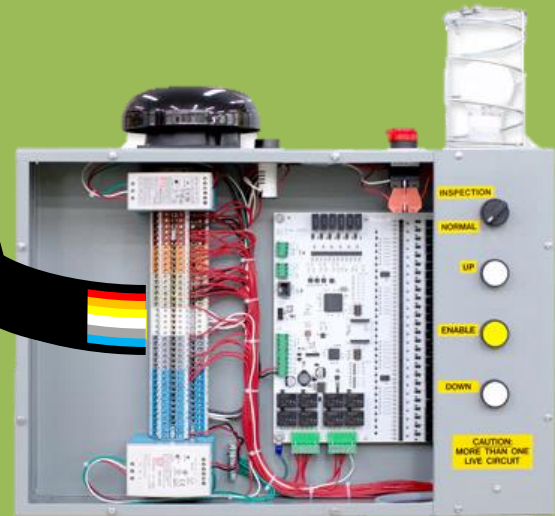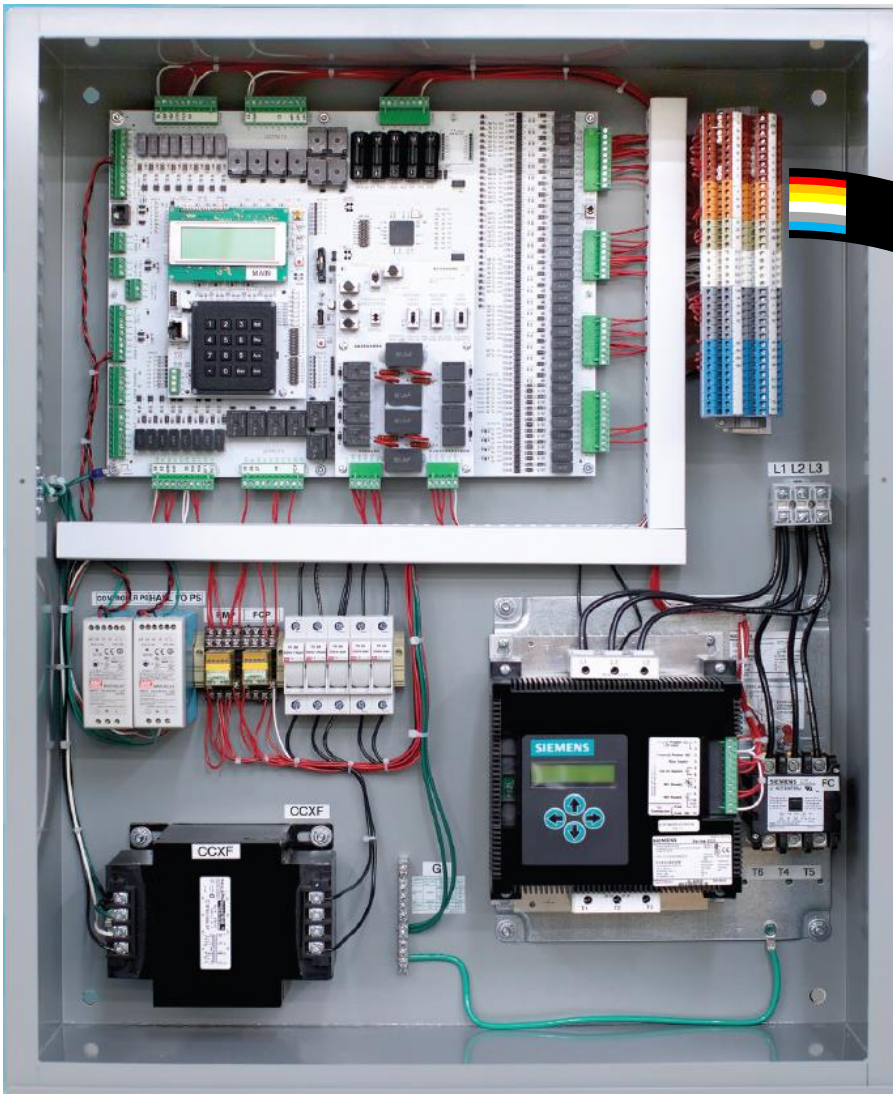# Vision 2.0 Hydraulic Controller
User Manual

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VIRGINIA CONTROLS

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TABLE OF CONTENTS

1. Vision 2.0 Introduction

1.1 General Description

The Vision 2.0 Hydraulic Controller is the newest microprocessor-based elevator controller offered by Virginia Controls, featuring a more compact and installer-friendly design of the Vision serial I/O platform. The Vision 2.0 package includes a factory pre-wired car top inspection station with color-coded traveling cable for convenient field hookups to a standardized terminal strip.

Vision 2.0 includes improvements to CPU power and capabilities that allow controller processing, dispatching, and monitoring processed by a single CPU. The CPU is also Wi-Fi & LAN compatible, allowing for remote CPU keypad access during installation and maintenance with any Wi-Fi enabled device.

Serial communication to I/O boards, absolute positioning system and other remote devices are handled using CANbus (Controller Area Network).

Safety processing is shared by dedicated safety processors in both the machine room controller and car top inspection station for more direct signal hookups while reducing the amount of conductors in the traveling cable.

This combination of features results in speedy installations, high reliability, ease of troubleshooting, and a long-lasting elevator control system.

1.2 What's New

New hardware, a more compact design, and improved plug and play package, including:

Machine Room controller, compact 26" x 32" x 10" enclosure with standardized layout, with all field connections to color-coded terminal blocks. A battery lowering equipped controller uses a 26" x 46" x 10" enclosure.

Car Top Inspection Station, with all field connections to color-coded terminal blocks.

Vision 2.0 traveling cable, color-coded for connections between main controller and car top inspection station.

C.O.P. Remote I/O board, for serial connection to C.O.P. fixtures. Fixture pre-wiring available on request.

C.O.P. – Car Top cable, color-coded for connections between C.O.P. and car top inspection station.

Hall I/O boards, for serial connection to hall calls at each landing and fire service key switch. Fixture pre-wiring available on request. Available with either screw terminal or RJ-45 connections.

Hoistway serial cable, for connecting Vision hall boards providing communication and 24VDC fixture power.

Absolute positioning system (APS), now with single RJ-45 connection to Car Top Inspection Station.

Upgraded CPU interface with backlit screen, for modular dispatching, safety checking and controller logic.

Wireless access to CPU screen & keypad through Wi-Fi interface on local area network (WAN/LAN).

Construction/Rescue operation, which allows machine room inspection control while car safety board is offline.

1.3 General Specifications

- 2-10 Landings from Simplex to dispatcher-less 8-Car Group – Demand/Response – operation.

- Up to 200 FPM for hydraulic applications.

- Compatible with 208, 240, 380, 460 or 600 VAC Building Supplies.

- Available starter arrangements: Solid State, Wye-Delta or Across-the-Line.

- Maximum of 64 car door openings: In-Line or Front and Rear: Selective or Non-Selective operation.

- Compatible with all standard new or existing door operators, passenger and freight.

- Applicable Codes: ASME A17.1/CSA B44 – Safety, and ASME A17.5/ CSA B44.1 – Electrical.

- Available with standard Car Top Selector or Absolute Positioning System (NTS included).

- Optional: Emergency Power, Hospital Service, EMT Service, and SBC or SAPB Operations.

- Local or Remote Monitoring capabilities via Ethernet, with configurable IP Addresses.

- Enclosure: 26"W x 32"H (typical) wall mounted NEMA 1 w/Lift-Off Cover. NEMA 12, 4, 4X also available.

- Battery Rescue/Lowering option available with a taller 26" x 46" enclosure.

- Single-Phase Starting, Three-Phase Starting, or Multi-Sequential Starting w/Branch Circuit Protection.

1.4 Warranty Terms & Conditions

WARRANTY: Virginia Controls, LLC (VC) warrants that all products will be free from defects in material and workmanship for a period of one (1) year from date of shipment. This warranty is extended to the original purchaser only and is not transferable to any subsequent purchaser. VC obligations under this warranty shall be strictly limited to repairing or replacing the documented defective material at VC's option.

Material may be returned only with prior authorization of VC. Unused material must be in its original carton and in resalable condition. A Restocking Charge of 25% will apply unless waived, in writing, by an authorized officer of VC. All material returned must be freight prepaid and insured for full value.

