ELEVATOR CONTROLS
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PVF Position & Velocity Feedback System Manual

For Microprocessor-Based Traction

Elevator Controls Prodigy & Standard

SDI Version 3 and Version 4 Board Sets

Product Documentation that's Simple to Navigate™

This is the PVF Position & Velocity Feedback System Manual to be used with all AC and DC Traction elevator controllers equipped with this option. Other resources include:

- **Installation & Adjustment Manual** product specific
- **Field Reprogramming Manual** for Model V900/H900 Prodigy & Standard controllers
- **Drive Specific Manuals**
- **Maintenance & Troubleshooting Training Manual** provided in conjunction with Factory and Customer Site technical training classes
- **Telephone Technical Support** available for Customers at no charge
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Introduction & Overview

Throughout this manual, icons will be used to call attention to certain areas of text. These icons represent safety warnings, cautions, and notes.

WARNING: Denotes operating procedures and practices that may result in personal injury and/or equipment damage if not correctly followed.

CAUTION: Denotes operating procedures and practices that may result in equipment damage if not correctly followed.

NOTE: Denotes useful information or procedures.

Throughout this manual it is assumed that field personnel are well qualified in the installation of elevator equipment. No attempt has been made to define terms or procedures that should be familiar to a qualified elevator mechanic.

Warnings

WARNING: Do not depress the reset button ("RESET") on the SDI, P8 or PIO9 boards while the elevator is in motion. This will cause the car to come to an immediate stop.

NOTE: It is assumed that all switches for slowdown, stop, and over travel limits at both terminal landings have been checked for proper type, placement, and operation.

CAUTION: Equipment installation must be in compliance with all Local and applicable Elevator and Electrical Codes and regulations.

This manual is intended only to acquaint the service technician with the information required to successfully install the microprocessor-based elevator controller with the Position and Velocity Feedback (PVF) option. Field personnel must be familiar with all codes and regulations pertaining to the safe installation and operation of the elevator system.

NOTE: Installation and wiring must be in accordance with the National Electrical Code and consistent with all local codes, and National elevator codes and regulations. The AC power supply to this equipment must be provided through a proper fused disconnect or circuit breaker. Improper protection may create a hazardous condition.

NOTE: Wiring to controller terminals must be done in a neat and careful manner. Stranded wire conductors must be twisted together to avoid strands that would create potential shorts if left out of terminals. All terminals and cable connectors must be

checked for proper seating and tightness. When connecting flat cable connectors, be certain to match pin #1 marks (arrow symbol on connectors, red stripe on cable) to prevent damage.

CAUTION: Restrict access to elevator control equipment and apparatus to qualified personnel only.

Product Description

The Elevator Controls PVF system is a multi-computer network that controls the elevator. The PVF uses a dual feedback servo loop from the elevator's speed and position to produce the optimum ride and performance. Figure I-1 is a block diagram of the PVF multi-computer network.

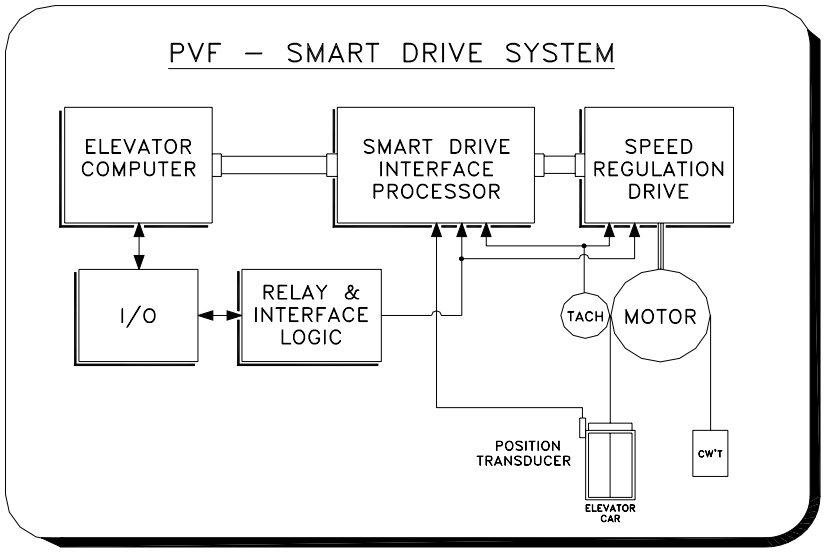


Figure I-1 PVF Block Diagram

Elevator Controls Position Velocity Feedback system is comprised of three basic elements, in addition to interface circuitry. These elements are:

1. **The elevator car controller computer**. It controls all of the elevator sequencingand signals. The elevator computer is the master computer, and tells the smart drive interface board (SDI) and the speed regulator what to do.

2. **The Smart Drive Interface (SDI).** The SDI board, version 3 or 4, generates the optimum speed pattern. The SDI system receives quadrature pulses from the position transducer. The SDI system keeps track of the elevators position to within 3/16 of an inch. This position, along with field adjustable variables, is used to generate an optimum speed pattern which is fed into the speed regulator.

3. **The speed regulator or drive system**. The speed regulator makes the elevator follow the speed pattern produced by the SDI system and control the actual speed and ride of the elevator.

This manual deals with the Position and Velocity Feedback (PVF) system, including the Smart Drive Interface (SDI) computer. It is intended for use in conjunction with the car controller Installation & Adjustment manual Model V900-PVF Series for Prodigy and Standard control system. A specific drive manual for the speed regulator will also be supplied.

The PVF firmware uses the basic physical characteristics of motion (jerk rates, acceleration rates, and deceleration rates) to generate a stepless speed pattern. Figure I-2 illustrates these physical characteristics. Section 3, Program Variables, shows how each of the characteristics of motion affects the overall speed pattern.

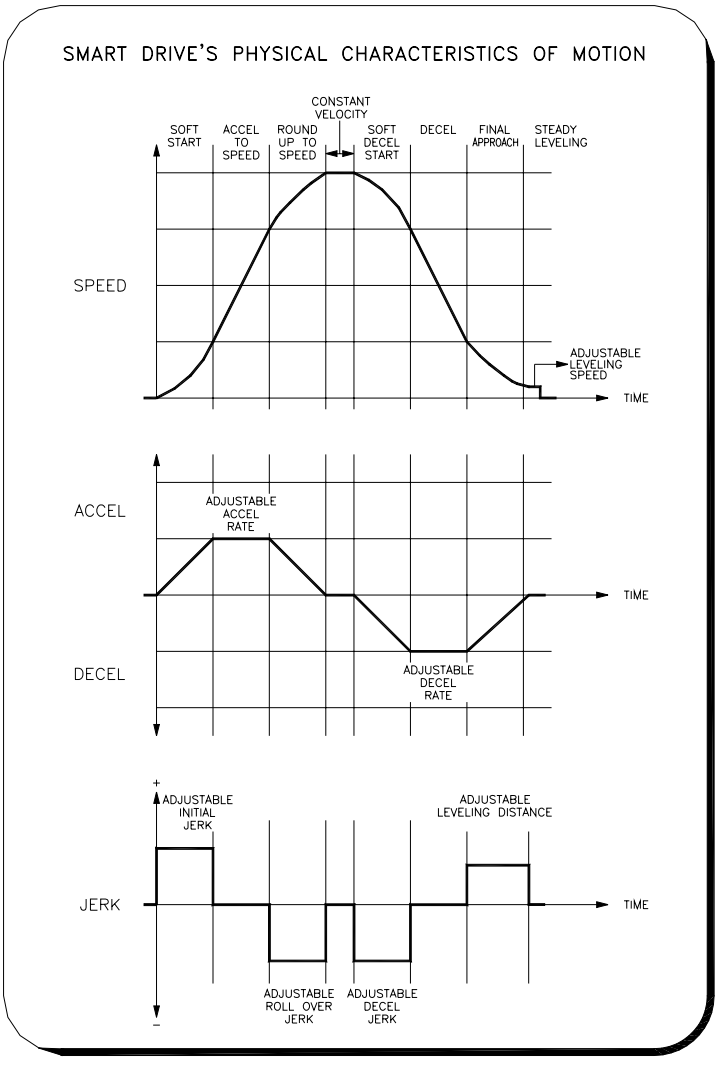


Figure I-2 Physical Characteristics of Motion

PVF Version 3 and Version 4 Board Models

There are two version models of the SDI system, Version 3 and Version 4.

SDI version 3 is made up of two boards, the SDI Microprocessor board and the SDI IO board. These boards are mounted on top of each other inside the controller, with the SDI Microprocessor board placed under the SDI I/O. SDI version 4 uses surface mount technology with higher integration design allowing placement for all circuits on single board. Functionally both versions of the SDI perform the same tasks, and the user interface is the same for both.

NOTE: Appendix A-Drawings SDI I/O, top board of SDI version3, and SDI-V4 show a pictorial description of the SDI Version 3, and SDI version 4 boards.

PVF Manual Presented in Eight Sections

- Introduction & Overview (this Section) provides a system overview.
- Section 1 covers installation and adjustment of the SDI computer and related hoistway equipment. The SDI computer user interface has a main menu and four submenus.
- Section 2 describes main menu options and how to access submenus.
- Sections 3 through 6 explain each of the submenus in detail including how each is used and viewed.
- Section 7 describes each of the faults. It explains all of the error codes and what they mean.
- The Appendix A-Drawings contains a detailed description of all the key strokes necessary to navigate the SDI menus.

NOTE: The SDI's LCD display contains 4 basic menus, with each basic menu containing several submenus. When reference is made to these menus/submenus in this manual, the submenu number and name is indicated as it is displayed on the LCD. For example: "1.10 Leveling Speed" refers to basic menu 1, submenu 10. It does not indicate page 1.10 or Section 1.10 in this manual. Likewise, the reference "submenu 2.1 Setup Mode" indicates submenu 2.1 and not page 2.1 or Section 2.1 in this manual. Section and page number references will be indicated with the words "Section" and "page" respectively.

WARNING: The position transducer on the cartop uses optical sensors to read tape holes to provide a quadrature signal to read the position of the elevator. It is important to keep the sensors and reflector clean from dust and debris, particularly on new installations where dust and dirt is excessive. Do not grease the center of the tape which may create reflection and cause the optical readers to attract dirt. For hoistways with excessive lighting and/or exposed to sun light, paint the center of the tape with flat black paint to avoid reflections from effecting sensors.

WARNING: The encoder-based position transducer on the cartop uses a car top mounted wheel driven encoder in conjunction with leveling, door zone and floor encoding signals to read the position of the elevator. Ensure proper pressure and tension is applied to encoder wheel to prevent it from losing traction with the rail for proper reading and performance. For governor driven encoders, please refer to job prints and run cable on a separate grounded conduit.

Section 1 – Installation

✍ **NOTE**: Sections 1.1 and 1.2 below are provided for installation/adjustment reference. Please refer to corresponding Installation & Adjustment Manual Model V900-PVF Series for Prodigy and Standard control system for procedures corresponding to the type of controller you are installing or adjusting.

✍ **NOTE**: The Installation & Adjustment manual Model V900-PVF Series for Prodigy and Standard control system will be referenced as V900-PVF Manual throughout this manual.

1.1 PVF Quick Installation Reference Guide

This guide provides an overview of installing and adjusting the SDI board. Users who are already familiar with the PVF installation process can quickly review these steps. Users who are not yet comfortable with these steps should read all references cited in each step before starting the SDI setup procedure. The installation instructions following this Section go into greater detail for each step.

1.1.1 Verify Factory Settings

Verify factory setting for: contract speed, number of floors, tach polarity, tach gain and tach zero. Use submenus 1.1 Contract speed (See Section 3-3), 1.2 Number of Floors (See Section 3-4), 1.13 Tach Polarity (See Section 3-15), 1.14 Tach Gain (See Section 3-16) and 1.15 Tach Zero (See Section 3-17).

1.1.2 Verify Floor Landing Magnets

Verify that floor landing magnets are installed and adjusted so that the car lands level with the floor at each landing. Verify that all terminal slowdowns are installed and adjusted as specified on your hoistway print. Go to submenu 3.8 Target and Position. Run car up on inspection; verify that the DP value goes up. Run car down on inspection and verify that the DP value goes down. If DP value increments in the wrong direction, interchange DP1 and DP2 field wires.

1.1.3 Verify Pattern Clamps

Verify that all pattern clamps are set according to Table 1.1.-1 below using submenu 2.5 Set Speed Clamps. Some clamps will not be available for your job. Turn the corresponding trimpot 20 turns counter-clockwise for all unused clamps. Ignore the displayed value for T1 through T14 for now. See Section 4-6.

Table 1.1-1 Initial Clamp Settings Before Final Adjustment			
Terminal & Resistor Number	Pattern Clamp	Terminal & Resistor Number	Pattern Clamp
T1, R55	P = 20 FPM	T8, R60	P = 700 FPM
T2, R54	P = 250 FPM	T10, R61	P = 800 FPM
T5, R53	P = 350 FPM	T12, R50	P = 1000 FPM
T6, R58	P = 500 FPM	T14, R57	P = 1200 FPM
T7, R59	P = 600 FPM		

1.1.4 Move Car on Inspection to "Learn the hoistway"

Move the car on inspection to the down travel limit. Place the "SDI Learn" jumper SH5 on the HLS-7 board. Select the hoistway learning program using Submenu 2.1 Setup Mode. Run the car up without stopping on inspection to the upper travel limit. Remove the SH5 jumper. See Section 4-2.

1.1.5 Verify Floor Positions

Verify all floor positions using Submenu 2.1 Floor Position Table. All of the pulse counts should be greater than 1000. See Section 4-3. Verify all terminal slowdown positions using Submenu 2.3 Terminal Pos Table. See Section 4-4.

1.1.6 Adjust Re-level Speed

Move the car on inspection above the first floor onto LD (level down). Disable the door(s) using the TEST switch on HLS-7 board. Take the car off inspection and allow it to re-level into the floor. Adjust re-level speed for accuracy and comfort using Variable 1.11 Re-level Speed . Repeat as needed. See Section 3-13.

1.1.7 Adjust Pattern

Adjust pattern to optimize ride comfort and the shortest brake-to-brake time. Make one and two floor runs on TEST mode in the both directions with the door disabled. Adjust pattern delay, initial jerk, acceleration, roll-over jerk, and deceleration jerk, deceleration, leveling distance and leveling speed variables. An oscilloscope is very useful here. See Sections 3-5 through 3-12.

1.1.8 Adjust Clamp Voltages

After completing step 1.1.7, on TEST mode, move the car to the lowest floor, then run the car up non-stop to the top floor, then non-stop back down to the lowest floor. Adjust all clamp voltages using Submenu 2.5 Set Speed Clamps for the speed indicated on the LCD. See Section 4-6.

✍ **NOTE**: If you readjust any of the parameters listed in step 2.17, you must repeat this step.

1.2 Installation Reference Guide

This installation guide provides more comprehensive instructions than the PVF Quick Installation Guide above. Read the entire Installation Reference Guide below before you attempt any of the steps. This will speed the installation process. This Section also describes final adjustment of the SDI unit.

1.2.1 Follow Startup Procedure

Read and follow the startup procedure in the V900-PVF Manual. You should also read the manual for the drive type provided for your controller as supplied by the drive manufacturer.

1.2.2 Note Signal Controls

Note that the signal controls supplied to the SDI system are: UP, DN and ENA (enable) as well as INS (inspection mode). These inputs are connected via relay logic and are the minimum signals the SDI system needs to generate a pattern. To run on inspection (required during the start up procedure) these inputs must be active as follows:

Table 1.2-1 SDI System Inspection Mode

Operation	INS	UP	DN	ENA
Inspection Run Up	110VDC	0VDC	15VDC	0VDC
Inspection Run Down	110VDC	15VDC	0VDC	0VDC
Inspection Mode Stopped	110VDC	15VDC	15VDC	5VDC

If these inputs are not active you will need to determine the cause of problem, refer to job prints page 3, safety page, and page 6B SDI Interface page. Normally a problem here is caused by an open safety string or open limit switch.

1.2.3 Pre-Operation Checklist

Follow the pre-operation checks in the drive's installation manual, where the start up procedure in the V900-PVF Manual directs you to do so.

1.2.4 Check Voltage

Check the voltage on the line side of the disconnect switch for correct supply voltage. Turn the disconnect switch off and remove the fuses for the relay logic supply, hall supply and door operator supply.

1.2.5 Check All Terminals

With power off, check all terminals for a direct short to ground (usually less than 100 ohms to the 3 bus terminal). Do not proceed with SDI setup until any problems are corrected. Turn power on and check the supply voltages on the L1, L2, L3 terminals on the controller. Replace the relay logic, hall and door operator supply fuses at this time.

WARNING: Electrical shock hazard - Power capacitors will remain charged for some time after power is removed from the system.

1.2.6 Turn on Power

Turn on power. With a PVF system, the SAF relay should not pick until the system is placed on inspection. If SAF does not pick when on inspection, troubleshoot the safety circuit using your job prints.

1.2.7 Initial Drive Setup

Refer to the V900-PVF Manual to set up your drive with the initial values specified.

The SDI system also needs a correct initial setup; this is done at the factory. You should verify the setup yourself before attempting to run on inspection. See Section 2 Program Variables. The following parameters must be set correctly: 1.1 Contract Speed (See Section 3-3), 1.2 Number of Floors (See Section 3-4), 1.13 Tach Polarity (See this Manual Section 3-15), 1.14 Tach Gain (See this Manual Section 3-16) and 1.15 Tach Zero (See Section 3-17).

1.2.8 Check Inspection Speed

Check that program variable 1.12 Inspection Speed is set within a reasonable range on the SDI system. You should start with a very low inspection speed (about 25 FPM) and increase this gradually in Step 10. See Section 3.14.

1.2.9 Verify Pattern Clamps Initial Setting

The pattern clamps need to be set correctly. This is not a final adjustment. Initial settings for the clamps are shown below. Verify these values on the SDI system using Submenu 2.5 Set Speed Clamps. Some clamps may not be used on your job; if your contract speed is less than the value shown below, that clamp will be unused, turn the corresponding trimpot 20 turns counter-clockwise for all unused clamps. See Section 4.6.

Table 1.2-2 Initial Clamp Settings Before Final Adjustment

Terminal & Resistor Number	Pattern Clamp	Terminal & Resistor Number	Pattern Clamp
T1, R55	P = 20 FPM	T8, R60	P = 700 FPM
T2, R54	P = 250 FPM	T10, R61	P = 800 FPM
T5, R53	P = 350 FPM	T12, R50	P = 1000 FPM
T6, R58	P = 500 FPM	T14, R57	P = 1200 FPM
T7, R59	P = 600 FPM		

1.2.10 Attempt Run

With the controller on Controller Inspection mode, try to run the car using the UP/DN switch on the controller. The Car-top Inspection, In Car Inspection/Access modes must be off to run on Controller Inspection. If the car runs backwards, refer to the Model V900-PVF Manual for the correct procedure for reversing the direction for your control system.
You will also have to adjust the brake picking voltage at this time. See the drive page of job prints Page 4, Area D2, for adjustments to the brake resistors.

1.2.11 Set Inspection Speed

✍ **NOTE**: Make sure the hoistway has been cleared of obstructions before proceeding with instructions below.

Increase inspection speed, program variable 1.12, to a comfortable working speed; Make changes in two or three incremental steps. Verify each incremental step by running the car Up and Down. Inspection speed between 40 and 50 Ft/Min is recommended depending on contract speed.

1.2.12 Check Brake

Make sure the brake will hold at least an empty car.

1.2.13 Check Overtravel Limits

The over-travel limits must be adjusted to the values specified on your job hoistway print. The elevator should now be completed. Test all safety circuits before continuing with the installation. Be sure that opening over-travel limits or the safety string will remove power from the controller and stop the car. Verify that the car will not move if the inspection mode is off. Test any other safeties that you will use during the installation, i.e.: the pit switch. With power off, test all terminals for grounds, as performed in step 1.2.5. Resolve any problems before proceeding.

1.2.14 Verify Proper Connector Seating

Verify that all connectors in the system are correctly seated. Ribbon and pluggable field and controller wire connectors can wiggle loose when the system is being worked on. Press firmly on all connectors to reseat them.

✍ **NOTE**: At this point the system should run correctly on inspection. If you are still having problems, review steps 1 through 14 and repeat as necessary.

Before running the system on automatic, follow steps 1.2.15 through 1.2.26. This includes the final adjustment of the elevator.

1.2.15 Adjust Terminal Slowdowns

The terminal slowdowns and over-travel limits must be adjusted to the values specified on your job hoistway print.

1.2.16 Set Leveling Switches

Set the leveling switches on the cartop to provide proper dead zone, +/- 1/4". The PVF system requires that LU and LD are off (0VDC) when the car is level. Vane lengths and switch arrangements are specified in the job information package. Use two twisted shielded wire pairs for the digital pulse output from the selector. Connect DP1 and DPC each to one wire in the first shielded pair. Connect DP2 and DPC each to one wire in the second shielded pair. DP1 and DP2 are each labeled on the SDI system and the selector. DPC on the SDI system connects to selector power supply 0 volts common. Refer to the job prints for the correct wiring schematic.

✍ **NOTE**: Make sure selector twisted shielded pairs shields are jumpered across junction boxes, and they are only connected to the EGND terminal on the SDI board.

1.2.17 Test Digital Pulse (DP) Inputs

Test the DP1 and DP2 inputs to the SDI board. Use Submenu 3.8 Target and Position. Run the car up on inspection; verify that the DP (digital pulse) value goes up. Run car down on inspection; verify that the DP value goes down. If the DP value goes in the wrong direction, interchange the DP1 in DP2 field wires on the SDI board.

1.2.18 Adjust Door Operator

The door operator must be correctly adjusted. Reinstall the door fuses if you have not already done so. Clutches must have proper running clearances in the hoistway. Check the prints for any special instructions on your job.

1.2.19 Check for Obstructions

Make sure all hoistway doors and car doors are closed and locked. Run the car on inspection mode through the entire hatch, making sure it is clear of obstructions. Door zone and level vanes should already be installed and adjusted to level the car within 1/4" of the floor.

1.2.20 Learn the Hoistway

The SDI system now needs to learn the hoistway. This procedure is fully detailed in Section 4.2 Setup Mode.

1.2.21 Verify Floor Position Table

After completing step 1.2.20 above, verify that the floor position table is correct. Use Submenu 2.2 Floor Position Table on the SDI system. Press the UP button on this menu, observing the recorded position for each floor. The floor positions are shown in two ways: feet (FT) and pulses (P), about 3/16 inch. These values should be reasonable and correspond to what you'd expect the floor heights to be. Any of the following indicate a problem:

1. All of the floor positions are the same. Floor heights are measured relative to the bottom limit. They normally increase 8 to 11 ft for each floor, example: 0 ft, 11 ft, 22 ft, 33 ft, 44 ft etc.

2. Floor positions decrease or are negative. Pulse counts are less than 1000P. Floors should start at 0 ft and go up from there. The pulse counts are set to 1000P at the bottom limit and go up from there.

If you find a problem, check your field wires, especially DP1, DP2, DPC and door level switches. Once the problem has been corrected, repeat steps 1.2.17, 1.2.20 and 1.2.21

1.2.22 Verify Terminal Slowdown Table

Verify that the terminal slowdown position table is correct. Use Submenu 2.3 Terminal Pos Table on the SDI system. Press the UP button on this menu, observing the recorded positions for each terminal. Like the floor position table, these values should be reasonable and correspond to what you'd expect the terminal positions to be. Any of the problems described in step 1.2.21 can also apply to terminal slowdowns.

If you find a problem, check your field wiring. Verify that the slowdowns are set in the correct positions. Once problem has been corrected, repeat steps 1.2.17, 1.2.20, 1.2.21 and 1.2.22.

1.2.23 Test Operation

Now move the car to the second level. Move the TEST switch to the on position. This will put the system on TEST mode when inspection mode is turned off. TEST also disables door opening (TEST mode does NOT disable door closing). Move the car below the floor onto the leveling input using the inspection switch, then turn inspection off. The car should re-level up into the floor. Verify that relays sequence properly for re-leveling. Adjust the program variable 1.11 Re-level Speed to optimize accuracy and comfort.

Put the system back on inspection and repeat step 1.2.23 as needed. Then repeat by moving the car above the floor to get a re-level down, repeating as needed.

1.2.24 Inspection Off

Turn inspection mode off (TEST should still be on from step 1.2.23). Place a car call one floor above the second level. The car will run up from the second level then slow down into the third floor. Observe how the system responds, especially the brake, motor and sheave. Decide what part of the system needs to be adjusted first and focus on that. You may need to stop and readjust other parts of the system during this procedure. Any problems with the brake or door clutch clearances will become apparent here. Correct these problems as they come up before continuing with this adjustment.

NOTE: To place car calls from the machine room (for a standard non Ez-LINK systems), jumper from the IO-7 Call GND post located on the top right corner of the board to the car call field terminals on the IO-7 or IO-EX boards for standard controllers – or from Terminal 3 to the car call field terminals on the PIO9 or IO-EX boards for Prodigy controllers.

NOTE: For P8 or PIO9 with car program version V5.50 or later, use the Reprogramming Manual to locate the car call entry menu by raising all four menu switches and pressing the **UP** or **DN** (down) buttons to display **System Control**. Lower the Menu / Sub switch to enter the System Control menu and press the **UP** button until **EZ Link Advance** is displayed. Lower the View / Edit switch to enter direction and floor data.

Adjusting the pattern can be more of an art than a science. Your two goals are ride comfort and brake-to-brake time. You will have to decide which to work on at any one time. The

two goals are not exclusive; you can achieve both. You will need to make numerous runs to be sure that the system responds as you want it to. Take your time here; adjustment procedures are not inherently quick.

✍ **NOTE**: A dual-trace storage oscilloscope can be a great help here. Observing the pattern output and the tach from the drive can save a lot of time and hassle. Connect one probe on the PUP output from the SDI system. PUP is "pattern up" and is a 0 to 10 volt positive signal. Connect the second probe on the TAC (tachometer) input to the SDI system. This is -10V to 10V input to the SDI, although some drives supply 0V to 8V or 0V to 5V (check your drive manual). 0V on TAC always indicates zero speed.

✍ **NOTE**: A pair of hand-held radios and a helper can be a great help. After the speed pattern is adjusted as well as possible from the machine room, the adjuster should ride the car while a helper adjusts the system per the adjuster's instructions. There is simply no substitute for riding a car while adjusting.

As you adjust the parameters below, refer to the relevant Sections in this Manual. These Sections contain explanations and illustrations to help you adjust the SDI system.

1.2.24.1 Decreasing Brake-To-Brake Time

A. Increase parameter 1.7 Acceleration. See Section 3.9. HINT: When you do this, you will probably have to increase parameter 1.3 Initial Jerk and parameter 1.4 Roll-Over Jerk. The jerk values should be 1 to 1.4 times the Acceleration value. Example: if Acceleration is set to 200 FPM/s, Initial Jerk and Roll Over Jerk should be set between 200 FPM/s/s and 280 FPM/s/s.

