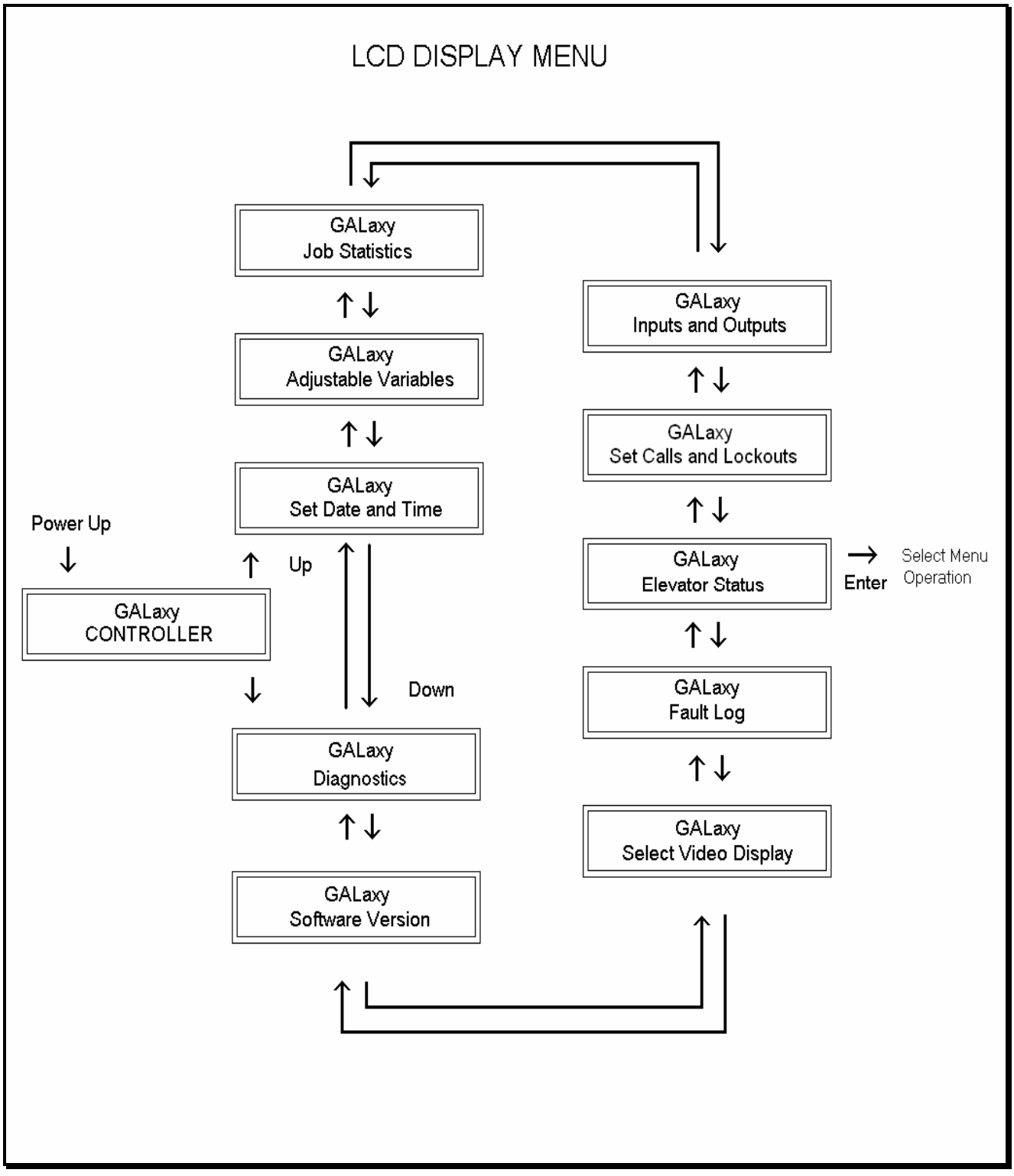
MODE button is used to go back to the previous menu or to select a digit of a data value.

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

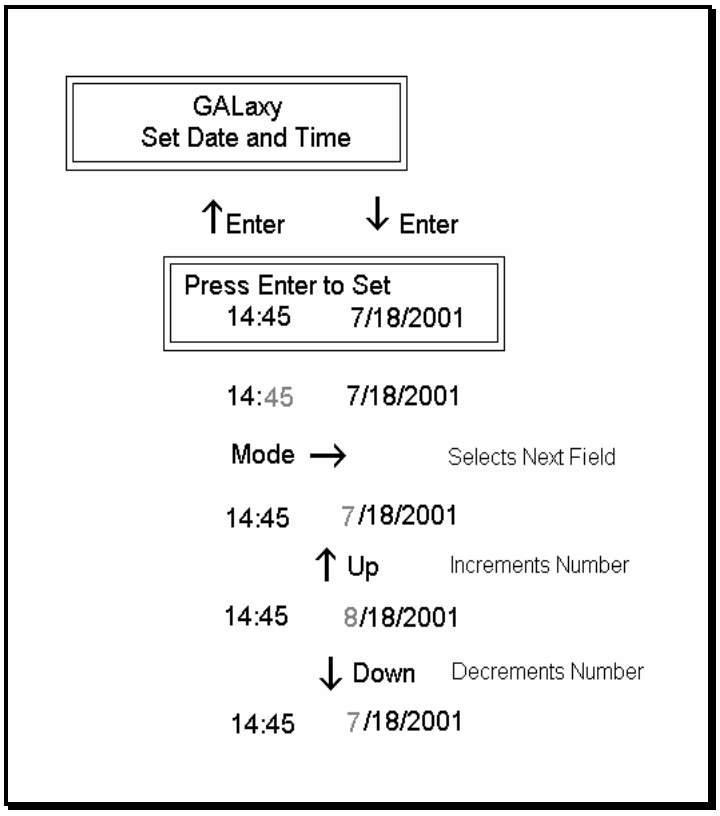
Potentiometer is used to adjust the viewing angle. It will make the display lighter or darker.

The four inputs buttons used with the LCD display are, UP, DOWN, MODE and ENTER. The UP and DOWN buttons are used to scroll up and down to each menu item. When an appropriate menu item is reached, the ENTER button is used to select the item. Some menu items, once selected, show a second menu. Again, use the UP and DOWN buttons to scroll through the menu items and the ENTER button to select a particular item. The MODE button is used to go back to the previous menu. When a menu item is an adjustable variable, select the item with the ENTER button and change the variable with the UP or DOWN button. The MODE button is used to move the cursor to the next digit. When the appropriate value is reached, used the ENTER button to complete the variable change operation and return to the current menu.

5.2 THE LCD MENU STRUCTURE

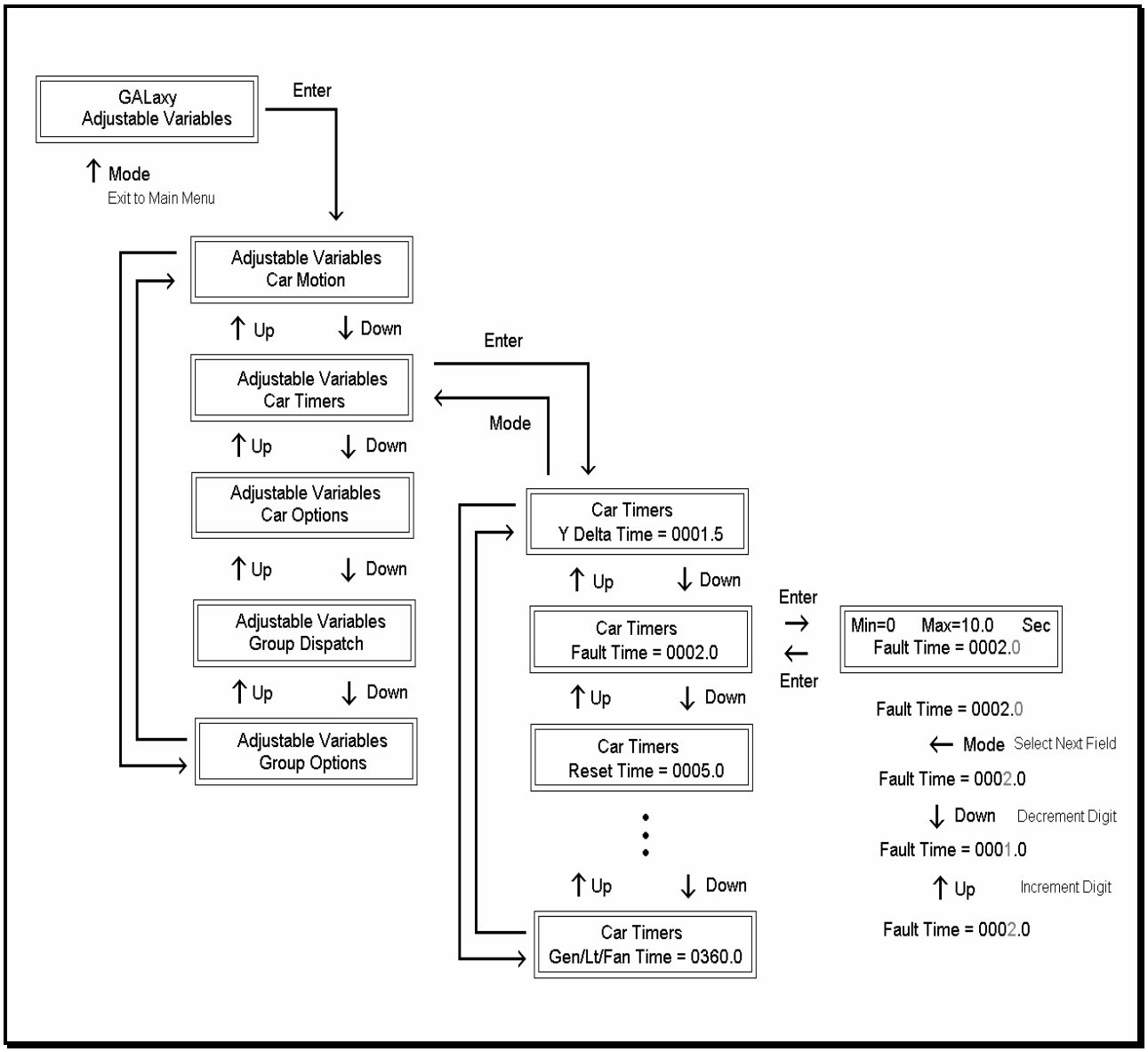


5.2.1 SET DATE AND TIME



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

5.2.2 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:

Adjustable Variables

Car Motion	Min	Max	Initial	Units	Description
Inspect Speed	0	150	75	Fpm	Inspection Speed. Maximum car speed while running on inspection.
Soft Stop Time	0	3.0	1.0	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.
Preopen Delay	0	3200.0	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.

Car Timers	Min	Max	Initial	Units	Description
Y Delta Time	0	5.0	1.5	Sec	Transfer time to change motor from Y start to Delta run.
Fault Time	0	10.0	2.0	Sec	Fault Time. Delay time before allowing the car to run after a fault occurs.
Reset Time	0	10.0	5.0	Sec	Reset Time. Delay time in the reset mode before allowing the car to run.
Double Stroke	0	1	1	Gongs	Select 1 or 2 gongs for down hall calls. 0 = 1 gong and 1 = 2 gongs.
Lant On Time	0	2.0	0.7	Sec	Lantern On time. Used for double stroke gongs. The lantern will turn on, turn off and then turn on again. The Lantern on time is the delay time from when the lantern first turns on until it turns on the second time.
Lant Off Time	0	2.0	0.2	Sec	Lantern Off Time. Used for double stroke gongs. The lantern off time is the delay time after the lantern first turns on until it turns off.
Pas Chime Time	0.2	2.0	0.5	Sec	Floor Passing Chime Time. Length of time the floor passing chime will sound when a floor is passed.
Door Fail Time	10.0	3200.0	25.0	Sec	Door Fail Time. Time with power on the door without getting the door open limit.
Nudging Time	20.0	3200.0	60.0	Sec	Nudging Time. Delay time for a door to be held before going into nudging.
Car Call Dwell	1.0	60.0	2.0	Sec	Car Call Dwell. Door open dwell time when answering a car call only.
Hall Call Dwell	1.0	60.0	4.0	Sec	Hall Call Dwell. Door open dwell time when answering a hall call or both a hall and car call.
Lobby Dwell	1.0	60.0	5.0	Sec	Lobby Dwell. Door open dwell time for a car at the lobby.
Handicap Dwell	1.0	120.0	25.0	Sec	Handicap Dwell. Extended door time from pressing the ED button in the car.
Non Interfer T	1.0	60.0	2.0	Sec	Non-Interference Time. Time between when you stop from when you can run again.

Car Timers	Min	Max	Initial	Units	Description
Stall Time	30.0	3200.0	60.0	Sec	Stall Time. Maximum time a run is requested but the car is not moving.
Gen Run Time	30.0	3200.0	360.0	Sec	Generator Run Time. Length of time to leave the generator running after there is no longer a demand to run.
Att Buz Delay	0.0	900.0	0.0	Sec	Attendant Buzzer Delay. When a car is on attendant service, if a hall call is placed and the car has not moved after the delay time expires, a buzzer will sound to notify the attendant that he must answer the call.
Door Delay Time	0.0	1.5	0.0	Sec	Door Open and Close Delay Time. When this timer is set non-zero, the door open or close outputs will delay before changing to the opposite direction.

Car Options	Min	Max	Initial	Units	Description
Fire Main Floor	Bot	Top	1	Floor	Fire Main Floor.
Alt Fire Floor	Bot	Top	2	Floor	Alternate Fire Floor.
Fire Sw Loc	0	3	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.
Aux. Fire Sw.	0	1	0	_	Auxiliary Fire Switch. When set, the controller expects an auxiliary hall fire switch to be used.
Hall Fire Light	0	3	0	_	Hall Fire Light. The variable controls the FSO output on the controller so it can be used for a hall fire light or a fire security override. 0=PH1&2: FSO output on for both phase 1 and 2 fire service. 1=PH1: FSO output on while phase 1 fire is in effect. +2=flash: FSO is flashed at a 1 second interval while activated.
MachRm Fire Ret	0	1	0	_	Machine Room Fire Sensor Return Floor Selection. 0 = Return to the Main fire floor, 1 = Return to the Alternate fire floor.
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.
Recall Reset	0	1	0	_	Recall Reset Selection. 0 = Reset fire service phase 1 after hall switch is turned off and car returns to fire floor. 1 = Reset phase 1 immediately after hall switch is turned off.
Lobby Floor	Bot	Top	1	Floor	Lobby Floor.
Med Em Floor	Bot	Top	1	Floor	Medical Emergency Return floor.
Med Em Sw	0	1	0	_	Medical Emergency Switch Location. 0 = Medical

Car Options	Min	Max	Initial	Units	Description
Loc					Emergency is located at front door. 1 = Switch is located at rear door.
Emerg Dispatch	0	1	0	_	Emergency Dispatch. If set and hall call power lost, the group will set down hall calls above the lobby and up hall call at and below the lobby. Also if comm. is lost to a particular hall call board, hall calls are set for the affected floors.
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.
LW-Antinus	0	29	0	Floors	Load Weighing Anti-nuisance. Set to the maximum number of car calls that can be 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.
No Psg Run Cnt	0	10	0	# of Runs	No Passenger Run Count. When set to a number other than zero, the car call anti-nuisance feature is activated. This count is the number of times to 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.
Ind Over Sec	0	1	0	_	Independent Overrides Security. Set to 1 to allow independent service to override security car call lockouts.
User Baud Rate	0	3	0	Bits/sec	User Interface Baud Rate. 0=2400, 1=4800, 2=9600 and 3=19200 bits per second.
Safe Test Year	2000	2999	0	Years	Safety Test Year.
Safe Test Month	1	12	0	Months	Safety Test Month.
Safe Test Day	1	31	0	Days	Safety Test Day.
Invert ISER	0	1	0	_	Invert In Service Output. When set to 1, the in service light output is turned off when the car is in service instead of turned on.
Video time out	0	3200.0	0	Sec	Video Time Out. Time delay after no user keyboard or pushbutton input to automatically turn off video display. Time out is disabled when set to zero.
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.