VC shall determine, in its sole discretion, whether the product is defective, and whether the warranty is applicable. VC will not be responsible for damage due to misapplication, misuse, improper hookup, incompatible peripheral devices, transients and voltage spikes, or the use of improper fusing or voltages. VC will not accept responsibility for equipment which has been modified in any way without the express written consent of an authorized officer of VC, further, the unauthorized modification of any product supplied by VC will render the here before stated warranty null, void, and unenforceable.

VC makes no other warranties or guarantees, expressed or implied, and any implied warranties of merchantability or fitness for a particular purpose. VC hereby disclaims and excludes from any agreement made by acceptance of this order. There are no warranties, either expressed or implied which extend beyond the face hereof. VC shall not be liable for damages, direct or consequential, or delays if such occur.

VC will not grant any allowances for any repairs or expenses without the express written consent of an authorized officer of VC. No further warranties or guarantees given by the purchaser to its customers shall be binding upon VC.

2. Pre-Installation Instructions and Notes

2.1 General Notes

Read this manual carefully before proceeding with the installation.

Important information is highlighted by the headings: WARNING, CAUTION, or NOTE. These headings are defined as follows:

> **WARNING: Warnings are used to indicate instructions which, if not followed correctly, may result in personal injury or substantial damage to equipment.**

> **CAUTION: Cautions are used to indicate instructions or information which, if not observed, may result in some damage to equipment if care is not taken.**

> **NOTE: Notes are used to indicate instructions or information which is especially helpful in understanding and operating the equipment, and which will usually speed up the installation.**
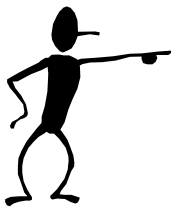
Pay special attention to points highlighted in this manner. They are of special consideration and are frequently overlooked.

2.2 Important Precautions and Notes

The following general rules and safety precautions must be observed for safe and reliable operation of your system.

> **WARNING: The elevator controller must be installed by experienced field installation personnel. The field installation personnel must know and follow all the rules and regulations pertaining to the safe installation and running of elevators. Additional information for specific devices (such as the door operator, valve solenoids, motors, etc.) is the responsibility of the manufacturers of those devices.**
>
> **WARNING: This equipment is designed and built to comply with ASME A17.1 / CSA B44 and ASME 17.5 / CSA B44.1 codes and must be installed by a qualified contractor. It is the responsibility of the contractor to make sure that the final installation complies with all applicable local, state, and national codes and is installed safely.**
>
> **WARNING: The 3 phase AC power supply to this equipment must come from a fused disconnect switch or circuit breaker which is sized in accordance with all applicable national, state, and local electrical codes, in order to provide the necessary branch circuit protection for the controller and motor. Incorrect motor branch circuit protection may create a hazardous condition.**
>
> **WARNING: The 3 phase AC power supply must be provided with a suitable ground conductor that is connected to the dedicated ground of the building's electrical distribution system.**
>
> **WARNING: Proper grounding is vital for the safe operation of your system. Bring the ground wire to the ground bar labeled "GND" or "G". You must choose the proper ground wire size. See national electrical code article 250-95 or the related local applicable code.**

3. Controller Installation and Wiring

3.1 Controller Location Selection & Environment

Mount the controller in a location that provides:

- Adequate support for the weight of the controller.
- Adequate lighting for installation and maintenance.
- Convenient access for the routing of required conduits and cables.
- Convenient access to other devices in the machine room.
- Minimal vibration (provide additional bracing or reinforcement if required).

For improved controller reliability:

- Keep the machine room clean.
- Do not install the controller in a dusty area.
- Do not install the controller in a carpeted area, or an area where static electricity is a problem.
- Keep room temperature between 0°C to 40°C (32°F to 104°F), and 95% non-condensing relative humidity. Extended high temperatures will shorten the life of electronic components. Provide adequate ventilation or air-conditioning as required, if necessary.
- Keep the controller away from sources of condensation and moisture (such as open windows) as these can create a hazardous condition and can damage the equipment.
- Do not install the controller in a hazardous location where excessive amounts of dust, vapors, or chemical fumes may be present. A NEMA 4 or NEMA 12 rated enclosure can be provided if necessary.
- Make sure power line voltage fluctuations are within ± 10% of intended voltage.
- High levels of radio frequency emissions may cause interference with the controller microprocessor and produce unexpected results. Proper grounding and operation with enclosure doors in place on the controller often prevents typical RFI/EMI issues.

3.2 Machine Room Wiring

- Mount the controller firmly and install all required conduits before wiring the controller.

- Note where wire duct and terminal blocks have been provided inside the controller for field wire and travelling cable connections before deciding where to locate conduit openings.

> **WARNING:** Do not allow any metal shavings to get into relays or contactors, or in or behind the electronic components, as these could cause serious damage to personnel or the equipment. Take reasonable measures to protect the electronic equipment.

3.2.1 Incoming Power

> **WARNING:** THE 3 PHASE AC POWER SUPPLY TO THIS EQUIPMENT MUST COME FROM A FUSED DISCONNECT SWITCH OR CIRCUIT BREAKER WHICH IS SIZED IN ACCORDANCE WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL ELECTRICAL CODES, IN ORDER TO PROVIDE THE NECESSARY OVERLOAD PROTECTION FOR THE CONTROLLER AND MOTOR. INCORRECT MOTOR BRANCH CIRCUIT PROTECTION MAY CREATE A HAZARDOUS CONDITION.

- Installation of AC line power wiring should be done by a qualified and licensed electrician, using the appropriate wire size(s) for the installation.

- Consider the motor size and type of starter, and also the length of wire required from the main power distribution center in determining the proper wire size.

- Proper branch circuit protection and disconnect device(s) must be provided, as required by applicable local, state, and national codes.

3.2.2 Grounding

> **WARNING:** PROPER GROUNDING IS VITAL FOR THE SAFE OPERATION OF YOUR SYSTEM. BRING THE GROUND WIRE TO THE GROUND BAR THAT IS LABELED "GND" OR "G". YOU MUST CHOOSE THE PROPER GROUND WIRE SIZE AND MINIMIZE THE RESISTANCE TO GROUND BY USING THE SHORTEST POSSIBLE ROUTING. SEE NATIONAL ELECTRICAL CODE ARTICLE 250-95, OR THE RELATED LOCAL APPLICABLE CODE.

Proper grounding is vital to reliable operation of the elevator. It is not only mandated by multiple codes for the safe operation of the controller, but it is also required for the consistent performance of microprocessors and serial communication devices, which depend on grounding and shielding to mitigate RFI & EMI noise issues. This controller has been tested to withstand the electrical interference levels specified by ISO 22200 for safety circuits. Passing these requirements is only achieved with proper grounding and with the controller enclosure doors in place.

- The ground wire between the controller and the building power disconnect switch must be connected to a ground conductor within the disconnect that proceeds from the dedicated ground of the building's electrical distribution system.

- The ground wire should be sized per the applicable codes. A ground wire of the same size as the incoming power conductors is always sufficient.

- Connect the ground wire on the controller to the large ground bar labeled **GND** or **G** as shown in the controller schematic.

3.2.3 Pump Motor and Starter Wiring

Connect the pump motor as shown on Sheets VM1 and VNL of the schematic. Consult the applicable codes for proper wire sizing and circuit protection for the motor being used.

> **NOTE: For Single-Phase motor applications, refer to the motor documentation for proper wiring of each motor lead and starting capacitor where applicable.**

If an **Across-the-Line** starter is used (3/9-lead motors), connect the motor leads T1, T2, T3 to the starter overload MOL.

If a **Wye-Delta** starter is used (6/12-lead motors), connect the motor leads T1, T2, T3 to the bottom of the overload MOL, and T4, T5, T6 the bottom of the STR contactor.

If a **Solid-State** starter is used, connect the motor leads T1, T2, T3 to the starter and connect T4, T5, T6 to the fault contactor FC.

The **Motor Thermal Overload** contact from the motor is wired between terminals 14P – 14M, in series with the starter pilot relay (PMP) contacts. This N.C. contact will stop the pump motor from running if it opens.

The **Oil Over-Temperature Switch** is wired between controller terminals 1X – P (MR-SIB input M23). This N.C. contact is required to be active/on at all times. If not required by code and not used, terminals 1X – P must be jumped in order for the car to run up.