B. Increase parameter 1.3 Initial Jerk and parameter 1.4 Roll Over Jerk. See Sections 3.5 and 3.6. HINT: Both of these parameters should be changed whenever parameter 1.7 Acceleration is changed significantly. For short brake-to-brake times, use 1.4 times the Acceleration value. Higher jerk values will cause the pattern to reach contract speed quicker.

C. Increase parameter 1.8 Deceleration. See Section 3.10. HINT: Your Deceleration value will probably have to be 25 to 50 FPM/s less than your Acceleration value. This improves passenger comfort and also makes final approach into the floor more accurate.

D. Decrease parameter 1.9 Leveling Distance. See Section 3.11. HINT: The leveling distance is used in place of a final (stopping) jerk. An oscilloscope is very useful for viewing the shape of the final curve. Also, leveling distance is measured in pulses from the tape, 3/16 of an inch. You'll have to make larger changes to this value – at least six to ten pulses – to see any change in performance. HINT: Leveling distance must always be greater than 16, which is only 3" of controlled floor targeting. Leveling distance should normally always be greater than 32. A good working range is between 38P to 72P.

1.2.24.2 Improving Passenger Comfort

A. Increase parameter 1.6 Pattern Delay. See Section 3.8.

✍ **NOTE** : This is only useful if the car is pulling through the brake when the pattern starts. Increasing pattern delay produces a programmed wait for a given amount of time, allowing the break to pick.

B. Decrease parameter 1.10 Leveling Speed. See Section 3.12. HINT: Leveling speed is set high at the factory so a car won't stall coming into a floor. In most systems you will need to decrease leveling speed to about 4 FPM to eliminate the bump when stopping.

C. Decrease parameter 1.3 Initial Jerk. See Section 3.5. HINT: Excessively high jerk values can cause passenger discomfort. HINT: Some motor systems can not follow high jerk values. The resulting overshoot can cause bumps during the ride. A dual trace storage oscilloscope on the TAC and Pattern inputs to the SDI system will help to determine this. Decrease the initial jerk until you can see a smooth start on the tachometer from the drive.

D. Decrease parameter 1.4 Roll Over Jerk. See Section 3.6. See part **C** above for hints on how to do this.

E. Decrease parameter 1.5 Deceleration Jerk. See Section 3.7. See part **C** above for hints on how to do this.

1.2.25 Final Pattern Clamp Adjustment

After step 1.2.24 is complete, the pattern clamps must be adjusted. With TEST mode still on, run the car to the bottom floor. Then make one complete run of the hoistway up to the top terminal. Run back down to the bottom terminal in one run.

Now access Submenu 2.5 Set Speed Clamps on the SDI system. The system will display the proper value for the speed clamp and indicate the potentiometer to adjust. Note: these values will be different than those set as initial values in step 3. This time you will use the displayed value for T1 through T14. Press the UP button on the SDI system and repeat for the next clamp. Repeat until all of the clamps are adjusted.

✍ **NOTE**: If you change any velocity pattern variable, the Speed Clamps may need to be re-adjusted. Repeat this step any time you adjust Initial Jerk, Acceleration, Roll Over Jerk, Deceleration Jerk, Deceleration or Leveling Distance.

1.2.26 Re-Verify Proper Connector Seating

Verify all connectors in the system are correctly seated. Ribbon and pluggable field wire connector can wiggle loose when the system is being worked on. Press firmly on all connectors to reseat them.

Section 2 – Main Menu

2.1 Startup

When the SDI is first powered up, or when the SDI reset button is pressed, the LCD will display the following message after one second:

You can now use the SDI main menu described below.

2.2 Main Menu Operation

The SDI main menu has four items which can be displayed one at a time. Scroll through the menu items by pressing the UP or DOWN buttons on the SDI system. To work with the currently displayed menu item press the SELECT button. Each of these submenu items is discussed in detail in Sections 3 through 6. Refer to those Sections for more details.

The four main menu items are listed in Table 2.2-1.

Table 2.2-1 Main Menu Items
1. Program Variables
2. Hoistway
3. View I/O
4. View Logs

For an example of how to use the main menu refer to in Appendix A-Drawings SDI 7A.

NOTE: For information on the special purpose menu: "5. Special Debugging" refer to Section 9. The special debugging menu has submenus dealing with hardware troubleshooting, programming faults auto-resets, clearing SDI memory, etc.

Section 3 – Program Variables

3.1 Viewing Program Variables

Press SELECT at the program variables menu to view program variables.

Program variables may be viewed in the same manner as the main menu. Press UP to select the next item in the list. Press DOWN to select the previous item in the list. Leveling speed is shown below as an example of viewing a program variable. Please refer to Appendix A-Drawings SDI 7B for a more detailed description of how to select submenu 1 items.

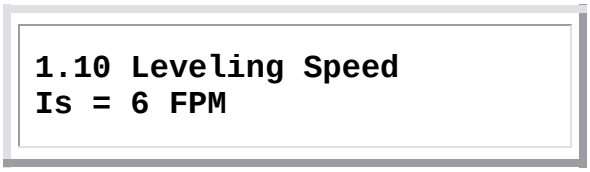


Table 3.1-1 lists all of the program variables available.

Table 3.1-1 Program Variables	
1.1 Contract Speed	1.10 Leveling Speed
1.2 Number of Floors	1.11 Re-leveling Speed
1.3 Initial Jerk	1.12 Inspection Speed
1.4 Roll Over Jerk	1.13 Tach Polarity
1.5 Deceleration Jerk	1.14 Tach Gain
1.6 Pattern Delay	1.15 Tach Zero
1.7 Acceleration	1.16 Leveling Decel. Time
1.8 Deceleration	1.17 Return to Main Menu
1.9 Leveling Distance	

3.2 Changing Program Variables

To change a parameter place the READ/EDIT toggle switch in the EDIT position. Push the UP or DOWN button to select the program variable you wish to change, then press SELECT (to select a program variable press UP or DOWN until it is displayed. See Appendix A-Drawings SDI 7B). SELECT has no effect if the READ/EDIT switch is in the READ position.

After pressing SELECT on a submenu item, the second display line will change to:

"New Value ="

An example is shown below.

```
1.7 Acceleration
New Value = 200 FPM/S
```

Note that the function of the UP and DOWN buttons now affects the value displayed rather than the submenu item displayed. If you press UP or DOWN consecutively more than 10 times, the value will change faster, enabling large changes to be made more quickly.

After setting the variable to the value you want, press SAVE to record the value permanently in the SDI's memory. If you make a mistake, you can return to the submenu without recording the changed value by pressing SELECT. The original value will be restored.

The SDI button operation is summarized below.

Table 3.2.1 Changing Program Variables	
UP	* Add 1 to value if 1 to 10 consecutive presses * Add 10 to value if 11 to 20 consecutive presses * Add 100 to value if 21 or more consecutive presses
DOWN	* Add 1 to value if 1 to 10 consecutive presses * Add 10 to value if 11 to 20 consecutive presses * Add 100 to value if 21 or more consecutive presses
SELECT	* Abandon your changes. Returns the variable to its original value. Returns to variable sub-menu item display.
SAVE	* Returns to submenu item, saving the variable's new value.

3.3 Contract Speed

```
1.1 Contract Speed
Is = 1400 FPM
```

RANGE: 25 - 1400 FPM
UNITS: feet per minute

The Contract Speed variable sets the scale values for all other parts of the SDI. This parameter must be set correctly for the rest of the SDI to function properly.

Change this value to the contract speed for this car. This value is set at the factory to the speed you specified on your data sheets.

3.4 Number of Floors

```
1.2 Number of Floors
Is = 24
```

RANGE: 2 - 63
UNITS: none

The Number of Floors should be set equal to the total number of floors served by this car. This value is set at the factory to the number of floors served as specified on your data sheets.

3.5 Initial Jerk

```
1.3 Initial Jerk
Is = 192 FPM/S/S
```

RANGE: 25 - 500
UNITS: feet per minute per second per second

The Initial Jerk variable controls the softness of the start of the velocity pattern. Larger values result in a greater g-force felt in the car when starting. With larger jerk values, the pattern also spends less time in rounding thereby reaching contract speed sooner.

The exact amount of time spent in rounding depends on the acceleration rate. The time is **acceleration ÷ initial jerk** and should normally be 0.6 to 1.3 seconds. You can easily set a one second round by setting the jerk numerically equal to the acceleration. If the acceleration is 200 FPM/S, an initial jerk value of 200 FPM/S/S will give one second of initial rounding.

The jerk should not be so low that the drive cannot reach contract speed. Initial rounding should never take more than one half of the total time to reach contract speed. The minimum jerk Jmin is equal to:

$$J_{min} = \frac{(acceleration)^2}{contract\ speed}$$

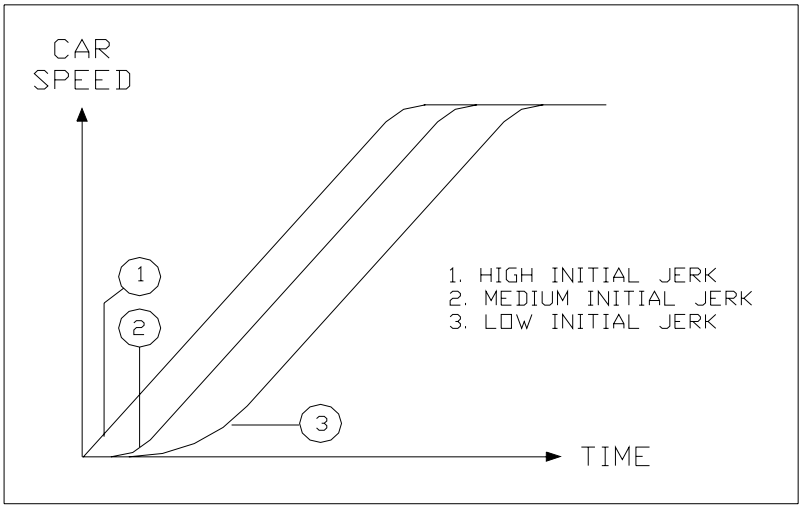


Figure 3.5-1 Initial Jerk

3.6 Roll Over Jerk

```
1.4 Roll Over Jerk
Is = 192 FPM/S/S
```

RANGE: 25 - 500
UNITS: feet per minute per second

The Roll Over Jerk variable controls the softness of the transition of velocity pattern to constant velocity. Larger values result in a greater g-force felt in the car when attaining maximum speed. With larger jerk values, the pattern also spends less time in rounding and reaches contract speed sooner. If the car overshoots contract speed, decrease the roll over jerk to reduce overshoot.

The exact amount of time spent in rounding depends on the acceleration rate. The time is **acceleration ÷ roll over jerk** and should normally be 0.6 to 1.3 seconds. You can easily set a one second rounding time by setting the jerk numerically equal to the acceleration. If the acceleration is 200 FPM/S, a roll over jerk value of 200 FPM/S/S will give one second of rollover rounding.

The jerk should not be so low that the drive cannot reach contract speed. Roll over rounding should never take more than one half of the total time to reach contract speed. The minimum jerk Jmin is equal to:

$$J_{min} = \frac{(acceleration)^2}{contract\ speed}$$

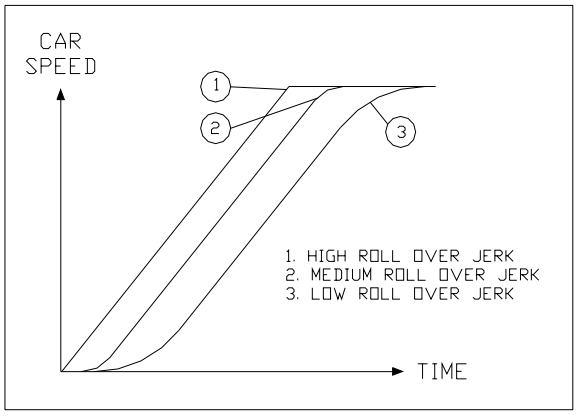


Figure 3.6-1 Roll Over Jerk

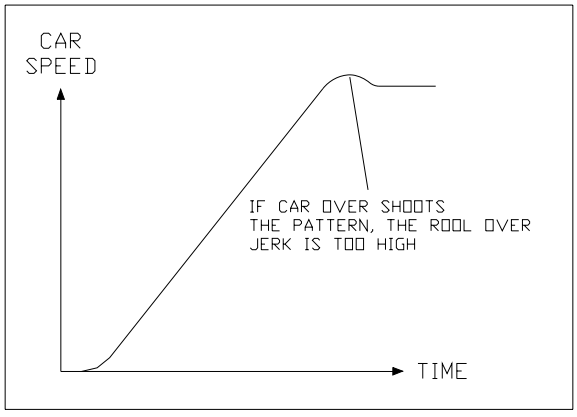


Figure 3.6-2 Overshoot

3.7 Deceleration Jerk

```
1.5 Deceleration Jerk
Is = 192 FPM/S/S
```

UNITS: feet per minute per second per second

The Deceleration Jerk variable controls the softness of the transition from constant velocity to constant deceleration. Larger values result in a greater g-force felt in the car when rounding into constant deceleration. With larger jerk values, the pattern also spends less time in rounding and reaches leveling speed sooner.

The exact amount of time spent in rounding depends on the deceleration. The time is **deceleration ÷ deceleration jerk** and should normally be 0.6 to 1.3 seconds. You can easily set a one second rounding time by setting the jerk numerically equal to the deceleration. If the deceleration is 200 FPM/S, a deceleration jerk value of 200 FPM/S/S will give one second of deceleration rounding.

The jerk should not be so low that the drive cannot slowdown from contract speed. Deceleration rounding should never take more than one half of the total time to reach leveling speed. The minimum jerk Jmin is equal to

$$J_{min} = \frac{(deceleration)^2}{contract\ speed}$$

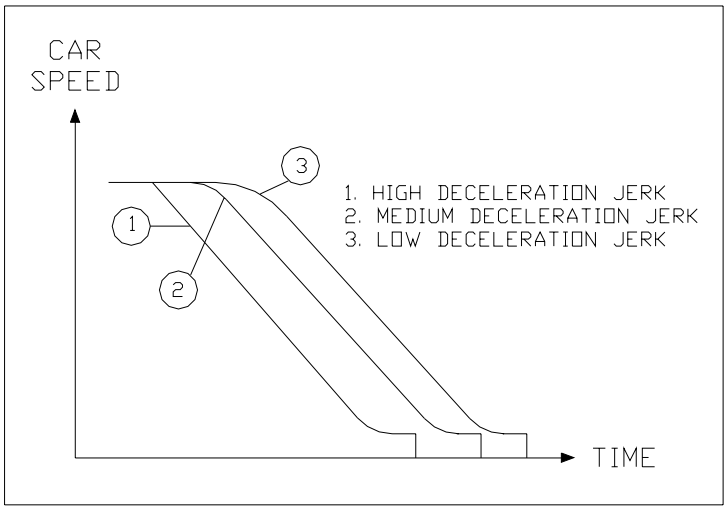


Figure 3.7-1 Deceleration Jerk

3.8 Pattern Delay

```
1.6 Pattern Delay
Is = 0 X 0.01 S
```

RANGE: 0 - 200
UNITS: hundredths of seconds

Pattern Delay keeps the pattern at zero speed for the amount of time you specify after the enable comes in (The enable input is located on the MPC-SDI board and is labeled ENA. Enable usually activates at the same time as the UP or DN relays pick). Use pattern delay to compensate for a sluggish brake pick. If the car pulls through the brake at start, increase pattern delay to hold zero pattern for a longer time at the start, which will allow the brake time to pick before the pattern begins to accelerate the car.

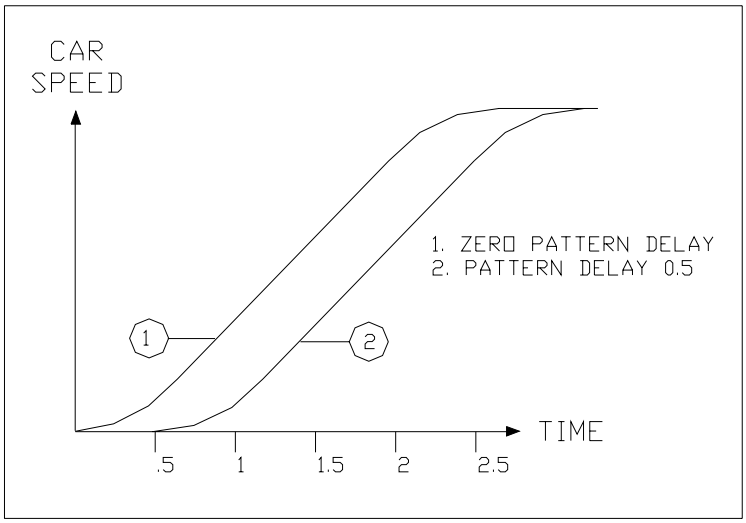


Figure 3.8 Pattern Delay

3.9 Acceleration

```
1.7 Acceleration
Is = 142 FPM/S
```

RANGE: 25 - 300
UNITS: feet per minute per second

Acceleration controls the rate at which the car reaches contract speed. The higher the acceleration value the sharper the rate. For example, with Contract Speed set at 350 FPM, and Acceleration set to 100 FPM/S, the car will reach contract speed in 3.5 seconds (this calculation does not allow for rounding). Each rounding corner will normally add about half of its rounding time to the time to reach contract speed.

The acceleration variable is also used to control the pattern ramp-up for inspection mode and during a re-level. Changing this parameter will change the rate at which an automatic run patterns, inspection patterns and a re-level patterns all attain their respective rated speeds.

Remember that changing the acceleration will affect the time spent in rounding. Each rounding corner will normally add about half of its rounding time to the time to reach contract speed. See Sections 3.5 Initial Jerk and 3.6 Roll Over Jerk for an explanation of how rounding works.

✍ **NOTE**: Divide FPM/S by 60 to get ft/s^2.

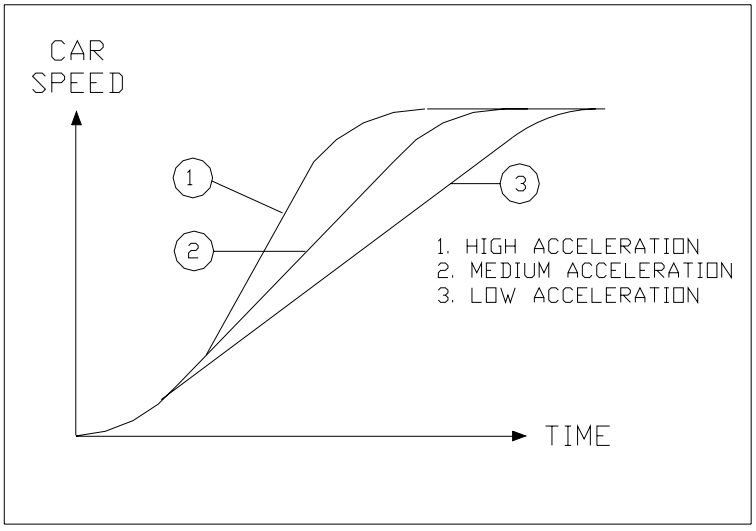


Figure 3.9 Acceleration

3.10 Deceleration

```
1.8 Deceleration
Is = 142 FPM/S
```

RANGE: 25 - 300
UNITS: feet per minute per second

Deceleration controls the rate at which the car reaches leveling speed. The higher the deceleration value the sharper the rate. For example, with Contract Speed set at 350 FPM, and Deceleration set to 100 FPM/S, the car will reach leveling speed in 3.5 seconds. This calculation is before rounding is considered. Each rounding corner will normally add about half of its rounding time to the time to reach contract speed.

Remember that changing deceleration will affect the time spent in rounding. See Section 3.7 Deceleration Jerk for an explanation of how rounding works.

✍ **NOTE**: Divide FPM/S by 60 to get ft/s2.

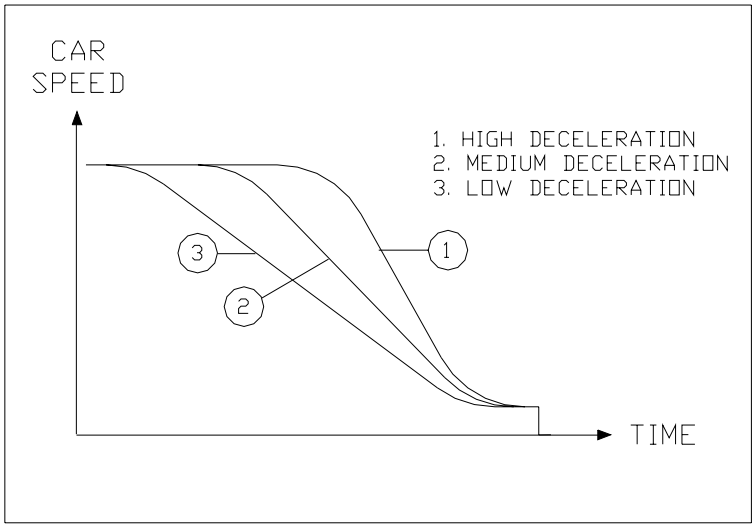


Figure 3.10-1 Deceleration

3.11 Leveling Distance

```
1.9 Leveling Distance
Is = 64 P
```

RANGE: 0 - 128
UNITS: Pulses (= 3/16 inches)

Leveling Distance determines where the car begins targeting the floor. The larger the value, the further away targeting begins. Leveling distance also controls the softness of the final rounding during an automatic run. Larger values produce softer approaches to the floor.

Leveling distance works with leveling speed to determine how the car comes into a floor. High values of leveling distance and low leveling speeds produce more accurate and softer approaches to the floor. Reducing leveling speed will reduce stop shock as the brake sets. However, softer and more accurate approaches also mean longer brake-to-brake times.

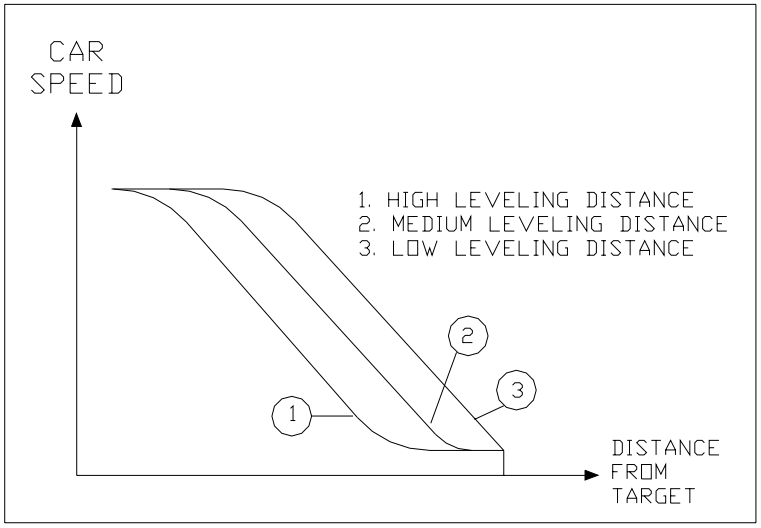


Figure 3.11-1 Leveling Distance

3.12 Leveling Speed

```
1.10 Leveling Speed
Is = 4 FPM
```

RANGE: 0 - 50
UNITS: feet per minute

Leveling Speed controls the final speed of the car when coming into a floor. Increasing leveling speed will increase this final speed.

Decreasing leveling speed will reduce the stop shock felt when the break sets. If leveling speed is set too high it will cause the car to overshoot the floor. Once Leveling Speed is set, use Leveling Distance to eliminate any overshoot.

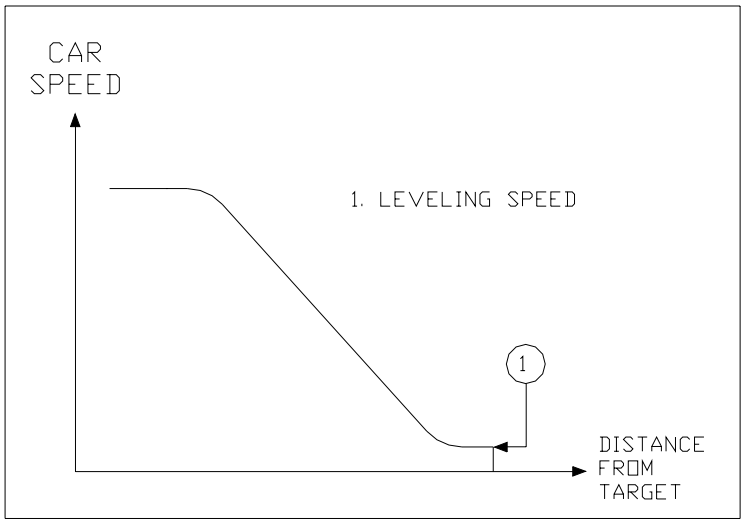


Figure 3.12-1 Leveling Speed

3.13 Re-Leveling Speed

```
1.11 Re-leveling Speed
Is = 4 FPM
```

RANGE: 4 - 50
UNITS: feet per minute

Re-Leveling Speed limits maximum car speed during re-leveling. Higher values in re-leveling speed result in faster speeds during a re-level. Program variable Acceleration controls the rate at which the car reaches re-leveling speed. The higher the acceleration value the sharper the rate.

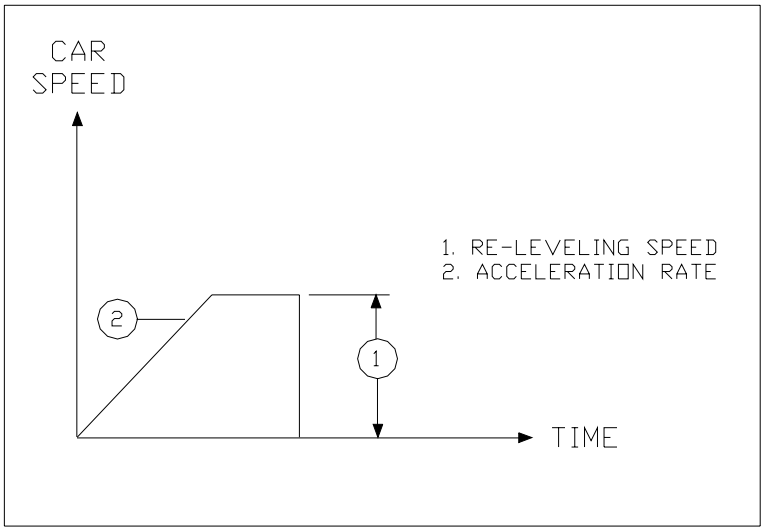


Figure 3.13-1 Re-leveling Speed

3.14 Inspection Speed

```
1.12 Inspection Speed
Is = 100 FPM
```

RANGE: 0 - 150
UNITS: feet per minute

Inspection Speed limits maximum car speed on inspection mode. Higher values in inspection speed result in faster speeds during movement on inspection. Program variable Acceleration controls the rate at which the car reaches inspection speed. The higher the acceleration value the sharper the rate.