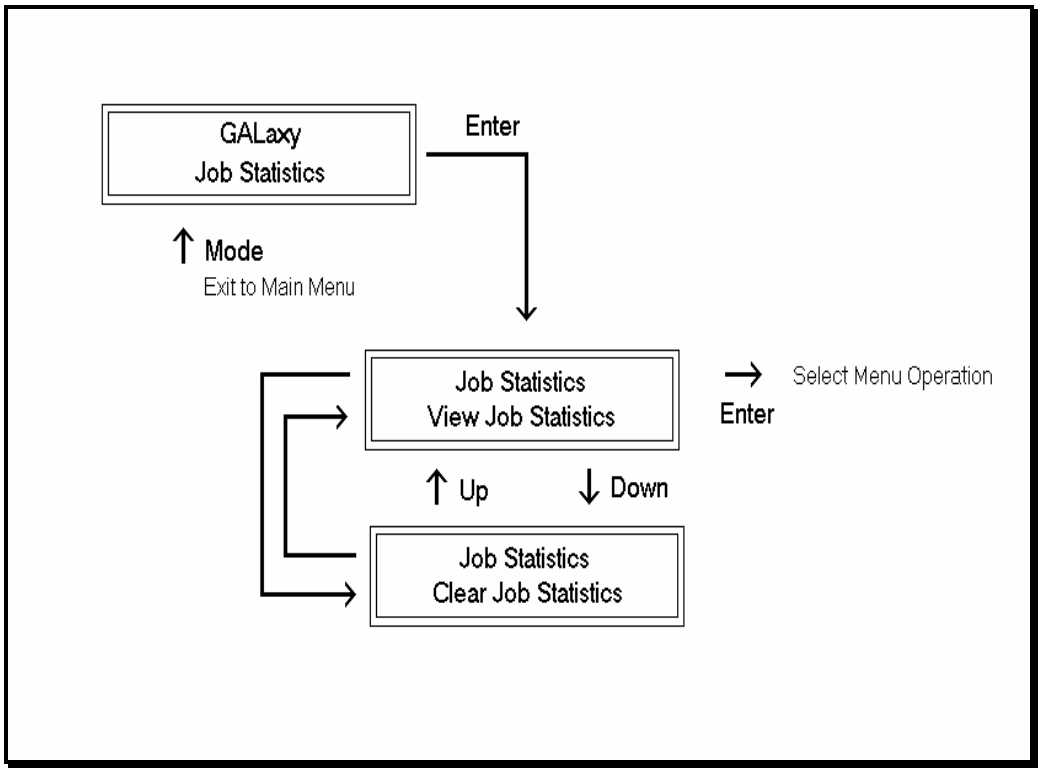
Group Dispatch	Min	Max	Initial	Units	Description
Parking	0	4	1	Car	Number of Cars to Park. One car is parked at the lobby. The remaining cars are parked at the most used floors of the building. If set to zero, no cars

Group Dispatch	Min	Max	Initial	Units	Description
					are parked.
Park Delay Time	0	120.0	8.0	Sec	Parking Delay Time. Time delay an idle car waits before being parked.
Lobby Request	0	4	0	Car	Lobby Request. Number of Cars Requested to the Lobby floor. Used with Next Car Up operation.
Next Car Up	0	2	0	_	Next Car Up. Set to 1 or 2 will activate the Next Car Up operation. If set to 1 the next up car will open its door at the lobby and keep it open. The car is allowed to leave the floor after the Lobby Dwell time expires but will remain at the floor with the door open until an onward call is assigned to it. If set to 2 the next up car will close the 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.
Up Pk Trig Time	0	3200.0	60.0	Sec	Up Peak Trigger Time. The time interval to count the number of up peak triggers.
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 CC Count	1	40	3	Car Call 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 Peak Time	0	3200.0	180.0	Sec	Up Peak Duration Time. The duration time for up peak operation once up peak is activated.
Dn Pk Trig Time	0	3200.0	60.0	Sec	Down Peak Trigger Time. The time interval to count the number of down hall calls above the lobby to activate down peak operation.
Dn Pk Trig Cnt	1	100	12	Down Hall Call 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.
Down Peak Time	0	3200.0	180.0	Sec	Down Peak Duration Time. The duration time for down peak operation once down peak is activated.
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.
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 then ETA Coincident Car Call Time.

Group Options	Min	Max	Initial	Units	Description
Em Power Floor	1	29	1	Floor	Emergency Power Recall Floor.
Em Power Cars	1	4	1	Car	Number of Emergency Power Cars that can run at the same time on the emergency power source.
1st Recall Car	0	4	1	Car	First Recall Car. This is the first car allowed to recall during the recall sequence. The recall sequence continues in consecutive order and then loops around until all cars are recalled.
1st EP Run Car	0	4	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.
Recall Timeout	1.0	600.0	60.0	Sec	Recall Time-out. The time allowed for the car to reach the recall floor. If this timer expires, the next car is selected to recall.
Code Blue Car	0	4	0	Car	Code Blue Car. If set to zero, the best ETA car will be assigned the code blue call. If set to a car number, the selected car will always be assigned the code blue call.
IR Car	0	4	0	Car	Inconspicuous Riser Car. This car is assigned all the IR hall calls.
IR Control	0	7	0	1=IREn 2=AnCB4S 4=AnCB4F	Inconspicuous Riser Control. This variable is used to set the automatic activation of IR service. Add each number to activate the option. 1 = IREn: Enable IR automatic activation. +2=AnCB4S: Answer all Car calls Before Starting IR service. +4=AnCB4F: Answer all Car calls Before Finishing IR service.
Vid Pos Car 1	1	6	1	Column Position	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. 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	6	2	Column Position	Video Position Car 2. See Video Position Car 1 for an explanation.
Vid Pos Car 3	1	6	3	Column Position	Video Position Car 3. See Video Position Car 1 for an explanation.
Vid Pos Car 4	1	6	4	Column Position	Video Position Car 4. See Video Position Car 1 for an explanation.
Vid Pos Car 5	1	6	5	Column Position	Video Position Car 5. See Video Position Car 1 for an explanation.
Vid Pos Car 6	1	6	6	Column Position	Video Position Car 6. See Video Position Car 1 for an explanation.
HC X-Assign En	0	1	0	_	Hall Call Cross Assignment Enabled. Set to enable cross assign with old elevator system.
HC X-	0	500	60	Sec	Hall Call Cross Assignment ETA limit. If ETA

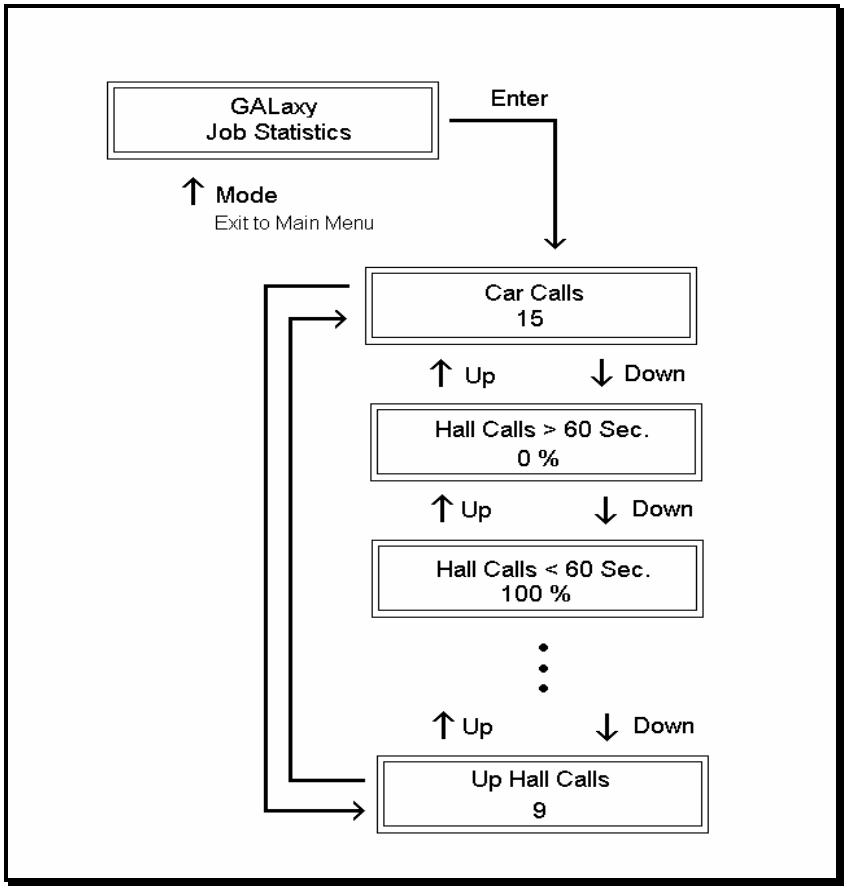
Group Options	Min	Max	Initial	Units	Description
Assign ETA					for hall call assignment is greater than this ETA limit, the hall call will be cross-assigned to the old group controller.

5.2.3 JOB STATISTICS



Select to view or clear job statistics from this menu.

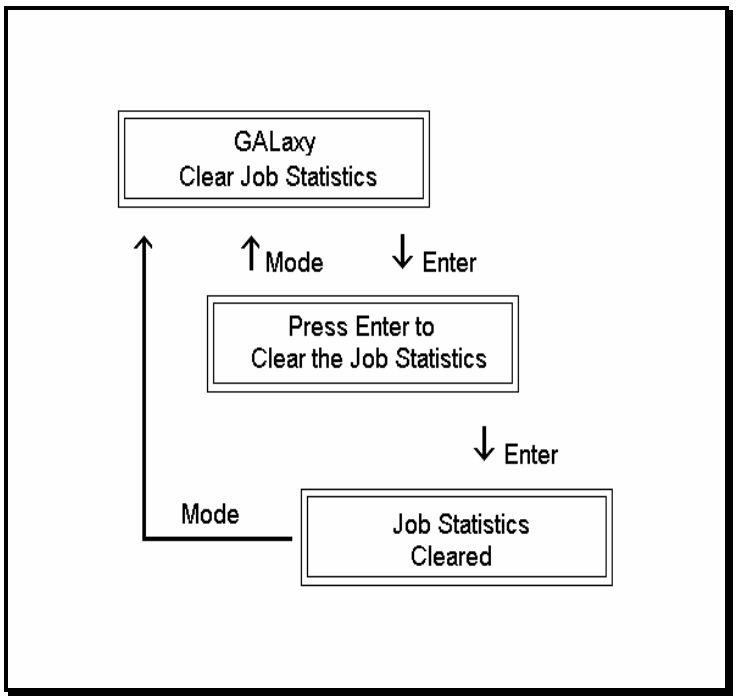
5.2.3.1 VIEW JOB STATISTICS



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:

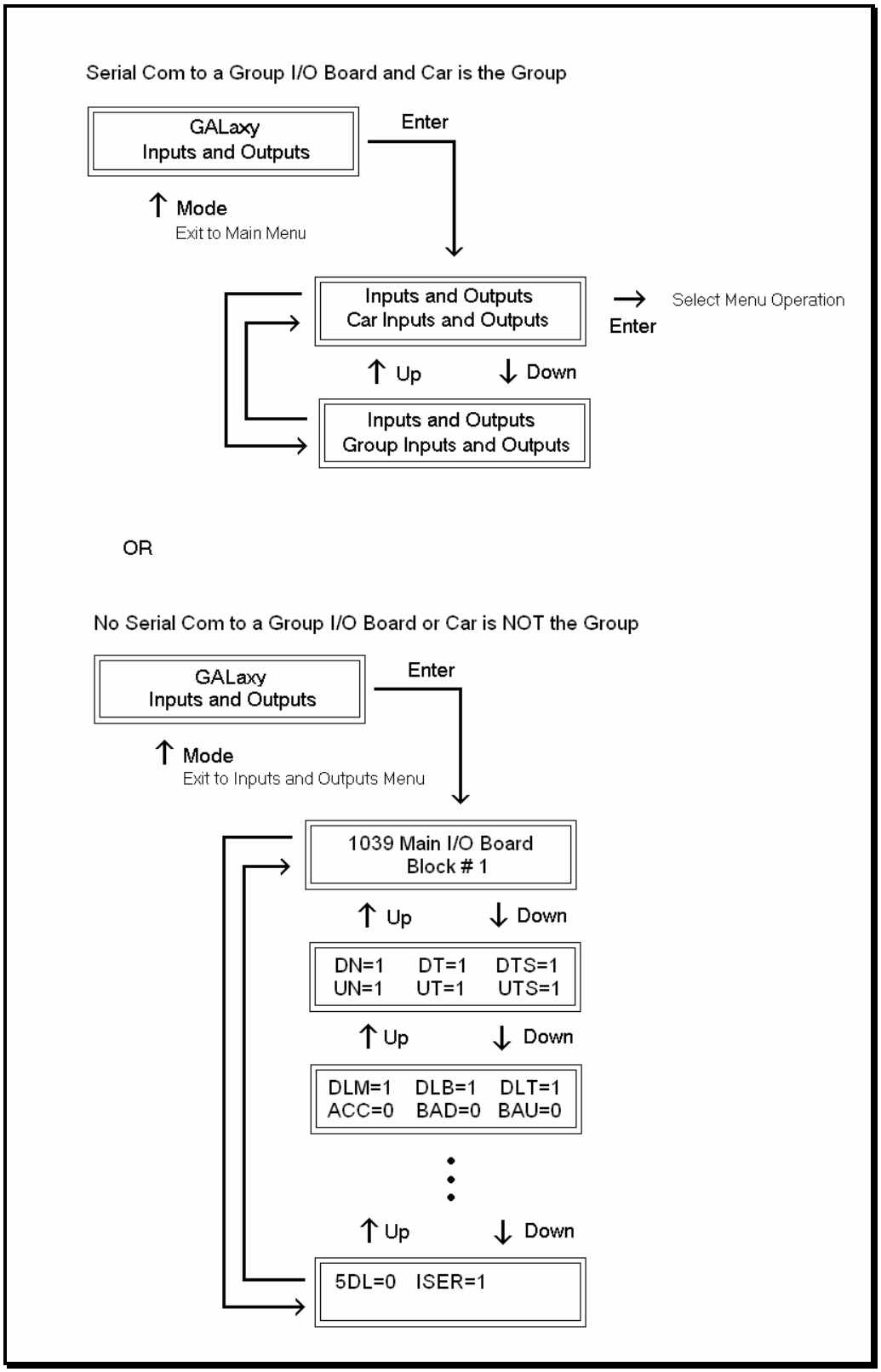
- Number of Car Calls
- Number of Up Hall Calls
- Number of Down Hall Calls
- Number of Up Hall Calls with < 15 second wait time
- Number of Up Hall Calls with < 30 second wait time
- Number of Up Hall Calls with < 45 second wait time
- Number of Up Hall Calls with < 60 second wait time
- Number of Up 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

5.2.3.2 CLEAR JOB STATISTICS

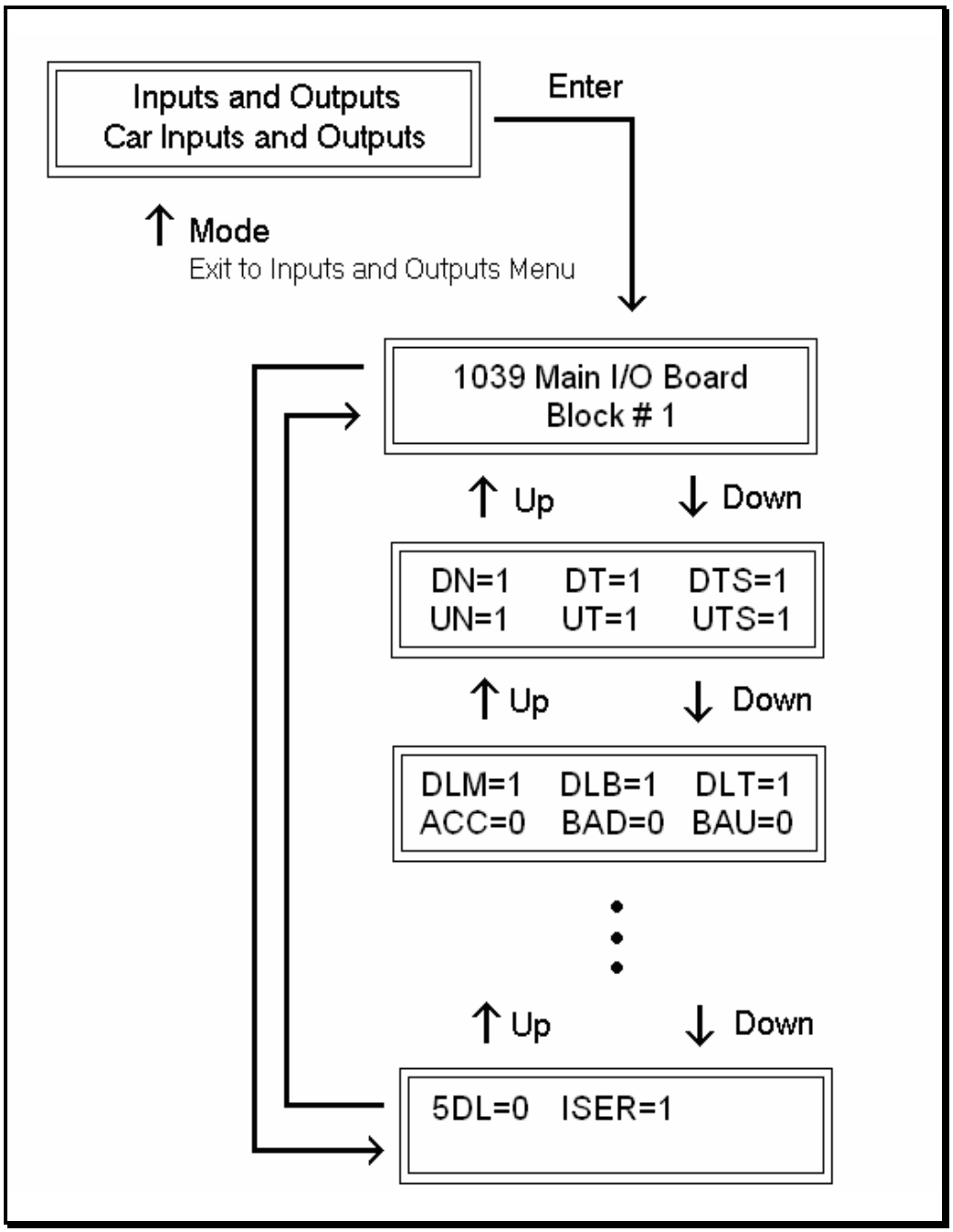


This operation will set all the job statistics data to zero.