The **Motor Overload (MOL)** device is used with Across-the-Line and Wye-Delta starter applications. A N.C. MOL contact is factory wired to MR-SIB TB:M24, which stops the pump from running should the contact open.

3.2.4 Motor Rotation (Contactor Starting Only)

Check that the pump motor is rotating in the proper direction by turning on power, then briefly pushing in the motor starter: '**P**' & '**PM**' on across-the-line installations, or '**P**' & '**STR**' on Wye-Delta installations. Observe the direction of rotation of the motor, and if incorrect, reverse any two of the three power leads (L1, L2, L3) at the main line disconnect or in the controller – per Sheet VM1 of the schematics.

If a Reverse Phase relay is provided, check that the OK light is on when power is applied to it. If the OK light is not on, then reverse any on the two wires connected to the A, B and C terminals.

3.2.5 Motor Timing

The '**PMP**' relay is used to initiate the starter run command in the up direction.

Starting Delay - The controller waits for ~1 second to allow the pump to start running before energizing the up valve(s). The controller monitors the starter Up-To-Speed input (MR-SIB TB:M22), based on the starter type:

a. Soft Starter: Timing is programmable in the soft-starter interface.

b. Contactor Starting: Timing is driven by the '**TRU**' relay using the adjustable timer `PMP RUN TRU DELY`. For Wye-Delta starters, the '**TRU**' run timer relay also controls the transition the motor state from '**Wye**' (STR) start to '**Delta**' (RU) run mode.

Stopping Delay – At the end of a run, the valves drop out immediately while the pump will remain running for ~1 second. This allows pressure to be maintained on the hydraulic system preventing the car from sinking when it stops, and also allows the car to start more smoothly if it runs in the up direction on the next run. This timing is based on the starter type:

a. Soft Starter: Timing is programmable in the soft-starter interface.

b. Contactor Starting: Timing comes from an RC circuit on the '**PMP'** relay, which can be adjusted by changing value of the capacitor in parallel with '**PMP'** coil.

3.2.6 Valve Solenoid Wiring

The Valve Solenoids are controlled by the Auxiliary Relay Board on the MR-SIB, routed to terminals HM1-HM4 and LM1-LM4. Valve Solenoid connections are 120VAC only, with common TB:HMC powered from the machine room safety string TB:2. Refer to Sheet VM4 of the schematics for Valve Solenoid wiring.

> NOTE: Vision 2.0 requires independent solenoid coils for each of the valves. Valve coils with a shared coil common or non-120VAC signals will require custom modifications and may not be compatible with Vision 2.0.

Table 1: Valve Solenoid Wiring.

Valve	Connection 1 (High Voltage)	Connection 2 (Low Voltage)
Up Level Valve	HM1	LM1
Up Fast Valve	18X or HM2	LM2
Down Fast Valve	HM3	LM3
Down Level Valve	HM4	LM4
Commons	HMC	LMC

> NOTE: When contract speed is greater than 50fpm, the Up Fast Valve connects to terminal 18X, which puts the valve in series with the Emergency Terminal Speed Reducing (ETSR) Switch. Refer to Sheet VM4 of the schematics for specific wiring information.

3.3 Start-Up Instructions

3.3.1 Before Applying Power

The system has been programmed and tested for the specific elevator project, so no further changes should be made without consulting with Virginia Controls.

3.3.1.1 Power and Grounding

WARNING: Confirm that the voltage of the incoming power matches the controller before applying power to the controller.

Check the system for proper grounding before applying power to the controller. Refer to Section 3.2.2 again!

With the power off, remove the fuses: F4, M1, M2, M3, M4, and M5 from the secondary of the main control circuit transformer ('**CCXF**') – see schematic Sheet VM1.

Check the safety circuit (terminals 1, 1X through 6) for grounds.

Using a Volt-Ohm meter, connect one lead to terminal 35 (ground) and touch the other lead to each terminal to be tested. The resistance should be considerably greater than 100 ohms.

NOTE: If the CCXF secondary fuses are not removed, the VOM will read a short through the windings of the main control circuit transformer.

With the fuses still removed, apply power to the controller, and verify that the voltage at the secondary of the main control circuit transformer ('**CCXF**') is 110-125VAC.

3.3.2 Applying Power

Remove all fuses before applying power.

Check for the proper voltage at the top of each fuse holder before installing the fuses for that circuit.

Reinsert fuses one circuit at a time, checking for the proper voltage on the base of each fuse before moving on to the next circuit.

3.3.3 Temporary Run Connections

The controller can run using a Run-Bug temporary control interface using two standard methods: Running with or without microprocessor control.

Follow Section 3.3.3.1 to wire the starter circuit directly to a Run-Bug, which will defeat the controller's diagnostics and ability to monitor the safety string.

Follow Section 3.3.3.2 to start up the controller in Construction mode, which enables the controller's diagnostics while verifying the safety string is made at every step of the installation.

The controller will not be able to run on standard modes of inspection (car top or controller) until the traveling cable is fully installed to the Car Top Inspection Station and the Car Top Safety Interface Board (CT-SIB) is connected and communicating.

NOTE: All safeties must be connected or jumped at all times in order for the controller to run on temporary.

3.3.3.1 OPTION 1: Connecting the "Run Bug" without use of Vision 2.0 Microprocessor (Solid State Starter Only)

The following diagram shows how the car may be run on temporary service when using a solid-state starter before the controller is fully wired. See the schematic for the pump motor wiring, incoming power wiring, and any special requirements.

FROM MAIN FUSES, OR DISCONNECT

"CCXF"
TRANSFORMER
(115VAC)

See SHT#VM1 for the connection diagram of the Pump Motor and Incoming Power.

M1   FUSE F4 (5A)

FUSE M4 (3A)

CHASSIS

MOTOR THERMAL OVERLOAD (IF USED)

TO CONTROLLER MOTOR STARTER CIRCUITS. (SEE SHT#VM4)

1X

SAFETY DEVICES

TEMPORARY RUN BUTTONS

RUN   UP

14M   35

UP SLOW VALVE   35

NOTE: Connect the Safety Devices and Run-Bug circuitry to terminal 1X, which feeds power from fuse M4.

DOWN

115VAC VALVE COILS

DOWN SLOW VALVE

WARNING: NO SAFETY DEVICES ARE SHOWN. CONNECT ANY SAFETY DEVICES AVAILABLE IN SERIES WITH THE RUN BUTTONS, AND USE EXTREME CAUTION WHEN OPERATING THE CAR.

Figure 1: Temporary Run Connection Diagram (Solid State Starter only)

Connect the hot side of valve solenoids to the run-bug temporary run buttons, and the neutral side to terminal 35, as shown in Figure 1.

To energize the FC-contactor, jump the oil temperature switch input 1X – P, and jump the shutdown defeat input 1X – DFT.

If a Battery Operated Rescue Initiation System (BORIS) is used, make sure that the UPS power cord is connected to the receptacle labeled "FOR BORIS USE ONLY". Do not use the BORIS unit until construction is complete and the elevator wiring has been tested. Jump L5 – L5A to bypass the auxiliary disconnect contact and provide power to the starter and terminal 1X.

Connect the Safety Devices and Run Bug to terminal 1X which provides power to the motor starter. Measure approximately 115 VAC at transformer '**CCXF**', which comes through fuse M4 on the MR-SIB and fuse F4. Remove fuses M1, M2 & M3 on the MR-SIB to remove power from other controller components.

When the car is sufficiently wired to be run from the Car Top Inspection Station, remove all temporary run wiring and wire per the controller schematics. Install fuses M1, M2, & M3 if removed in previous step.

WARNING: It is up to the operator to ensure safe movement of the car/platform. It is solely up to the mechanic operating the Temporary Run Buttons to ensure that no damage or personal injury will occur when moving the car. Use extreme caution when moving the car/platform.

3.3.3.2 OPTION 2: Connecting the "Run Bug" using Vision 2.0 Microprocessor Construction Mode Operation

INSTRUCTIONS/PROCEDURE

1. Connect the Pump Motor leads to terminals **T1, T2, T3, T4, T5, T6** as shown on Sheet VM1 of schematics.
2. Connect the Valve Solenoids to terminals **HM1-HM4 & LM1-LM4** as shown on Sheet VM4 of schematics.