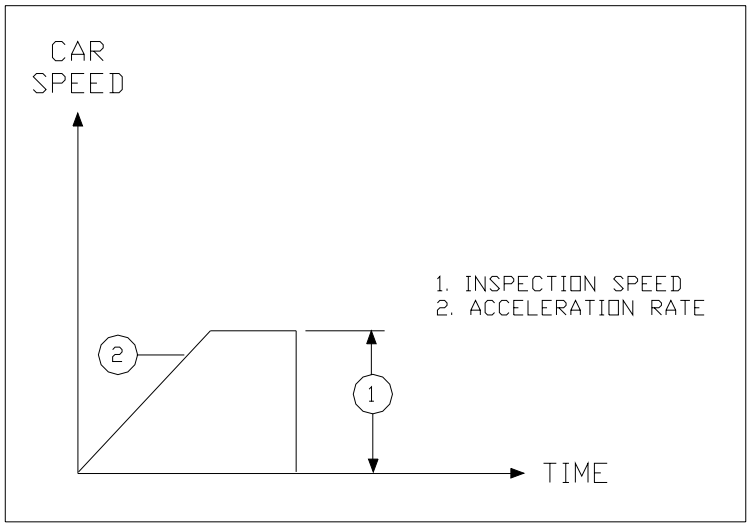


Figure 3.14-1 Inspection Speed

3.15 Tach Polarity

```
1.13 Tach Polarity
Is = Positive Up Bi-directional
```

Tach Polarity matches the tachometer input on the SDI to the direction of the car. This parameter is set at the factory based on the type of drive included with your system. This parameter can be checked with a voltmeter. Place the car on inspection and move the car up and down, checking the voltage on the tach input to the SDI board, labeled TAC, relative to ground (GND). Refer to Table 3.15-1. Table 3.15-2 shows typical settings for popular drives.

NOTE: Tach polarity can also be observed using menu 3.5 Analog Inputs, refer to section 5.6 of this manual.

Table 3.15-1 Tach Polarity

	Direction on Inspection	Polarity on TAC
Positive Up Tach	UP	Positive
	DOWN	Negative
Positive Down Tach	UP	Negative
	DOWN	Positive
Positive Tach	UP	Positive
	DOWN	Positive
Negative Tach	UP	Negative
	DOWN	Negative

Table 3.15-2 Typical SDI Tach Settings for Various Drives

Drive	**Tach polarity**	**Tach gain**
Yaskawa Vector	Positive Up Tach	100%
Magnetek HPV900/600	Positive Up Tach	100%
KEB Combivert F5	Positive Up Tach	100%
Magnetek DSD412 SCR drive	Positive Up Tach	100%
Control Techniques Mentor II	Positive Down Tach	100%
EDGE	Positive Down Tach	100%
SWEO Digital SCR (ABS Speed)	Positive Tach	50%
SWEO Analog SCR	Positive Down Tach	80%

3.16 Tach Gain

```
1.14 Tach Gain
Is = 100%
```

RANGE: 75 - 105
UNITS: percent

Tach Gain is used to scale the tachometer input to the SDI for the particular drive provided. This parameter is set at the factory and should not need to be reset in the field. However, this parameter may be adjusted slightly to tune the tachometer feet-per-minute display in 3.1 Tracking Performance.

NOTE: THE CAR SPEED MUST ALREADY BE CORRECT. CHECK CAR SPEED WITH A HAND TACH BEFORE ADJUSTING THIS PARAMETER. Adjustment of this parameter cannot compensate for a car that is not running at the correct contract speed. You can only fine tune the tach display or configure the tach for a different drive input.

To fine tune Tach Gain, run the car at constant speed and measure car speed with a hand tachometer. Compare this value with the value displayed as Tach Speed shown in 3.1 Tracking Performance. If the speed displayed on the LCD is greater than the actual speed, increase tach gain until they are equal. If the speed displayed on the LCD is less than the actual speed, decrease tach gain until they are equal. Refer to Section 3.15, Table 3.15-2 for typical tach gain settings for popular drives.

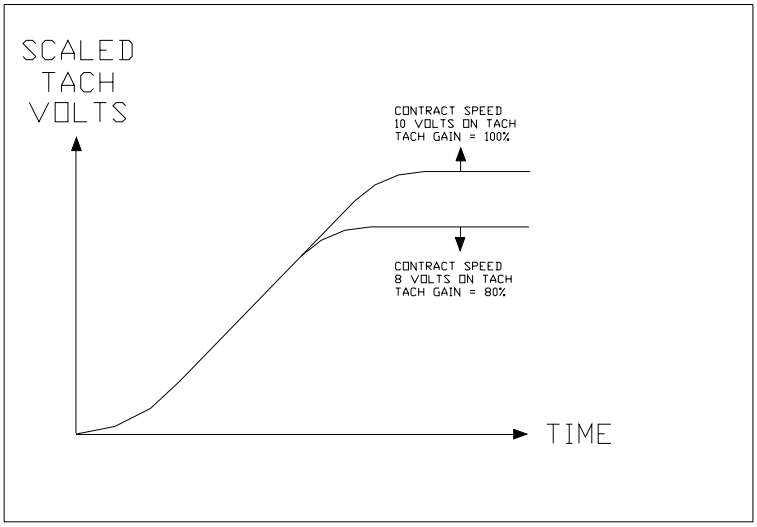


Figure 3.16-1 Tach Gain

3.17 Tach Zero

RANGE: 0 - 1024
UNITS: (internal)

The Tach Zero parameter is used to adjust the electrical zero value for the tachometer on the SDI. It compensates for variation in component tolerances and is set at the factory. Reset this parameter when replacing the SDI board, when replacing a "RAM" chip, or after a "memory reset procedure". This parameter will only adjust the value displayed on the LCD in Section 4.1 Tracking Performance. ADJUSTMENT OF THIS PARAMETER WILL NOT CAUSE THE DRIVE TO HOLD ELECTRICAL ZERO, OR AFFECT THE CAR PERFORMANCE IN ANY WAY.

NOTE: If desired, verify that this parameter is set correctly in the field as follows: With the car stopped (preferably on inspection) and Submenu item 1.15 displayed, press the SELECT and then SAVE buttons. The READ/EDIT switch must be in the EDIT position. The system will read the voltage on the TAC input to the SDI and accept this as zero for this drive. The system will display the value it reads, scaled to internal units. Values from 460 to 500 are typical.

WARNING: IF A VALUE OUT SIDE OF THE RANGE 460 – 500 IS DISPLAYED, A SERIOUS SYSTEM ERROR HAS OCCURRED. DO NOT ATTEMPT TO RUN THE CAR ON AUTOMATIC OPERATION. Verify that the car was in fact stopped and the tach is connected as instructed. You may need to check the drive programming for the proper tach input to the SDI. Call for factory technical support if you cannot resolve the problem.

3.18 Leveling Deceleration Time

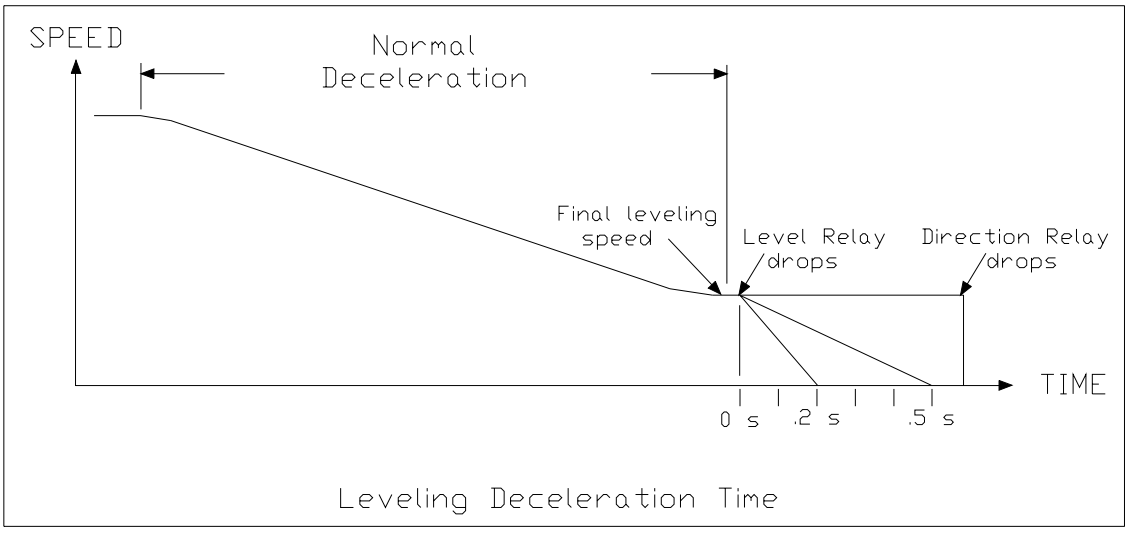
```
1.16 Level Decel Time
Is = 0 x 100ms
```

RANGE: 0 - 10
UNITS: ms

Leveling Deceleration Time should be set to 0 x 100ms for most applications. The effect of the Leveling Deceleration Time on the pattern is shown below. The default value for this parameter is 0, and maximum value is 10.

Increasing this parameter will allow car to "float" further into the dead zone after the leveling relay has dropped using a time controlled "level decel rate". A value of zero, or too high a value, may cause overshoot.

✍ **NOTE**: With Leveling Deceleration Time set to zero, the leveling speed output is maintained until an up or down relay drops (no "level decel" applied).



Leveling Deceleration Time

3.19 Return To Main Menu

Press SELECT on this submenu item to return to the main menu. See Section 6 for a description of the main menu.

Section 4 – Hoistway

4.1 Viewing the Hoistway Submenu

Press SELECT on the hoistway menu, shown above, to view the hoistway submenu.

Hoistway submenu items may be viewed in the same manner as the main menu. Pressing UP selects the next item in the list. Pressing DOWN selects the previous item in the list. Floor position table is shown below as an example of viewing a hoistway submenu item. Please refer to Appendix A-Drawings SDI 7C for a more complete description of using the Hoistway submenu.

Table 4.1-1 lists all the hoistway submenus available.

Table 4.1-1 Hoistway Submenu
2.1 Set Up Mode
2.2 Floor Position Table
2.3 Terminal Pos Table
2.4 Terminal Vel Table
2.5 Set Speed Clamps
2.6 Terminal Activation
2.7 Return to Main Menu

4.2 Setup Mode (Hoistway "Learning" Procedure)

The Set Up mode program allows the SDI system to learn the position of each floor and terminal slowdowns in the hoistway. You must run set-up mode before running the SDI system on automatic. Check for proper operation and wiring of digital position pulse signals before running Set Up. Be sure optical devices and reflector on the cartop are clean.

CAUTION: Before running Set Up mode, all door zone magnets must be adjusted so that the car is level within 1/8th of an inch of the floor. All terminal slowdowns and limit switches must be installed in the correct positions in the hoistway, or proper "learning" will not occur. If any of these problems are detected during Set Up, correct the condition and restart the Set Up procedure.

Press SELECT on the Set Up mode submenu as shown above and the display below will appear. Move the car down on inspection to the down limit. Be careful not to open the final limit. If you do, connect 4A to 23 on the HLS board and move the car up off the final limit. **Remember to remove the jumper** as soon as the car is has been moved off the final limit. Once the car is correctly on the down travel limit, press SELECT again.

Now place the “SDI Learn” SH5 jumper on Relay board and the display below will appear. Run the car up non-stop the entire length of the hoistway on inspection. Car speed is automatically set to 25 FPM for this operation. While the car is moving, check the display to confirm that the floor levels are reasonable distances apart. **Remove the SH5 jumper after this procedure is completed**.

NOTE: If you do have a problem, stop the car. Reduce inspection speed then run the car in both directions. Verify the DZ, LU and LD inputs at the appropriate terminals on the SDI board with a voltmeter. Verify that DP1 and DP2 are connected and properly phased. Make sure the DP1 and DP2 LED's on the SDI illuminate properly

when you move the car. Use the Target and Position display, Submenu 3.8, to verify that the position counts up when the car moves up and counts down when the car moves down. Call for factory technical support if you cannot resolve the problem.

NOTE: Once the problem has been corrected, re-run the Set Up Mode program.

4.3 Floor Position Table

```
ELEVATOR CONTROLS SDI
2.2 Floor Position Table
```

Use the Floor Position Table submenu to view the actual position of the floor levels in the hoistway. It's a good idea to do this just after running Set Up Mode. Verify that all values are reasonable. For example, if all of the floors are at 0.0ft, one of the DP wires to the selector may not be connected.

An example display is shown below.

```
Level 1:  1024P,  0.3FT
Level 2:  1774P, 12.1FT
```

Use the UP or DOWN buttons to select the next or previous level. SELECT or SAVE will return you to the hoistway Floor Position Table submenu.

4.4 Terminal Position Table

```
ELEVATOR CONTROLS SDI
2.3 Terminal Pos Table
```

The Terminal Position Table displays the position of the terminal slowdowns as "learned" during the Set Up Mode procedure (See Section 4.7 for Terminal Activation Table). Use this Submenu to check the position of each terminal after running the Set Up Mode. If anything appears incorrect, check the operation of the terminal slowdown, wiring, etc. with the car on inspection. Identify and correct the problem then re-run the Set Up Mode program.

CAUTION: Do not run the car on automatic if the terminal position table is incorrect.

An example table entry is illustrated below.

```
UT2:  4731P, 54.3FT
DT2:  1122P,  1.9FT
```

The final slowdown terminals, up and down, are shown together. You can display other terminal slowdowns, if present, by pressing the UP or DOWN buttons. Press SELECT or SAVE to return to Submenu 2.4.

4.5 Terminal Velocity Table

```
ELEVATOR CONTROLS SDI
2.4 Terminal Vel Table
```

Use the Terminal Velocity table to determine at what speed the car is hitting each terminal slowdown. Check this display before setting trimpots R53 - R61 in Submenu 2.5 Set Speed Clamps. Make a high speed run, both up and down, from terminal to terminal, the entire length of the hoistway.

NOTE: You must make one high speed run into the terminals, on automatic, before this display or 2.5 Set Speed Clamps is valid.

```
UT2: 180 FPM
DT2: 178 FPM
```

Use the UP or DOWN buttons to display additional terminals, if any are present on your system. Pressing SELECT or SAVE to return to Submenu 2.4.

4.6 Set Speed Clamps

```
ELEVATOR CONTROLS SDI
2.5 Set Speed Clamps
```

Use the Set Speed Clamps menu to set the speed to which the velocity pattern will be clamped by each terminal slowdown. This clamping will slow the car into a terminal in the event of a total microprocessor failure.

WARNING: Since this is part of the systems redundant safety design, you must set the speed clamps correctly before releasing a car for automatic operation.

Press SELECT on Submenu item 2.5 Set Speed Clamps, pictured above, to view the speed clamps.

NOTE: Selecting this sub-menu will drop the DSAF relay opening the elevator safety string to inhibit any car movement while this SDI sub-menu is selected.

To adjust the pattern clamps:

1. Turn the indicated trimpot clockwise to decrease the displayed pattern velocity clamp speed. It may take a few turns at the beginning to get started.
2. Set the speed so that the car speed equals the pattern velocity clamp speed.
3. Use UP or DOWN to select a new terminal clamp.
4. For all unused clamps turn trimpots fully counter-clockwise. Unused clamps will not appear in the "set speed clamps" submenu display.

After all of the terminal clamps are set correctly, press SELECT or SAVE to return to Submenu 2.5 Set Speed Clamps.

4.7 Terminal Activation

The Terminal Activation Table will display the position of the terminal slowdowns as detected during the last normal automatic mode run into the terminal landing (see Section 4.4 for Terminal Position Table). Use this submenu to check the position of each terminal as it is read during a normal run into the terminal compared to "learned" terminal positions after running the Set-Up Mode. If anything appears incorrect, check the operation of the terminal slowdown, wiring, etc. with the car on inspection. Identify and correct the problem then re-run the Set Up Mode program.

CAUTION: Do not run the car on automatic if the terminal position table and terminal activation for each slowdown do not match within 5 inches.

An example table entry is illustrated below.

```
UT2: 4731P,  54.3FT
DT2: 1122P,  1.9FT
```

The final slowdown terminals, up and down, are shown together. You can display other terminal slowdowns, if present, by pressing UP or DOWN buttons. Press SELECT or SAVE to return to Submenu 2.6.

✍ **NOTE**: If two or more slowdown input terminals are jumpered together, for whatever reason, the values for some of the terminal activation slowdowns will be displayed incorrectly. Identify and correct the problem then re-run the Set Up Mode program.

4.8 Return To Main Menu

Press SELECT to return to the main men. Please refer to Appendix A-Drawings SDI 7A for a more detailed description of how to use the main menu.

Section 5 – Viewing the Inputs and Output

5.1 Viewing the Inputs and Outputs Submenu

Press SELECT on the View I/O menu shown above to View the I/O Submenu.

View I/O Submenu items may be viewed in the same manner as the main menu. Pressing UP selects the next item in the list. Pressing Down selects the previous item in the list. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select Submenu 3 items.

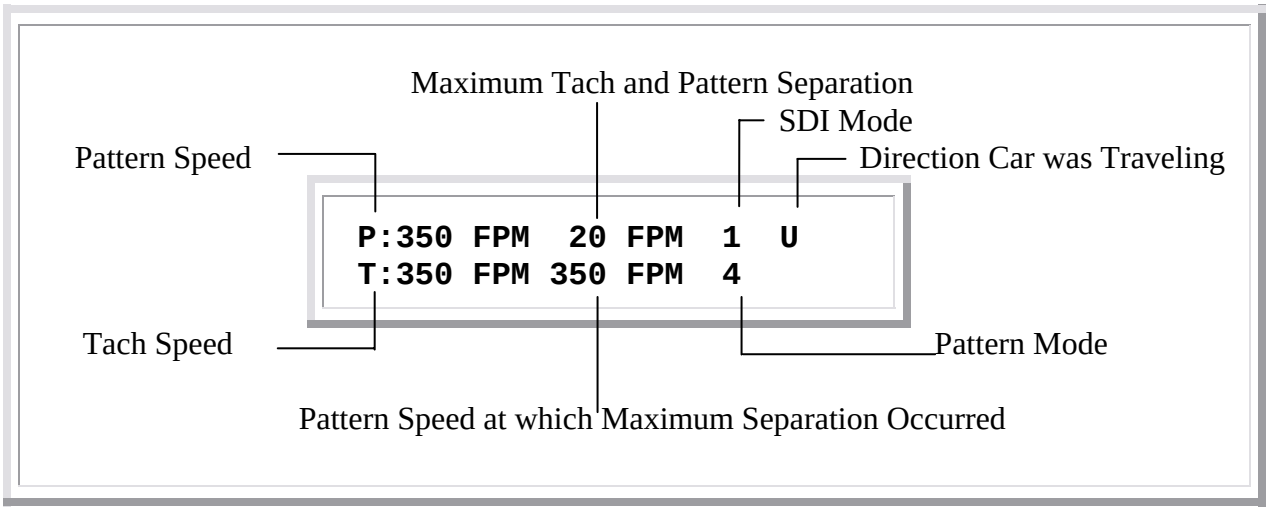
Table 5.1-1 lists all the View I/O submenus.

Table 5.1-1 View I/O Submenu
3.1 Tracking Performance
3.2 Up Terminals
3.3 Down Terminals
3.4 Control Signals
3.5 Analog Inputs
3.6 Edge I/O
3.7 Elevator MPC Flags
3.8 Target and Position
3.9 SDI Flags
3.10 Return To Main Menu

5.2 Tracking Performance

```
ELEVATOR CONTROLS SDI
3.1 Tracking Performance
```

Press SELECT on the Tracking Performance, shown above, to view the tracking performance of the elevator. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select Submenu 3 items.



The tracking performance shows how closely the elevator is tracking the pattern. The pattern speed, tach speed, pattern speed at which the maximum separation occurred, and the separation are displayed in feet per minute. This information will aid in adjustment of the speed regulator. The direction of travel, SDI Mode, and Pattern Modes are also shown. Refer to Table 5.2-1 to see a list of SDI Modes.

Table 5.2-1 SDI Modes

Value	SDI Mode	Value	SDI Mode
0	Stopped	6	Emergency Slowdown
1	Automatic Run	7	Out of Service
2	Earthquake Run	8	Waiting for the Car to Stop
3	Inspection Run	9	Waiting Until it is Safe to Run
4	Learn the Hoistway	10	Waiting Until no Errors
5	Relevel	11	Set the Speed Clamps

Refer to Table 5.2-2 to see a list of the Pattern Modes.

Table 5.2-2 Pattern Modes			
Value	**SDI Mode**	**Value**	**SDI Mode**
0	Pattern is Stopped 0 volts	5	Roll Into Constant Deceleration
1	Soft Start	6	Constant Deceleration
2	Constant Acceleration	7	Soft Stop Floor Targeting
3	Roll Into Constant Velocity	8	Constant Leveling Speed
4	Constant Velocity	9	Emergency Slowdown

To return to submenu 3 from tracking performance press UP, DOWN, or SELECT.

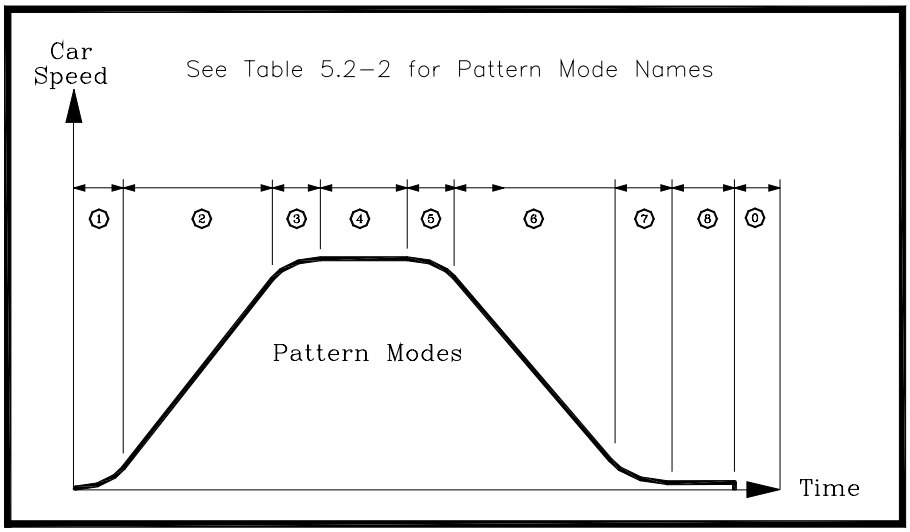
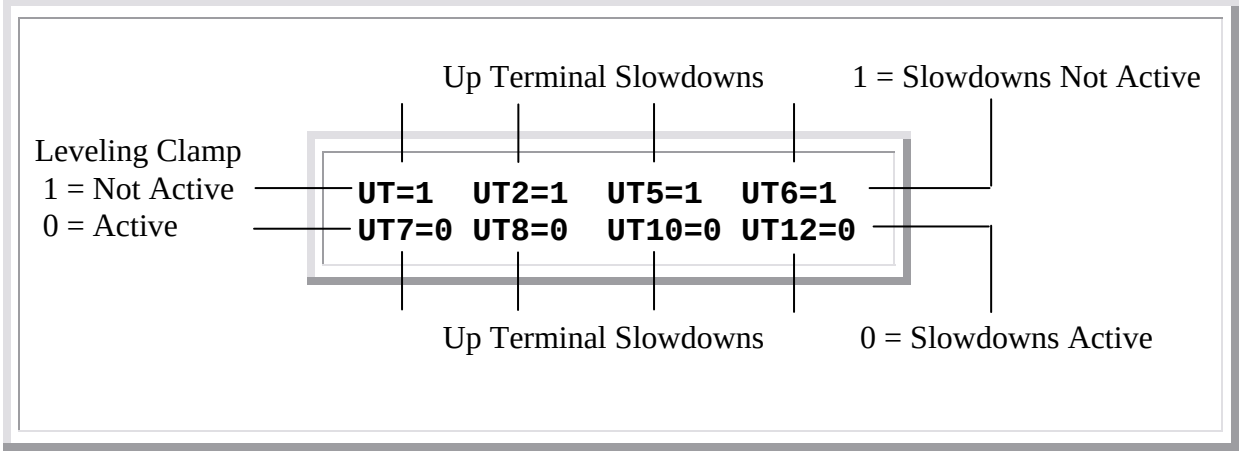


Figure 5.2 Pattern Modes

5.3 Up Terminals

```
ELEVATOR CONTROLS SDI
3.2 Up Terminals
```

Press SELECT on the Up Terminals submenu, shown above, to view the status of the up terminal slowdowns. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select Submenu 3 items.



The Up Terminals display shows whether the leveling clamp and up terminals are active or not active. The terminals are normally closed switches therefore the slowdown is active if there is no voltage on its corresponding input terminal. Refer to Table 5.3-1 below to see how many slowdowns are used.

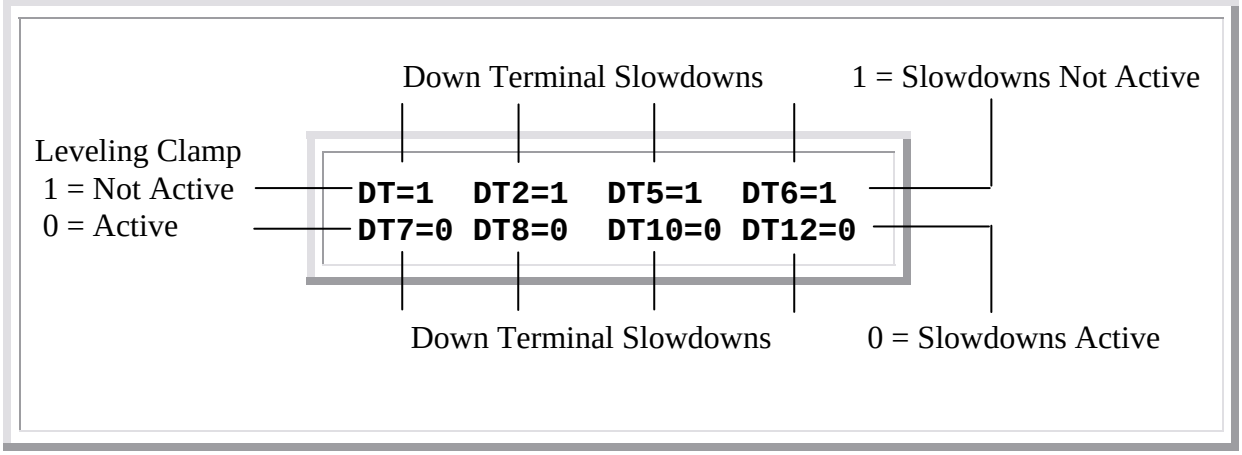
Table 5.3-1 Up Terminals vs. Elevator Speed

Speed	UT	UT2	UT5	UT6	UT7	UT8	UT10	UT12	UT14
200 FPM	X	X							
250 FPM	X	X	X						
350 FPM	X	X	X	X					
500 FPM	X	X	X	X	X				
700 FPM	X	X	X	X	X	X			
800 FPM	X	X	X	X	X	X	X		
1000 FPM	X	X	X	X	X	X	X	X	
1200 FPM	X	X	X	X	X	X	X	X	X
1400 FPM	X	X	X	X	X	X	X	X	X

To return to Submenu 3 from Up Terminals press UP, DOWN, or SELECT.