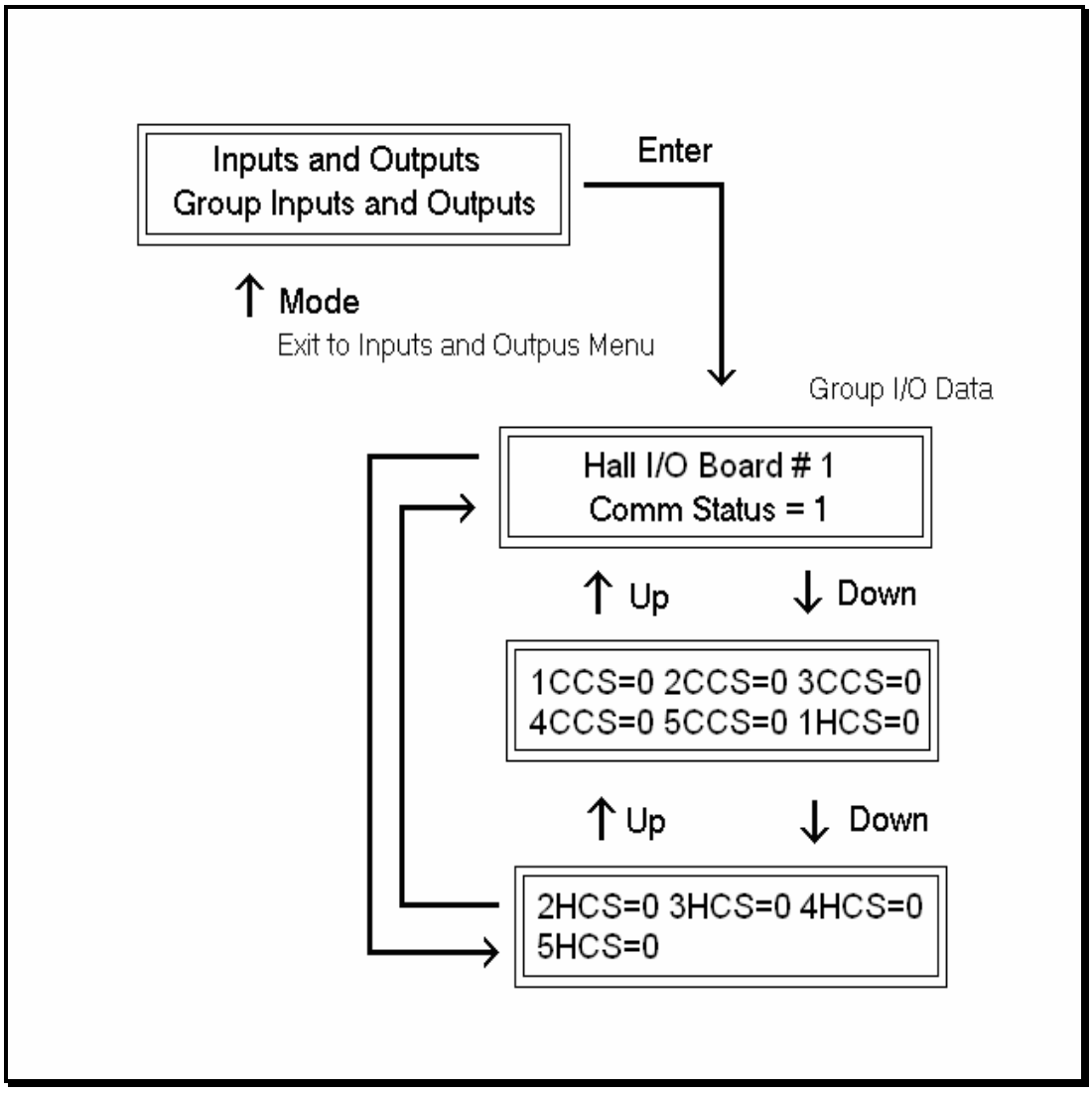
5.2.4 INPUTS AND OUTPUTS



5.2.4.1 CAR INPUTS AND OUTPUTS

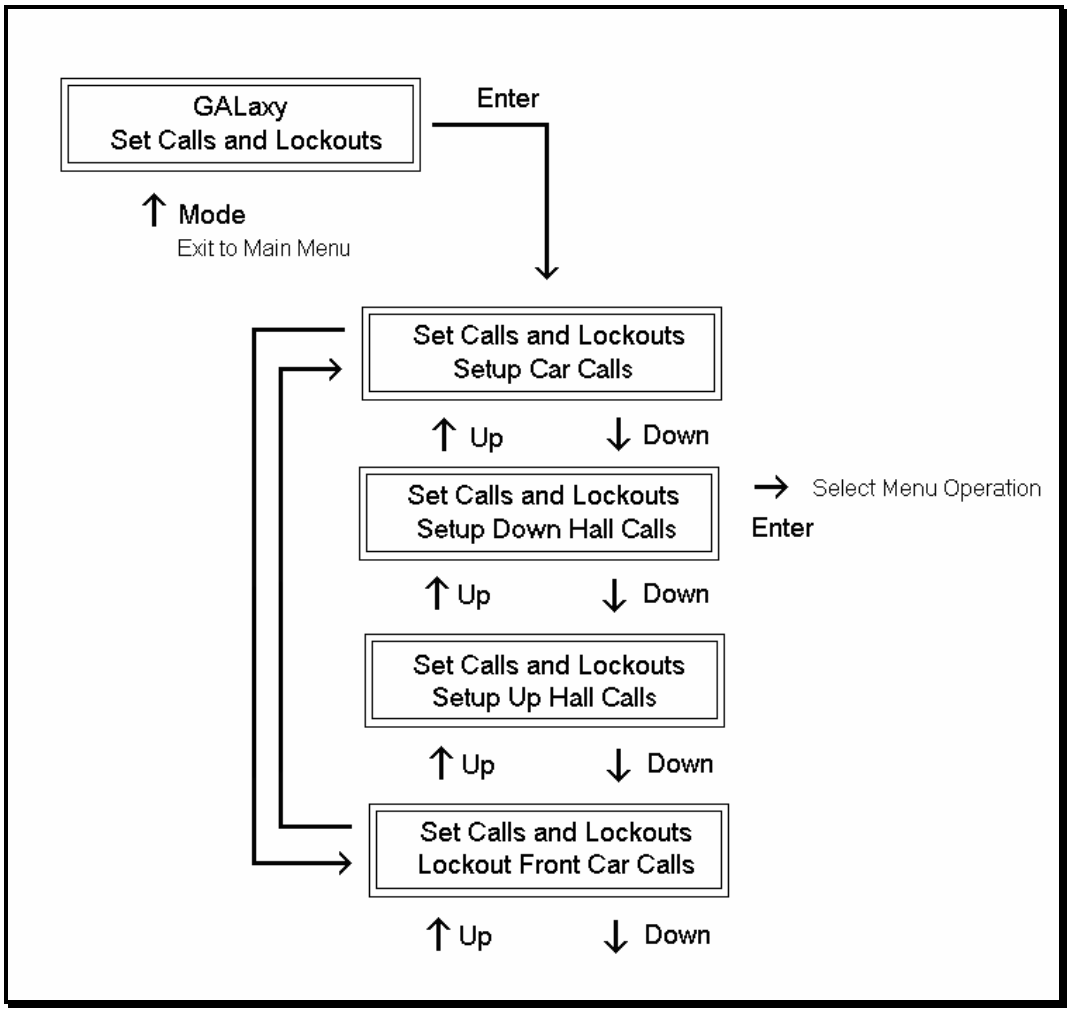


Inputs and outputs show a "1" for ON and a "0" for OFF. A list every input and output used on the controller and the board it is located on is shown in Appendix A. The controller determines which boards are used depending on the options selected and the number of front and rear floors. All the I/Os for a given board are displayed even if a particular I/O is not used.



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.

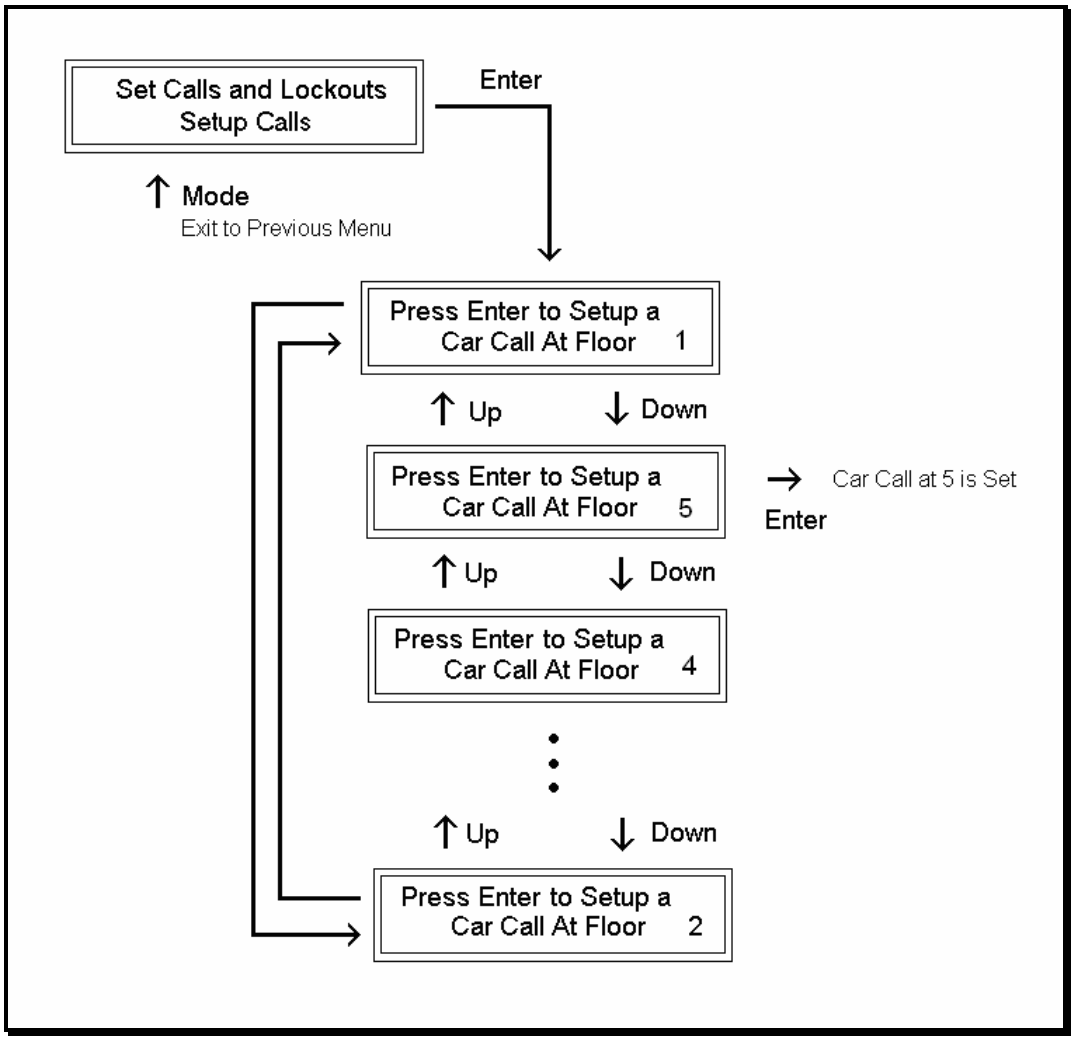
5.2.5 SET CALLS AND LOCKOUTS



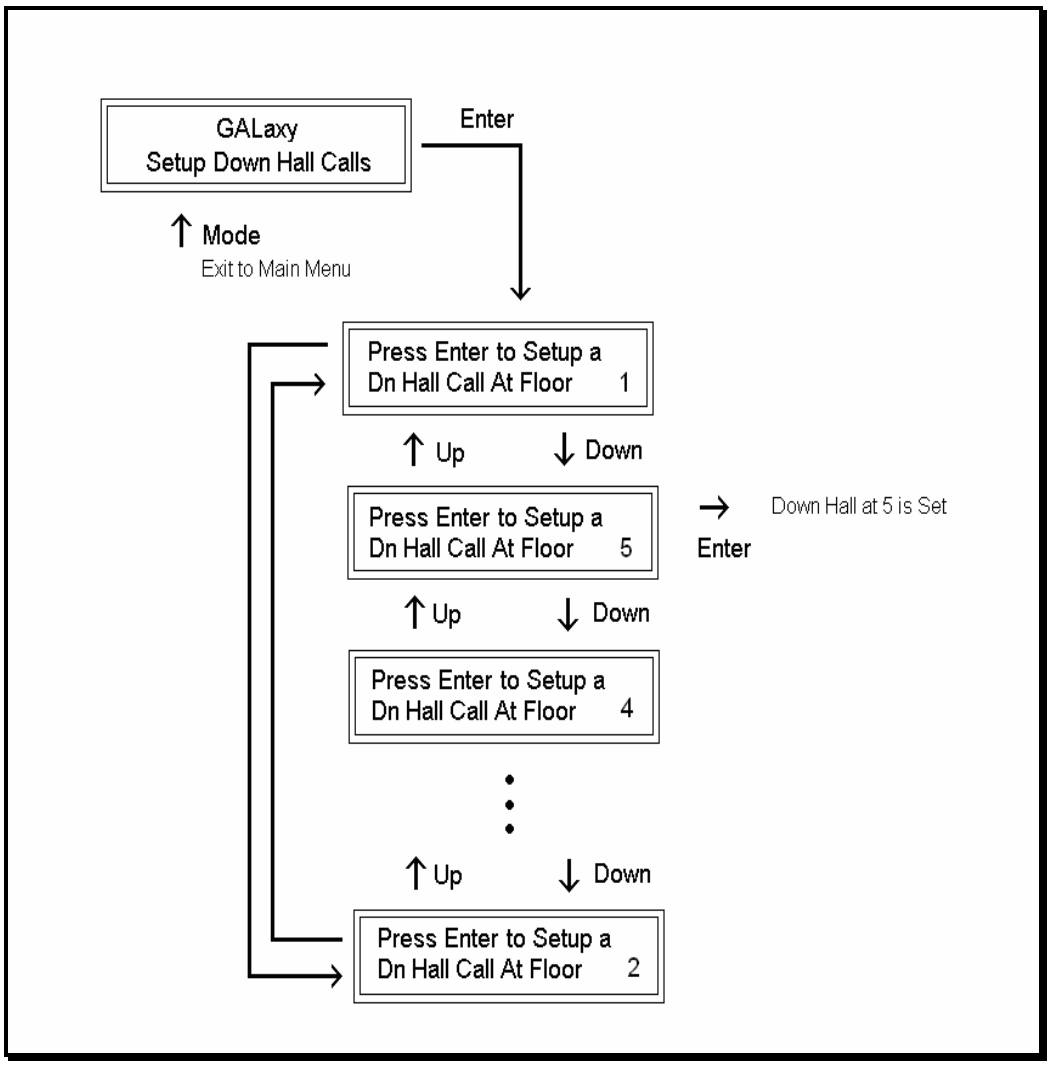
When a car is the group the menu system allows access to setting both hall calls and car calls. When not the group, only car calls can be set.

Rear lockouts are only displayed only when the car has a rear door.