> **NOTE: The Up Fast Valve coil often connects to TB:18X, not HM2. See sheet VM4 of schematics.**

3. Enable Construction Mode on the CPLD safety processor by turning on the CPLD DIP Switches XM7 & XM8. These switches are located on the right side of the MR-SIB board below the fuses. Note: These are not the CPU DIP switches.
4. Enable Construction Mode in the controller CPU using the Setup Menu – Edit Adjustable Settings/Features. Turn on the parameter '**CONSTRUCTION MOD**', located near the bottom of the list. (see Section 6.1.4.5 for using the setup menu) Note: Verify the setting was saved by going back into the menu and see that CONSTRUCTION MOD = ON.

INSTALL SAFETY STRING CONNECTIONS/JUMPERS

5. Jump all the connections listed in Table 2 on the following page.
6. Apply power to the controller. Verify power to the controller CPU, input LEDs, and starter.
7. Ensure all of the corresponding indications are met, including LEDs, "enable" circuits, and car status screen.

RUN CAR USING INSPECTION RUN-BUG INPUTS

8. To run UP, energize terminal 25B using Run Bug Up. To run DOWN, energize terminal 24T using Run Bug Down.

> **NOTE: Controller Inspection buttons (up/down/enable) may not be used while on construction mode. This is by design to prevent inadvertent operation of controller inspection while construction mode is active.**

> **NOTE: Construction Mode runs using the slow speed valves by default (recommended). To run fast speed on Inspection, turn OFF the feature "SLOW SPD ON INSP" using the Setup Menu.**

9. Construction mode must be used until the Car Top Inspection Station and Traveling Cable is installed. Once the CT-SIB has power and CANbus 0 communication, all other modes of operation become available and construction mode may be reverted.

TURNING OFF CONSTRUCTION MODE

10. When finished with construction mode, remove all temporary jumpers and wire all field connections per the controller schematics. Jumpers may be left in place until field devices are ready to be installed.

> **NOTE: The following jumpers must be removed when turning off construction mode: 1X-23, 1X-4A, 1X-4B, as these bypass the inspection and safety string circuits. All other jumpers can remain jumped and swapped out as field devices and the traveling cable are installed.**

11. Revert Construction mode back to normal mode by turning off CPLD DIP switches XM7 & XM8 and turning off the '**CONSTRUCTION MOD**' parameter in the Setup Menu.

Table 2 - Temporary Run connections using Construction Mode

Item	Instructions	Terminals to Jump	Indication location	LED
Governor Switch	Jump on terminal strip	1X – 1Y	MR-SIB input	M01
Roped Hydraulic Safety Switch	Jump on terminal strip	1Y – 1T	MR-SIB input	M02
Final Limit Switch	Jump on terminal strip	1T – 1B	MR-SIB input	M03
Pit Stop Sw. & ELGO Tape Sw.	Jump on terminal strip	1B – 2	MR-SIB input	M04
Car Gate Contact, Front	Jump on terminal strip	1X – 4	MR-SIB input	M05
Car Gate Contact, Rear	Jump on terminal strip	1X – 4R	MR-SIB input	M06
Controller Stop Switch	Set switch to RUN (on MR-SIB)		MR-SIB input	M07
Hall Door Contacts: Top	Jump on terminal strip	2 – 5T	MR-SIB input	M09
Hall Door Contacts: Front	Jump on terminal strip	2 – 5	MR-SIB input	M10
Hall Door Contacts: Bottom	Jump on terminal strip	2 – 5B	MR-SIB input	M11
Hall Door Contacts: Rear	Jump on terminal strip	2 – 5R	MR-SIB input	M12
Hall Lock Contacts: Top	Jump on terminal strip	2 – 6T	MR-SIB input	M13
Hall Lock Contacts: Front	Jump on terminal strip	2 – 6	MR-SIB input	M14
Hall Lock Contacts: Bottom	Jump on terminal strip	2 – 6B	MR-SIB input	M15
Hall Lock Contacts: Rear	Jump on terminal strip	2 – 6R	MR-SIB input	M16
Run-Bug Common	Connect terminal 1X – Run Bug Common		Enables Run Bug Signals	
Run-Bug Down Run Signal	Connect terminal 24T – Run Bug Down		MR-SIB input (while running)	M18
Run-Bug Up Run Signal	Connect terminal 25B – Run Bug Up		MR-SIB input (while running)	M19
Oil Over-Temperature Switch	Jump on terminal strip	1X – P	MR-SIB input	M23
Car Safety String #1	Jump on terminal strip	1X – 4A	MR-SIB input	M31
Car Safety String #2	Jump on terminal strip	1X – 4B	MR-SIB input	M32
Inspection String Common	Jump on terminal strip	1X – 23	Enables Controller Inspection Sw	
Gate, Door, Lock Bypass Sws.	All Bypass Switches must be turned OFF		Enables Controller Inspection Sw	
Controller Inspection Switch	Set switch to INSP (on MR-SIB)		MR-SIB input	M41
Motor Thermal Overload	Jump on terminal strip	14P – 14M	Enables Starter "Run" Signal	
Battery Lowering Aux. Disconnect (if used)	Jump on terminal strip (bottom of enclosure)	L5 – L5A	Enables Power to Controller	
Emergency Power (if used)	Jump on terminal strip	1E – EP	MR-SIB input	Input #5
Shutdown Defeat (use if faulted)	Jump MR-SIB input (lower left)	1X – DFT	MR-SIB input	Input #15
Enable in Controller Setup Menu	Turn ON '**CONSTRUCTION MOD'** parameter		Car Status Screen: '**CON'**	
Enable CPLD Safety Processor	Turn ON CPLD DIP Switches: XM7 & XM8 (on right of MR-SIB, not CPU board)		Car Status Screen: '**ConSw'** CPLD LEDs: X2, X5, X6 = ON	

**NOTE: Use Construction mode to run on inspection without the Car Top Safety Interface Board.
All Car Top signals will be bypassed and disabled while Construction mode is active.**

3.3.3.3 Troubleshooting Construction Mode

If the car will not run, the Car Status screen can indicate the cause of the problem:

```
CON NoCall CTSIB-ERR
? DC OD CLSD ConSw
100 000 000 000 000
No Calls
```

Figure 2: Typical Construction Mode

- '**CON**' indicates Construction Mode is enabled in the Setup Menu.

    o '**INS**' indicates Construction Mode is not enabled, or the controller inspection input '**M41**' is not ON.

- '**NoCall**' or '**Fire1**' is typical. Fire Service being active does not affect construction mode.

    o '**SafStr**' or '**StopSw**' indicates a missing jumper or safety string connection per Table 2.

    o '**OilTemp**' indicates an oil temperature fault. Use Shutdown Defeat (1X-DFT) to defeat.

- '**CTSIB-ERR**' indicates the Car Top Safety Interface Board (CT-SIB) is not communicating. This is typical while on construction mode until the traveling cable is fully installed.

    o '**MRSIB-ERR**' indicates a problem with the Machine Room Safety Interface Board (MR-SIB) internal communication. Try disconnecting all CANbus connections on the left of the MR-SIB, namely CH0 & CL0, to verify that MRSIB-ERR is cleared. Then troubleshoot the connection which causes the error while connected.

    o '**ELGO-ERR**' or '**ELGO-DAT**' is typical after the traveling cable is installed prior to installing the ELGO system and completing the ELGO Learn Procedure (see Section 3.9). Inspection may be used in the meantime.

    o '**Shutdown**' indicates a fault was latched. Jump Shutdown Defeat (1X-DFT) to resolve.

    o See Section 6.1.3.2 for further information of displayed car status messages.

- '**DC**' indicates the doors are closed.

    o '**DO**' indicates a missing jumper or connection for the hall door contacts.

- '**OD**' is typical and indicates the car is idle and out of door zone. Note: door zone is not read while on inspection or construction mode.

- '**CLSD**' or '**DrLmt**' is typical and indicates the doors are closed, or door limits are not yet installed.

- '**ConSw**' indicates the Construction Mode DIP Switches XM7 & XM8 are set.

    o '**CPLDSwErr**' indicates XM7 & XM8 are ON while Construction Mode is not active. The car will not run with these DIP switches active while not on Construction Mode.

    o '**CTSAF**' indicates the car safety string jumpers 4A & 4B are not made.

If all signals appear correct, verify the inputs using the '**MACHINE ROOM DATA**' menu screen and verify all signals are '**ON**'. If any signals read '**ERR**', check for CAN0 Tx & Rx communication LEDs under the CPU screen and troubleshoot CANbus 0. Removing all connections to CH0 & CL0 should restore communication.