5.4 Down Terminals

Press SELECT on the Down Terminals submenu, shown above, to view the status of the down terminal slowdowns. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select Submenu 3 items.



The Down Terminals display shows whether the leveling clamp, and down terminals are active or not active. The terminals are normally closed switches therefore the slowdown is active if there is no voltage on its corresponding input terminal. Refer to Table 5.3-1 below to see how many slowdowns are used.

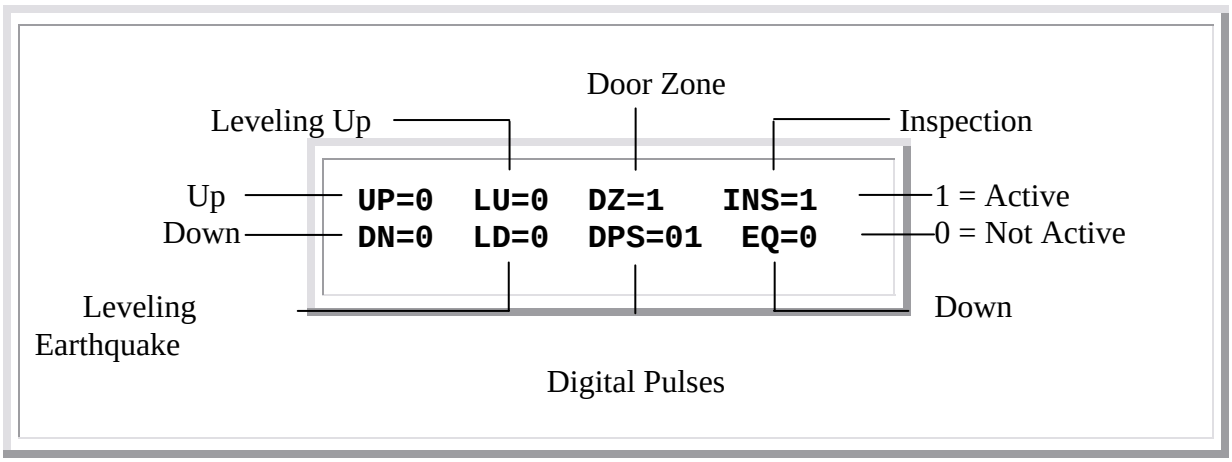
Table 5.4-1 Down Terminals Vs Elevator Speed

Speed	DT	DT2	DT5	DT6	DT7	DT8	DT10	DT12	DT14
200 FPM	X	X							
250 FPM	X	X	X						
350 FPM	X	X	X	X					
500 FPM	X	X	X	X	X				
700 FPM	X	X	X	X	X	X			
800 FPM	X	X	X	X	X	X	X		
1000 FPM	X	X	X	X	X	X	X	X	
1200 FPM	X	X	X	X	X	X	X	X	X
1400 FPM	X	X	X	X	X	X	X	X	X

To return to Submenu 3 from down terminals press UP, DOWN, or SELECT.

5.5 Controls Signals

Press SELECT on the Control Signals submenu, shown above, to view the status of the control signals. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select Submenu 3 items.

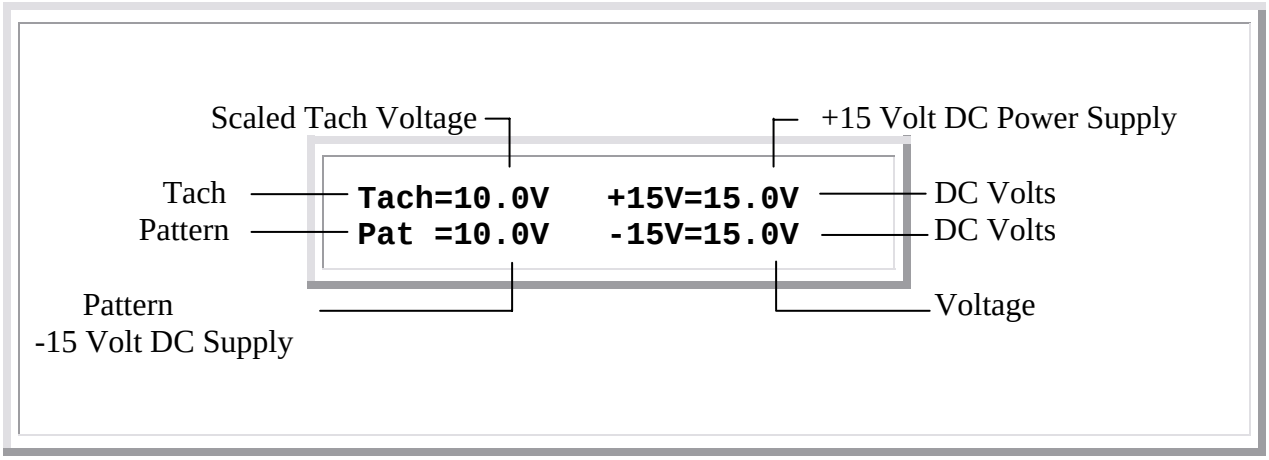


The Controls Signals submenu display shows the signals that control motion. If the signal is equal to a one the signal is currently active. If the signal is equal to a zero the signal is currently not active.

To return to Submenu 3 from control signals press UP, DOWN, or SELECT.

5.6 Analog Signals

Press SELECT on the Analog Inputs submenu, shown above, to view the status of the analog inputs. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select Submenu 3 items.



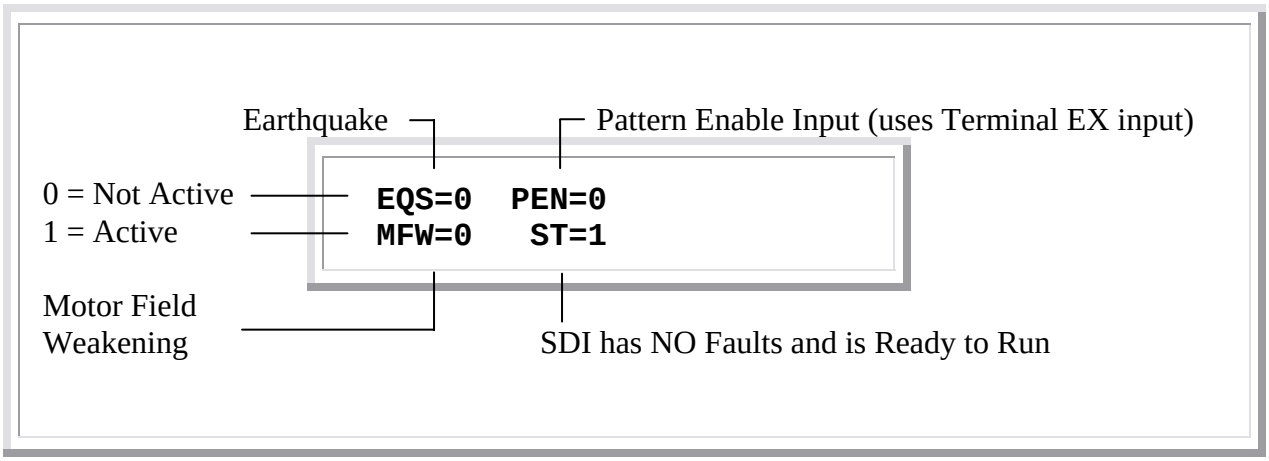
The Analog Inputs submenu display shows the voltage the microprocessor is seeing on four analog inputs. Scaled Tach Volts comes from the speed regulator and is usually scaled so

that ten volts is equal to contract speed. Pattern Volts is the voltage sent to the speed regulator which is directly proportional to the speed. Ten volts on the pattern is always equal to contract speed. The analog signals use a plus and minus fifteen volt direct current power supply. The voltages of these power supplies can be view in this submenu. If the voltage drops below twelve volts a power supply fault will occur.

To return to Submenu 3 from Analog Inputs press UP, DOWN, or SELECT.

5.7 Edge Inputs and Outputs

Press SELECT on the Edge I/O submenu, shown above, to view the status of the edge inputs and outputs. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select Submenu 3 items.



The Edge I/O submenu allows you to view four signals usually sent and received from the speed regulator. Earthquake Input during an automatic run will cause the SDI pattern to go into an emergency slowdown. Pattern Enable input enables the SDI to produce a pattern. If the pattern enable input is equal to a zero, the pattern will stay at zero volts.

Motor Field Weakening output is turned on anytime the elevator speed is greater than fifty percent of contract speed. This output is used to weaken the motor field on direct current motors to allow them to reach contract speed. The ST output controls the STO relay which is in the safety string. This output is active any time the SDI has no faults and is ready to run. If ST output is not on, check Submenu 4.1 to view the Current Fault. To return to Submenu 3 from Edge I/O press UP, DOWN, or SELECT.

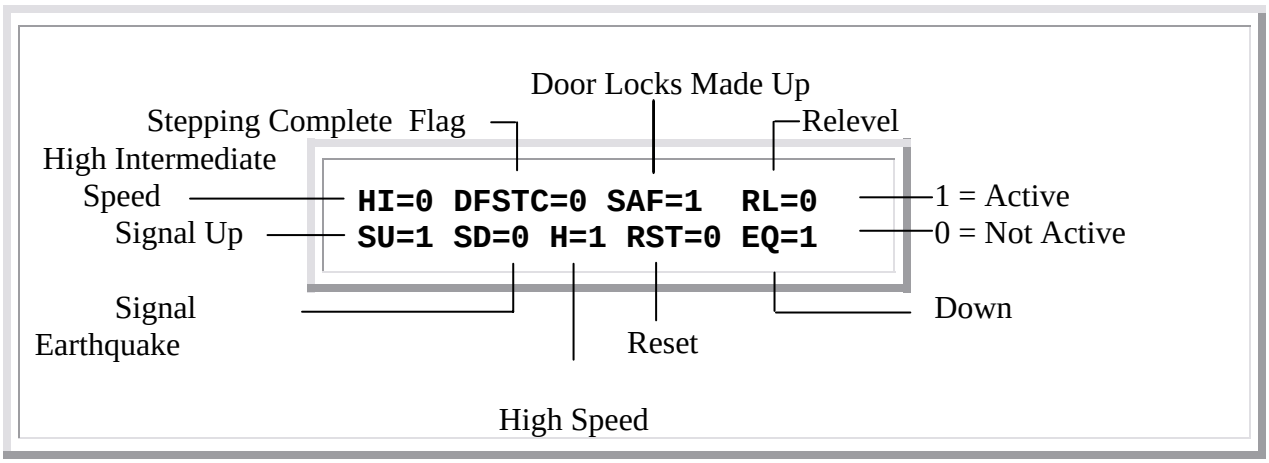
✍ **NOTE**: The PEN signal display above corresponds to SDI input EX, if input is fed from 110vdc supply, or to SDI input ENA if input is fed from EDGE drive's ENA

output or from system ground common. Input to EX terminal is "voltage inverted" and fed to the ENA terminal on the printed circuit board.

5.8 Elevator MPC Flags

```
ELEVATOR CONTROLS SDI
3.7 Elevator MPC Flags
```

Press SELECT on the Elevator MPC Flags submenu, shown above, to view the status of the elevator MPC communicated flags. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select submenu 3 items.



The Elevator MPC Flags submenu display shows flags communicated from the elevator microprocessor, P8 or PIO9, to the SDI.

HI flag is the high intermediate flag, and indicates that the elevator is at high intermediate speed or slowing down into a floor. DFSTC flag is the distance feedback stepping complete flag, and indicates that the elevator received the STU or STD flag from the SDI and incremented or decremented its position. SAF flag is the safe flag, and shows whether all safeties including the door locks are made up. If the RL flag equals one, the elevator is re-leveling at a floor.

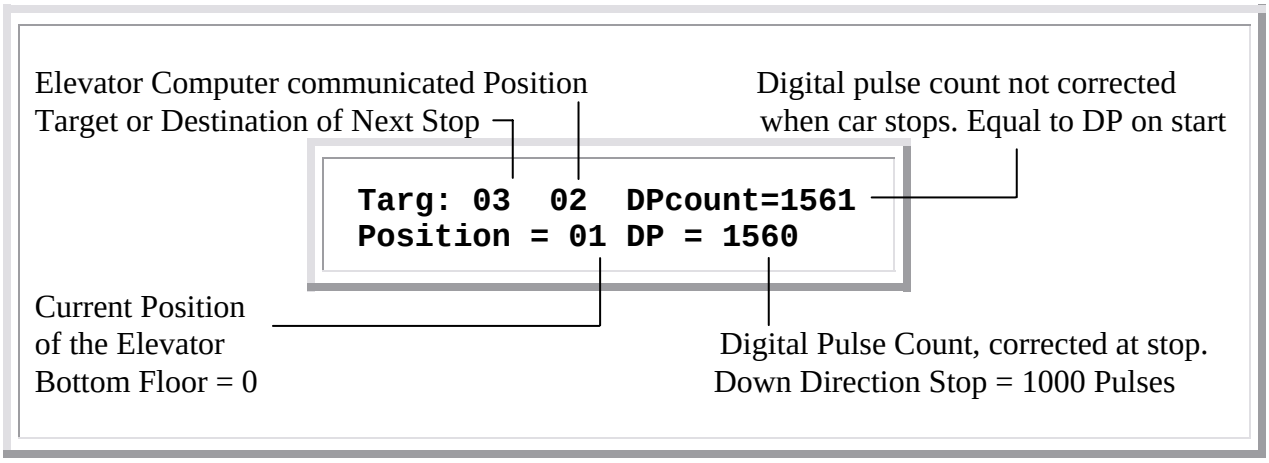
SU flag is the signal up flag, and is sent to the SDI to make an up run. SD flag is the signal down flag, and is sent to the SDI to make a down run. H flag is the high speed flag. If it is equal to one, the elevator is either ramping up to or at high speed. RST flag is the reset flag. If it is equal to one, it will cause the SDI to clear its faults and do a reset. EQ flag is the earthquake flag. If it is equal to one, the elevator microprocessor has the earth quake input active.

To return to Submenu 3 from Elevator MPC Flags press UP, DOWN, or SELECT.

5.9 Target and Position

```
ELEVATOR CONTROLS SDI
3.8 Target and Position
```

Press SELECT on the Target and Position submenu, shown above, to view the status of the target and position of the elevator. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select Submenu 3 items.



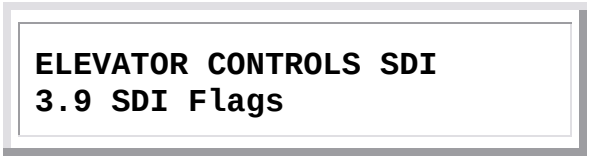
The Target and Position submenu displays the current elevator position and destination. The target is the next floor at which the elevator is going to stop. The bottom floor is zero and all the other floors are relative to the bottom. Example: if the next stop was the fourth floor from the bottom, “Targ: 03” would be displayed.

The position of the elevator is displayed relative to the bottom floor. The bottom floor is zero. Example: if the elevator was at the second floor from the bottom, Position = 01 would be displayed.

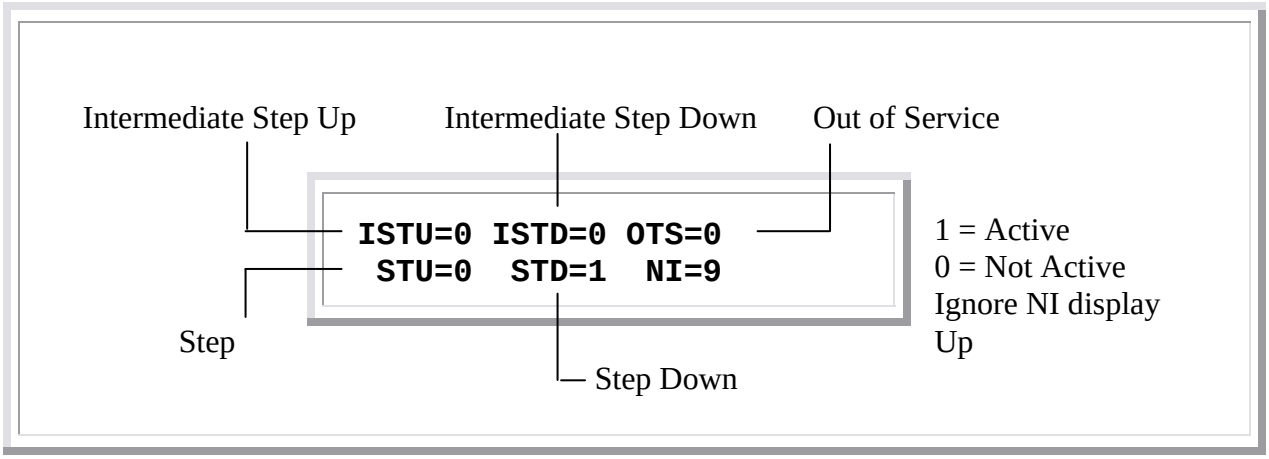
The elevator computer-communicated position is sent to the SDI from the elevator computer, and it may be advanced ahead of the actual elevator position while running. The digital pulse count is displayed in the “DP =” Section. This count is adjusted to “learned position” when the car is stopped within 3 inches of floor level. The DP count displayed is the actual counted position used to determine a count error, if any, once the car is stopped.
The largest floor count difference is stored and displayed in the “VIEW LOGS” menu, under "Floor Count Error Occurrences" displayed as “LCE=” (largest count error =). DP count is set equal to DP when the car starts an auto run. The pulse count is relative to the down directional stop. The down directional stop is always set to 1000 pulses; each pulse is equal to 3/16 of an inch.

To return to Submenu 3 from Target and Position press UP, DOWN, or SELECT.

5.10 SDI Flags



Press SELECT on the SDI Flags submenu, shown above, to view the status of the SDI flags communicated to the elevator microprocessor. Please refer to Appendix A-Drawings SDI 7D for a more detailed description of how to select Submenu 3 items.



The SDI Flags submenu displays the flags communicated from the SDI to the elevator microprocessor.

ISTU flag is the intermediate step up flag, and is used to debounce the elevator stepping, and drops HI relay just prior to stopping at a floor. ISTD flag is the intermediate step down flag, and is used to debounce the elevator stepping, and drops HI relay just prior to stopping at a floor.

OTS flag is the out of service flag. The OTS flag is active any time the SDI has a fault that makes it unsafe to run the elevator. STU flag is the step up flag. Step up flag is set to a one to increment the cars position one floor. STD flag is the step down flag. Step down flag is set to a one to decrement the car position one floor.

To return to Submenu 3 from SDI flags press UP, DOWN, or SELECT.

5.11 Return to Main Menu

Press SELECT on the Return to Main Menu submenu, shown above, to return to the main menu. Please refer to Appendix A-Drawings for a more detailed description of how to navigate the Submenus.

Section 6 – View Logs

6.1 Viewing the View Logs Submenu

6.1 Viewing the View Logs Submenu

Press SELECT on the View Logs menu, shown above, to view the View Logs Submenu. Please refer to Appendix A-Drawings SDI 7A for more detailed information on selecting main menu items.

The View Logs submenu may be viewed in the same manner as the main menu. Pressing UP selects the next item in the list. Pressing DOWN selects the previous item in the list. Pressing SELECT will display the submenu information. Please refer to Appendix A-Drawings SDI 7E for a more detailed description of how to select Submenu 4 items.

Table 6.1-1 lists all of the View Logs submenus.

Table 6.1-1 View Logs Submenu	
4.1	View Current Fault
4.2	View Sequence Log
4.3	View Fault History
4.4	Clear Fault History
4.5	Last Fault Sequence
4.6	Return to Menu

6.2 View Current Fault

Press SELECT on the

View Current Fault submenu, shown above, to view the current fault. Please refer to Appendix A-Drawings SDI 7E for a more detailed description of how to select Submenu 4 items.

The SDI system will display one of thirteen different fault messages. Each message has several error codes that may be displayed. See Section 7 Faults for more information about the error codes.

Table 6.2-1 lists all error messages and gives a short explanation of each. Section 6 Troubleshooting goes into much more detail about possible causes and solutions.

Table 6.2-1 Error Messages	
Following Error	Tach and pattern separated by more than 25%, or pattern output is incorrect by more than 25%.
Pulse Failure	No pulses on either DP1 or DP2 for more than 1 second, or six inches of pulses in the wrong direction.
Power Supply Failure	+15 or -15 supply incorrect by more than 15%.
Floor Count Error	Floor level magnet off by more than 3", or no floor magnets found within 6" of where expected.
Terminal Count Error	Terminal failed to open within 6" of where expected, or terminal opened when not within 6"
Hoistway Not Learned	On automatic without completing a successful learn mode run of the entire hoistway
Pattern Variable Error	Impossible pattern variables programmed. See Program Variables, Sections 2.5 through 2.12.
Demand Lost	SU, SD or H flag went to 0 in the middle of a run.
Motion Signals Lost	Lost UP, DN, ENABLE or SAFE during a run.
Communication Error	No serial communication from P8 or PIO9 for more than 0.25 seconds
Go To Inspection	Inspection mode activated when car was not stopped
Earthquake Speed	Earthquake input activated during an automatic run
Signals Error	Stopped with U, D or H relays picked for > 1 sec

6.3 View Sequence Log

Press SELECT on the View Sequence Log submenu to display the sequence log. Please refer to Appendix A-Drawings SDI 7E for a more detailed explanation of using the View Faults submenu.

Each event in the sequence log is numbered from one to twenty six. Event number one is the most recent. Event twenty six is the oldest. Press UP or DOWN to sequence through the list of events. Pressing UP will increase the event numbers and display the immediately preceding event. Pressing DOWN does the opposite; the event number decreases and displays the event immediately following. Press either SELECT or SAVE to bring you back to Submenu 4.

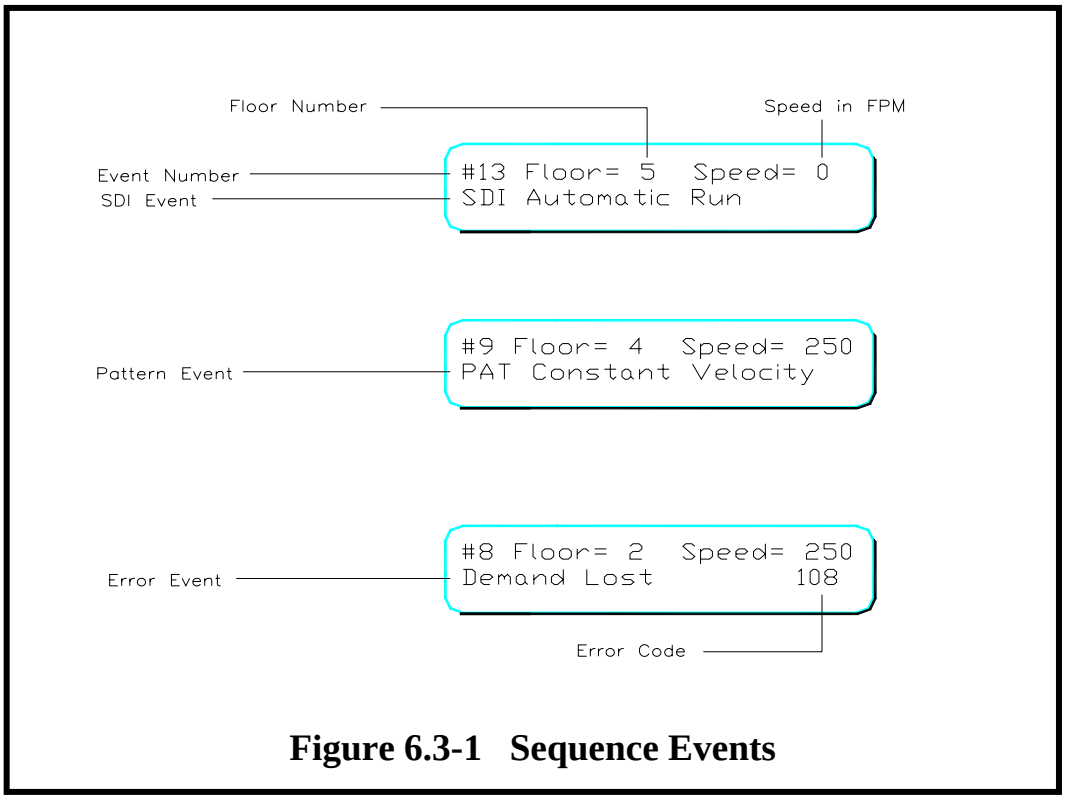


Figure 6.3-1 Sequence Events

In addition to the event itself, the SDI system also records the floor and the speed at which the event occurred. The sequence log contains three types of events, which are listed on the second line of the display. The events are SDI events, pattern events and errors. Figure 6.3-1, above, show the three types of events and identifies their parts.

Table 6.3-1 provides a complete list of SDI system modes. Every time the system switches from one mode to another, a record is made in the sequence log.

#1 Floor = 1 Speed = 0
No Faults 0

#2 Floor = 1 Speed = 0
PAT Stopped Mode

#3 Floor = 1 Speed = 0
SDI Stopped Mode

#4 Floor = 1 Speed = 3
PAT Constant Leveling

#5 Floor = 1 Speed = 3
PAT Constant Leveling

#6 Floor = 1 Speed = 208
PAT Constant Deceleration

#7 Floor = 2 Speed = 250
PAT Roll Into Const. Dec.

#8 Floor = 2 Speed = 250
Demand Lost 118

#9 Floor = 5 Speed = 250
PAT Constant Velocity

#10 Floor = 5 Speed = 194
PAT Roll into Const Vel

#11 Floor = 5 Speed = 23
PAT Const Acceleration

#12 Floor = 5 Speed = 0
PAT Soft Start

#13 Floor = 5 Speed = 0
SDI Automatic Run

Figure 6.3-2 Sequence Log

Table 6.3-1 SDI Modes

Value	SDI Mode
0	Stopped
1	Automatic Run
2	Earthquake Run
3	Inspection Run
4	Learn the Hoistway
5	Re-level
6	Emergency Slowdown
7	Out of Service
8	Waiting for the Car to Stop
9	Waiting Until it is Safe to Run
10	Waiting Until no Errors
11	Set the Speed Clamps

Pattern or PAT events are recorded whenever the pattern changes. Table 6.3-2 lists the pattern modes.