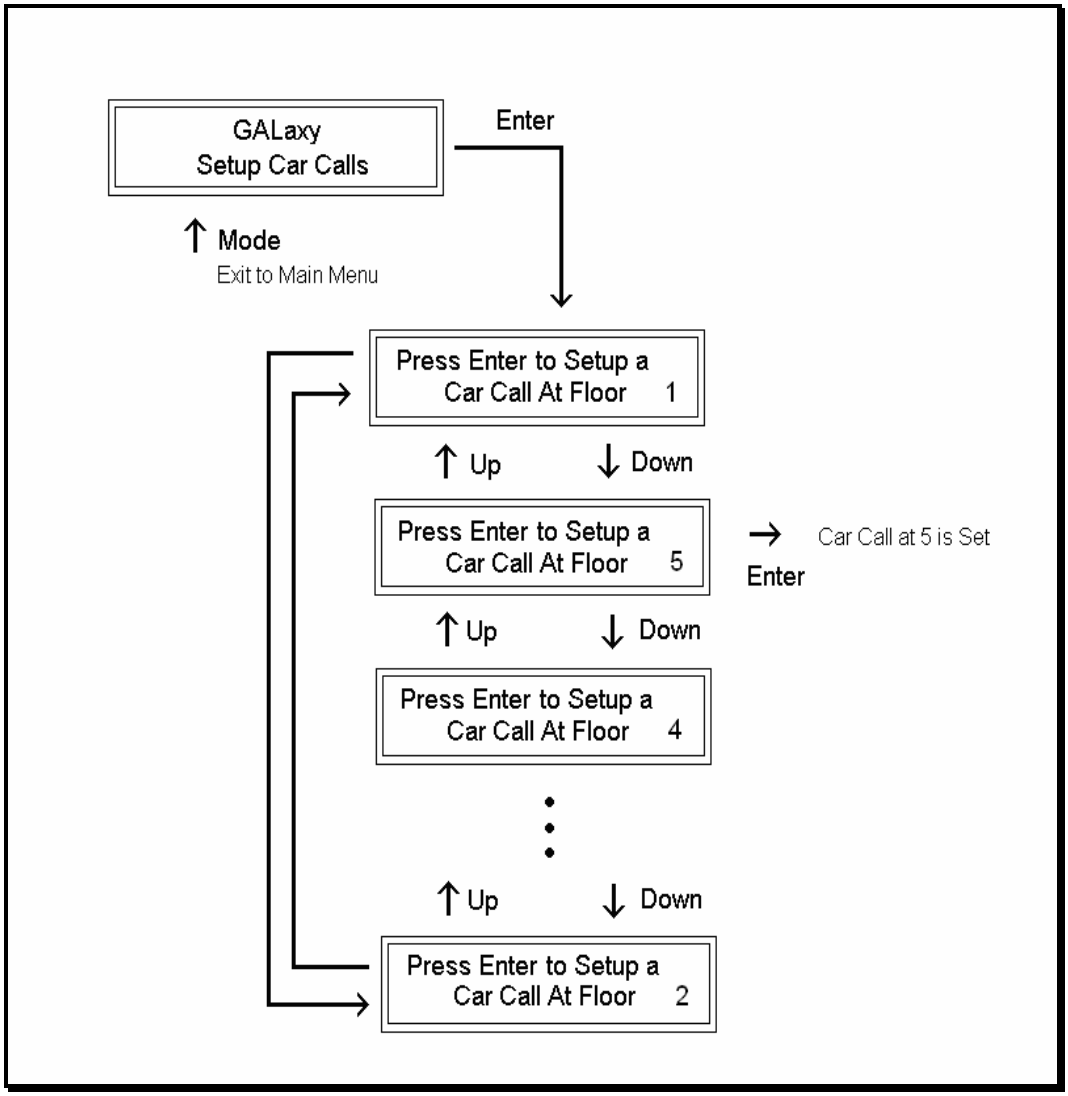
5.2.5.1 SETUP CAR CALLS



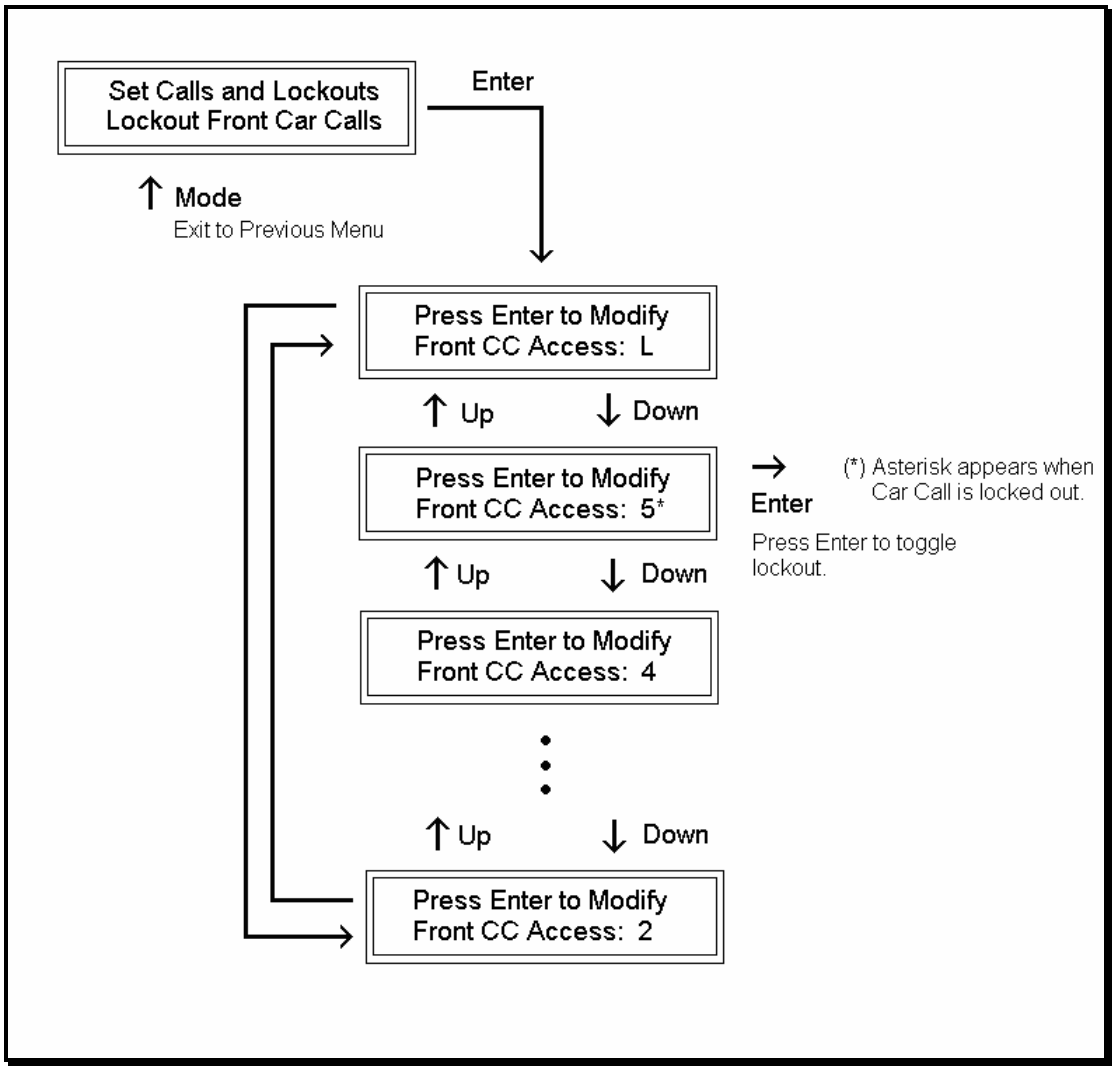
5.2.5.2 SETUP DOWN HALL CALLS



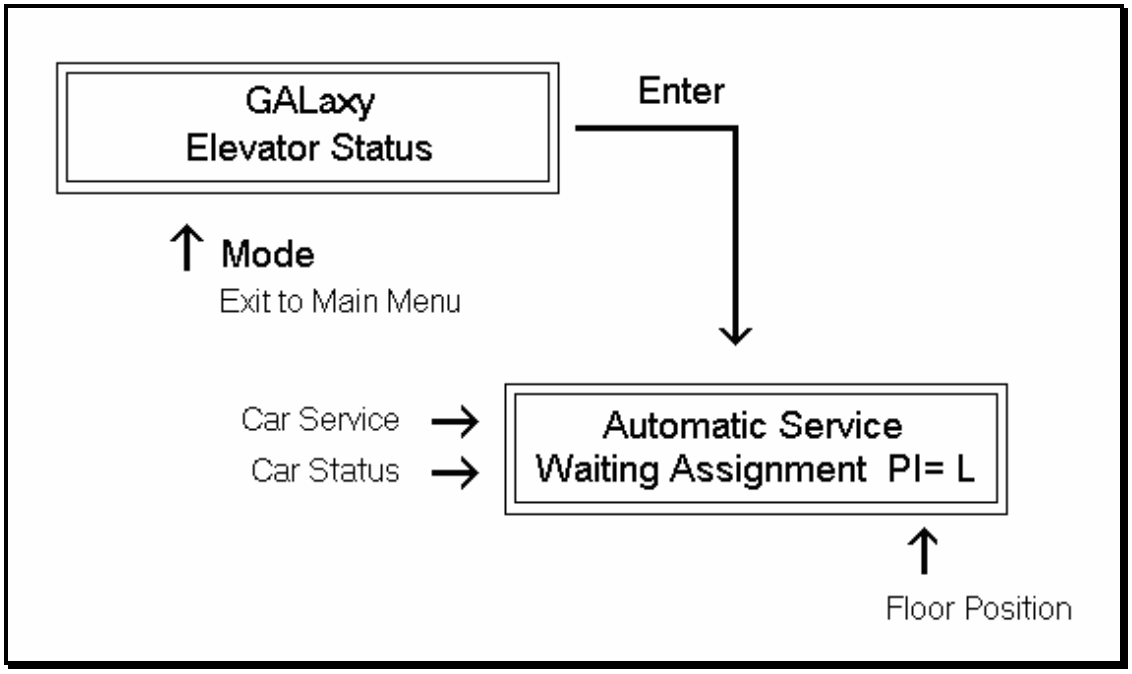
5.2.5.3 SETUP UP HALL CALLS



5.2.5.4 LOCKOUT FRONT CAR CALL



5.2.6 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

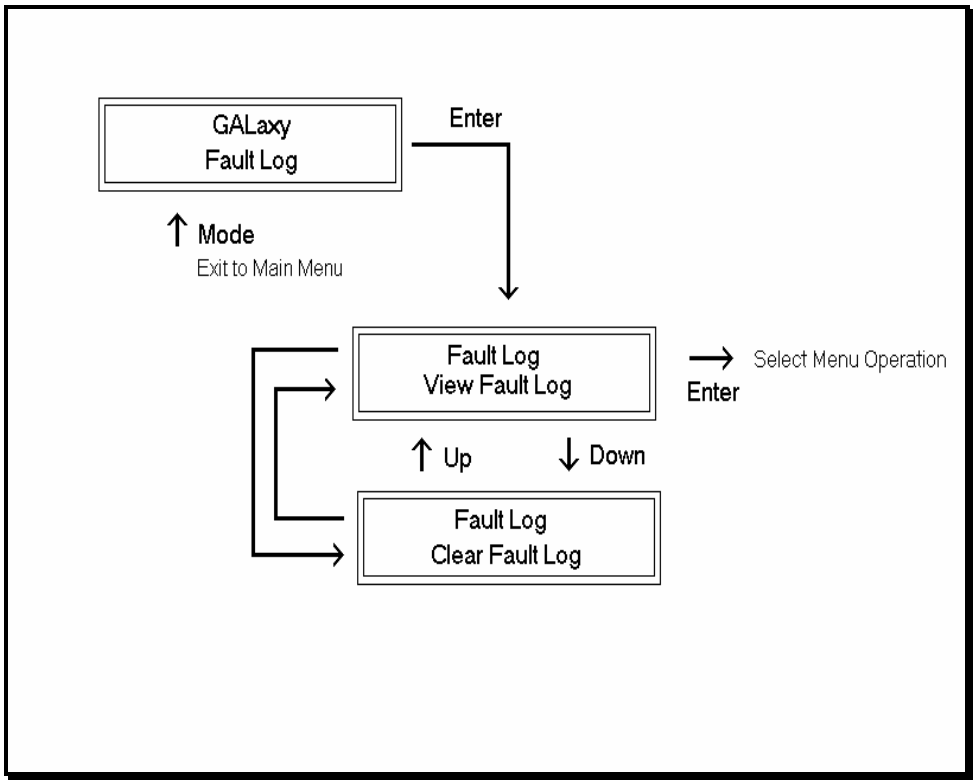
Elevator Status:

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 Deccel	PI= 1
Constant Deccel	PI= 1
Targeting Floor	PI= 1
Emergency Slowdown	PI= 1
Safety String Open	PI= 1
Elevator Off Line	PI= 1
Elevator Parked	PI= 1
Waiting Assignment	PI= 1
Door Procedure	PI= 1
Elevator Stalled	PI= 1

Door Status:

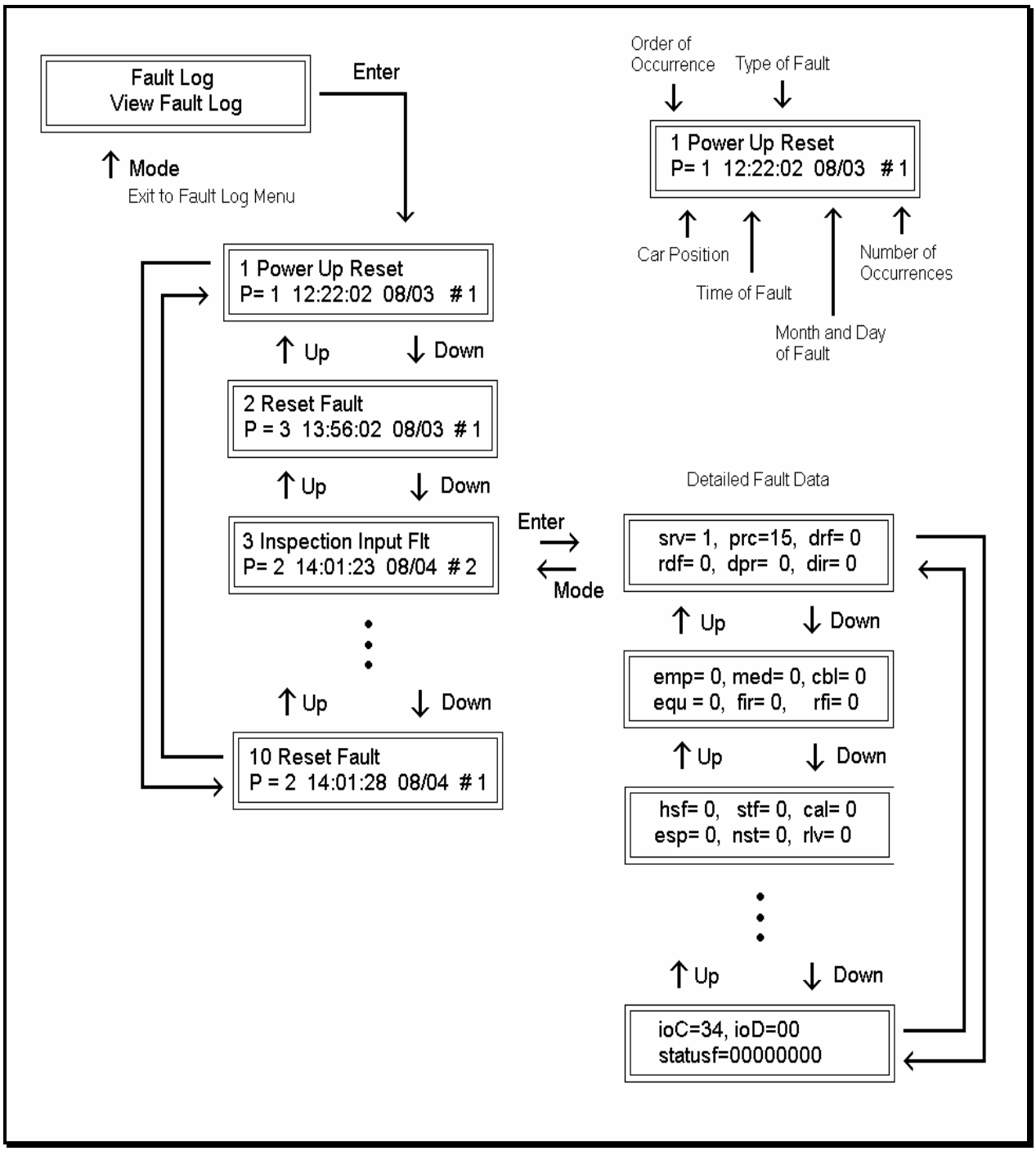
Elev Door Closed	PI= 1
Elev Door Opening	PI= 1
Elev Door Dwelling	PI= 1
Elev Door Open	PI= 1
Elev Door Closing	PI= 1
Elev Door Nudging	PI= 1
F1RET Door Open	PI= 1
F2CPO Door Open	PI= 1
F2CPO Door Opening	PI= 1
F2CPO Door Closed	PI= 1
F2CPO Door Closing	PI= 1
F2CPC Door Open	PI= 1
F2CPC Door Opening	PI= 1
F2CPC Door Closed	PI= 1
F2CPC Door Closing	PI= 1
F2HLD Door Open	PI= 1
F2HLD Door Opening	PI= 1
F2HLD Door Closed	PI= 1
F2HLD Door Closing	PI= 1
F2MBC Door Open	PI= 1
F2MBC Door Opening	PI= 1
F2MBC Door Closed	PI= 1
F2MBC Door Closing	PI= 1

5.2.7 FAULT LOG



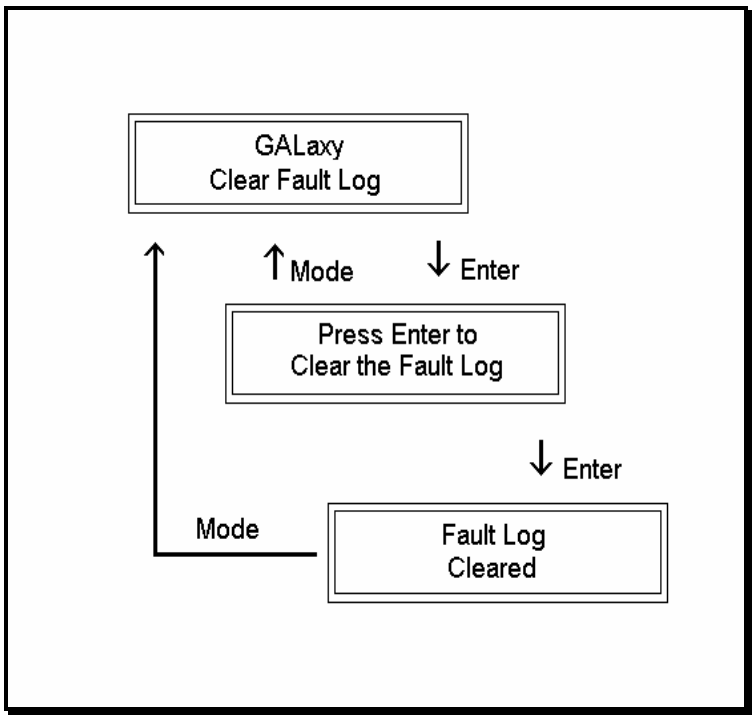
This menu allows the user to view or clear the fault log.

5.2.7.1 VIEW FAULT LOG



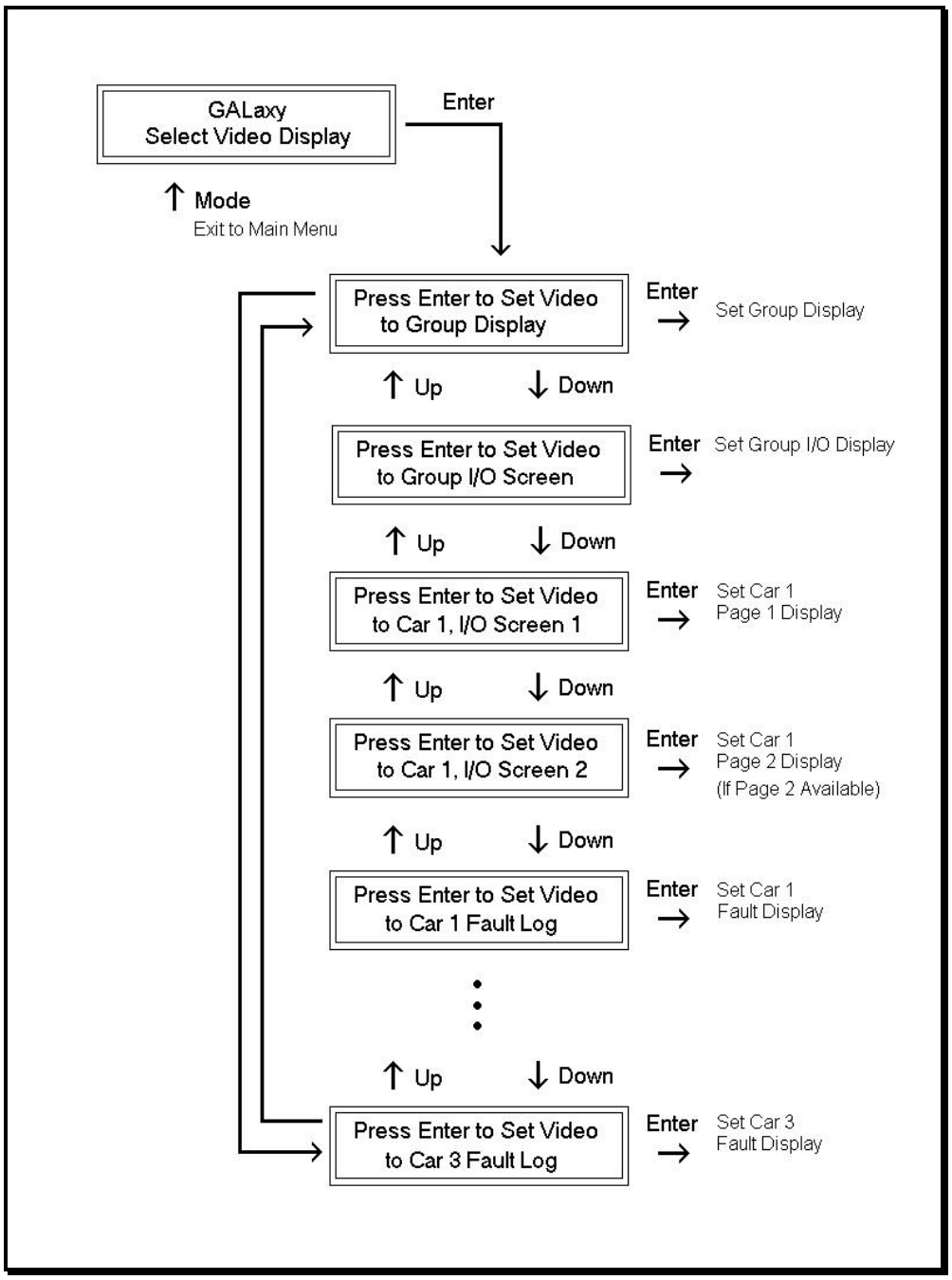
The fault display shows the fault, the car position, time and date the fault occurred and the number of occurrences. Faults are displayed in the order of occurrence with the order number displayed on the top left. The largest order number signifies the last fault that has occurred. Faults are stored 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.