- Safety Status will display '**Mode: None**' if Construction Mode is not turned off in the setup menu.

- Shutdown defeat may be used to temporarily disable shutdowns caused by redundancy faults. Jump 1X-DFT.

- To clear any latched faults, use the Fault Reset momentary jumper 1X-RST.

3.3.4 Machine Room I/O Connections to Terminal Blocks

The Vision 2.0 layout designates all field connections to terminals for customer convenience. As such the majority of Machine Room I/O connections to the MR-SIB are prewired by the factory. Refer to the schematics sheet VM5 for specific input or output connections.

Table 3: Machine Room I/O Connections

Inputs	Terminal Block	MR-SIB Input LED	
Oil Pressure Switch	16P	1	
Oil Viscosity Contacts	16V	2	
Low Oil Switch	LOS	3	
Flood Switch	FLS	4	
Emergency Power Operation	EP	5	
Emergency Power Pre-Transfer	EPT	6	
Emergency Power Manual Select	EPS	7	
Shunt Trip / Machine Room Heat Sensor	85	8	
Fire Sensors – Recall to Main	82	9	
Fire Sensors – Recall to Alternate	82M	10	
Fire Sensors – Flashing Hat & Recall to Main	82F	11	
Fire Sensors – Flashing Hat & Recall to Alt	82FM	12	
Up Terminal Speed Reducing Sw.	18X	13	
Down Terminal Speed Reducing Sw.	19X	14	
Shutdown Defeat	DFT	15	*
Fault Reset	RST	16	*
Oil Overtemperature Switch	P	M23	
Battery Lowering (BORIS)	NP	M24	

Outputs	Terminal Block	MR-SIB Output LED	
Pump Relay	PMP	1	†
RU Timer Relay	TRU	2	†
Shunt-Trip Relay	SHT	4	†
Shunt-Trip Contacts	SH1,2,3	4	
Position Indicator Floor	1F – 8F	5 – 12	
P.I. Driver Binary Position	1PI – 8PI	5 – 8	
Fire Service Buzzer	81Y	8	*
Up Direction Indicator	36	9	
Down Direction Indicator	37	10	
P.I. Blanking (Fire Service Active)	38	11	
Battery Lowering Indicator	89	12	*
P-Contactor Enable	PT/PC	13 & 14	†
Starter Fault Contactor Relay	FCP	15	†
Shutdown Indicator	SDN	16	

*-these signals connect directly to the MR-SIB
†-these signals are factory wiring only

3.4 Hoistway Wiring

3.4.1 Safety String and Inspection Inputs

3.4.1.1 Safety and Stop Switches

Hoistway safety string inputs are wired in series ahead of hall door & lock contacts and the car safety string. Each safety device is monitored by a discrete MR-SIB input – per Sheet VM3. Standard inputs include:

Safety String Description	Terminal	Input LED
Roped Hydraulic Governor Switch	1Y	M01
Roped Hydraulic Safety Switch	1T	M02
Final Limit Switches	1B	M03
Pit Stop Switch*		
ELGO APS Broken Tape Switch*	2	M04
Over-Pressure Switch (Roped Hydraulic)*		

* These signals are wired in series and share the same monitoring input.

> **NOTE: Every Safety String monitoring input to the MR-SIB must be active/on/jumped in order for the car to run. If any of these safety inputs (1Y, 1T, 1B, 2) is not active, the controller logs a safety fault describing which input is missing.**

3.4.1.2 Hall Door and Hall Lock Contacts

The Hall Door and Lock (if used) Contacts section of the safety string is wired predominantly in parallel, allowing multiple safety systems to monitor critical door and lock contact inputs independently. The Hall Door safety string branches into Top Inspection Access opening, Bottom Inspection Access opening, and intermediate Front and Rear door openings, all of which are wired in series. See Sheet VM3 of the schematics and Table 4, below.

Table 4: Safety String inputs for Hall Door and Lock Contacts.

Door Description	Hall Door Contact		Hall Lock Contact	
	Terminal	MR-SIB Input LED	Terminal	MR-SIB Input LED
Top Access Door	5T	M09	6T	M13
Front Doors (not Access)	5	M10	6	M14
Bottom Access Door	5B	M11	6B	M15
Rear Doors (not Access)	5R	M12	6R	M16

All hall door and lock contact inputs are actively read by the MR-SIB, so any unused door or lock inputs must be jumped active/on from controller terminal 2, as shown on the job-specific drawings. Top and Bottom Access Door and Lock (if used) contacts are received as separate inputs to allow these contacts to be bypassed while using Inspection Access. Front and Rear inputs for Hall Doors and Locks (if used) receive all other remaining door contacts or lock contacts (if used) in series.

3.4.1.3 Inspection Access Hall Switches

Inspection Access Up and Down Run switches are located in the door jambs or hall fixture panel of the terminal landings (front or rear) designated for Hoistway Access operation.

They connect to MR-SIB terminals, per Sheet VM3, as follows:

Inspection Hall Switch	Terminal	MR-SIB Input LED
Top Access Up Run	25T	M17
Top Access Down Run	24T	M18
Bottom Access Up Run	25B	M19
Bottom Access Down Run	24B	M20

These run inputs are subject to the Inspection Access Switch in the car (CT-SIB input T16 / terminal 23A) being on (see Section 3.5.2.10). Additionally, the car must be within the corresponding top or bottom hoistway access zones as computed within the Absolute Positioning System.

3.4.2 Emergency Terminal (Top) Landing Speed Reducing Switch

The Emergency Terminal Landing Speed Reducing Switch (ETSR) should be installed as required by applicable code (ASME 17.1 3.25.2.1). This switch is normally required when contract speed is greater than 50 fpm, otherwise this function may be bypassed using a wire jumper between terminals HM2 & 18X – per Sheet VM4 of the schematics.

The ETSR switch has normally closed contacts that open after the car has gone beyond the Normal Terminal Slowdown limit position. The ETSR input TB:18X is monitored using MR-SIB input #12, which is required to be ON for the controller to run up at fast speed. This switch acts directly on the Up Fast Speed valve solenoid, causing the car to slow down in the event that both the normal slowdown signal and the normal terminal slowdown limit signal have malfunctioned.

The location of the ETSR Switch should be adjusted after tuning the ELGO APS system, after the slowdown and leveling adjustments are completed. Then set the ETSR switch at approximately 1" after the terminal slowdown limit switch distance, as given by UHS Limit distance in "**Setup Menu** -> **Edit ELGO APS**".

3.4.3 Terminal Landing Final Limit Switches (if required)

> **NOTE: Final Limits at terminal landings are not generally required per ASME A17.1 3.25.3.**

Where required by local code, Terminal Landing Final Limit Switch(es) are wired between safety string terminals 1T & 1B (MR-SIB Input M03). Final Limits have normally closed contacts that open when the car has gone considerably beyond floor level at a terminal landing. They prevent any further movement of the car in either direction by opening the safety string. Refer to Sheet VM3 of the schematics and consult local/applicable codes for proper switch positioning.

When using the Jack Resynchronization feature, the controller automatically bypasses the Bottom Terminal Landing Normal Limit (as computed by the ELGO APS). Redundant relays (JR & JRX) are used to bypass the Bottom Terminal Landing Final Limit between terminals 1BX and 1B.

3.4.4 Hall I/O (2-In / 2-Out) Board Connections

Each Hall I/O Board provides 2 inputs (24VDC), 2 outputs (24VDC), and 24VDC power, making it ideal for controlling hall fixtures. The boards can be mounted inside or on the backside of the hall fixture box. For applications which use 120VAC inputs and outputs, use the Remote I/O Board instead. Refer to the schematics Sheets HL1 & HL3 for Hall Riser and Sheet HLL for Hall Lanterns (if used) for specific connections to the assigned Hall I/O board(s) on CANbus 2 or 3.

Possible Hall I/O hookups include:

- Hall Call Riser: Up & Down push-buttons and lights per floor

- Fire Recall (Phase 1) switch & light: On & Reset

- Hall Lanterns: Up and Down arrows with gongs

- Emergency Power Operation or Battery Lowering light

- Emergency Power Auto/Manual Select switch inputs

- EMT (Massachusetts) Operation Hall key switch & light

- Hospital Service: Recall push-button and indicator per floor

Depending on the location of the fire service or emergency power light, the I/O may be mapped to use the spare input and output of the bottom terminal landing Hall I/O board. Otherwise, a separate Hall I/O board may be used or the wiring may be routed to/from a Remote I/O board.