Error events are recorded whenever the SDI detects an error. These errors are the same errors described earlier in Section 6.2 View Logs. Table 6.2-1 lists the errors and gives a brief description of each. Each error has an error code, shown on the right-hand side of the display. These error codes provide greater detail about the error. The error codes are described completely in Section 7 Faults.

The sequence log is designed to allow you to see what happened during the last automatic run of the car. The log will retain the last twenty-six events recorded by the SDI. Since an automatic run will normally produce thirteen to twenty events, you must check the sequence log immediately after a problem has occurred to view all pertinent events before putting the car back in service.

Figure 6.3-2 shows an example of the sequence log for a normal automatic run. On some systems, there may also be an additional Demand Lost Error recorded before or after PAT Constant Leveling. This is normal.

Table 6.3-2 Pattern Modes			
Value	**Pattern Mode**	**Value**	**Pattern Mode**
0	Pattern Is Stopped 0 Volts	5	Roll Into Constant Deceleration
1	Soft Start	6	Constant Deceleration
2	Constant Acceleration	7	Soft Stop Floor Targeting
3	Roll Into Constant Velocity	8	Constant Leveling Speed
4	Constant Velocity	9	Emergency Slowdown

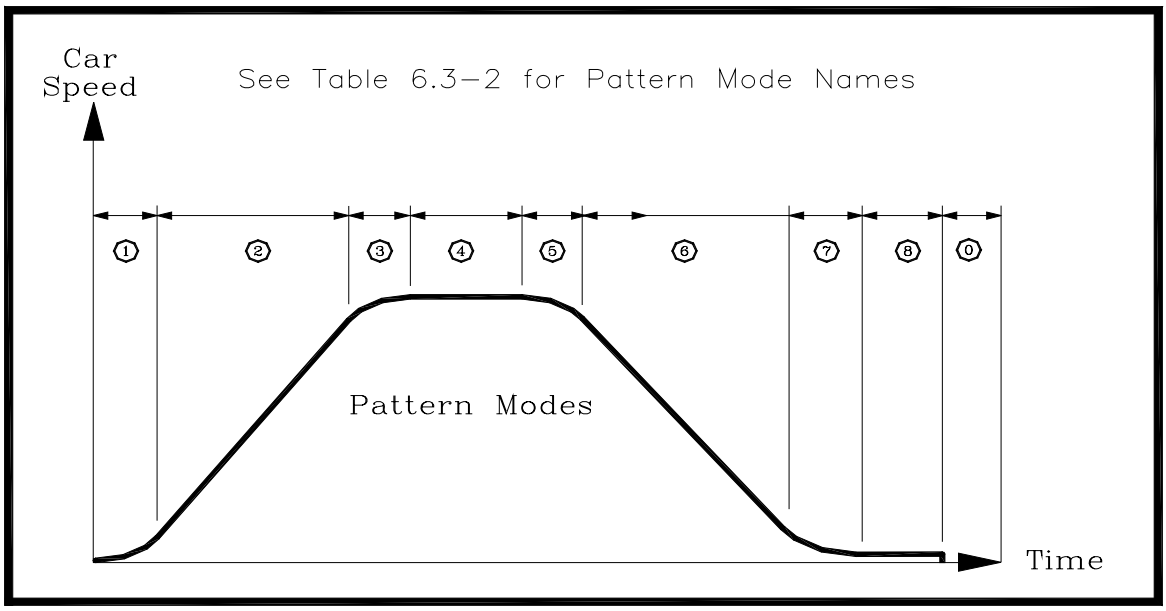


Table 6.3-3 Pattern Modes

6.4 View Fault History

```
ELEVATOR CONTROLS SDI
4.3 View Fault History
```

The Fault History offers a way to see how many times each error has occurred. The fault history displays the number of occurrences for each error. Please refer to Appendix A-Drawings SDI 7E for a more detailed explanation of using the View Fault History submenu.

To see each error, press SELECT on the View Fault History submenu shown above. The display will change to the Following Error fault history shown below. Use UP or DOWN to display the next error. Press SELECT or SAVE to returns to Submenu 4.3 View Fault History. The sequence log will also display the number of successful automatic trips the system has made. The number of trips is not affected when you clear the fault history. See Section 6.5 Clear Fault History.

```
Following Error
Occurrences = 0
```

The table below lists each of the errors available in the view fault history.

Pattern Mode	**Pattern Mode**
Following Error	Motion Signals Lost
Pulse Failure	Communication Error
Power Supply Failure	Go To Inspection
Floor Count Error	Earthquake Speed
Terminal Count Error	Signals Error
Hoistway Not Learned	Number of Trips
Pattern Variable Error	Power Cycled
Demand Lost	

✍ **NOTE**: The “Floor Count Error” display also displays the largest floor count error (LCE=) detected during an auto run since last "Clear Fault History" operation.

6.5 Clear Fault History

```
ELEVATOR CONTROLS SDI
4.4 Clear Fault History
```

Use submenu 4.6 Clear Fault History to clear all of the faults discussed in Section 6.5 Fault History. Press SELECT to set the number of occurrences of each fault to zero (number of trips is not reset to zero). It is good practice to clear the fault history between service visits. This way, any errors recorded by the fault history must have happened since last service visit. This procedure will save you from having to write down each error to compare with updated list next service visit. Please refer to Appendix A-Drawings SDI 7E for a more detailed explanation of using the View Fault History submenu.

6.6 Last Fault Sequence

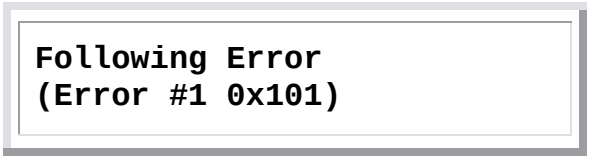
The Last Fault Sequence works the same way as the “4.2 View Sequence Log” Submenu described in Section 6.1. In this case, the log stores the last sequence when a fault was detected, so that even if the system is programmed with auto resets, the fault sequence can be analyzed by accessing this Submenu. Refer to Section 6.1 for details on how to interpret data in a Sequence Log display. A Clear Fault History operation will clear this log. If the log is clear of data, this will be indicated when the log is viewed

6.7 Return to Main Menu

Press SELECT on Submenu 4.4 to return to the main menu display. Please refer to Appendix A-Drawings SDI 7E for a more detailed explanation of using the submenus. Refer to Appendix A-Drawings SDI 7A for a more detailed explanation of using the main menu.

Section 7 – Faults

7.1 Following Error



A Following Error occurs when a speed variance of 25 percent of contract speed is detected when actual elevator speed is compared to the speed pattern supplied by the SDI. A Following Error will also be indicated if the SDI pattern output varies from the SDI pattern input by twenty five percent of contract speed.

Example: If the contract speed is 300 feet per minute, twenty five percent of 300 feet per minute is 75 feet per minute. If the elevator is moving at 225 feet per minute and the speed pattern is at 300 feet per minute (a variance of 25 percent of contract speed) a following error will occur. If a following error occurs, because of a tach and pattern variance, the elevator will go into an emergency slowdown, stop at the next floor, cycle the doors, and take itself out of service.

Contract speed is always equal to a pattern output of ten volts. The SDI monitors its pattern output using an analog input to verify the speed pattern. If the pattern output varies from the pattern input by 2.5 volts, a following error will occur. If a following error occurs, because the variance between ~~the~~ pattern input and pattern output has exceeded the 25 percent threshold, the SDI will open the safety string shutting down the elevator and shut itself off.

The error code displays the SDI mode at the time the following error occurred. Table 7.1-1 lists possible Following Error codes.

Table 7.1-1 Following Error Codes	
Error Code	SDI Mode
0x101	Tach and Pattern Separation During an Auto Run
0x201	Tach and Pattern Separation During an Earthquake Run
0x301	Tach and Pattern Separation During an Inspection Run
0x401	Tach & Pattern Separation During an Learn Hoistway Run
0x501	Tach and Pattern Separation During an Relevel Run
0x111	Pattern Output Error During an Auto Run
0x211	Pattern Output Error During an Earthquake Run
0x311	Pattern Output Error During an Inspection Run
0x411	Pattern Output Error During an Learn Hoistway Run
0x511	Pattern Output Error During an Relevel Run
0x611	Pattern & Tach Separation during Emergency slowdown. Safety Relay drops.

7.2 Pulse Failure

```
Pulse Failure
(Error #2 0x102)
```

A pulse error occurs if there is more than a second between digital pulses while the elevator is moving faster than thirty feet per minute. A pulse error also occurs if the SDI counts more than 32 pulses in the wrong direction.
If a pulse failure occurs, the elevator will go into an emergency slowdown, stop at the next floor, cycle the doors, and take itself out of service. The error code displays the SDI mode at the time the pulse failure occurred. Table 7.2-1 lists possible Pulse Failure codes.

Table 7.2-1 Pulse Failure Codes	
Error Code	SDI Mode
0x112	No DP1 pulse for > 1 second during an auto run
0x122	No DP2 pulse for > 1 second during an auto run
0x132	Counted down while going up on an auto run
0x142	Counted up while going down on an auto run
0x152 0x162, 0x172	Counting Error due to both up and down inputs active simultaneously
0x212	No DP1 pulse for > 1 second during an earthquake run
0x222	No DP2 pulse for > 1 second during an earthquake run
0x232	Counted down while going up on an earthquake run
0x242	Counted up while going down on an earthquake run

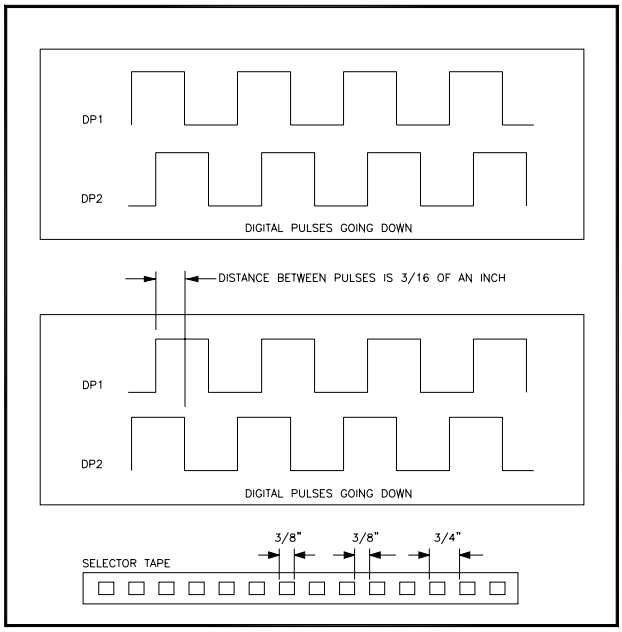


Figure 7.2-1 Digital Pulses

7.3 Power Supply Error

```
Power Supply Error
(Error #3 0x113)
```

A Power Supply Error occurs if the +15 power supply voltage drops below +12.5 volts or exceeds +17.5 volts. A power supply error will also occur if the -15 power supply drops below -12.5 volts or exceeds -17.5 volts.

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If a Power Supply Error occurs, the SDI will open the safety string and shut down. The SDI will restart when the power supplies are within there proper voltage ranges. The error code displays the SDI mode at the time the Power Supply failure occurred. Table 7.3-1 lists possible Following Error codes.

Table 7.3-1 Power Supply Error Codes

Error Code	SDI Mode
0x013	+15 volt power supply failure while stopped
0x023	-15 volt power supply failure while stopped
0x113	+15 volt power supply failure during an auto run
0x123	-15 volt power supply failure during an auto run
0x213	+15 volt power supply failure during an earthquake run
0x223	-15 volt power supply failure during an earthquake run
0x313	+15 volt power supply failure during an inspection run
0x323	-15 volt power supply failure during an inspection run
0x413	+15 volt power supply failure during learn hoistway run
0x423	-15 volt power supply failure during learn hoistway run
0x513	+15 volt power supply failure while re-leveling
0x523	-15 volt power supply failure while re-leveling
0x613	+15 volt power supply failure during an emergency stop
0x623	-15 volt power supply failure during an emergency stop

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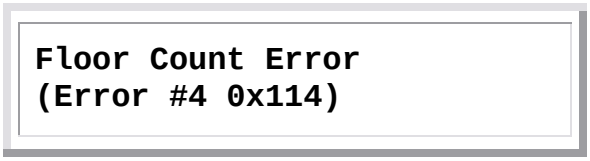
7.4 Floor Count Error



The SDI keeps a table of the floor positions, in pulse counts. If the elevator stops at a floor and the digital pulse count differs from the floor position table by more than 16 pulses, a Floor Count Error occurs. If a Floor Count Error occurs, the elevator will cycle the doors, then take itself out of service.

If the elevator slows down to stop and no door magnet is detected within 32 pulses of where a floor is located on the floor table, a Floor Count Error will occur. This Floor Count Error will cause the elevator to accelerate to 25 feet per minute and search for the next door magnet. Once located, the elevator will stop at the floor, cycle the doors, and take itself out of service. The error code displays the SDI mode at the time the Floor Count error occurred.

If there is a discrepancy between position defined by SDI pulse count and selector Absolute Floor Position Feedback, an error will occur and the SDI position will be corrected to match the Absolute Position Feedback value. If this error occurs, verify that floor position feedback from the selector is reliable and that the digital pulse feedback system is working properly. Table 7.4-1 lists possible Floor Count Error codes.

Table 7.4-1 Floor Count Error Codes

Error Code	SDI Mode
0x114	Floor count off during an auto run
0x124	Floor number and count corrected to Selector's Absolute Floor Position Feedback
0x214	Floor count off during an earthquake run
0x104	Missing floor magnet during an auto run
0x204	Missing floor magnet during an earthquake run

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7.5 Terminal Count Error

```
Terminal Count Error
(Error #5 0x125)
```

Terminal slowdown switch locations are stored in the terminal position table. When these mechanical switches open, the SDI verifies that it is at the right position in the hoistway. If the position at which the terminals open does not match the terminal position table, within 32 pulses, a Terminal Count error will occur.

Terminal Count errors result under two possible conditions. (1) The switch opens before the elevator gets to the terminal position table count; (2) The switch does not open and the digital pulses position is beyond the terminal position defined in the table. If either of these conditions occur, the validity of the digital pulses count is in question. The SDI will do a time based emergency slowdown, stop at the next floor, cycle the doors, and take the elevator out of service. The error code displays the SDI mode at the time the Following Error occurred. Table 7.5-1 lists possible Terminal Count error codes.

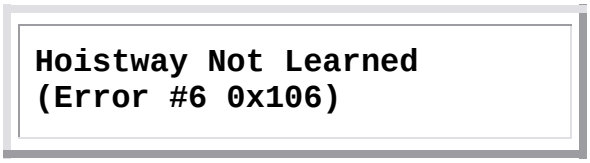
Table 7.5-1 Terminal Count Error Codes

Error Code	SDI Mode
0x105	Terminal opened too soon during an auto run
0x125	Terminal didn't open during an up auto run
0x135	Terminal didn't open during a down auto run
0x205	Terminal opened too soon during an earthquake run
0x225	Terminal didn't open during an up earthquake run
0x235	Terminal didn't open during a down earthquake run
0x015	Position Indicator doesn't match the terminal slowdown. To reset from this error, run car on inspection to terminal floor

If a terminal count error 0x015 occurs, the pulse count needs to be reset. To reset the pulse count, run the elevator, on inspection, to a terminal floor. The SDI will automatically reset the pulse count when the car is stopped at floor level with the final slowdown switch open (USD2 or DSD2).

If this switch closes without a matching change in pulse count (e.g., faulty switch or input breaking open and re-making with car not at the corresponding terminal floor level), then the validity of the digital pulses and/or the terminal slowdown switch is in critical question. Under these conditions, the SDI system will drop its safety relay output, requiring an elevator serviceman to run the car on inspection to the terminal floor in order to restore normal operation. It is intended when this error is detected that elevator serviceman checks both the digital pulse system and terminal slowdown switches for proper operation.

7.6 Hoistway Not Learned

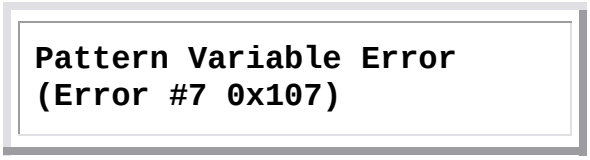


Before the SDI can make an automatic run it has to learn where the floors and terminal slowdowns are located. This is accomplished with a Learn Hoistway inspection run from the bottom of the hoistway to the top of the hoistway. Refer to Submenu 2.1 for a more detailed description of how to do a Learn Hoistway run. The error code displays the SDI mode at the time the Learn Hoistway error occurred. Table 7.6-1 lists possible Hoistway Not Learned error codes.

Table 7.6-1 Hoistway Not Learned Error Codes

Error Code	SDI Mode
0x106	Hoistway not learned and trying to do an auto run
0x206	Hoistway not learned and trying to do an earthquake run
0x6	Hoistway not learned and the controller is on automatic

7.7 Pattern Variable Error



A Pattern Variable Error will occur if the pattern variables are set to values that would generate a non-contiguous pattern. The SDI will open the safety string until proper values for the pattern variables are set. Refer to the Program Variables section to learn more about variable ranges and what they control. The error code displays the SDI mode at the time the Pattern Variable error occurred. Table 7.7-1 lists possible Pattern Variable error codes.

Table 7.7-1 Pattern Variable Error Codes

Error Code	SDI Mode
0x107	Pattern Variable Error and trying to do an auto run
0x207	Pattern Variable Error and trying to do an earthquake run
0x7	Pattern Variable Error and the controller is on automatic

7.8 Demand Lost

```
Demand Lost
(Error #8 0x108)
```

A Demand Lost error occurs under one of three conditions: (1) If the elevator is in motion in the up direction and there is no demand to go up (Su flag=0) from the elevator microprocessor; (2) If the elevator is in motion in the down direction and there is no demand to go down (SD flag=0) from the elevator microprocessor, or (3) If the elevator is running at high speed and the elevator microprocessor does not indicate it is at high speed (H flag = 0).

When a Demand Lost error occurs the elevator will makes a normal stop into the next available floor. The error code displays the SDI mode at the time the Demand Lost error occurred. Table 7.8-1 lists possible Demand Lost error codes.

Table 7.8-1 Demand Lost Error Codes

Error Code	SDI Mode
0x108 and 0x188	No SU or SD while on an auto run
0x118 and 0x198	No H while at high speed during an auto run
0x208 and 0x288	No SU or SD while on an earthquake run
0x218 and 0x298	No H while at high speed during an earthquake run

7.9 Motion Signals Lost

```
Motion Signals Lost
(Error #9 0x109)
```

The SDI motion signals are up, down, pattern enable, and safe. If the elevator is in motion and any of these signals become inactive, a Motion Signals Lost fault occurs. If this fault occurs, the SDI will drop the safety string, wait until the elevator comes to a stop, energize the relay in the safety string, and wait for signals to become active again. Once the signals become active, the elevator will continue on to the desired floor. The error code displays the SDI mode at the time the Motion Signals Lost error occurred. Table 7.9-1 lists possible Motion Signals Lost error codes.

Table 7.9-1 Motion Signals Lost Error Codes	
Error Code	SDI Mode
0x119	Up lost during an auto run
0x129	Pattern enable lost during an auto run
0x139	Safe lost during an auto run
0x149	Up signal reversal during an auto run
0x159	Down signal reversal during an auto run
0x219	Up lost during an earthquake run
0x229	Pattern enable lost during earthquake run
0x239	Safe lost during earthquake run
0x249	Up signal reversal during an earthquake run
0x259	Down signal reversal during an earthquake run
0x619	Up lost during an emergency slowdown
0x629	Pattern enable lost during emergency slowdown
0x639	Safe lost during emergency slowdown
0x649	Up signal reversal during an emergency slowdown
0x659	Down signal reversal during an emergency slowdown

7.10 Communication Error

```
Communication Error
(Error #10 0x10A)
```

The SDI and the elevator microprocessor communicate with each other. This communication establishes all the flags necessary to run. If this communication is interrupted for longer than .25 seconds, a communication error will occur. If the elevator is in motion it will execute an emergency slowdown, stop at the next floor, cycle the doors, and take itself out of service. If communication is reestablished, the elevator will automatically return to normal operation. The error code displays the SDI mode at the time the Communication Error occurred. Table 7.10-1 lists possible Communication Error codes.

Table 7.10-1 Communication Error Codes	
Error Code	SDI Mode
0x00A	Communication error while elevator is stopped
0x10A	Communication error during an auto run
0x20A	Communication error during an earthquake run
0x50A	Communication error while elevator is re-leveling

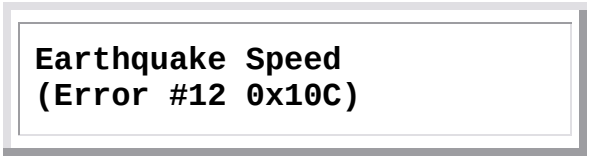
7.11 Go to Inspection Error

If the elevator is put on inspection mode while the elevator is in motion, a Go To Inspection error will occur. The elevator will come to an immediate stop, then go into inspection operation. The error code displays the SDI mode at the time the Go To Inspection error occurred. Table 7.11-1 lists possible Go To Inspection codes.

Table 7.11-1 Go To Inspection Error Codes

Error Code	SDI Mode
0x10B	Put on inspection during an auto run
0x20B	Put on inspection during an earthquake run

7.12 Earthquake Speed



If the elevator is executing an auto run when an earthquake occurs, an Earthquake Speed fault occurs. The elevator will execute an emergency slowdown, stop at the next available floor, and cycle the doors. There is only one code for an earthquake speed error, 0x10C.

7.13 Signals Error

A Signals Error occurs if the elevator is stopped at a floor and motion signals are still present for 5 seconds. The motion signals that are checked are H, SU, SD, UP, and DN (down). The error code displayed shows which signal(s) the SDI lost when the Signals Error occurred. Table 7.13-1 lists possible Signals Error codes.

Table 7.13-1 Signal Error Codes	
Error Code	SDI Mode
0x1D	Elevator computer H Signal error
0x2D	Elevator computer SU Signal error
0x3D	Elevator computer SD Signal error
0x4D	Up relay Signal error
0x5D	Down relay Signal error

Section 8 – Troubleshooting

NOTE: When troubleshooting Floor Count and Terminal Count errors, you may find it useful to view “Target and Position” count displays in the VIEW I/O menus (see Section 5.9, and entire Section 6 “View Logs”). For Terminal Count errors, compare the terminal position table and terminal activation displays in the Hoistway submenus. Terminal count error 0x15 requires the car to be run on inspection to a terminal floor in order to reset this major fault. See Section 8.24 at end of this chapter for more information.

8.1 Following Error (0x101, 0x201, 0x301, 0x401, 0x501)

These Following Error codes indicate that the elevator speed varied from the speed pattern by twenty five percent of contract speed. Use 3.1 Tracking Performance to view the tach and pattern outputs and their separation.

Possible Solution #1

The drive is not calibrated for contract speed. Check the drive manual to see how to calibrate the drive. If the elevator is being adjusted for the first time, use a hand held tach to verify speed. Hint: check to see if the inspection speed, program variable 1.12, matches the hand held tach on an inspection run.

Possible Solution #2

The pattern is changing faster than the elevator can follow. If the error occurs during acceleration, lower the acceleration rate. If the error occurs during deceleration, lower the deceleration rate.

Possible Solution #3

1.13 Tach Polarity is set wrong. See Section 3.15 Tach Polarity and check Table 3.15-1 to verify that this parameter is set correctly for the drive you are using.

Possible Solution #4

1.14 Tach Gain is set wrong. See Section 3.16 Tach Gain and follow the instructions for adjusting this parameter.

Possible Solution #5

The elevator brake did not lift. Verify that the pick voltage used to pick the brake matches the nameplate voltage of the brake. Adjust the break resistors to set the picking voltage to match the brake's nameplate data.

Possible Solution #6

If DC machine: loss of motor field or motor field weakening adjusted wrong. Verify that the motor field voltage used matches the nameplate voltage of the motor field. Adjust the speed regulator (Drive) to match the nameplate voltage.

8.2 Following Error (0x111, 0x211, 0x311, 0x411, 0x511)

These Following Error codes indicate that the elevator speed pattern output varied from the speed pattern input by 2.5 volts. Use 3.5 Analog Inputs to view the speed pattern input voltage. Contract speed is always equal to 10 volts. The output voltage is proportional to the speed. Speed pattern output voltage is equal to actual speed divided by the contract speed times by 10.

Possible Solution #1

The pattern speed clamps are set wrong. See Section 4.6 Set Speed Clamps, and follow the procedure to reset the speed clamps.

Possible Solution #2

The terminal slowdowns are not working. Use 3.2 Up Terminals and 3.3 Down Terminals to view the inputs. Check wiring and switches and repair as needed.

Possible Solution #3

There is a hardware failure on the SDI MPC board. Contact Elevator Controls Factory Technical Support and request a replacement board.

8.3 Pulse Error (0x112, 0x122, 0x212, 0x222)

These Pulse Error codes indicate that either DP1 or DP2 failed. If the error code is 0x112 or 0x212 DP1 failed. If the error code is 0x122 or 0x222 DP2 failed.

Possible Solution #1

There is a wiring mistake. Check the wiring of DP1, DP2 and DPC depending on the error code and repair as needed.

Possible Solution #2

The Selector Output is bad. Use a digital voltmeter to check the output of the selector. It should be +15 volts if the sensor is off and 0 volts if the sensor is on. Verify that, when the car is moved on inspection, the output switches on and off. If the output is not switching on and off, the selector is bad and needs to be replaced.

Possible Solution #3

The SDI input for DP1 or DP2 is bad. Use a digital voltmeter to check terminals DP1 to GND or DP2 to GND. It should be +15 volts if the sensor is off (DP LED on) and 0 volts if the sensor is on (DP LED off). Verify that, when the car is moved on inspection, the input voltages switch on and off (DP LED's are going on and off). If the voltages are switching on and off, and the DP LED's are not, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement board.

If the DP LED's are switching on and off, use 3.4 Control Signals to verify that DPS read-out is switching on and off. If the LED's are switching on and off and the DPS read-out is not, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement board.

8.4 Pulse Error (0x132, 0x142, 0x232, 0x242)

These Pulse Error codes indicate that the SDI counted 32 pulses opposite the direction of the up or down inputs.

Possible Solution #1

DP1 and DP2 are wired in reverse. Reverse DP1 and DP2. Use 3.8 Target and Position to view the DP count while running up on inspection. Verify that the DP count increases. Run down on inspection and verify that the DP count decreases. If reversing DP1 and DP2 does not correct the problem the selector is bad. Contact Elevator Controls Factory Technical Support and request a replacement.