5.2.7.2 CLEAR FAULT LOG



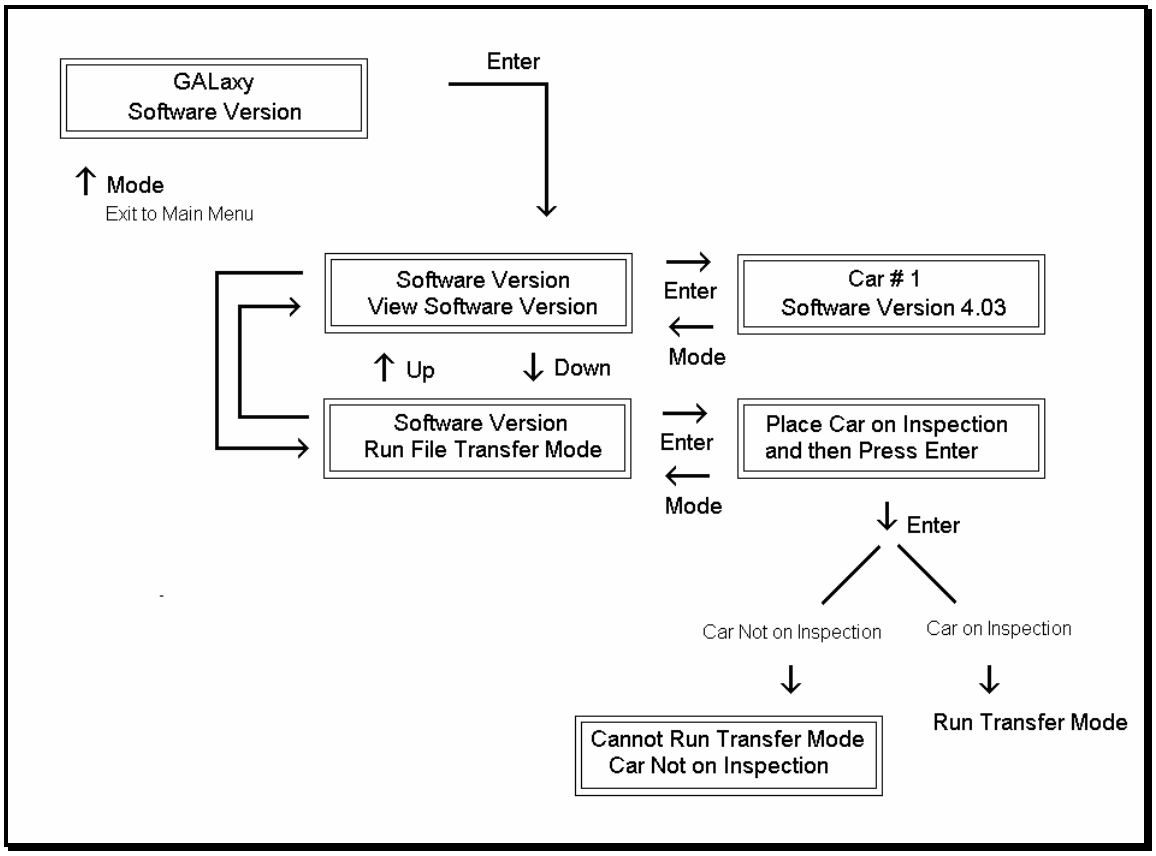
This operation clears the fault log. Once cleared, all faults will show "No Occurrences" until a new fault occurs.

5.2.8 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.

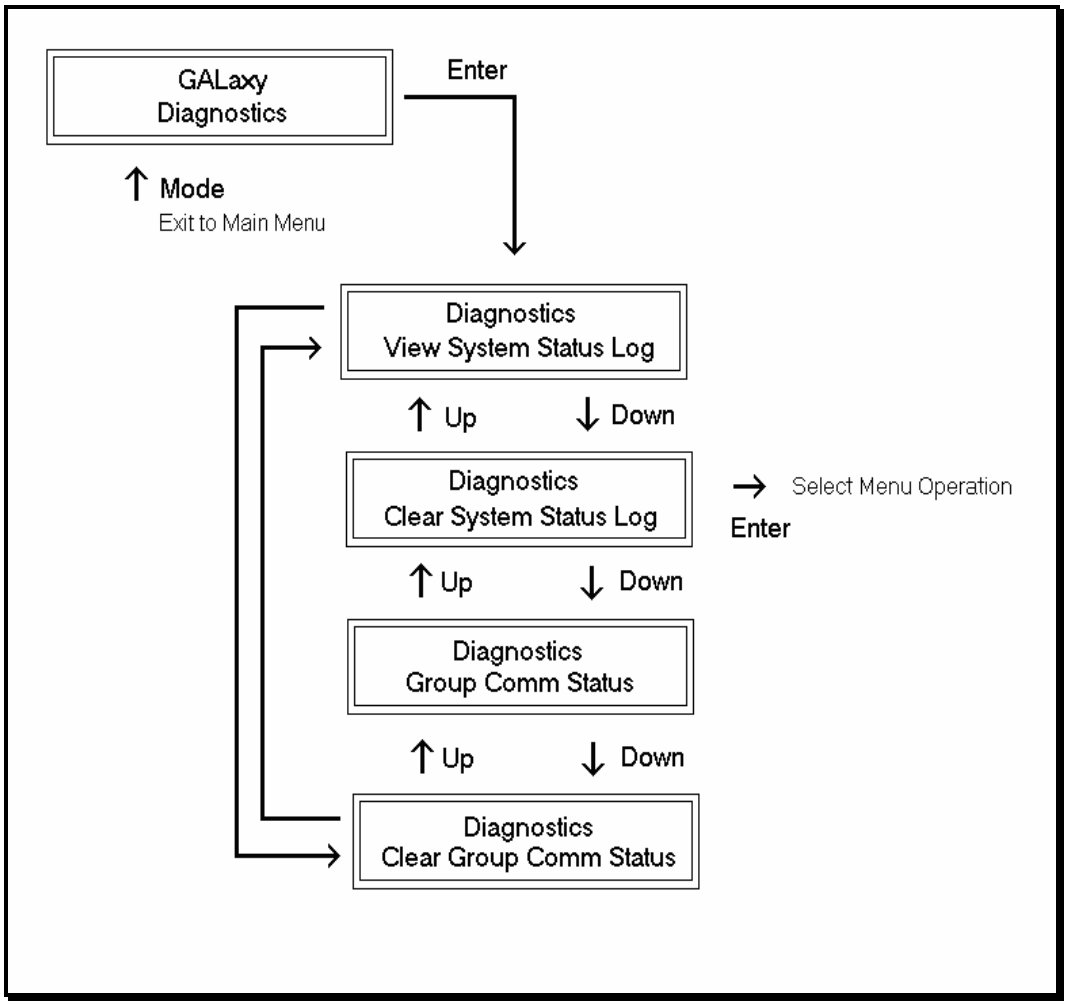
5.2.9 SOFTWARE VERSION



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.

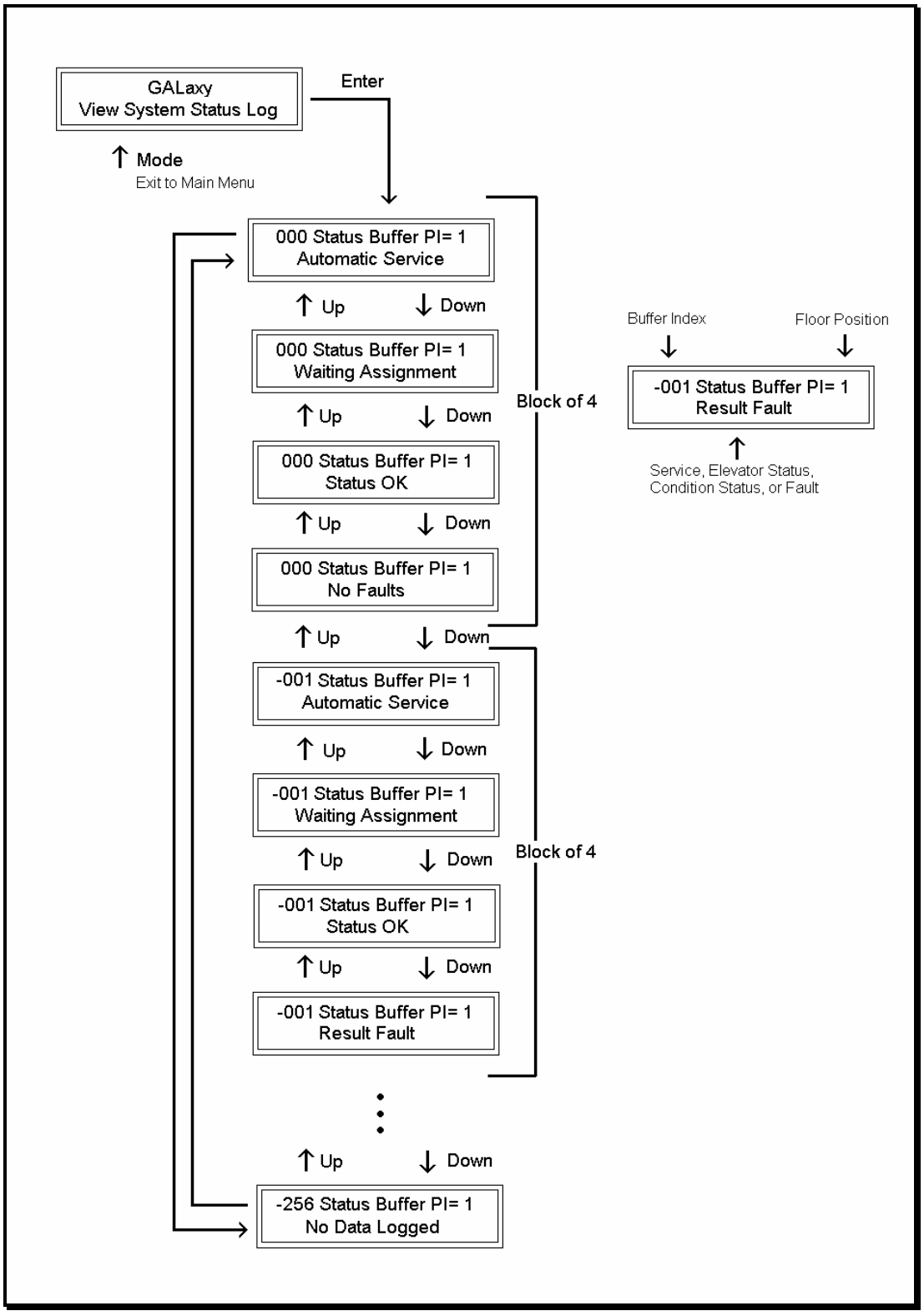
To place the car in file transfer mode, the car must be on inspection. As shown in the above diagram, the controller is programmed to be Car # 1, having software version 4.03.

5.2.10 DIAGNOSTICS



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

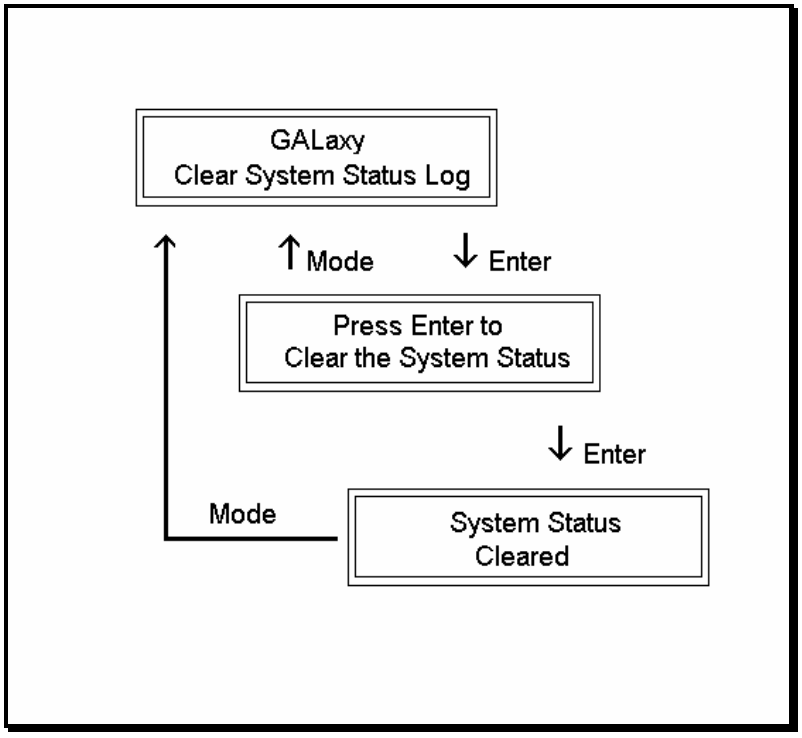
5.2.10.1 VIEW SYSTEM STATUS LOG



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.

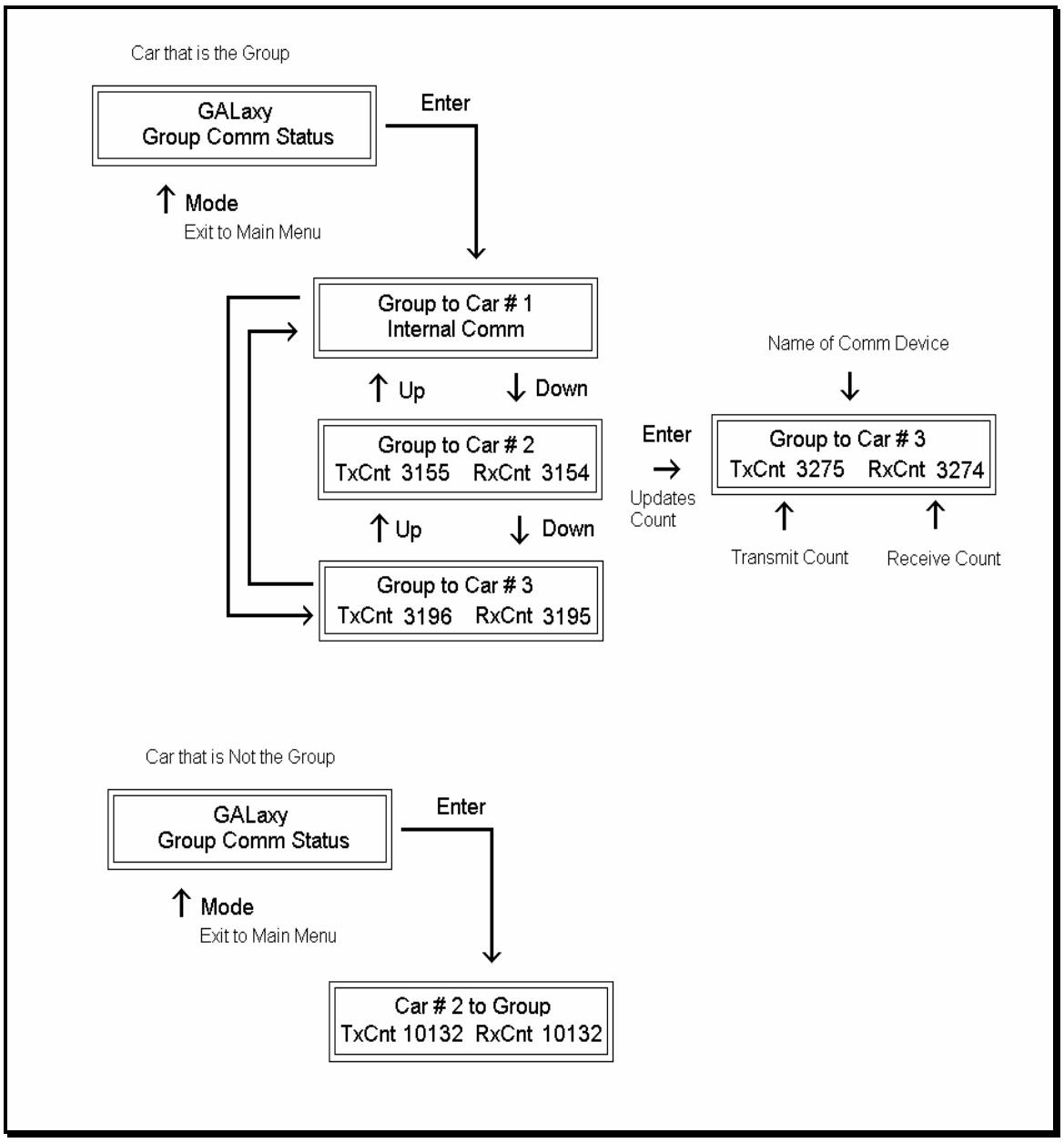
The most recent block of information is always at location 000 and the event prior to the most recent is at block location –001. The event at block –002 happened before block –001 and also before block 000.

5.2.10.2 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".