3.4.5 Remote I/O Board (16-In / 16-Out) Connections

3.4.5.1 Hall I/O Group Connections

A Remote I/O Board #63 with 16 inputs & 16 outputs may be used to consolidate I/O for shared group signals (24VDC or 120VAC) which are not suitable for hall I/O board or machine room connections. The most common application is a lobby panel, fire panel, security panel, or any other remote panel that uses controller I/O. This board may be mounted and prewired as part of the fixture panel, or it can be mounted into the machine room enclosure for the lead group controller 'A', or it can be provided with its own dedicated enclosure for mounting wherever is most convenient. When used, refer to schematic Sheet HL2 for specific I/O connections and Sheet HL1 for CANbus & power field connections.

Possible Remote I/O Board #63 connections include:

- Hall Calls, Fire Recall (Phase 1), and Emergency Power Operation light

- Fire Sensors: Main (82M), Alternate (82), Shaftway/Machine Room (82F)

- Emergency Power: Normal Power (EP), Pre-Transfer (EPT), Selector switch (EPA, EPB, EPC, …)

- Hall Riser Position Indicator: Discrete (1F, 2F, …), PI Driver (1PI, 2PI, 4PI, …), PI Blanking (38)

- Hall Riser Direction Indicator: Up (36), Down (37)

- Hall Lanterns: Up (1UL, 2UL, …), Down (2DL, 3DL, …)

- Car to Lobby switch

- Lobby/Fire Panel status indicators

> NOTE: If more than 16 inputs or outputs are needed, additional Remote I/O boards may be required. Refer to the schematics for job-specific wiring and I/O configuration.

3.4.5.2 Hall I/O Connections to Machine Room

A Remote I/O Board #9 with 16 inputs & 16 outputs may be used for additional machine room I/O beyond what can be accommodated by the MR-SIB alone. This board is not used for group I/O and is mounted in the machine room enclosure and prewired by the factory when applicable.

Possible Remote I/O Board #9 connections include:

- Power Freight Door Operator Signals

- Discrete Hall I/O fixtures (when serial Hall I/O boards are not used)

- Miscellaneous machine room 24VDC I/O (MR-SIB has no 24VDC inputs)

3.5 Car and Selector Wiring

3.5.1 Traveling Cable & C.O.P. Cable

Refer to schematic pages "CTB", "MTC" & "CTC" for Vision 2.0 color-coded traveling cable specifications and wiring diagrams. One end of the traveling cable terminates on the color-coded terminal blocks in the machine room enclosure. The other end terminates on the color-coded terminal blocks in the Vision 2.0 Car Top Inspection Station.

> **Note: It is not recommended to split the traveling cable or terminate in the car station (C.O.P.), as all terminating connections are provided in the Vision 2.0 Car Top Inspection Station.**

Refer to schematic pages "CTB" & "COP" for Vision 2.0 color-coded C.O.P. cable specifications and wiring diagrams.

The use of CANbus communication and Remote I/O modules on the Car Top and in the Car Operating Panel considerably reduces the number of conductors required in the traveling cable compared to discreet (point-to-point) wiring of I/O to the controller.

The majority of car top field connections are made directly to the Car Top Inspection Station terminal blocks, which are routed by factory wiring to the Car Top Safety Interface Board (CT-SIB). Car Station fixture connections are wired directly to the Remote I/O board(s) mounted within the C.O.P. I/O data is routed to the machine room using serial CANbus twisted-pair **CAN 0**. Specific connections, such as those related to safety string and inspection operation, remain discrete signals transmitted through traveling cable conductors wired directly to the Machine Room Safety Interface Board (MR-SIB) of the Vision 2.0 controller. These include: Stop Switches, Gate Contacts, Inspection Inputs and Door Zone. Refer to Sheet "CTB" of the schematics for specific traveling cable wiring designations and conductor counts.

3.5.2 Car Safety String and Inspection Inputs

All Inspection switches and their associated run push-button inputs connect to Car Top Inspection Station color-coded terminals, which are routed to the CT-SIB via factory wiring or to the MR-SIB via the traveling cable. If any inspection mode is not used on a specific job, those inputs are left un-wired and bypassed using factory jumpers. Refer to the schematic sheets VM3 and VT1 for specific wiring of the car safety string and inspection inputs.

3.5.2.1 Car Safety String & Stop Switch Connections & CT-SIB Monitoring

The car safety string & stop switch devices connect to car top terminals as shown in the table below. With specific exceptions, any open contact on the car safety string will stop and prevent the car from running and the doors will be held open while on normal operation. Refer to the schematics sheet "VT1" for specific wiring of each car safety string connection.

Car Safety String Description	Terminal Connections	CT-SIB Input LED
Car Safeties (Roped Hydraulic)	1X – 3A	T01
Emergency Exit Hatch switch	1X – 3E	T02
Car Top Stop Switch* (factory prewired)	3E – 3Y	T03
Fire Stop Switch*	3Y – 3	
In Car Stop Switch	3 – 3X	T04

* These signals are wired in series and share the same monitoring input.

3.5.2.2 Car Safeties (Roped Hydraulic)

The Roped Hydraulic Car Safeties are field connected to Car Top Inspection Station terminals 1X – 3A.

If this switch is opened:
- the car status screen will display '**SafStr**'.
- the fault code "173 CAR SAFTY 3A FLT " will be logged.

The car roped safeties are wired independent from the rest of the car safety string, while the rest of the car safety string is wired in series. This allows the safety input to be monitored and bypassed without affecting the rest of the car safety string.

If the Car Safeties are mechanically tripped, it may not be practical to directly jump out terminals 1X – 3A on the car top to electrically bypass the safeties. The controller setting '**CARSAFETY SW BYP**' may be used to temporarily bypass the T01 car safety string input in software to allow the car to run on inspection. This bypass feature is disabled while on Normal Operation to prevent unsafe use.

3.5.2.3 Emergency Exit Hatch Switch

The Emergency Exit Hatch switch is field connected to Car Top Inspection Station terminals 1X – 3E.

If this switch is opened:
- the car status screen will display '**SafStr**'.
- the fault code "174 CAR EMRGNCY EXIT" will be logged.

3.5.2.4 Car Top Stop Switch

The Car Top Stop switch is factory prewired to Car Top Inspection Station terminals 3E – 3Y. The switch contact is wired in series with the Fire Stop switch and monitored as one signal. If the input T03 goes low, both switches may need to be checked.

If this switch is opened:
- the car status screen will display '**CTStop**'.
- the fault code "151 CAR TOP STOP SW" will be logged.

3.5.2.5 Fire Stop Switch

The Fire Stop switch is field connected to Car Top Inspection Station terminals 3Y – 3 via the C.O.P. cable. The switch contact is wired in series with the Car Top Stop switch and monitored as one signal. If the input T03 goes low, both switches may need to be checked.

If this switch is opened:
- the car status screen will display '**CTStop**'.
- the fault code "151 CAR TOP STOP SW" will be logged.

Door operation is disabled by default when the fire stop switch is tripped. To meet a certain interpretation of ASME A'17 fire & safety code 2.27.3.3.1 (d), full door operation while on fire operation phase 2 may be enabled by turning on the controller setting '**FS2 FIRE STOP BYP**'.

3.5.2.6 In Car Stop Switch

The In Car Stop switch is field connected to Car Top Inspection Station terminals 3 – 3X via the C.O.P. cable.

If this switch is opened:
- the car status screen will display '**ICStop**'
- the fault code "153 IN CAR STOP SW" will be logged.

Depending on the applicable fire & safety code, the in-car stop switch may be bypassed during Fire Service Recall or Fire Operation Return operation. The bypass was permitted starting in ASME A'17.1 2000 code and discontinued in 2016 code. The bypass feature will be configured in the program when the controller setting '**2000+ FIRE CODE**' is turned ON and the setting '**2016+ FIRE CODE**' is turned OFF.

The code also permits bypassing of the in-car stop switch during anti-creep releveling, in the same manner the door contacts are bypassed.

Door operation is disabled by default when the in-car stop switch is tripped. To meet a certain interpretation of ASME A'17 fire & safety code 2.27.3.3.1 (d), full door operation while on fire operation phase 2 may be enabled by turning on the controller setting '**FS2 INCARSTOP BYP**'.