8.5 Power Supply Error (0x013 to 0x623)

These Power Supply Error codes indicate that either the +15 volt power supply or the -15 volt power supply is out of range (less than 12.5 volts or greater than -12.5 volts, respectively). If the second digit of the error code is a 1 then the +15 volt power supply is out of range. If the second digit of the error code is a 2 then the -15 volt power supply is out of range.

Possible Solution #1

The power supply is just adjusted wrong. Turn the voltage adjust pot, on the power supply indicated by the error, until it is 15 volts DC. Use a digital voltmeter between +15 and GND and -15 and GND to verify.

Possible Solution #2

There is a short on the SDI board pulling the power supply voltage down. Turn off power and disconnect the power supply from the terminal block. Then turn on the power and measure the voltage with a digital voltmeter. If the voltage is correct with the power supply disconnected from the terminal block, and lower than 12.5 volts DC with it connected to the terminal block, then there is likely a problem with one of the SDI board. Contact Elevator Controls Factory Technical Support and request a replacement.

Possible Solution #3

There is a bad power supply. Turn off power and disconnect the power supply from the terminal block. Then turn on the power and measure the voltage with a digital voltmeter. If the voltage is lower than 12.5 volts DC with it disconnected from the terminal block, and it can't be adjusted, the power supply is bad. Contact Elevator Controls Factory Technical Support and request a replacement.

Possible Solution #4

The analog input on the SDI board is bad. Measure the voltage with a digital voltmeter. If the voltage is above 12.5 volts DC, view the analog input with 3.5 Analog Inputs. If the display shows less than 12.5 volts DC, and the measured voltage is greater than 12.5 volts DC, the analog input is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.6 Floor Count Error (0x114, 0x214, 0x124)

These Floor Count Error codes indicate that the elevator stopped at a floor and the digital pulse count varied from the floor position table by over 16 pulses (3 inches).

Possible Solution #1

The digital pulse wires are not shielded. Verify that the digital pulse wires are run in shielded cable and that the shield is grounded **only on the controller end**. If these wires are not run in shielded cable, they must be re-wired using shielded cables in order for the system to function correctly.

Possible Solution #2

The digital pulse lens is dirty. The digital pulses use light to detect the holes. If the mirror on the selector is dirty the pulses could be read incorrectly. Remove the mirror on the selector and clean it. The mirror is on the upper slide guide bracket.

Possible Solution #3

Direct sunlight is shining right on the pulse mirror. The digital pulses use light to detect the holes in the selector tape. Direct sun light can cause pulses count errors. Shield the top of the selector from direct sunlight.

Possible Solution #4

The floor magnet got moved or was not glued down. Verify that all magnets are present and glued down in there proper places. If a magnet is out of place or missing, replace it. Then see Section 4.2 Set Up Mode and follow the instructions to relearn the hoistway.

Possible Solution #5

Either a bad selector or bad SDI board. See Section 8.3 and check to see which board is bad. Contact Elevator Controls Factory Technical Support and request the appropriate replacement board.

8.7 Floor Count Error (0x104, 0x204)

These Floor Count Error codes indicate that the SDI stopped at a floor and a floor magnet was not within 32 pulses (6 inches) of the floor position table.

Possible Solution #1

A floor magnet is missing. With the car on inspection, check the position of all floor magnets. If a floor magnet is missing, replace it. After the magnet is replaced see Section 4.2 Set Up Mode and follow the instructions to relearn the hoistway. If a floor magnet was not missing, see Section 8.6 and Section 8.3 for other possible solutions.

8.8 Terminal Count Error (0x105 to 0x235 and 0x15)

Terminal Count Error codes 0x105 and 0x205 indicate that a terminal slowdown opened before the digital pulse position as defined in the floor position table was reached. Error codes 0x125, 0x135, 0x225 and 0x235 indicate that a terminal slowdown did not open at the digital position stored in the terminal position tables. Terminal count error 0x015 is a major fault that indicates that a slowdown switch opening was detected while car was stopped at a floor level other than the terminal landing. It is necessary to run the car on inspection to a terminal floor to reset a 0x015 fault or the car will not run. It is intended that a serviceman check slowdown switches (USD2/DSD2), wiring integrity, and selector sensor unit and digital pulses.

Possible Solution #1

Faulty terminal slowdown switch. Run the car on inspection to the top floor. Use a digital voltmeter to check the voltage on the terminals. If there is 110 volts DC on the up terminal slowdown terminals there is a switch or wiring problem. Fix as required. If there is 0 volts DC on the down terminal slowdown terminals, there is a switch or wiring problem. Fix as required. Run the car on inspection to the bottom floor. Use a digital

voltmeter to check the voltage on the terminals. If there is 0 volts DC on the up terminal slowdown terminals, there is a switch or wiring problem. Fix as required. If there is 110 volts DC on the down terminal slowdown terminals, there is a switch or wiring problem. Fix as required.

Possible Solution #2

Digital pulse failure. Check Section 8.6 and 8.3 for digital pulses solutions.

Possible Solution #3

Faulty SDI terminal slowdown input. Run the car on inspection to the top floor. Examine the LED's on the SDI board then look at 5.3 Up Terminals to verify that the up terminal slowdown inputs are 0. Examine the LED's again then look at 5.4 Down Terminals to verify that the down terminal slowdown inputs are 1. If the up and down terminals are not zero and 1, respectively, use a digital voltmeter to check the voltage on the terminals. If there is 0 volts DC on the up terminal slowdown terminals and the display shows a 1 the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

If there is 110 volts DC on the down terminal slowdown terminals and the display shows a 0 this also indicates a bad SDI board. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

Run the car on inspection to the bottom floor. Examine the LED's on the SDI board then look at 5.3 Up Terminals to verify that the up terminal slowdown inputs are 1. Examine the LED's again then look at 5.4 Down Terminals to verify that the down terminal slowdown inputs are 0. If the down and up terminals are not zero and 1, respectively, use a digital voltmeter to check the voltage on the terminals. If there is 0 volts DC on the down terminal slowdown terminals and the display shows a 1 the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

If there is 110 volts DC on the up terminal slowdown terminals and the display shows a 0 this also indicates a bad SDI board. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.9 Hoistway Not Learned (0x106)

The Hoistway Not Learned error code indicates that the SDI has not learned the hoistway. The speed patterns are generated based on the distance from the current car position to the target. If the hoistway has not been learned, the SDI system does not know the position of the floors and consequently cannot generate the distance-based pattern required for it to function.

Possible Solution #1

The hoistway has not been learned. Learn the hoistway by following the directions in Section 4.2 Setup Mode.

Possible Solution #2

The RAM battery is dead. Learn the hoistway by following the directions in Section 4.2 Setup Mode. View 4.3 Floor Position Table and write down the digital pulses for each floor in the floor position table. Turn off power. Turn power back on. View 4.3 Floor Position Table and verify that the digital pulse count for each floor is the same. If they are different the ram batter is dead. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.10 Pattern Variable Error (0x7, 0x107, 0x207)

These error codes indicate that the current program variables would produce a non contiguous pattern.

Possible Solution #1

The acceleration parameters would produce a non-contiguous pattern. There are three acceleration parameters: 1.3 Initial Jerk, 1.4 Roll Over Jerk, and 1.7 Acceleration. Refer to Section 3.5 Initial Jerk, Section 3.6 Roll Over Jerk and 3.9 Acceleration to see how these parameters affect the speed pattern. The most likely problem is that variables are set where initial rounding or roll over rounding will take more than one half of the total time to reach contract speed. To reduce the rounding time, increase the Initial or Roll Over Jerk Rate, or lower the Acceleration Rate.

Possible Solution #2

The deceleration parameters would produce a non-contiguous pattern. There are two deceleration parameters: 1.5 Deceleration Jerk, and 1.8 Deceleration. Refer to Section 3.7 Deceleration Jerk, and Section 3.10 Deceleration to see how these parameters affect the speed pattern. The most likely problem is that variables are set where initial deceleration rounding will take more than one half of the total time to reach to leveling speed. To reduce the rounding time, increase the Deceleration Jerk Rate, or lower the Deceleration Rate.

8.11 Demand Lost (0x108, 0x118, 0x208, 0x218)

The Demand Lost error code indicates that the demand to move further in the current direction of travel has been lost.

Possible Solution #1

The demand to run is sent to the SDI from the elevator microprocessor via the communications cable. This error is a normal occurrence during every automatic run. The only time this is a real problem is if the elevator is stopping at floors when there is no demand to stop at that floor.

8.12 Motion Signals Lost (0x119, 0x219, 0x619)

These Motion Signals Lost error codes indicate that the UP or DOWN inputs to the SDI became inactive while the elevator was in motion.

Possible Solution #1

Loss of any signal that would drop the UP or DOWN relays. The most common problem would be a clipped interlock, or a bouncy interlock.

Possible Solution #2

Contact or coil failure on UX or DX relays. Refer to the job prints for the exact contacts used to indicate Up and Down to the SDI. Replace the relay which is causing the problem.

Possible Solution #3

Contact or coil failure on RL1 or RL2 located on the SDI MPC board for Version 3 board and labeled UP or DN on SDI Version 4 board. Replace the relay which is causing the problem with an Aromat DS2E-M-DC12V relay or OMRON G5V-2-12VDC.

Possible Solution #4

An SDI board failure. Check Solution #3 first before proceeding. Use a digital voltmeter to measure the voltage on the UP and DN terminals on the SDI board. Use 3.4 Control Signals to view the status of UP and DN. If there is +15 volts DC on the UP terminal and UP=1 is on the display, the SDI board is bad. If there is 0 volts DC on the UP terminal and UP=0 is displayed, the SDI board is bad. If there is +15 volts DC on the DN terminal and DN=1 is displayed, the SDI board is bad. If there is 0 volts DC on the DN terminal and DN=0 is on the displayed, the SDI board is bad, Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

Possible Solution #5

The +15 volt DC power supply failed. Refer to Section 8.5 and check to see if there is a power supply failure. Follow resolution instructions found in Section 8.5.

8.13 Motion Signals Lost (0x129, 0x229, 0x629)

These Motion Signals Lost error codes indicate that the ENABLE input to the SDI became inactive while the elevator was in motion.

Possible Solution #1

Loss of any signal that would drop the UP or DOWN relays. The most common problem would be a clipped interlock, or a bouncy interlock.

Possible Solution #2

A contact or coil failure on U, D, or RNX relays. Refer to the job prints for the exact contacts used to indicate ENABLE to the SDI. Replace the relay which is causing the problem.

Possible Solution #3

An SDI board Failure. Use a digital voltmeter to measure the voltage on the ENA terminal on the SDI board. Use 3.6 Edge I/O to view the status of PEN. If there is +5 volts DC on the ENA terminal and PEN=1 is displayed, the SDI board is bad. If there is

0 volts DC on the ENA terminal and PEN=0 is displayed, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.14 Motion Signals Lost (0x139, 0x239, 0x639)

These Motion Signals Lost error codes indicate that the SAF communicated input to the SDI became inactive while the elevator was in motion.

Possible Solution #1

Loss of any signal that would drop the SAF relay or DLK input to the elevator microprocessor. The most common problem would be a clipped, or a bouncy interlock. The status of this communicated input can be viewed with 3.7 Elevator MPC Flags.

8.15 Communication Error (0x10A)

This Communication Error code indicates that the SDI MPC has stopped communicating with the Elevator microprocessor.

Possible Solution #1

The SDI option has not been set in the elevator microprocessor. Make sure address FC92 is equal to 01. Refer to the V900/H900 Field Reprogramming Manual for Prodigy and Standard Controllers instructions for viewing and setting this option.

Possible Solution #2

The communication cable is not connected between SDI connector P1, version 3 board, or JCOM version 4 board, and the elevator microprocessor SDI port. Connect the cable between these two points.

Possible Solution #3

The communication cable is bad. Replace the communication cable.

Possible Solution #4

The elevator microprocessor board or the SDI board is bad. After all other possible solutions have been tried without success. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.16 Go To Inspection (0x10B)

The Go To Inspection error code indicates that the inspection input came on during an automatic run.

Possible Solution #1

Do not place the elevator on inspection while the car is in motion.

Possible Solution #2

A bad input on the SDI board. Check the voltage on the INS terminal with a digital voltmeter. Use 3.4 Control Signals to view the status of the INS input. If there is 110 volts DC on this terminal, the elevator is on inspection. If there is 0 volts DC on the

terminal and INS=1 is displayed, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.17 Earthquake Speed (0x10C)

The Earthquake Speed error code indicates that the earthquake input became active during an automatic run.

Possible Solution #1

The seismic switch was activated. Either there was an earthquake or the seismic indicator switch is bad. Refer to the manufacturer of the switch for troubleshooting.

Possible Solution #2

There is a bad input on the SDI board. Check the voltage on the EQS terminal with a digital voltmeter. Use 3.4 Control Signals to view the status of the EQ input. If there is 0 volts DC on the terminal, the elevator is on earthquake mode. If there is 110 volts DC on the terminal and EQ=1 is displayed, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.18 Signals Error (0x1D, 0x2D, 0x3D)

The Signals Error codes indicate that H, SU, or SD stayed active for 5 seconds while the elevator was in stopped mode.

Possible Solution #1

The elevator microprocessor and the SDI got out of step with each other. These two microprocessors are synchronized with communications and I/O. If the UP or DN inputs to the SDI do not activate when the elevator microprocessor generates a run command, this error will occur. Communication faults can also cause this error. Check the I/O for proper function.

8.19 Signals Error (0x4D,0x5D)

The Signals Error codes indicate that UP or DN stayed active for 5 seconds while the elevator was in stopped mode.

Possible Solution #1

A contact failure on UX or DX relays. Refer to the job prints for the exact contacts used to indicate up and down to the SDI. Replace the relay which is causing the problem.

Possible Solution #2

Contact or coil failure on RL1 or RL2 located on the SDI MPC board for Version 3 board and labeled UP or DN on SDI version 4 board. Replace the relay which is causing the problem with an Aromat DS2E-M-DC12V relay or OMRON G5V-2-12VDC.

Possible Solution #3

An SDI board Failure. Check Solution #2 first before proceeding. Use a digital voltmeter to measure the voltage on the UP and DN terminals on the SDI board. Use 3.4 Control Signals to view the status of UP and DN. If there is +15 volts DC on the UP

terminal and UP=1 is displayed, the SDI board is bad. If there is 0 volts DC on the UP terminal and UP=0 is displayed, the SDI board is bad. If there is +15 volts DC on the DN terminal and DN=1 is displayed, the SDI board is bad. If there is 0 volts DC on the DN terminal and DN=0 is ~~on the~~ displayed, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.20 No LCD Display

Possible Solution #1

The contrast is turned down to low. Contrast resistor potentiometer R72 Version 3 board or PLCO Version 4 board is located near the top left corner of the LCD. Turn the contrast control clockwise to make the display brighter.

Possible Solution #2

The +5 volt DC power supply is not adjusted correctly or failed. Measure the voltage from 5IN to GND, with a digital voltmeter. The voltage should be 5.0 volts DC. If the voltage is lower than 5.0 volts, turn the volt adjustment potentiometer until there is 5.0 volts between 5IN and GND. If the voltage can not be adjusted to 5.0 volts DC, remove the connector from the board and try again. It cannot be adjusted with the connector disconnected, the power supply is bad. Contact Elevator Controls Factory Technical Support and request a replacement power supply.

Possible Solution #3

The SDI boards are not connected together (Version 3 boards only). Make sure the connectors between the SDI board and the I/O board are plugged in correctly and locked in place.

Possible Solution #4

The SDI board is bad. If all other solution have been tried and nothing corrects the problem, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.21 No Safety String

These solutions apply when the SDI output SSAF relay is not energized. Refer to the V900-PVF Manual and job prints for all other causes for safety string not energized.

Possible Solution #1

The SDI detects a fault that would make it unsafe to run the elevator. Use 4.1 View Current Fault to view the current SDI fault status. If the SDI shows a fault, look up the error in this Section for a possible solution.

Possible Solution #2

The SSAF relay coil or contacts failed. Contact Elevator Controls Factory Technical Support and request a replacement SSAF relay.

Possible Solution #3

The SDI board failed. The SSAF relay is controlled by the SDI. The SDI drops the relay if there is a fault that would make it unsafe to run the elevator. Check the status of the SSAF out put using 3.6 Edge I/O. If ST=1 the relay should be picked. Check the voltage between the STI and GND terminals using a digital voltmeter. If ST=1 is displayed and there is +15 volts DC on the STI terminal, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

8.22 The Car Won't Run on Inspection

It is assumed that the drive is on and ready to run, the safety string is made up, and the door interlocks and car gate are made up.

Possible Solution #1

The SDI detects a fault that would make it unsafe to run the elevator. Use 4.1 View Current Fault to view the current SDI fault status. If the SDI shows a fault, look up the error in this Section for a possible solution.

Possible Solution #2

The inspection input is not energized. Look to see if the INS LED is on. If the LED is off, check the wiring to make sure it is connected properly. Use a digital voltmeter to measure the voltage on the INS terminal. Use 3.4 Control Signals to view the status of the INS input. If there is a 110 volts DC on the INS terminal and INS=0 is displayed, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

Possible Solution #3

The SAF, UP, DOWN, or ENABLE inputs are not energized. Review Sections 8.12, 8.13, and 8.14 for possible solutions.

8.23 The Car Won't Run on Automatic

Make sure the car will run on inspection before checking these possible solutions. It is assumed that the drive is on and ready to run, the safety string is made up, and the door interlocks and car gate are made up.

Possible Solution #1

The SDI detects a fault that would make it unsafe to run the elevator. Use 4.1 View Current Fault to view current SDI fault status. If the SDI shows a fault, look up the error in this Section for a possible solution.

Possible Solution #2

The inspection input is energized. Look to see if the INS LED is on. If the LED is on, check to make sure the elevator is not on inspection or access. If it is not on inspection, check the wiring to make sure it is connected properly. Use a digital voltmeter to measure the voltage on the INS terminal. Use 3.4 Control Signals to view the status of the INS input. If there is a 0 volts DC on the INS terminal and INS=1 is displayed, the SDI board is bad. Contact Elevator Controls Factory Technical Support and request a replacement SDI board.

Possible Solution #3

The elevator MPC detects a problem that will not let the car run on automatic. Refer to the V900 manual for possible solution.

8.24 Intermittent/Repeated Shutdowns

Use 4.2 View Sequence Log, 4.3 View Fault History, and 4.5 Last Fault Sequence to identify the fault that is causing the problem. After the fault has been located, refer to Section 8 to determine possible solutions.

The Fault History and Last Fault Sequence can be cleared by pressing the select button on 4.4 Clear Fault History An intermittent fault can be more easily identified by clearing the fault history. After clearing the fault history, wait until the fault recurs, then check the Last Fault Sequence and fault history. All faults that have occurred since the last time the fault history has been cleared will be displayed.

The Last Fault Sequence retains the sequence pertaining to last time a fault was detected to help you determine how the fault may have occurred. The Fault History and Last Fault Sequence Histogram is retained when power is cycled. The same is true for the information in the Largest Count Error (LCE) display found in the Floor count Error Occurrences submenu.

Before clearing faults with 4.4 Clear Fault History, take notes of current faults in 4.3 View Fault History, including LCE = xx, and 4.5 Last Fault Sequence. If auto resets are programmed (See Section 9), the SDI safety will return to normal if recovered from fault. If SDI's safety is permanently dropped, an indication will be displayed showing that the number of auto resets has been exceeded (or none are programmed). Terminal Count Error 0x15 requires that the car be run on inspection to a terminal floor to reset this major fault.

When troubleshooting Floor Count and Terminal Count errors, you may find it useful to view the “Target and Position” count displays in the VIEW I/O menus (see Section 5.9, and entire Section 6 “View Logs’). For Terminal Count errors, compare Terminal Position Table values and Terminal Activation displays in the Hoistway submenus.

Section 9 – Special Debugging

9.1 Viewing the Special Debugging Submenu

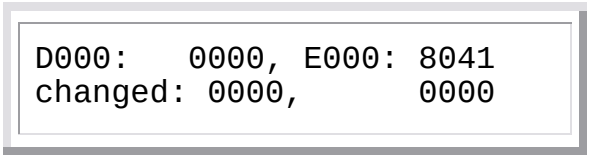
The special debugging submenu is intended to help Elevator Controls test boards. This submenu isn't intended to be used in the field and is not normally accessible. If for some reason access to the Special Debugging submenu is required, this Section describes its operation.

Special Debugging submenu must be activated with the elevator removed from normal operation. Immediately after reset or power on, (press the SDI RESET button if you've done anything since power on), press the SAVE button seven times consecutively. You will then be able to select the Special Debugging menu on the main menu like any other menu. Press SELECT on the Special Debugging menu to view the submenus below.

Table 9.1 Special Debugging	
5.1	Aggregate I/O
5.2	Pattern Sawtooth
5.3	Serial Communication Test
5.4	Reset Memory
5.5	Automatic Reset
5.6	Slowdowns for 350fpm
5.7	Return to Main Menu

9.2 Aggregate I/O

The Aggregate I/O submenu displays all of the SDI inputs simultaneously. This allows you to quickly check for shorts and inputs that aren't working. In additional, the second line will detect any changes in the input line. This allows you to test for intermittent inputs. The D000 and E000 hex numbers on the first line refer to the address of the input port. Check the schematic. Also, since all of the buttons are also inputs, you must press the RESET button to exit this menu.



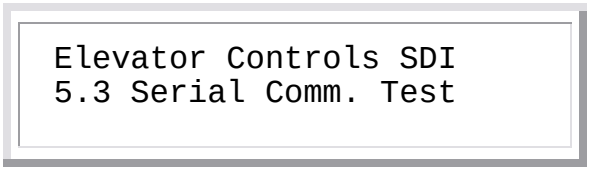
9.3 Pattern Sawtooth

The Pattern Sawtooth submenu generates a pattern on the PUP, PDN and VPAT which can be tested with a meter or oscilloscope. This test pattern doesn't require any other input to run, so be careful if this is done in the field.

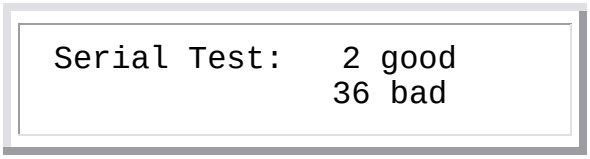
While this display is active, the LCD shows the voltage on the pattern output. Note that the display will go to 11.2 but the output is only capable of 10.0V. This produces a truncated sawtooth waveform on an oscilloscope. This feature is intended to allow extra time for (often slow) digital voltmeters to display the full voltage attained by the output.

Press SELECT to return to the Special Debugging submenu.

9.4 Serial Communication Test



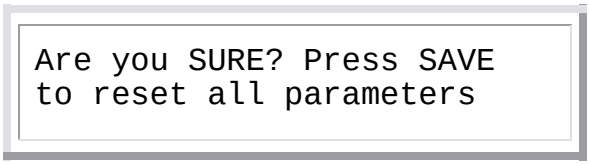
The Serial Communication Test allow you to verify operation of the serial transmit and receive port without having a functioning elevator computer available. Use an RJ-11 connector with the input (receiver) connected to the output (transmitter) to perform this test.



If the display indicates any good packets, the serial communication link is working. If you see zero good tests, contact Elevator Controls Factory Technical Support and request a replacement SDI board.

9.5 Reset Memory

Occasionally you will want to return all parameters to their default values. This can be done with the Reset Memory submenu. This submenu runs a short machine code routine to erase (set to zero) all memory on the SDI system. Then the routine forces a software reset, resetting the MPU and all devices connected to it. The normal start-up procedure on the MPU will detect that the RAM has no previous information and initialize all variables as if this were the first time the system had started. All program variables must be re-entered and Hoistway "learning" procedures, rerun after a Reset Memory operation.



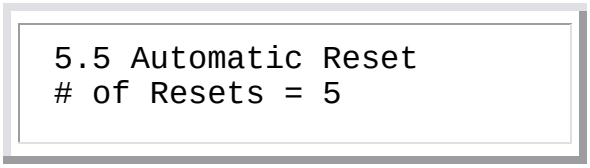
After selecting this submenu, you must press the SAVE button to actually reset memory. Pressing any other button will return you to the submenu selection. Since this routine sets all memory locations to zero, you will also lose the floor position (hoistway learn mode) table, the terminal velocity table, the current car position and the fault logs.

Table 9.2 Program Variable Defaults			
Contract Speed	1400 FPM	No. of Floors	64
Initial Jerk	200 FPM/S/S	Roll-over Jerk	200 FPM/S/S
Deceleration Jerk	200 FPM/S/S	Deceleration	100 FPM/S/S
Acceleration	100 FPM/S/S	Pattern Delay	0 x 0.01 S
Leveling Distance	32 Pulses	Leveling Speed	6 FPM
Re-leveling Speed	12 FPM	Inspection Speed	50 FPM
Tach Polarity	Positive Down	Tach Gain	100 %
Tach Zero	473		

9.6 Automatic Reset

You can program up to 99 fault auto resets on the SDI system to resume normal operation. After the SDI has detected a fault that caused it to perform an emergency slowdown and/or to drop the safety relay output, it will then wait for the Tach signal to drop to zero (car stopped), and then it will reset faults as many times as auto resets are programmed.

To program auto resets, press SELECT when the Automatic Reset submenu, shown above, is displayed:



Use the Up or Down button to increase or decrease the number of Auto Resets desired.

Press SELECT to return to the Special Debugging submenu.

9.7 Slowdowns for 350fpm

The SDI requires three (3) slowdown switches at each terminal for adequate resolution of the speed limiting safety clamps. For modernizations, some installations have only two (2) slowdown switches at each terminal. You may use Submenu 5.6 Slowdowns for 350fpm to program the SDI to temporarily accept only two (2) switches.