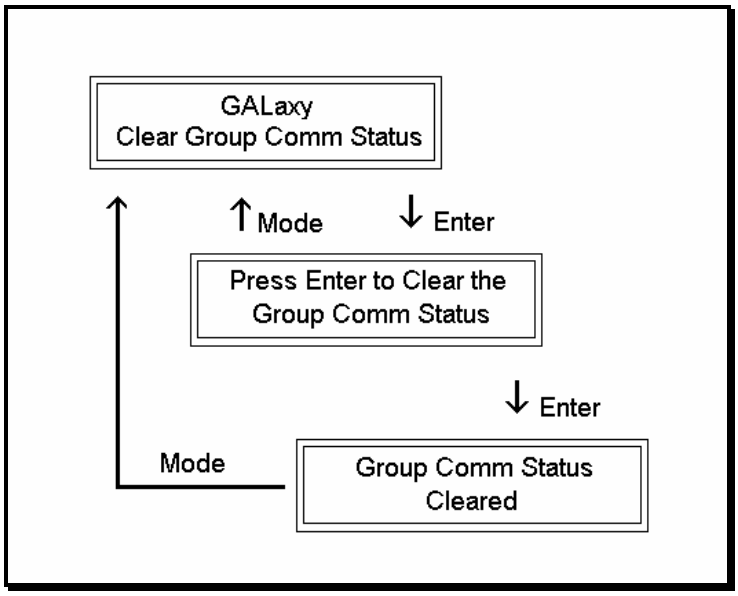
5.2.10.3 GROUP COMM STATUS



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.

5.2.10.4 CLEAR GROUP COMM STATUS

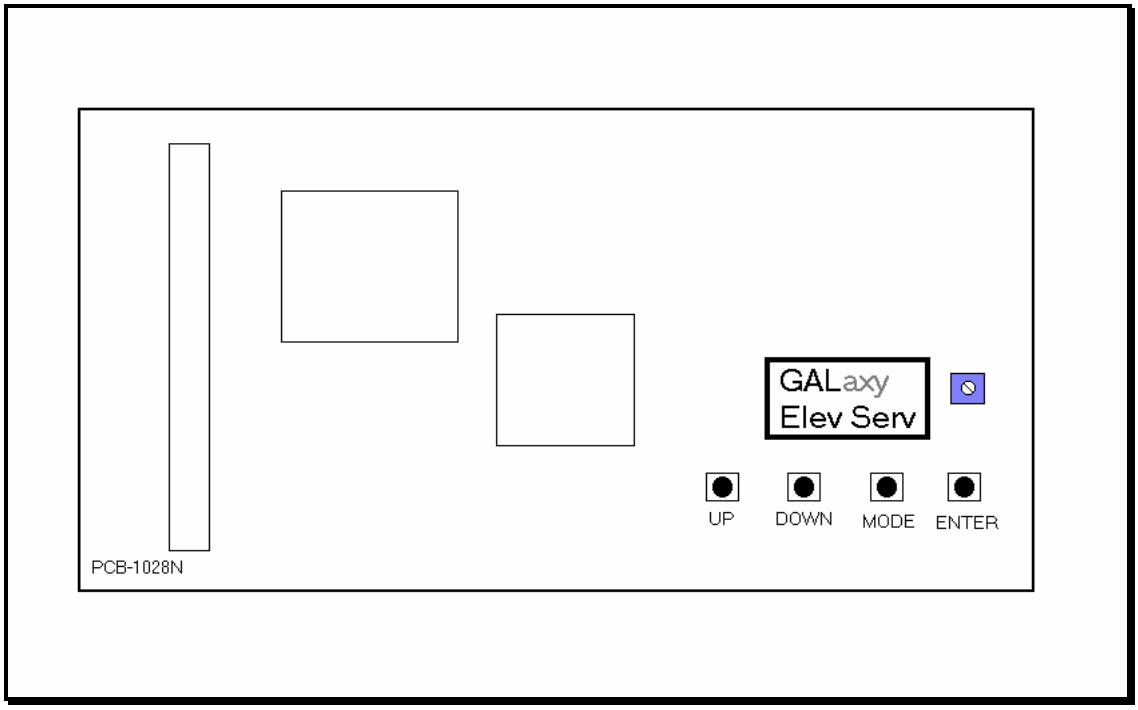


This menu is used to clear the transmit and receive counters for the group to car serial communications.

6 SAFETY PROCESSOR LCD DISPLAY INTERFACE

6.1 OPERATING THE LCD INTERFACE

The Safety Processor Board LCD display 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.

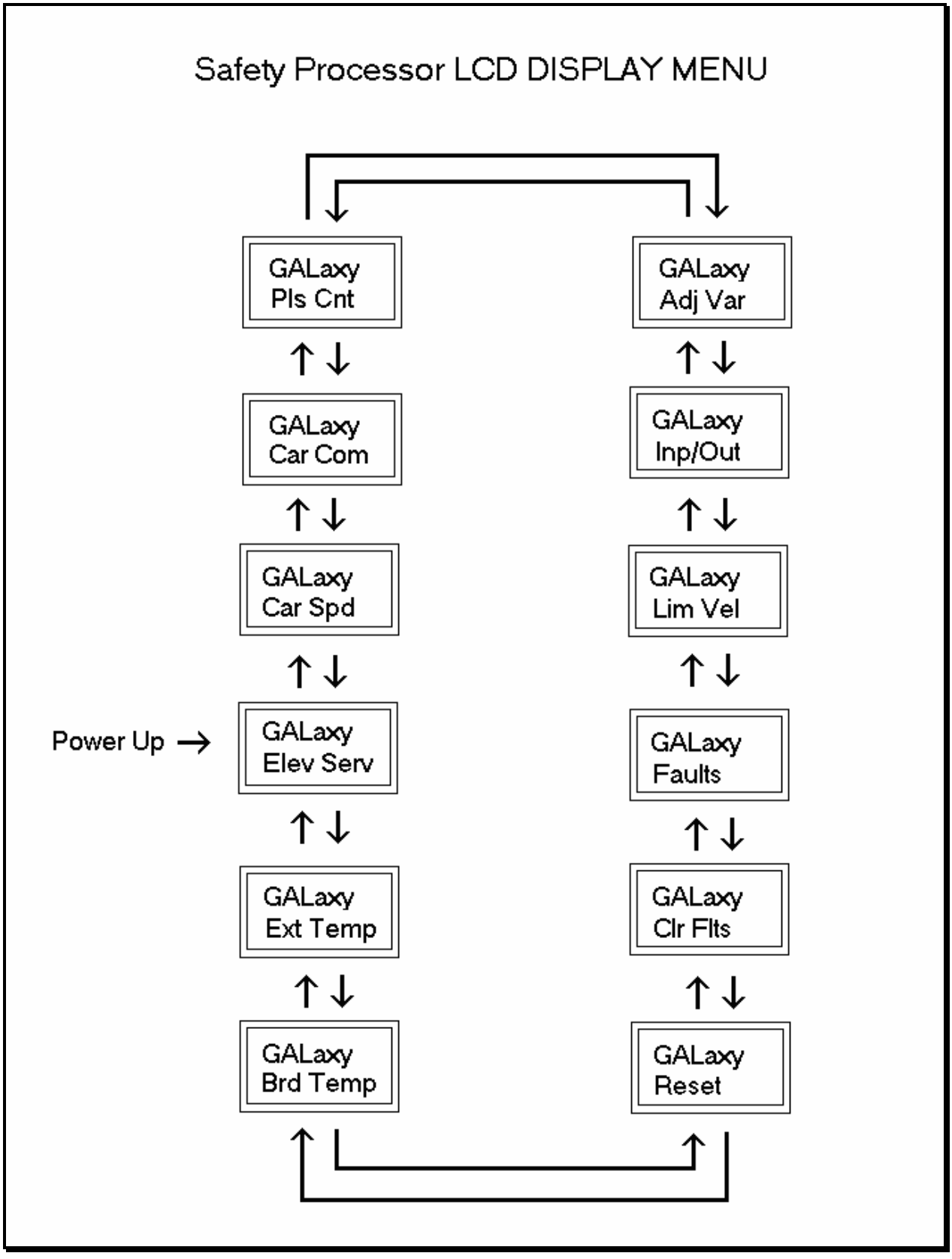
MODE button is used to go back to the previous menu or to select a digit of a data value.

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

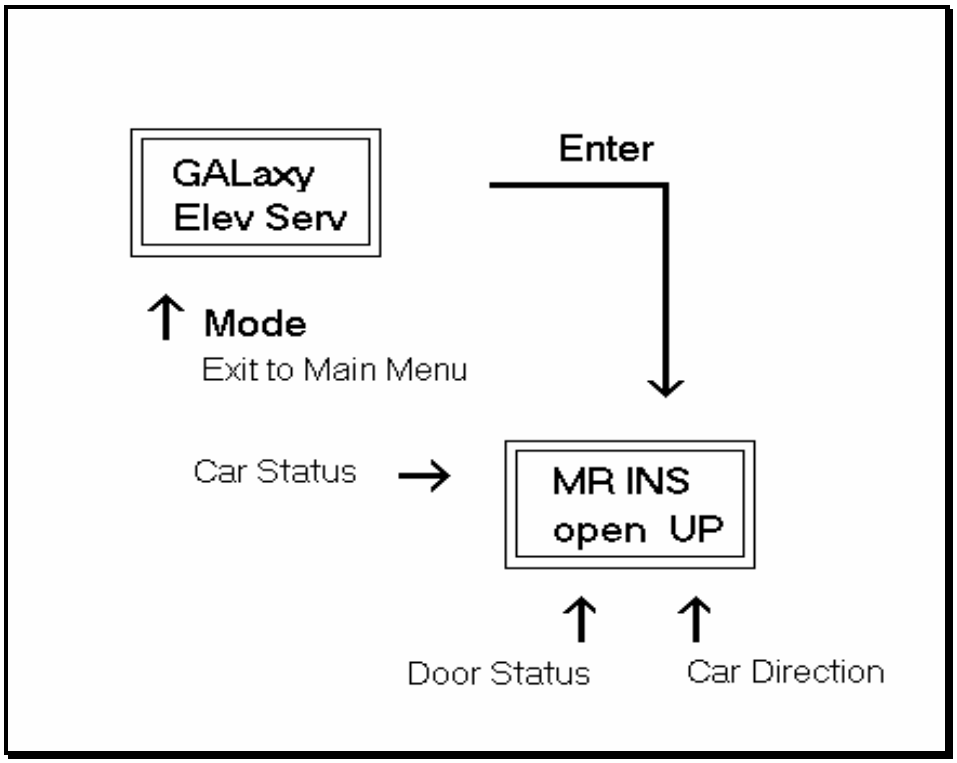
Potentiometer is used to adjust the viewing angle. It will make the display lighter or darker.

The four inputs buttons used with the LCD display are, UP, DOWN, MODE and ENTER. The UP and DOWN buttons are used to scroll up and down to each menu item. When an appropriate menu item is reached, the ENTER button is used to select the item. Some menu items, once selected, show a second menu. Again, use the UP and DOWN buttons to scroll through the menu items and the ENTER button to select a particular item. The MODE button is used to go back to the previous menu. When a menu item is an adjustable variable, select the item with the ENTER button and change the variable with the UP or DOWN button. The MODE button is used to move the cursor to the next digit. When the appropriate value is reached, used the ENTER button to complete the variable change operation and return to the current menu.

6.2 THE SAFETY PROCESSOR BOARD LCD MENU STRUCTURE



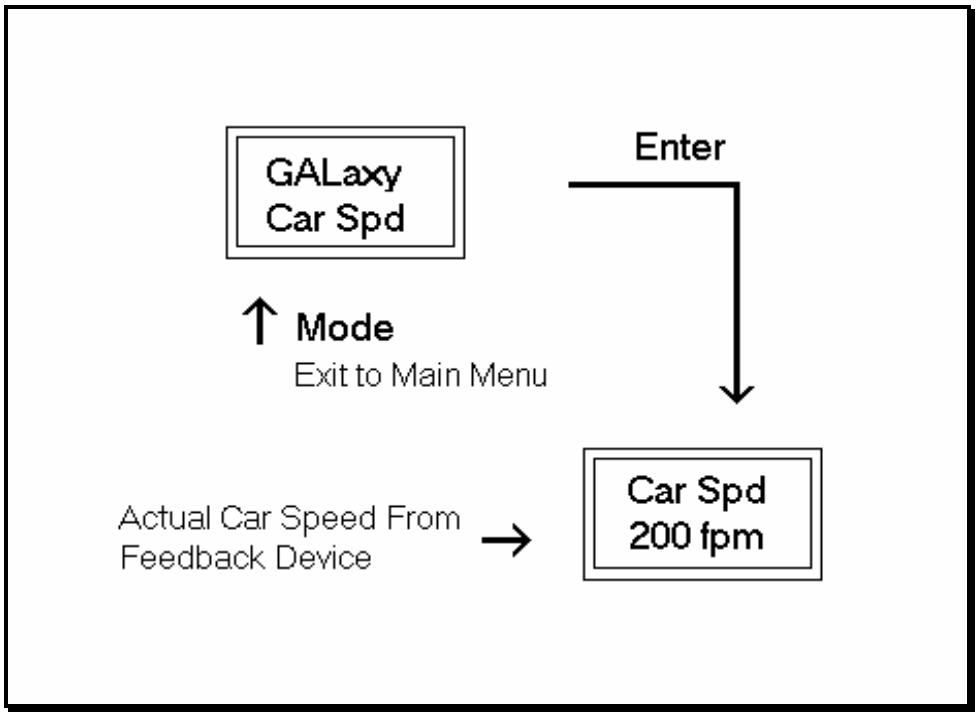
6.2.1 ELEVATOR SERVICE



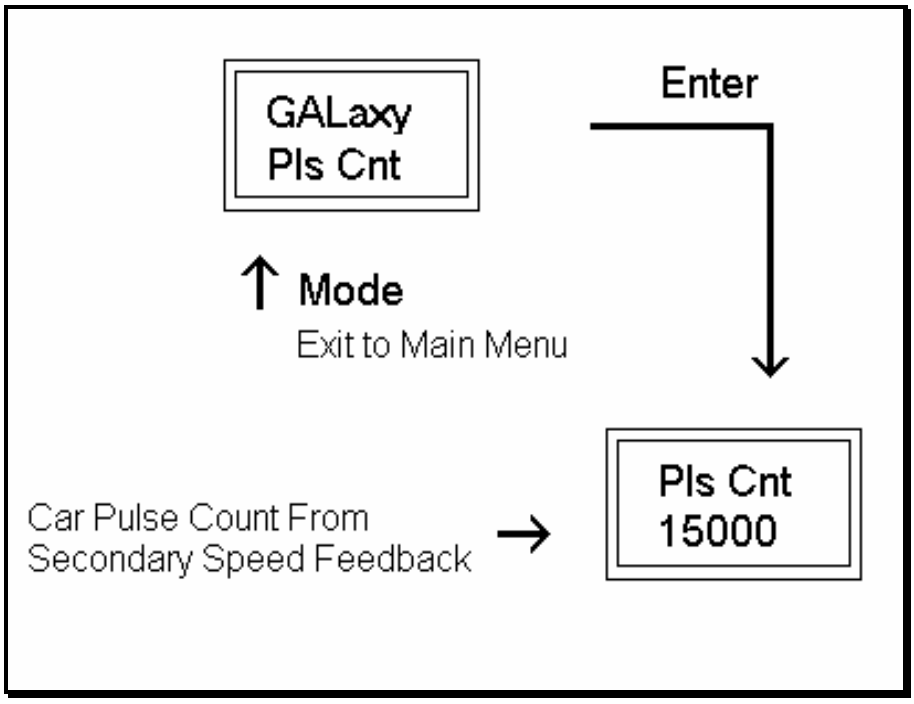
This screen shows the service the car should be on from the inspection inputs, the gate and lock bypass switch inputs and the gate and lock inputs. If any inputs are in error, the error status is displayed. Below shows a list of what is displayed and the condition for it.

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.