3.5.2.7 Car Gate Contacts

| Car Gate Contact | Terminal Connections | | MR-SIB |
	Common	Input TB	Input LED
Front Door	2	4	M05
Rear Door	2	4R	M06

Car Gate contacts are field connected to the Car Top Inspection Station terminals 2 – 4 (front) & 2 – 4R (rear), which are routed to the MR-SIB via the traveling cable. If a rear door is not present, the rear doors will be jumped out by the factory to complete the safety string.

3.5.2.8 Car Top Inspection Switch

The Car Top Inspection switch and run buttons are factory prewired to Car Top Inspection Station terminals as shown below. See schematic sheet VT1 for the circuit wiring.

| Car Top Inspection Signals | Terminal Connections | | CT-SIB |
	Common	Input TB	Input LED
Car Top Inspection/Normal	1X	23T/23Y	T09
Car Top Up Run	23T	25	T10
Car Top Enable	23T	23E	T11
Car Top Down Run	23T	24	T12

3.5.2.9 In-Car Inspection Switch

The In-Car Inspection switch and run buttons (when used) are factory prewired to Car Top Inspection Station terminals as shown below. See schematic sheet VT1 for the circuit wiring.

| In-Car Inspection Signals | Terminal Connections | | CT-SIB |
	Common	Input TB	Input LED
In-Car Inspection/Normal	23Y	23X/23B	T13
In-Car Up Run (if used)	23T	25X	T14
In-Car Down Run (if used)	23T	24X	T15

The most common way to run while using in-car inspection is to use the car call buttons 1C for down and 2C for up, or the attendant service up & down buttons if applicable. The controller setting '**INCAR INSP 1C&2C**' must be turned ON to enable this mode of operation.

When In-Car Inspection is not used, the car top terminals 23 – 23B are factory jumped to bypass the switch in the Normal position.

3.5.2.10 Hoistway Access Inspection Car Switch

The Inspection Access Car switch is field connected to Car Top Inspection Station terminals 23B, 23A, and 23 via the C.O.P. cable. This switch enables the Hoistway Access Run keyswitches at the top and bottom terminal landings (see Section 3.4.1.3).

| Hoistway Inspection Access Car Switch State | Terminal Connections | | CT-SIB |
	Common	Input TB	Input LED
Inspection State	23B	23A	T16
Normal State	23B	23	T07

3.5.2.11 **CT-SIB Normal Operation State**

The CT-SIB Normal Operation state is enabled when all inspection switch states are in the normal position. This provides power to car top terminal '**23**' which is routed to the machine room terminal '**23**' via the traveling cable. The CT-SIB Normal State is monitored by CT-SIB input T07, which enables the controller inspection and normal operation MR-SIB inputs M41 & M42 in the machine room.

> **NOTE: The controller will detect an error if multiple inspection signals are active, indicating a field wiring error.**

- If CT-SIB input T07 is ON, the CT-SIB inputs T09, T13 and T16 must all be OFF, and the MR-SIB inputs M41 and M42 are enabled.

- If CT-SIB input T07 is OFF, one and only one of the inputs T09, T13 and T16 must be ON, and the MR-SIB inputs M41 & M42 are disabled. If none of these inputs are ON, the factory jumper 23Y – 23B may be missing.

> **NOTE: If any signals above indicate an error, the controller will disable all modes of inspection and normal operation and be inoperable. This indicates a jumper or miswiring of an inspection switch or the traveling cable. Verify the inspection switches are wired as shown on schematic sheets VM3 & VT1.**
>
> **NOTE: Construction Mode may be used while the CT-SIB is not yet installed, so the rules for input T07 above do not apply. If all of the inspection signals are correct but the car will not run, make sure Construction Mode is properly turned off. (see Section 3.3.3.2)**

3.5.3 Door Operator Interface

VC provides the interface for all common door operator types, including:
- GAL MOVFR/MOVFE
- GAL MONXT
- GAL MOD
- MACSS
- TKE-HLDM
- Witter AMD
- Supra/Midi
- Power Freight (interface in machine room)

Other interfaces are available on request. The customer must provide documentation and signal requirements. On-site pictures can help, but model information and user manual are ideal. Information required:

- Door Operator Power Supply (115VAC or 230VAC or other)
- Signal Voltage Open/Close/Nudge (115VAC or 24VDC or other)
- Door Open/Close Limit Voltage (dry contact or 115VAC or 24VDC or other)

A MODSS interface board by VC can be used to power a standard 1/6 hp motor with an existing cam. Minor operator rewiring may be required.

Hand wired interface is not suited for Vision 2.0, due to serial communication traveling cable concerns. Consider using an interface board such as an MODSS or upgrade the operator.

3.5.3.1 **Door Operator Power Supply**

- VC provides the fusing and transformer(s) for the door operator supply per manufacturer specifications.

- Typical power configuration is 208/230VAC, but 120VAC or DC power can be provided where needed.

- Typical door operator power connections are made to terminals AC1 & AC2, and AC1R & AC2R for rear.

- Refer to the controller schematics sheet VT2 for specific power wiring information.

3.5.3.2 Door Open and Close Limit Switches

| Door Limit Signals | Terminal Connections | | CT-SIB |
	Common	Input TB	Input LED
Door Open Limit, Front	1X	7X	T29
Door Close Limit, Front	1X	8X	T30
Door Open Limit, Rear	1X	7XR	T25
Door Close Limit, Rear	1X	8XR	T26

The Door Open Limit & Door Close Limit Switch inputs on the CT-SIB are 120VAC by default. If a different voltage (such as 24VDC) is required by the operator, relays may be added to accommodate both the door operator and CT-SIB hardware.

The Door Open & Close Limit contacts should be N.C. The limit input goes low when a door is tripping the limit, which prevents the door from opening or closing past the limit. This allows the controller to determine the location of the door(s) as follows:

Actual Door State	Car Status Display	Door Open Limit State	Door Close Limit State
Fully Closed	CLSD	ON	OFF
Fully Open	OPEN	OFF	ON
Opening	OPNG	ON	ON
Closing	CLSG		
Stopped Ajar	AJAR		
Invalid State (miswire/no power)	DrLmt	OFF	OFF

If the door limit inputs indicate an invalid state:
- The limits may not be wired at all.
- The limits may be miswired/backwards, such as:
  o Door Open & Close Limits are swapped with each other.
  o Limits are wired using N.O. contacts.
- Common '1X' may be miswired or may have no power.

An invalid state will render the doors inoperable. The car will still be able to run if the car gate and hall door contacts are high.

While on Inspection, the Door Open and Close Limits are not required. Only door contacts are needed to run.

While on Normal Operation:
- The controller uses the door open limit for door lock monitoring (DLM) to detect jumpers on door contacts.
- The controller uses the door close limit for door position monitoring (DPM) and will not allow the car to run if the DCL input is high. This applies to ASME A'17.1 2000 code or later.

> NOTE: Many problems in operation can be attributed to failures in the Door Open or Close Limit Switches (including long door times, improper door operation on Fire Service, inability to go on or clear Fire Service, etc.). Always check the Door Open and Close Limit Switches if the elevator is operating unusually.
>
> NOTE: It is recommended that the Door Close Limit Switch be adjusted so as the doors are closing, the Car Gate Contact closes before the Door Close Limit opens. See the manufacturer's Door Operator Installation Instructions for further details on the adjustment of the doors.
>
> NOTE: If using a solid-state door operator unit, check the appropriate schematics to see if any changes are required on the actual operator. These may include changing resistors in the operator, and adding a diode and a power resistor for proper opening & closing torque adjustment.
>
> NOTE: The controller door open cutout switch effectively disables the door open limit state and prevents the door from opening. Car status will display "DoorKO".

3.5.3.3 Door Open, Close, and Nudging Outputs

Door Open, Close & Nudging Outputs are provided by the Car Top Safety Interface Board for both front and rear door operators (if used), per schematic sheet "VT2".

Door Control Signals	Car Top Terminal	CT-SIB Output LED
Door Open Output, Front	O	LT2
Door Close Output, Front	C	LT3
Door Nudging Output, Front	N	LT4
Door Open Output, Rear	OR	HT3
Door Close Output, Rear	CR	HT4
Door Nudging Output, Rear	NR	LT1
Door Signal Common (120VAC)	1X	(n/a)

The Signal Common on the door operator for these outputs is typically connected to terminal 1X, which provides a 120VAC reference to the operator input circuit. The controller then switches the outputs low (typically ground via TB:35) to energize the door operator inputs. Refer to the schematic sheet "VT2" for proper common wiring when a non-standard circuit is used.