WARNING: Return this parameter to three (3) switches before releasing elevator for public use after the required third switch is installed.

```
Elevator Controls SDI
5.6 Slowdowns for 350fpm
```

To change this parameter, press SELECT when the above is displayed, then use the UP or Down button to change, and SELECT again or SAVE to exit:

```
5.6 Slowdowns for 350fpm
# used for 350fpm = 3
```

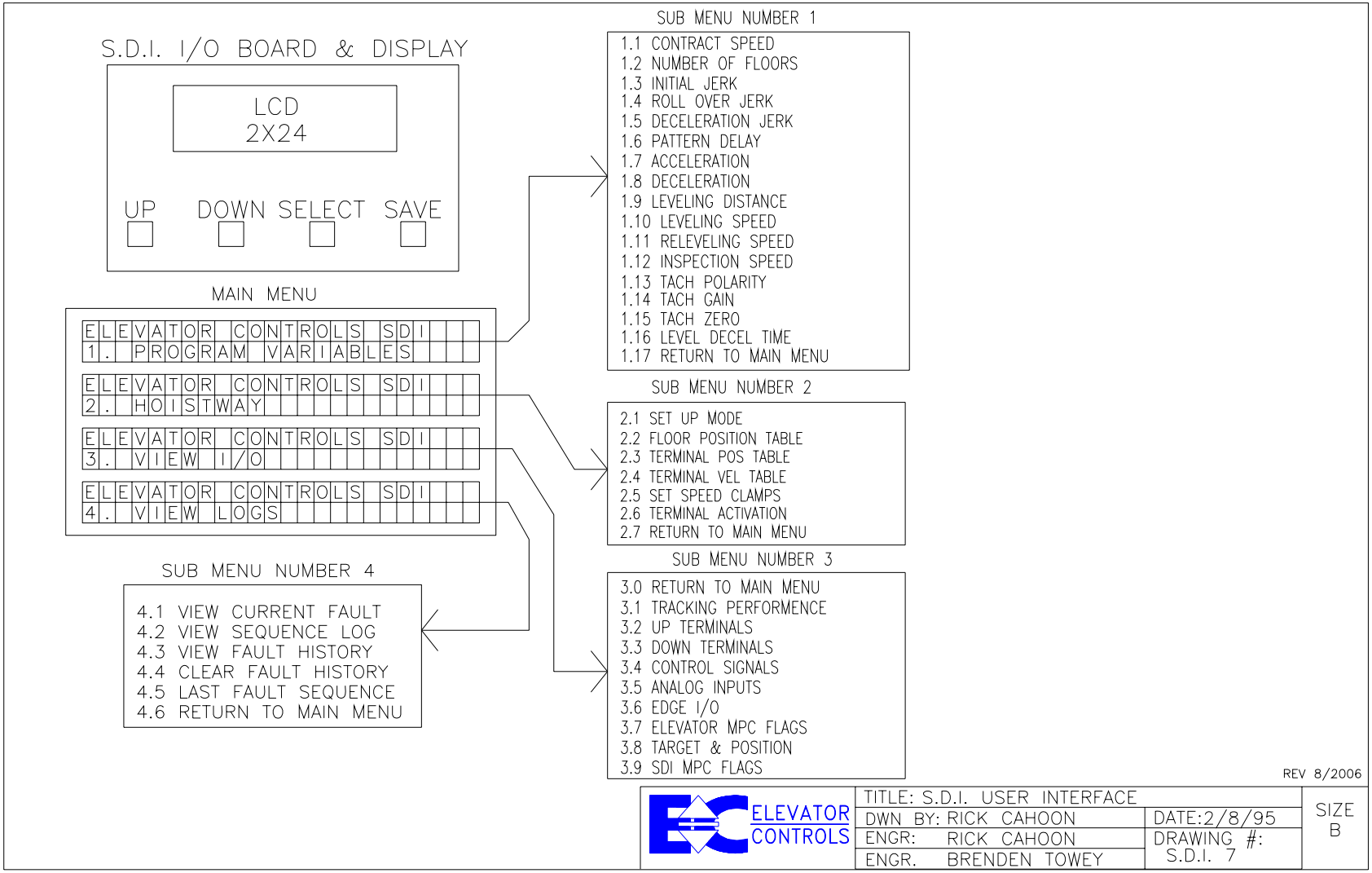
9.8 Return to Main Menu

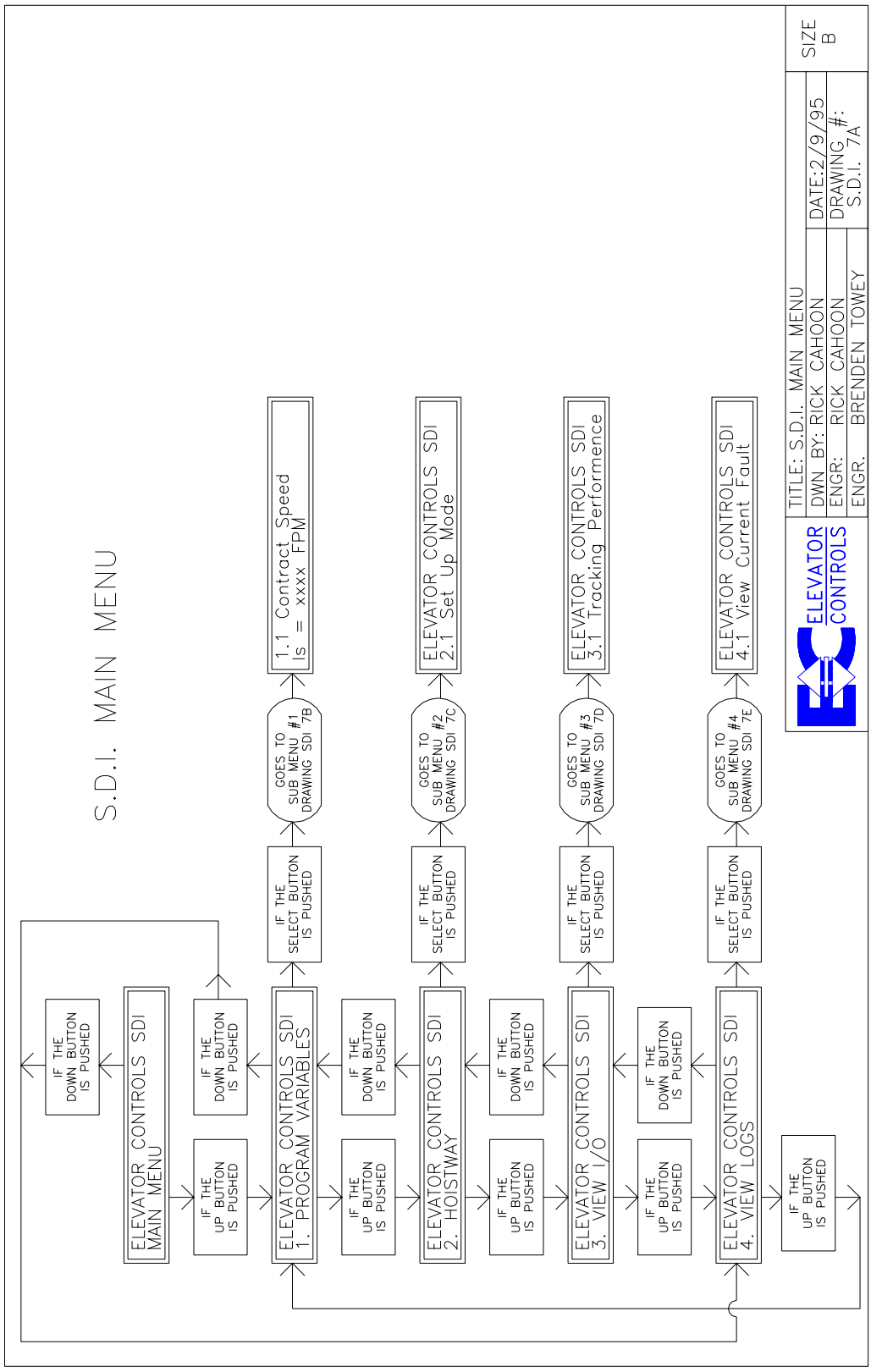
```
Elevator Controls SDI
5.7 Return to Main Menu
```

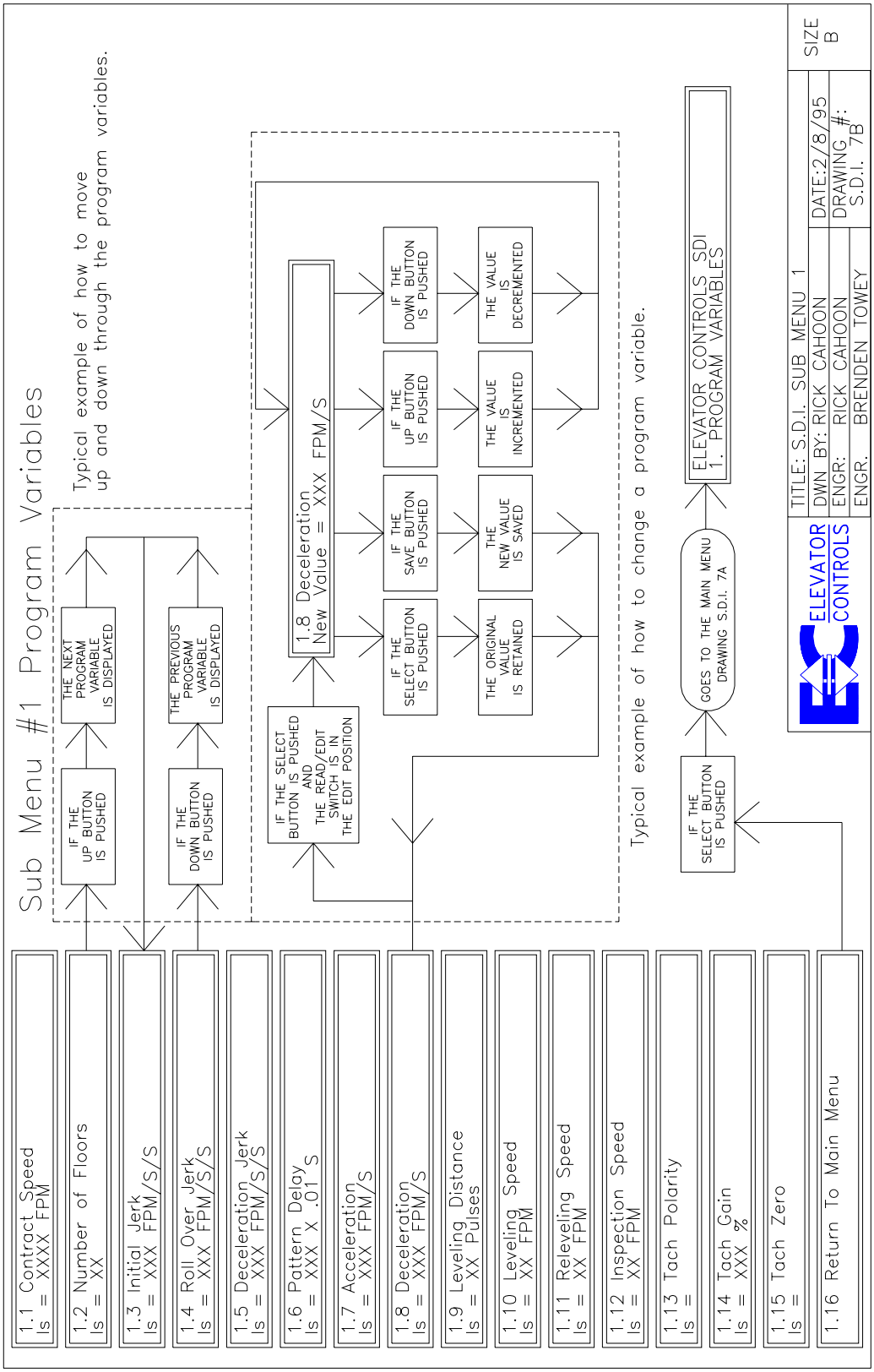
Press SELECT to return to the SDI main menu.

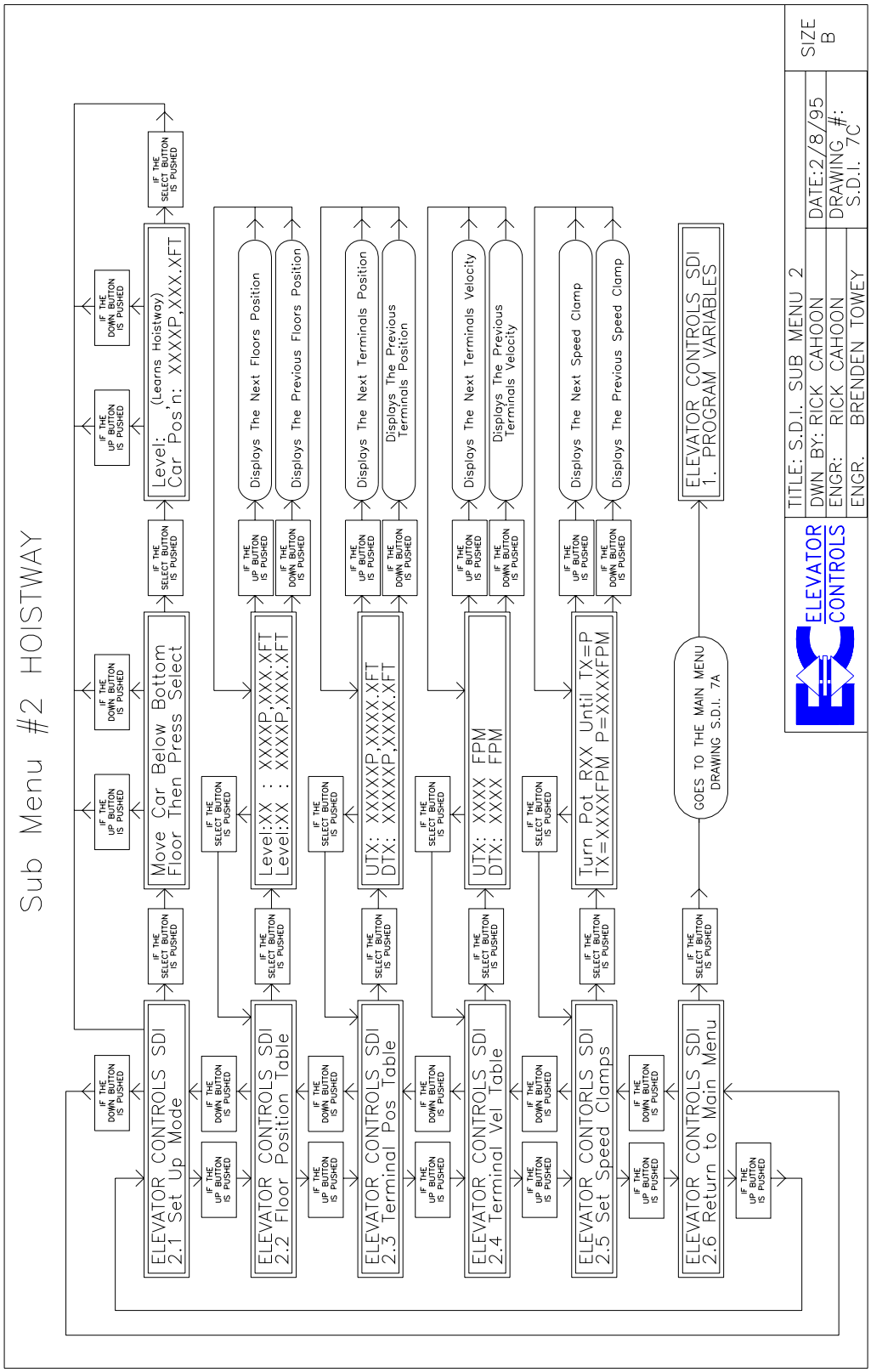
Appendix A – Drawings

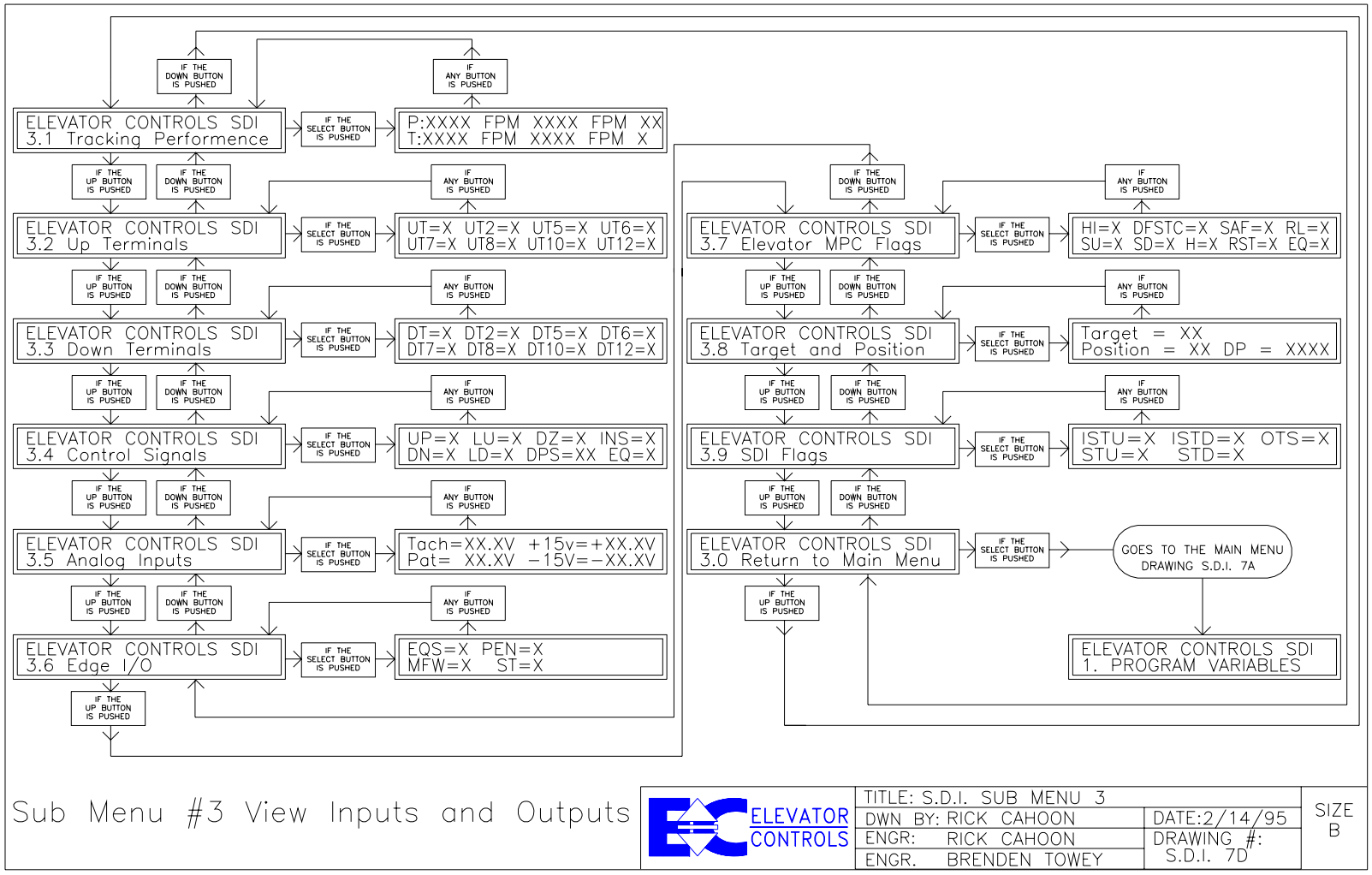
SDI 7	SDI User Interface
SDI 7 A	SDI Main Menu
SDI 7 B	SDI Submenu 1
SDI 7 C	SDI Submenu 2
SDI 7 D	SDI Submenu 3
SDI 7 E	SDI Submenu 4
Page 1	Elevator Controls SDI Displays
Page 2	Elevator Controls SDI Displays
Page 3	Typical Sequence Logs and Fault Displays
SDI I/O	SDI I/O Board General Layout
SDI V4	SDI Microprocessor Version 4 Board General Layout


S.D.I. I/O BOARD & DISPLAY
LCD
2X24
UP
DOWN
SELECT
SAVE
MAIN MENU
ELEVATOR CONTROLS SDI
1. PROGRAM VARIABLES
ELEVATOR CONTROLS SDI
2. HOISTWAY
ELEVATOR CONTROLS SDI
3. VIEW I/O
ELEVATOR CONTROLS SDI
4. VIEW LOGS
SUB MENU NUMBER 1
1.1 CONTRACT SPEED
1.2 NUMBER OF FLOORS
1.3 INITIAL JERK
1.4 ROLL OVER JERK
1.5 DECELERATION JERK
1.6 PATTERN DELAY
1.7 ACCELERATION
1.8 DECELERATION
1.9 LEVELING DISTANCE
1.10 LEVELING SPEED
1.11 RELEVELING SPEED
1.12 INSPECTION SPEED
1.13 TACH POLARITY
1.14 TACH GAIN
1.15 TACH ZERO
1.16 LEVEL DECEL TIME
1.17 RETURN TO MAIN MENU
SUB MENU NUMBER 2
2.1 SET UP MODE
2.2 FLOOR POSITION TABLE
2.3 TERMINAL POS TABLE
2.4 TERMINAL VEL TABLE
2.5 SET SPEED CLAMPS
2.6 TERMINAL ACTIVATION
2.7 RETURN TO MAIN MENU
SUB MENU NUMBER 3
3.0 RETURN TO MAIN MENU
3.1 TRACKING PERFORMENCE
3.2 UP TERMINALS
3.3 DOWN TERMINALS
3.4 CONTROL SIGNALS
3.5 ANALOG INPUTS
3.6 EDGE I/O
3.7 ELEVATOR MPC FLAGS
3.8 TARGET & POSITION
3.9 SDI MPC FLAGS
SUB MENU NUMBER 4
4.1 VIEW CURRENT FAULT
4.2 VIEW SEQUENCE LOG
4.3 VIEW FAULT HISTORY
4.4 CLEAR FAULT HISTORY
4.5 LAST FAULT SEQUENCE
4.6 RETURN TO MAIN MENU
REV 8/2006
ELEVATOR CONTROLS
TITLE: S.D.I. USER INTERFACE
DWN BY: RICK CAHOON
DATE:2/8/95
ENGR: RICK CAHOON
ENGR. BRENDEN TOWEY
DRAWING #: S.D.I. 7
SIZE B


S.D.I. MAIN MENU
ELEVATOR CONTROLS SDI
MAIN MENU
IF THE
UP BUTTON
IS PUSHED
IF THE
DOWN BUTTON
IS PUSHED
ELEVATOR CONTROLS SDI
1. PROGRAM VARIABLES
IF THE
SELECT BUTTON
IS PUSHED
GOES TO
SUB MENU #1
DRAWING SDI 7B
1.1 Contract Speed
Is = xxxx FPM
ELEVATOR CONTROLS SDI
2. HOISTWAY
IF THE
SELECT BUTTON
IS PUSHED
GOES TO
SUB MENU #2
DRAWING SDI 7C
ELEVATOR CONTROLS SDI
2.1 Set Up Mode
ELEVATOR CONTROLS SDI
3. VIEW I/O
IF THE
SELECT BUTTON
IS PUSHED
GOES TO
SUB MENU #3
DRAWING SDI 7D
ELEVATOR CONTROLS SDI
3.1 Tracking Performence
ELEVATOR CONTROLS SDI
4. VIEW LOGS
IF THE
SELECT BUTTON
IS PUSHED
GOES TO
SUB MENU #4
DRAWING SDI 7E
ELEVATOR CONTROLS SDI
4.1 View Current Fault
ELEVATOR
CONTROLS
TITLE: S.D.I. MAIN MENU
DWN BY: RICK CAHOON
DATE:2/9/95
ENGR: RICK CAHOON
DRAWING #:
S.D.I. 7A
ENGR. BRENDEN TOWEY
SIZE
B


Sub Menu #1 Program Variables
Typical example of how to move up and down through the program variables.
1.1 Contract Speed Is = XXXX FPM
1.2 Number of Floors Is = XX
1.3 Initial Jerk Is = XXX FPM/S/S
1.4 Roll Over Jerk Is = XXX FPM/S/S
1.5 Deceleration Jerk Is = XXX FPM/S/S
1.6 Pattern Delay Is = XXX X .01 S
1.7 Acceleration Is = XXX FPM/S
1.8 Deceleration Is = XXX FPM/S
1.9 Leveling Distance Is = XX Pulses
1.10 Leveling Speed Is = XX FPM
1.11 Releveling Speed Is = XX FPM
1.12 Inspection Speed Is = XX FPM
1.13 Tach Polarity Is =
1.14 Tach Gain Is = XXX %
1.15 Tach Zero Is =
1.16 Return To Main Menu
IF THE UP BUTTON IS PUSHED
THE NEXT PROGRAM VARIABLE IS DISPLAYED
IF THE DOWN BUTTON IS PUSHED
THE PREVIOUS PROGRAM VARIABLE IS DISPLAYED
IF THE SELECT BUTTON IS PUSHED AND THE READ/EDIT SWITCH IS IN THE EDIT POSITION
1.8 Deceleration New Value = XXX FPM/S
IF THE SELECT BUTTON IS PUSHED
THE ORIGINAL VALUE IS RETAINED
IF THE SAVE BUTTON IS PUSHED
THE NEW VALUE IS SAVED
IF THE UP BUTTON IS PUSHED
THE VALUE IS INCREMENTED
IF THE DOWN BUTTON IS PUSHED
THE VALUE IS DECREMENTED
Typical example of how to change a program variable.
IF THE SELECT BUTTON IS PUSHED
GOES TO THE MAIN MENU DRAWING S.D.I. 7A
ELEVATOR CONTROLS SDI
1. PROGRAM VARIABLES
ELEVATOR CONTROLS
TITLE: S.D.I. SUB MENU 1
DWN BY: RICK CAHOON
ENGR: RICK CAHOON
ENGR. BRENDEN TOWEY
DATE:2/8/95
DRAWING #: S.D.I. 7B
SIZE B