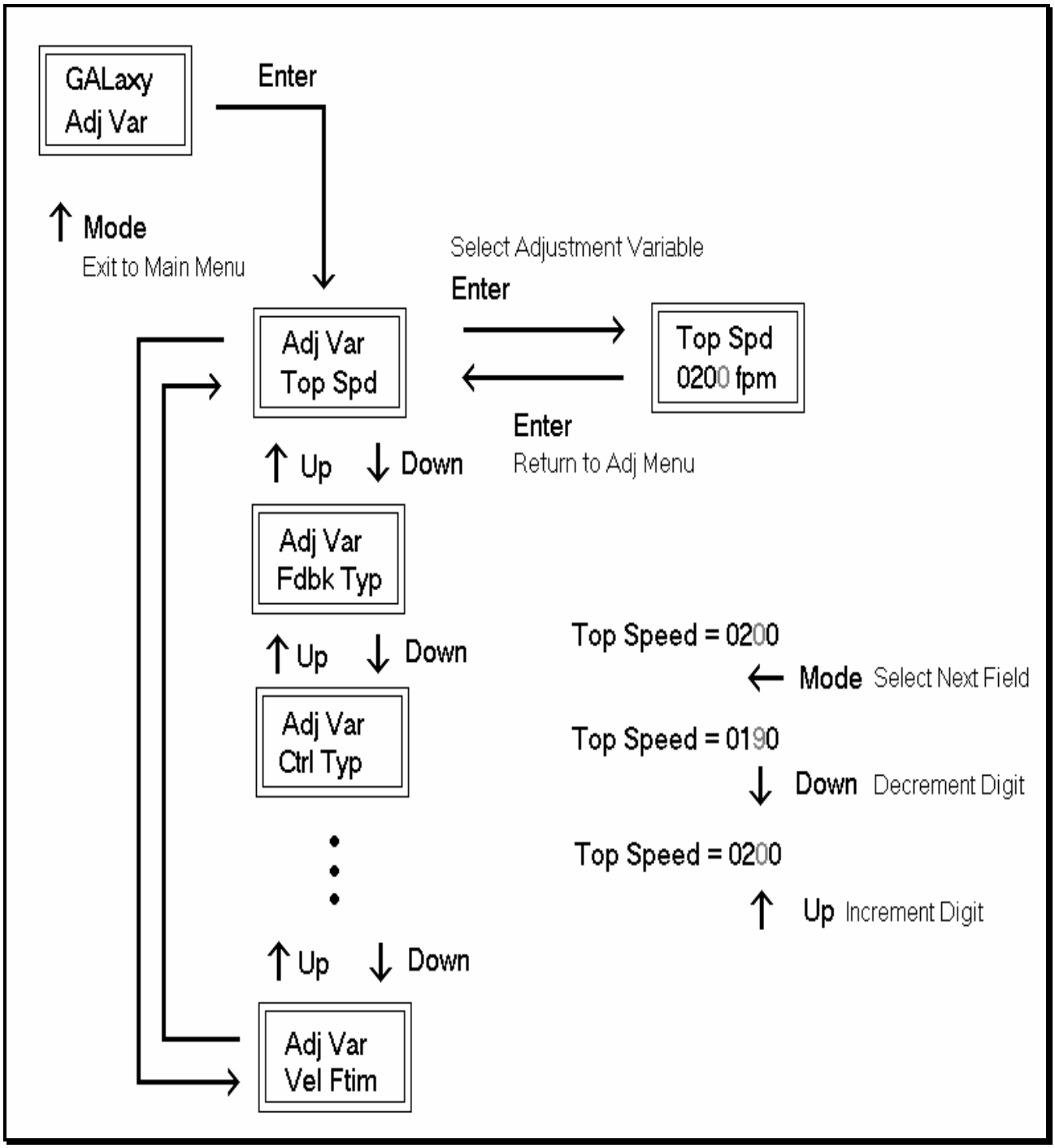
6.2.2 CAR SPEED



6.2.3 SAFETY PROCESSOR PULSE COUNT



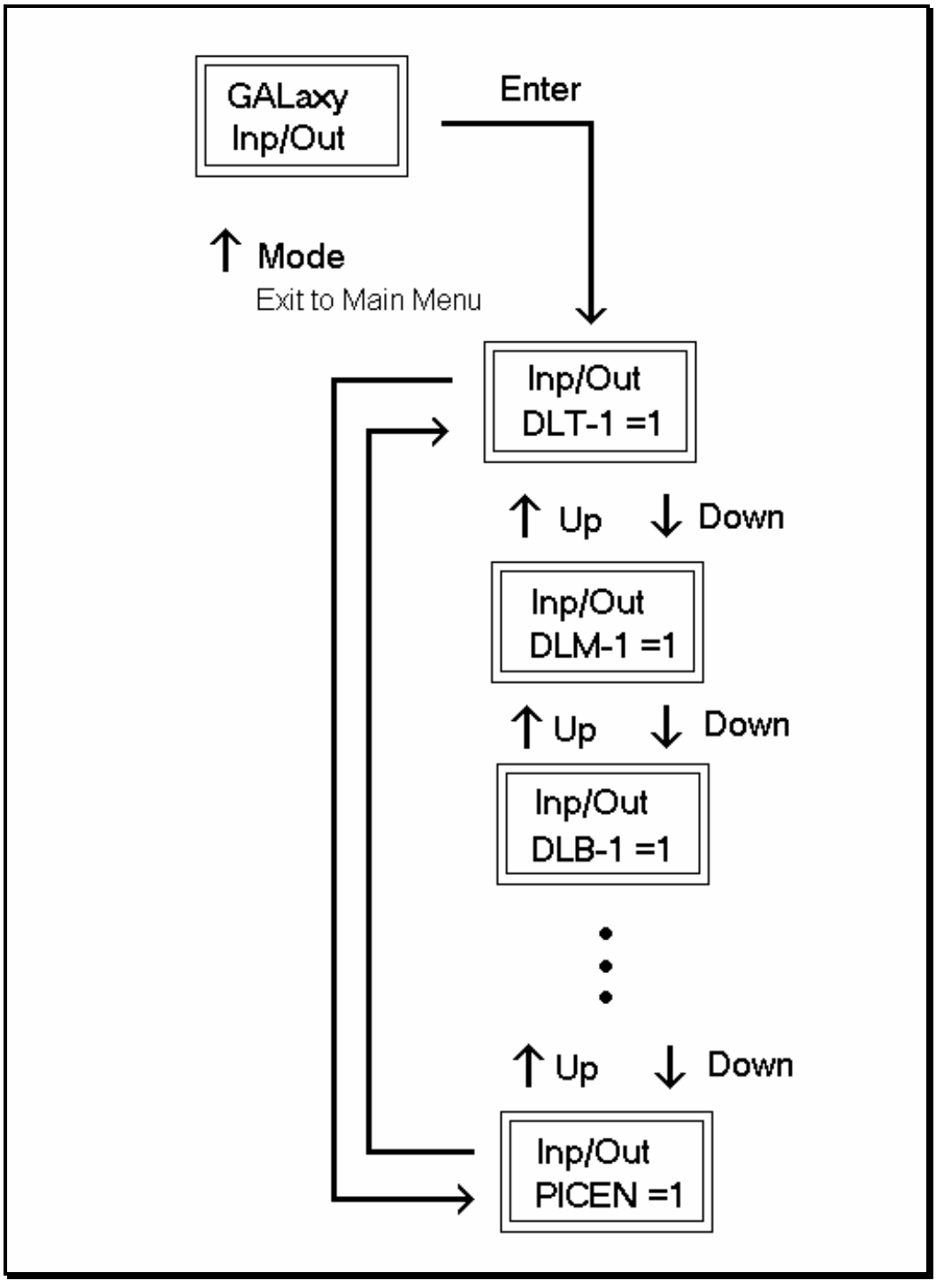
6.2.4 SAFETY PROCESSOR ADJUSTABLE VARIABLES



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

Adjustable Variable	Min	Max	Initial	Units	Description
					velocity error.
UT Count	0	2000	12	Pulse Counts	Up Terminal Count. The number of counts after the UT limit is hit traveling toward the terminal landing for the UT software limit to become active. On cars with only one slowdown limit, the car would normally hit the limit at top speed during a recovery run. The UT Count allows the car time to slowdown before the Safety Processor can shut the car down from a limit velocity error.
DT Count	0	2000	12	Pulse Counts	Down Terminal Count. The number of counts after the DT limit is hit traveling toward the terminal landing for the DT software limit to become active. On cars with only one slowdown limit, the car would normally hit the limit at top speed during a recovery run. The DT Count allows the car time to slowdown before the Safety Processor can shut the car down from a limit velocity error.
Dmd Mult	0.5	1.5	1	_	Demand Multiplier. Multiplies the analog to digital input of the car's demand velocity. Increase or decrease the multiplier to display the exact speed of the car on the Car Demand screen.
SoftStop	1	10	1	Sec	Soft Start Timer. During a soft stop, the speed command is brought to zero, then the brake is dropped and finally the run outputs are turned off. This timer is used to keep the run outputs from timing out during a soft stop.
Pls Ftim	0	5.00	2.00	Sec	Pulse Count Fault Delay Time. Time delay to detect that the selector pulses have stopped.
Vel Ftim	0	0.500	0.180	Sec	Velocity Fault Delay Time. Time delay after a velocity fault to shut the car down.

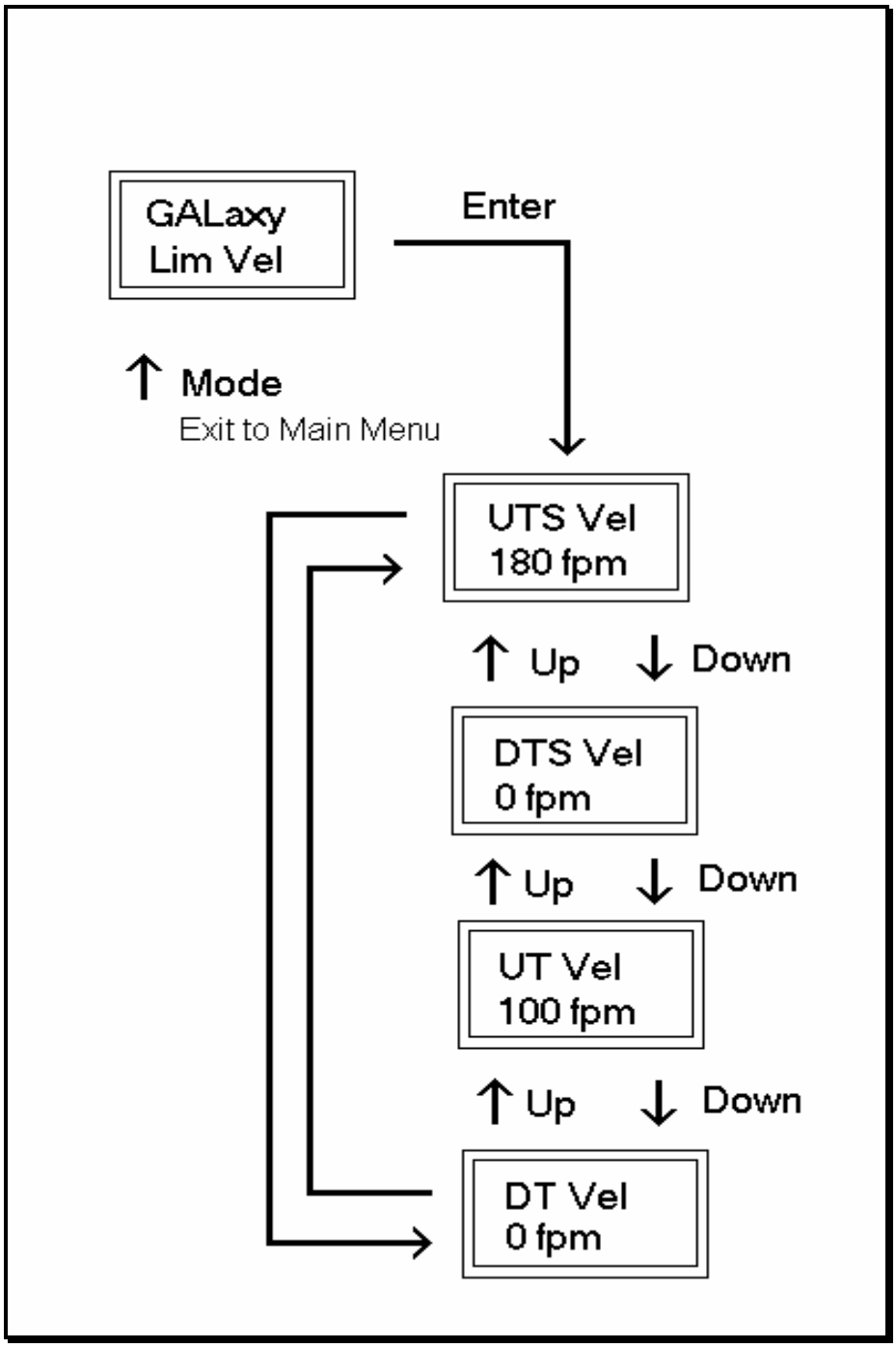


This display shows all the inputs and outputs of the Safety Processor. The following table shows the name description for each I/O.

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

NAME	DESCRIPTION
	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.

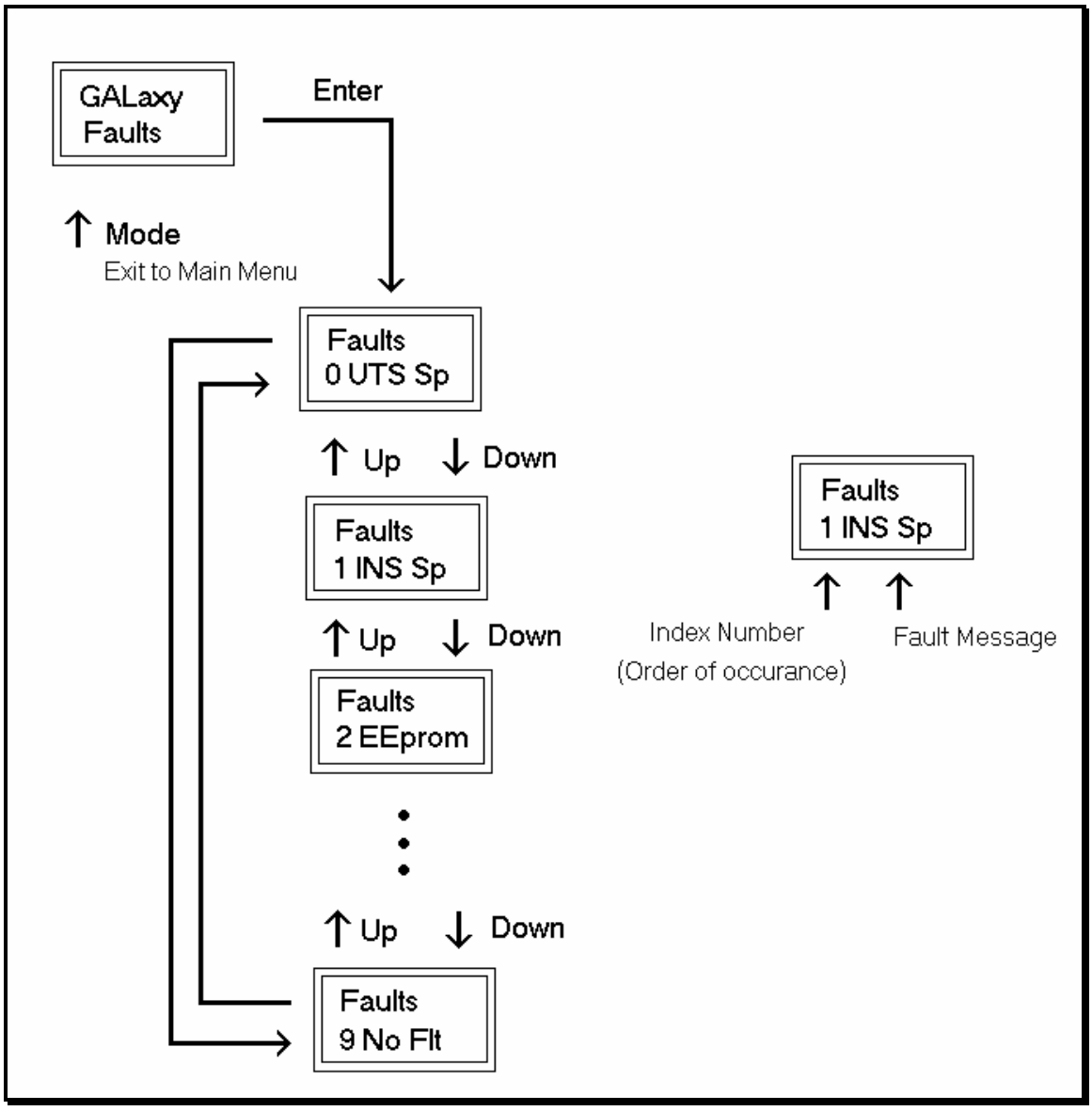
6.2.6 LIMIT VELOCITY



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.

6.2.7 SAFETY PROCESSOR FAULTS



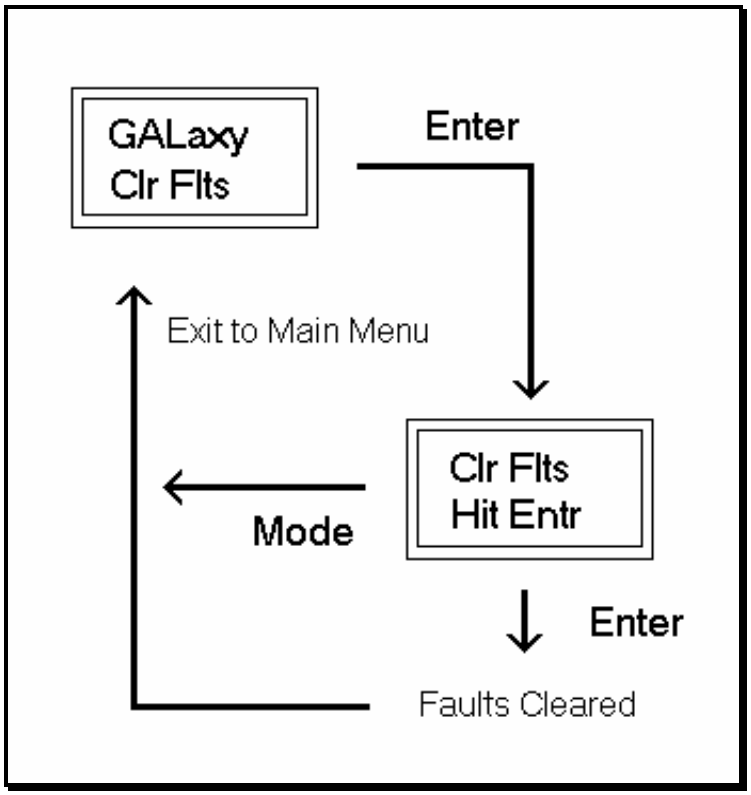
Faults are displayed in the order that they occur with index 0 being the most recent. In the figure above, an EEprom fault occurred followed by an Inspection Speed fault followed by a UTS Speed fault. Any index location that does not yet contain a fault will show No Flt.

There are 10 fault locations all of which are cleared on power up or from the clear fault menu. Below is a list of faults and their causes.

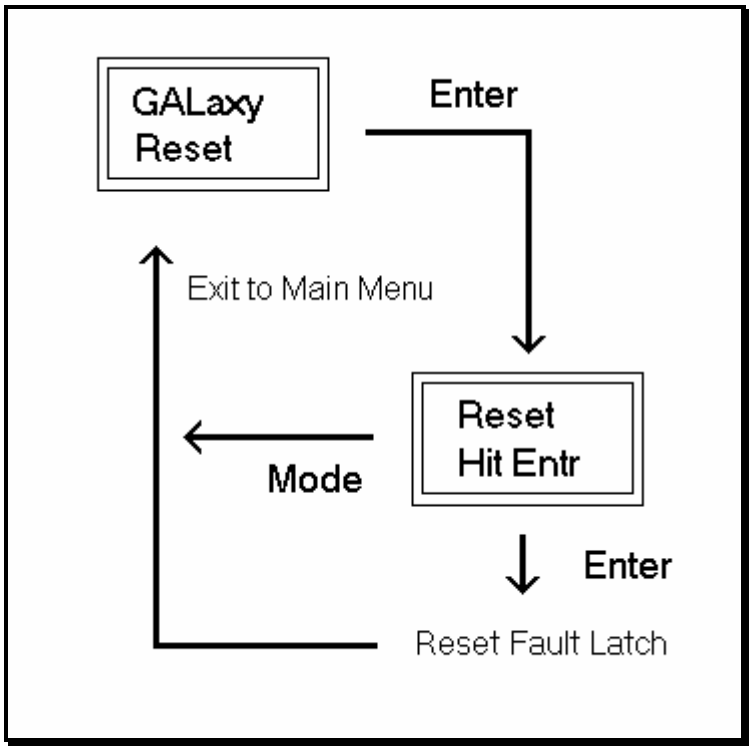
FAULT	DESCRIPTION AND CAUSE
No Flt	No fault is recorded in this index location.
Invalid	Invalid fault number. (This can only be caused by a programming error in the chip).
EEprom	EEprom fault. Defective EEprom device or EEprom device is not installed. The car will not be able to run until the EEprom 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.

FAULT	DESCRIPTION AND CAUSE
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.

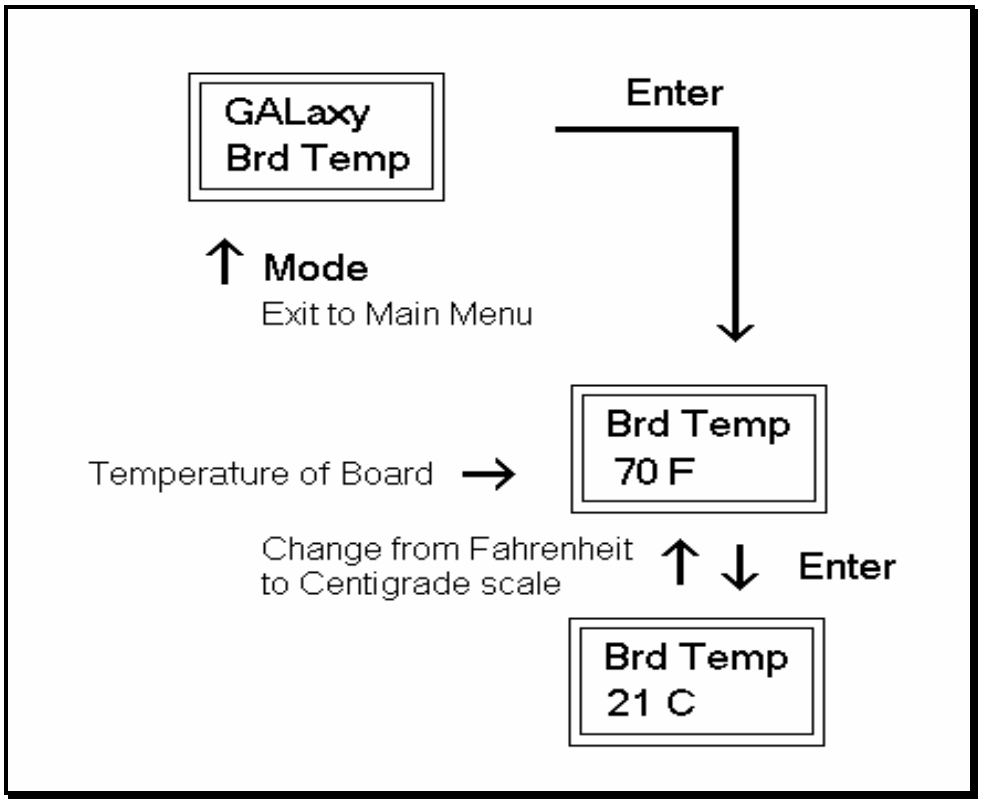
6.2.8 CLEAR FAULTS



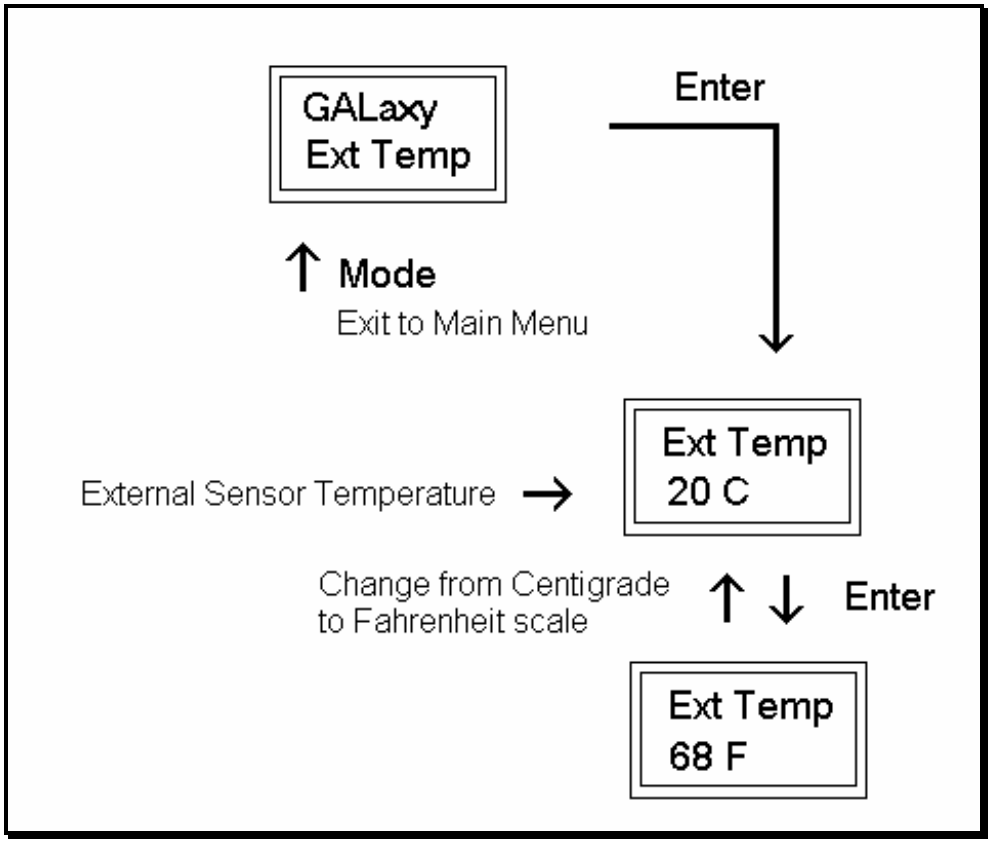
6.2.9 RESET SAFETY PROCESSOR FAULT LATCH



6.2.10 SAFETY PROCESSOR BOARD TEMPERATURE



6.2.11 EXTERNAL TEMPERATURE



Appendix A

Description of I/O Mnemonics

Mnemonic	I/O Name
1C-29C	1st – 29th Floor Car Call Inputs
1CA-29CA	1st – 29th Floor Car Call Acknowledge Outputs
1CAR-29CAR	1st – 29th Floor Rear Car Call Acknowledge Outputs
1CR-29CR	1st – 29th Floor Rear Car Call Inputs
1U-28U	1st – 28th Floor Up Hall Call Inputs
1UA-28UA	1st – 28th Floor Up Hall Call Acknowledge Outputs
1UAR-28UAR	1st – 28th Floor Rear Up Hall Call Acknowledge Outputs
1UR-28UR	1st – 28th Floor Rear Up Hall Call Inputs
2D-29D	2nd – 29TH Floor Down Hall Call Inputs
2DA-29DA	2nd – 29th Floor Down Hall Call Acknowledge Outputs
2DAR-29DAR	2nd – 29th Floor Rear Down Hall Call Acknowledge Outputs
2DR-29DR	2nd – 29TH Floor Rear Down Hall Call Inputs
ACC	Access Operation Input.
AD	Automatic Door Switch Input
AD0-AD11	Analog to Digital Input Data
ALT	Alternate Fire Smoke Detector Sensor Input
ATT	Attendant Operation Input.
ATTDN	Attendant Down Input.
ATTUP	Attendant Up Input.
AUTO	Automatic Operation Input.
B16	Binary Position Sensor 16 Input
BAD	Bottom Access Down Input.
BAU	Bottom Access Up Input.
BP	Fire Phase I Smoke Detector Bypass Input
BP1	Binary Position Sensor 1 Input
BP2	Binary Position Sensor 2 Input
BP4	Binary Position Sensor 4 Input
BP8	Binary Position Sensor 8 Input
BRK	Brake Pilot Output
BRKI	Brake Control Input.
CAR	Car number
CDL	Cab Down Lantern Output
CNV	DAC Convert Output
COL	Counter Weight Collision Switch Input (Traction Elevators)
CS	In Car Stop Switch Input
CUL	Cab Up Lantern Output
DA0-DA7	Digital to Analog Output Data
DC	Door Close Output
DCB	Door Close Button Input
DCBR	Door Close Button Rear Input
DCC	DAC Clear Output
DCL	Door Close Limit Input
DCLR	Door Close Limit Rear Input

Mnemonic	I/O Name
DCR	Door Close Rear Output
DDA	Down Direction Arrow Output
DEL	Delta Relay Input
DF	Down Fast Pilot Output
DFI	Down Fast Input
DL	Down Level Sensor Input
DL-1	Down Level Sensor Secondary Input.
DLB	Door Lock Bottom Input.
DLB-1	Door Lock Bottom Secondary Input
DLM	Door Lock Middle Input
DLM-1	Door Lock Middle Secondary Input
DLT	Door Lock Top Input.
DLT-1	Door Lock Top Secondary Input.
DN	Down Normal Limit Input
DNI	Down Run Input.
DNO	Down Normal Override (used for jack alignment reset)
DNR	Down Pilot Output
DO	Door Open Output
DOB	Door Open Button Input
DOBR	Door Open Button Rear Input
DOL	Door Open Limit Input
DOLR	Door Open Limit Rear Input
DON	Drive On.
DOR	Door Open Rear Output
DPR	Door Protect Relay Input
DS	Down Slowdown Sensor Input
DT	Down Terminal Limit Input
DT1	Down Terminal Input 1
DT2	Down Terminal Input 2
DT3	Down Terminal Input 3
DZ	Door Zone Relay Input
EE	Electric Eye Input
EER	Electric Eye Rear Input
EMP	Emergency Power Input
EPS	Emergency Power Select Input
EQ	Earthquake Sensor Input
FB	Fire Buzzer Output
FF	Full Field Pilot Output
FL	Fire Phase I Light Output
FS	Fire Phase I On Hall Switch Input
FS2	Fire Switch Phase II On Input
FS2C	Fire Switch Phase II Call Cancel Input
FS2H	Fire Switch Phase II Hold Input
FST	Fire Stop Switch Override Output
FSTP	Fire Stop Switch Override Output
GBP	Gate Switch Bypass Input.
GR1R	Rope Gripper 1 Relay Output.
GR2R	Rope Gripper 2 Relay Output.

Mnemonic	I/O Name
GRT1	Rope Gripper Test Switch Input 1.
GRT2	Rope Gripper Test Input 2.
GS	Car Gate Switch Input
GS-1	Gate Switch Secondary Input.
GTS	Rope Gripper Trip Switch Input.
HB	Handicap Buzzer Output
HBE	DAC High Byte Enable Output
HC	Hall Call Common Input
HWS	Hoistway Smoke Sensor Input
ICI	In-Car Inspection Input.
ICR	Inconspicuous Riser Input
ID	Car top Inspection Down Input
IND	Independent Input
INS	Car Top Inspection Input
ISER	In Service Output
IU	Car Top Inspection Down Input
LBE	DAC Low Byte Enable Output
LBP	Lock Bypass Input
LC	Logic Common Input
LD	Down Hall Lantern Output
LDR	Rear Down Hall Lantern Output
LE	Level Enable Output
LE1	Level Enable 1 Output.
LE2	Level Enable 2 Output.
LED1-LED16	LED Output On A1010 Board
LOA	DAC Load Output
LU	Up Hall Lantern Output
LUR	Rear Up Hall Lantern Output
LW	Load Weighing Bypass Input
MCA	Motor Contactor Output
MCAI	Motor Contactor Input.
MES	Main Egress Smoke Detector Sensor Input
MRI	Motor Room Inspection Input.
MRID	Motor Room Inspection Down Input.
MRIU	Motor Room Inspection Up Input.
MRS	Motor Room Smoke Sensor Input
MCC	Motor Contactor Output
MCCI	Motor Contactor Input.
NB	Nudging Buzzer Output
NUD	Door Nudging Output
NUDR	Door Nudging Rear Output
OT1	OT1 Job Specific Output 1/Fire Service On Output
OT2	OT2 Job Specific Output 2/Motor Starter Timer Relay Output
OT3	OT3 Job Specific Output 3/Generator Pilot Output
OT4	OT4 Job Specific Output 4/Field Weakening Pilot Output
OVL	Overload Input
P	Potential (Run Contactor) Input
P1-P29	1ST – 29th Discrete Floor Position Indicator Outputs

Mnemonic	I/O Name
PFC	Primary Fault Control Output.
RDY	Drive Ready Input
RGS	Rear Car Gate Switch Input.
RGS-1	Rear Car Gate Switch Secondary Input.
RLM	Rear Lock Middle Input.
RLM-1	Rear Lock Middle Secondary Input.
RST	Reset Drive Output
RTL	Return to lobby Input
RUN	Run Pilot Output
RUNAI	Run Auxiliary Input.
RUNI	Run Input.
SE	Safety Edge Input
SER	Safety Edge Rear Input
SPI#	Spare Input, # references input number
SPO#	Spare Output, # references output number
SS	Safety String Input
TAD	Top Access Down Input.
TAU	Top Access Up Input.
TPL	Temp Low Input (Hydraulic Elevators)
UDA	Up Direction Arrow Output
UFI	Up Fast Input
UL	Up Level Sensor Input
UL-1	Up Level Sensor Secondary Input
UN	Up Normal Limit Input
UP	Up Pilot Output
UPF	Up Fast Pilot Output
UPI	Up Relay Input
UPI	Up Run Input.
US	Up Slowdown Sensor Input
UT	Up Terminal Limit Input
UT1	Up Terminal Input 1
UT2	Up Terminal Input 2
UT3	Up Terminal Input 3

I/O Locations

1039 Main I/O Standard	1039 I/O Locations	1039 I/O Type
Block 1	**Block 1**	**Block 1**
DN	U1	Input
DT	U1	Input
DTS	U1	Input
UN	U1	Input
UT	U3	Input
UTS	U3	Input
DLB	U3	Input
DLM	U3	Input
DLT	U4	Input
ACC	U4	Input
BAD	U4	Input
BAU	U4	Input
TAD	U6	Input
TAU	U6	Input
SS	U6	Input
EQ	U6	Input
DLB-1	U7	Input
DLM-1	U7	Input
DLT-1	U7	Input
GS-1	U7	Input
EQR	U9	Input
EMH	U9	Input
EMP	U9	Input
EPS	U9	Input
Block 2	**Block 2**	**Block 2**
EQL	U75	Output
EML/DNO	U74	Output
FSO	U78	Output
FL	U77	Output
FB	U79	Output
MST	U76	Output
UDA	U84	Output
DDA	U95	Output
HC	U13	Input
HWS	U13	Input
MRS	U13	Input
MES	U13	Input
ALT	U15	Input
BP	U15	Input

FS	U15	Input
TPL	U15	Input
1U	U16	Input
2U	U16	Input
3U	U16	Input
4U	U16	Input
2D	U18	Input
3D	U18	Input
4D	U18	Input
5D	U18	Input
Block 3	**Block 3**	**Block 3**
RUNI	U31	Input
RUNAI	U31	Input
MCCI	U31	Input
MCAI	U31	Input
DNI	U33	Input
DFI	U33	Input
UPI	U33	Input
UFI	U33	Input
GBP	U25	Input
LBP	U25	Input
IND	U25	Input
AD	U25	Input
MRI	U27	Input
MRID	U27	Input
MRIU	U27	Input
AUTO	U27	Input
1UA	U66	Input
2UA	U67	Input
3UA	U68	Input
4UA	U69	Input
2DA	U70	Input
3DA	U71	Input
4DA	U72	Input
5DA	U73	Input
Block 4	**Block 4**	**Block 4**
UL	U10	Input
DZ	U10	Input
DL	U10	Input
US	U10	Input
DS	U12	Input
BP1	U12	Input
BP2	U12	Input
BP4	U12	Input
RUNA	U43	Output

RUN	U51	Output
DO	U104	Output
DC	U106	Output
NUD	U105	Output
HB	U83	Output
FSTP	U63	Output
FSTP1	U64	Output
DOL	U19	Input
DCL	U19	Input
EE	U19	Input
DPM	U19	Input
GS	U20	Input
LC	U20	Input
INS	U20	Input
IU	U20	Input
Block 5	**Block 5**	**Block 5**
ID	U22	Input
SE	U22	Input
CS	U22	Input
ICI	U22	Input
FS2	U24	Input
FSC	U24	Input
FSH	U24	Input
EMS	U24	Input
DEL	U34	Input
DCB	U34	Input
DOB	U34	Input
1C	U34	Input
2C	U65	Input
3C	U65	Input
4C	U65	Input
5C	U65	Input
1CA	U90	Output
2CA	U89	Output
3CA	U88	Output
4CA	U87	Output
5CA	U86	Output
2DL	U98	Output
3DL	U97	Output
4DL	U96	Output
Block 6	**Block 6**	**Block 6**
P	U28	Input
FST	U28	Input
UL-1	U28	Input
DL-1	U28	Input

ATT	U30	Input
ATU	U30	Input
ATD	U30	Input
ATB	U30	Input
PFC	U60	Output
MCA	U58	Output
MCC	U59	Output
P1	U94	Output
P2	U93	Output
P3	U92	Output
P4	U91	Output
P5	U85	Output
SD	U41	Output
SDF	U37	Output
SU	U40	Output
SUF	U37	Output
1UL	U102	Output
2UL	U101	Output
3UL	U100	Output
4UL/CUL	U99	Output
Block 7	**Block 7**	**Block 7**
5DL/CDL	U103	Output
ISER	U107	Output