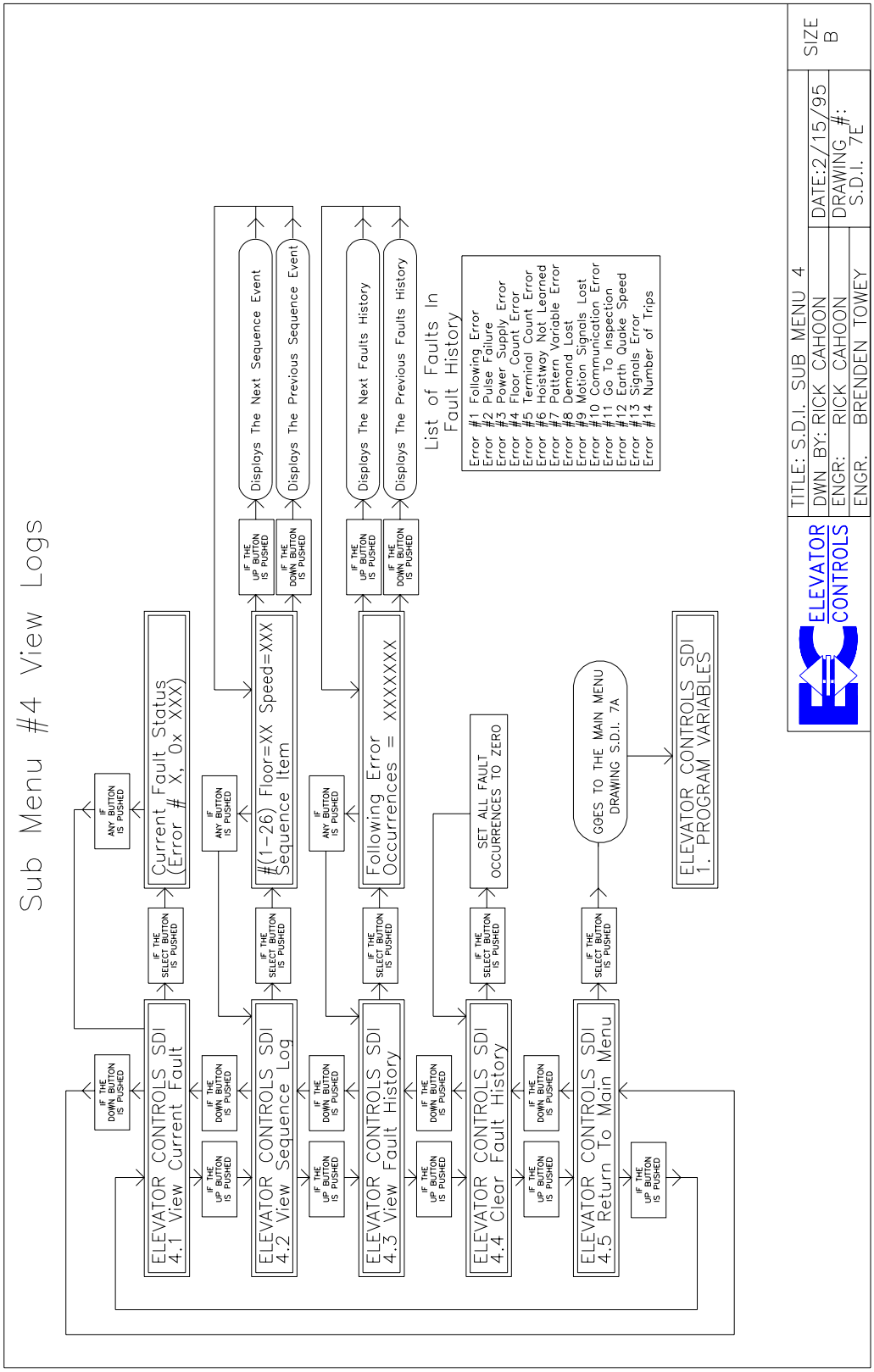

Sub Menu #2 HOISTWAY
ELEVATOR CONTROLS SDI
2.1 Set Up Mode
ELEVATOR CONTROLS SDI
2.2 Floor Position Table
ELEVATOR CONTROLS SDI
2.3 Terminal Pos Table
ELEVATOR CONTROLS SDI
2.4 Terminal Vel Table
ELEVATOR CONTROLS SDI
2.5 Set Speed Clamps
ELEVATOR CONTROLS SDI
2.6 Return to Main Menu
IF THE UP BUTTON IS PUSHED
IF THE DOWN BUTTON IS PUSHED
IF THE SELECT BUTTON IS PUSHED
Move Car Below Bottom Floor Then Press Select
Level: (Learns Hoistway)
Car Pos'n: XXXXP,XXX.XFT
Level:XX : XXXXP,XXX.XFT
Level:XX : XXXXP,XXX.XFT
UTX: XXXXXP,XXXX.XFT
DTX: XXXXXP,XXXX.XFT
UTX: XXXX FPM
DTX: XXXX FPM
Turn Pot RXX Until TX=P
TX=XXXXFPM P=XXXXFPM
Displays The Next Floors Position
Displays The Previous Floors Position
Displays The Next Terminals Position
Displays The Previous Terminals Position
Displays The Next Terminals Velocity
Displays The Previous Terminals Velocity
Displays The Next Speed Clamp
Displays The Previous Speed Clamp
GOES TO THE MAIN MENU
DRAWING S.D.I. 7A
ELEVATOR CONTROLS SDI
1. PROGRAM VARIABLES
ELEVATOR CONTROLS
TITLE: S.D.I. SUB MENU 2
DWN BY: RICK CAHOON
ENGR: RICK CAHOON
ENGR. BRENDEN TOWEY
DATE:2/8/95
DRAWING #: S.D.I. 7C
SIZE B

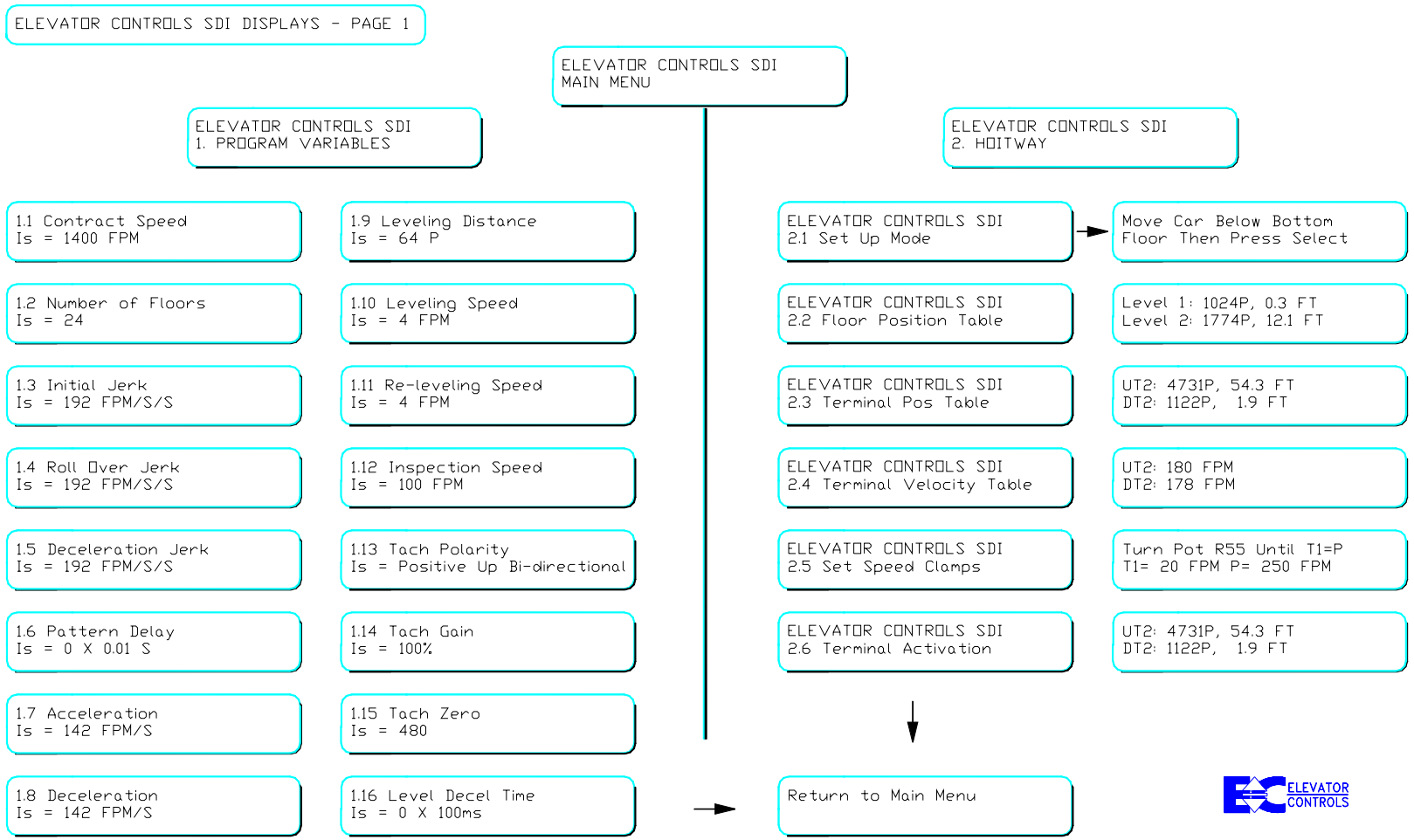


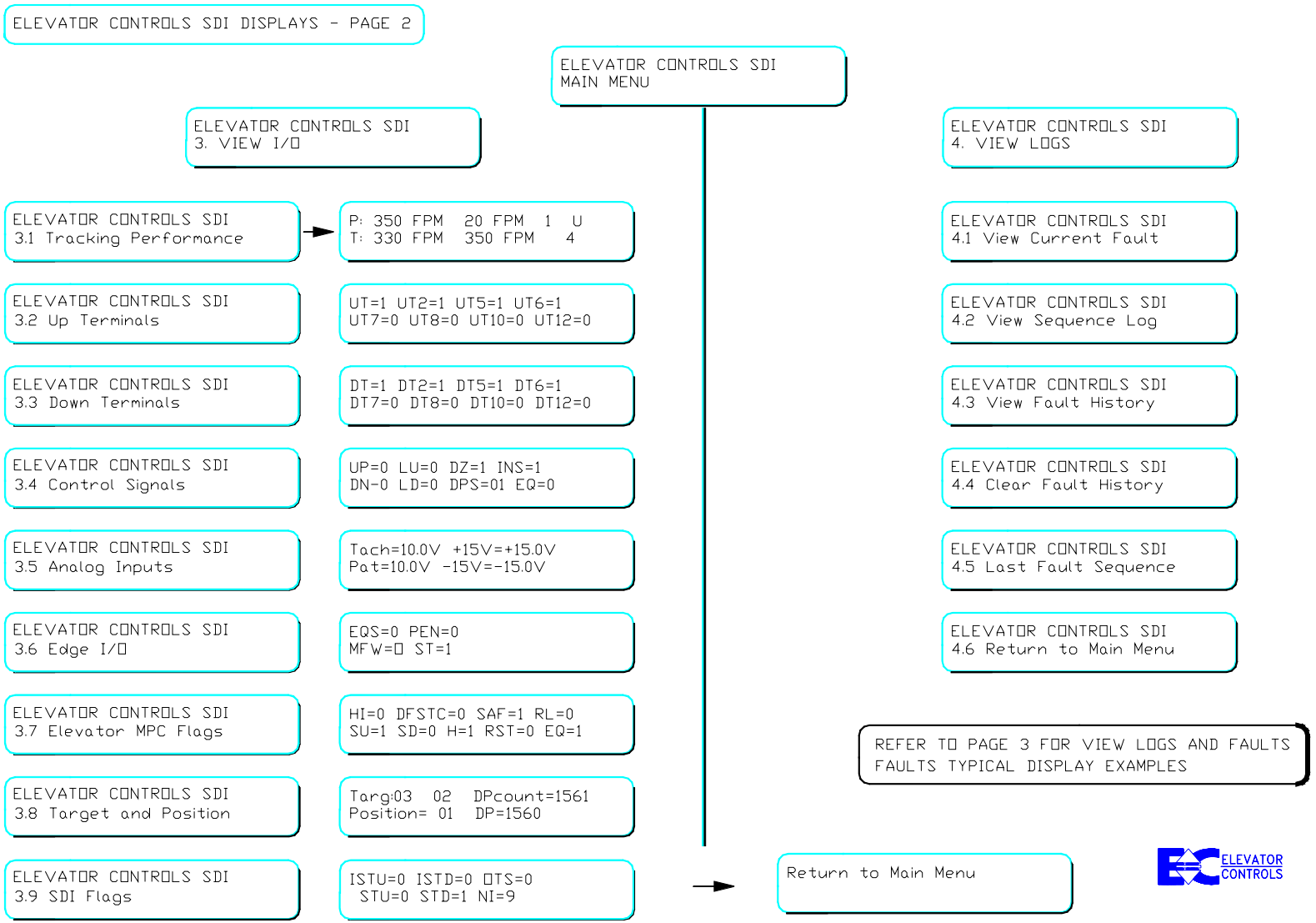
Sub Menu #3 View Inputs and Outputs

ELEVATOR CONTROLS

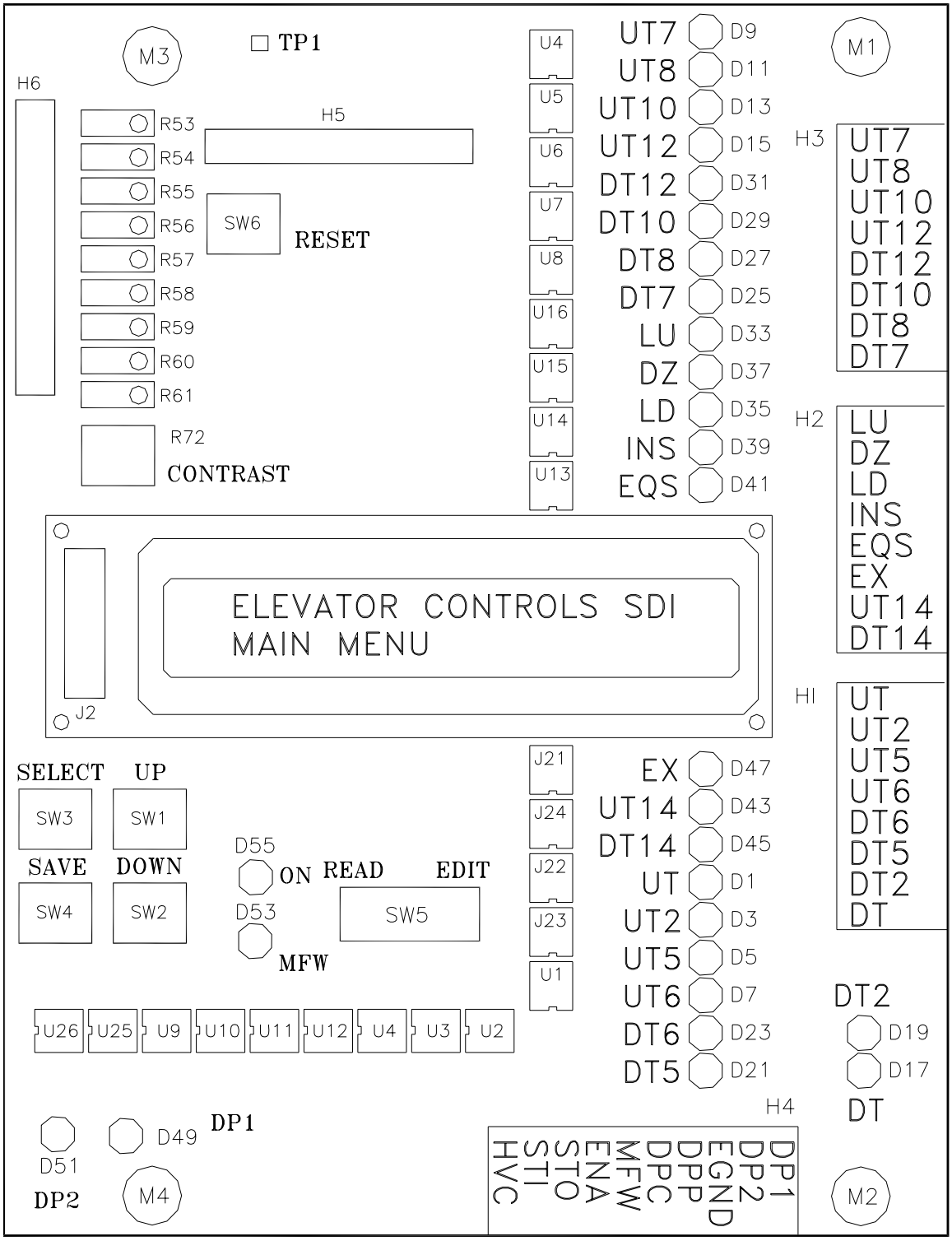
TITLE: S.D.I. SUB MENU 3		SIZE B
DWN BY: RICK CAHOON	DATE:2/14/95	
ENGR: RICK CAHOON	DRAWING #: S.D.I. 7D	
ENGR. BRENDEN TOWEY		


Sub Menu #4 View Logs
ELEVATOR CONTROLS SDI
4.1 View Current Fault
ELEVATOR CONTROLS SDI
4.2 View Sequence Log
ELEVATOR CONTROLS SDI
4.3 View Fault History
ELEVATOR CONTROLS SDI
4.4 Clear Fault History
ELEVATOR CONTROLS SDI
4.5 Return To Main Menu
IF THE DOWN BUTTON IS PUSHED
IF THE UP BUTTON IS PUSHED
IF THE SELECT BUTTON IS PUSHED
IF ANY BUTTON IS PUSHED
Current Fault Status
(Error # X, 0x XXX)
#(1-26) Floor=XX Speed=XXX
Sequence Item
Following Error
Occurrences = XXXXXXX
SET ALL FAULT
OCCURRENCES TO ZERO
GOES TO THE MAIN MENU
DRAWING S.D.I. 7A
ELEVATOR CONTROLS SDI
1. PROGRAM VARIABLES
Displays The Next Sequence Event
Displays The Previous Sequence Event
Displays The Next Faults History
Displays The Previous Faults History
List of Faults In
Fault History
Error #1 Following Error
Error #2 Pulse Failure
Error #3 Power Supply Error
Error #4 Floor Count Error
Error #5 Terminal Count Error
Error #6 Hoistway Not Learned
Error #7 Pattern Variable Error
Error #8 Demand Lost
Error #9 Motion Signals Lost
Error #10 Communication Error
Error #11 Go To Inspection
Error #12 Earth Quake Speed
Error #13 Signals Error
Error #14 Number of Trips
ELEVATOR CONTROLS
TITLE: S.D.I. SUB MENU 4
DWN BY: RICK CAHOON
DATE:2/15/95
ENGR: RICK CAHOON
DRAWING #:
ENGR. BRENDEN TOWEY
S.D.I. 7E
SIZE B


ELEVATOR CONTROLS SDI DISPLAYS - PAGE 1
ELEVATOR CONTROLS SDI
MAIN MENU
ELEVATOR CONTROLS SDI
1. PROGRAM VARIABLES
ELEVATOR CONTROLS SDI
2. HOITWAY
1.1 Contract Speed
Is = 1400 FPM
1.2 Number of Floors
Is = 24
1.3 Initial Jerk
Is = 192 FPM/S/S
1.4 Roll Over Jerk
Is = 192 FPM/S/S
1.5 Deceleration Jerk
Is = 192 FPM/S/S
1.6 Pattern Delay
Is = 0 X 0.01 S
1.7 Acceleration
Is = 142 FPM/S
1.8 Deceleration
Is = 142 FPM/S
1.9 Leveling Distance
Is = 64 P
1.10 Leveling Speed
Is = 4 FPM
1.11 Re-leveling Speed
Is = 4 FPM
1.12 Inspection Speed
Is = 100 FPM
1.13 Tach Polarity
Is = Positive Up Bi-directional
1.14 Tach Gain
Is = 100%
1.15 Tach Zero
Is = 480
1.16 Level Decel Time
Is = 0 X 100ms
ELEVATOR CONTROLS SDI
2.1 Set Up Mode
Move Car Below Bottom
Floor Then Press Select
ELEVATOR CONTROLS SDI
2.2 Floor Position Table
Level 1: 1024P, 0.3 FT
Level 2: 1774P, 12.1 FT
ELEVATOR CONTROLS SDI
2.3 Terminal Pos Table
UT2: 4731P, 54.3 FT
DT2: 1122P, 1.9 FT
ELEVATOR CONTROLS SDI
2.4 Terminal Velocity Table
UT2: 180 FPM
DT2: 178 FPM
ELEVATOR CONTROLS SDI
2.5 Set Speed Clamps
Turn Pot R55 Until T1=P
T1= 20 FPM P= 250 FPM
ELEVATOR CONTROLS SDI
2.6 Terminal Activation
UT2: 4731P, 54.3 FT
DT2: 1122P, 1.9 FT
Return to Main Menu
ELEVATOR CONTROLS

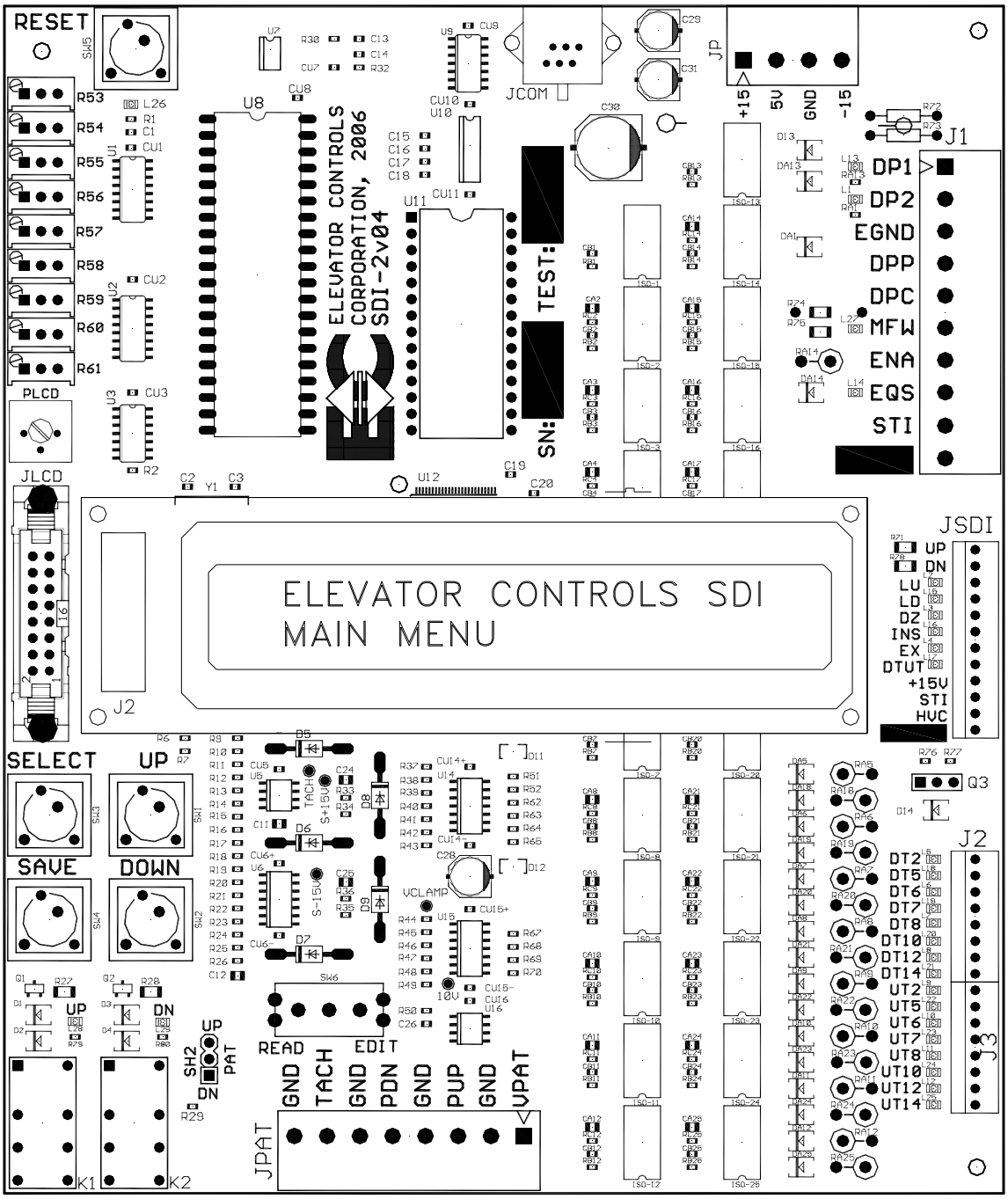

ELEVATOR CONTROLS SDI DISPLAYS - PAGE 2
ELEVATOR CONTROLS SDI
MAIN MENU
ELEVATOR CONTROLS SDI
3. VIEW I/O
ELEVATOR CONTROLS SDI
4. VIEW LOGS
ELEVATOR CONTROLS SDI
3.1 Tracking Performance
P: 350 FPM 20 FPM 1 U
T: 330 FPM 350 FPM 4
ELEVATOR CONTROLS SDI
3.2 Up Terminals
UT=1 UT2=1 UT5=1 UT6=1
UT7=0 UT8=0 UT10=0 UT12=0
ELEVATOR CONTROLS SDI
3.3 Down Terminals
DT=1 DT2=1 DT5=1 DT6=1
DT7=0 DT8=0 DT10=0 DT12=0
ELEVATOR CONTROLS SDI
3.4 Control Signals
UP=0 LU=0 DZ=1 INS=1
DN-0 LD=0 DPS=01 EQ=0
ELEVATOR CONTROLS SDI
3.5 Analog Inputs
Tach=10.0V +15V=+15.0V
Pat=10.0V -15V=-15.0V
ELEVATOR CONTROLS SDI
3.6 Edge I/O
EQS=0 PEN=0
MFW=O ST=1
ELEVATOR CONTROLS SDI
3.7 Elevator MPC Flags
HI=0 DFSTC=0 SAF=1 RL=0
SU=1 SD=0 H=1 RST=0 EQ=1
ELEVATOR CONTROLS SDI
3.8 Target and Position
Targ:03 02 DPcount=1561
Position= 01 DP=1560
ELEVATOR CONTROLS SDI
3.9 SDI Flags
ISTU=0 ISTD=0 OTS=0
STU=0 STD=1 NI=9
ELEVATOR CONTROLS SDI
4.1 View Current Fault
ELEVATOR CONTROLS SDI
4.2 View Sequence Log
ELEVATOR CONTROLS SDI
4.3 View Fault History
ELEVATOR CONTROLS SDI
4.4 Clear Fault History
ELEVATOR CONTROLS SDI
4.5 Last Fault Sequence
ELEVATOR CONTROLS SDI
4.6 Return to Main Menu
REFER TO PAGE 3 FOR VIEW LOGS AND FAULTS
FAULTS TYPICAL DISPLAY EXAMPLES
Return to Main Menu
ELEVATOR CONTROLS

SDI I / O BOARD GENERAL LAYOUT
Redrawn: 9/14/2006



SDI I / O BOARD GENERAL LAYOUT
Redrawn: 9/14/2006

SDI V4


RESET
SW5
R53
R54
R55
R56
R57
R58
R59
R60
R61
PLCD
JLCD
U8
ELEVATOR CONTROLS
CORPORATION, 2006
SDI-2v04
U11
TEST:
SN:
U12
JCOM
JP
+15
5V
GND
-15
J1
DP1
DP2
EGND
DPP
DPC
MFW
ENA
EQS
STI
ELEVATOR CONTROLS SDI
MAIN MENU
J2
JSDI
UP
DN
LU
LD
DZ
INS
EX
DTUT
+15V
STI
HVC
SELECT
UP
SAVE
DOWN
SW1
SW2
SW3
SW4
SW6
READ
EDIT
SH2
PAT
GND
TACH
GND
PDN
GND
PUP
GND
VPAT
JPAT
K1
K2
Q3
J2
J3
DT2
DT5
DT6
DT7
DT8
DT10
DT12
DT14
UT2
UT5
UT6
UT7
UT8
UT10
UT12
UT14