> **NOTE: Consider running the door operator in manual mode prior to connecting the controller signals to verify operation.**
>
> **NOTE: The Door Open Output is restricted to the Door Zone, and the Door Close Output is disabled while on Inspection Access.**
>
> **NOTE: If the safety string opens while in Door Zone and Normal Operation, the door will be commanded to open.**
>
> **NOTE: The Door Close Output is energized while the car is running to help prevent door contacts and door close limit from bouncing while the car is moving.**
>
> **NOTE: If the car door is open while on inspection, the controller will attempt to auto-close the doors when commanded to run. Enable controller setting "NO CLOSE ON INSP" to prevent the door from auto-closing while on inspection. The Door Close Output will still energize while running.**

Door Nudging is standard while on fire service recall or medical emergency call to accommodate the lack of safety edge on modern door operators, per code.

To enable the door nudging timeout feature while on Normal Operation, turn on the controller settings '**DOOR NUDGING**' and '**TIMED EYE CUTOUT**'. With this enabled, when the door is held open by passengers for over 20 seconds (adjustable using controller parameter '**ICU CUTOUT TIME**'), the nudging buzzer will activate. Then the Infrared Curtain Unit will be disabled, allowing the door to close at reduced nudging speed, with only the door open button or safety edge input being able to reopen the door.

Custom door operation signals and sequences are available upon request.

See Section 7.1 for the complete list of available door settings and timer adjustments.

3.5.3.4 Infrared Curtain Unit (ICU)/Electric Eye & Safety Edge

The Infrared Curtain Unit, or combination of Electric Eye & Safety Edge devices, is field connected to Car Top Inspection Station terminals as shown below and per schematic sheet "VT2".

Door Reopening Signals	Terminal Connections		CT-SIB Input LED
	Common	Input TB	
Infrared Curtain Unit / Electric Eye, Front	1X	27E	T31
Safety Edge (if used), Front	1X	27S	T32
Infrared Curtain Unit / Electric Eye, Rear	1X	27ER	T27
Safety Edge (if used), Rear	1X	27SR	T28

While the Infrared Curtain Unit has largely replaced the legacy Electric Eye & Safety Edge devices in modern elevators, the Vision controller can accommodate either style of door reopening device.

While many passenger door operators have an ICU connection interface, the Vision 2.0 controller needs to receive the signal, whether it be routed through the door operator or connected directly from the device.

For power freight door (PFD) applications, do not connect to the Vision 2.0 controller. Connect directly to the PFD operator.

The Infrared Curtain Unit may be powered using the 120VAC car fixture supply, using terminals '1' & '35'.

The Infrared Curtain Unit and Electric Eye inputs 27E/27ER are disabled while on fire service.

The Safety Edge inputs 27S/27SR are always enabled and will reopen the door(s) indefinitely while active, even while on fire service.

When an Electric Eye is used, it will be hooked up to the same input as an Infrared Curtain Unit as they function the same way in the controller programming.

When a Safety Edge is used, optionally turn OFF the controller setting '**ENABLE I.C.U.**'. This will allow the doors to close at normal speed during a fire service recall, which is allowable by code. Otherwise leaving this setting ON by default will cause the door to close at nudging speed during a fire recall, which is typical and familiar regardless of the type of the equipped door reopening device.

The Infrared Curtain Unit may be configured to timeout by enabling the controller setting '**TIMED EYE CUTOUT**'. The timeout may be adjusted using controller timer setting '**ICU CUTOUT TIME**'. Turn OFF this setting to allow the door to stay open indefinitely while the 27E/27ER inputs are high (not applicable while on fire service).

> **NOTE: The Infrared Curtain Unit, Electric Eye, and Safety Edge inputs are not used on inspection.**

3.5.4 Car Lighting & Fan Circuit

The Vision 2.0 Car Top Inspection Station includes dedicated terminals for the 15A car lighting and fan circuit. See schematic sheets "VT2", "CTB", and "FC" for the complete circuit.

15A Circuit Devices	Car Top Terminal
115V Power (Hot)	115V
115V Power for Fan/Cab Light	PWR
Neutral	NEUT
Cab Light & Switch	LITE
Cab Fan & Switch (low)	FAN
Cab Fan & Switch (high)	SPX
Cab Fan & Switch (medium)	SPY

This 15A circuit (115V & NEUT) is used to power general circuits external to the controller, including:
- Fan
- Cab Lighting
- Car Top Lighting
- Car Top GFCI outlet
- Alarm Bell 6VDC power supply
- Miscellaneous car devices

3.5.4.1 Car Lighting & Fan Cutout Feature

Upon request, the car lighting and fan circuit (PWR & NEUT) may be disabled after the car is idle for 5 minutes (adjustable using controller timer '**CAR LIGHT CUTOUT TM**'). A '**LIT**' relay is provided in the Car Top Inspection Station to enable or disable power to this circuit using relay contacts.

The 'LIT' relay coil is driven by a controller output, which is configured based on available I/O in the car top. Refer to schematic sheet "VT2" to determine the job-specific car light and fan cutout circuit.

If CT-SIB output LT1 is available:
- Typical when doors are inline or freight.
- LIT relay coil is 120VAC.
- LIT relay coil is fully prewired by the factory to CT-SIB output LT1.
- No field connections or jumpers are required.

If no spare CT-SIB outputs are available:
- Typically applies to passenger doors w/rear openings.
- LIT relay coil is 24VDC.
- LIT relay coil is configured to a spare output in the C.O.P. I/O board #20, labeled output "LT".
- A field connection via the C.O.P. cable is required to connect "LT" in the car station to terminal "LT" in the car top to enable the LIT relay.

To disable the cutout feature:
- Jump terminals 115V – PWR to bypass the relay circuit.

3.5.5 Fire Light & Buzzer (Car Top)

The car top Fire Light & Buzzer are factory prewired to terminals '**81L**' & '**81B**' in the Car Top Inspection Station. When car top I/O is available, the terminals are factory prewired to CT-SIB outputs HT3 & HT4, which is typical when doors are inline or freight. If no spare CT-SIB outputs are available, a field connection via the C.O.P. cable is required to connect terminals '**81**' & '**81X**' in the car station to terminals '**81L**' & '**81B**' in the car top. Refer to the schematics sheet "VT2" & "CR1" for reference on whether a cross-connect is needed.

3.5.6 Alarm Bell

The Vision 2.0 Car Top Inspection Station includes dedicated terminals for the alarm bell & button circuit as shown below. See schematic sheets "CTB" and "FC" for the complete circuit.

Alarm Circuit Devices	Car Top Terminals	
+6VDC Power Supply Line	115V	NEUT
+6VDC Power Supply Load	AL1	ALX
Alarm Button	ALX	AL2
Alarm Bell	AL2	AL1

NOTE: Virigina Controls does not provide the 6VDC alarm bell power supply, only the alarm bell & terminals.

NOTE: Verify +/- polarity when connecting the 6VDC power supply. Reverse the power supply connections if bell does not sound when pressing the alarm button.

3.5.7 Load Weighing

> **NOTE: Vision 2.0 is compatible only with discrete dry contact signals from Load Weighing devices. Serial connections or analog signals are incompatible.**

The Load Weighing signals are field connected to Car Top Inspection Station terminals as shown below, and per schematic sheet VT2. Note the CT-SIB input may change based on available I/O configuration.

Load Weighing Signals	Terminal Connections		CT-SIB
	Common	Input TB	Input LED
Load Weighing Bypass	1X	LWB	T21
Load Weighing Overload	1X	LWO	T22
Load Weighing Antinuisance	1X	LWA	T23
Load Weighing Occupied	Available on Request (See Sht.VT2)		

Load Weighing Bypass – This N.O. input closes when load exceeds the threshold of ~50-80% capacity. When tripped, all hall calls are bypassed until the load is reduced. The elevator will only respond to car calls while in this state. The load is checked when the doors are fully open and begin closing and will hold this state until arriving at the next stop.

Load Weighing Overload – This N.O. input closes when load exceeds the threshold of ~90-100% capacity. When tripped, all car calls and hall calls will be disabled and the door will be held open until load is reduced. An output indicator in the C.O.P. and/or PI interface can help alert passengers to exit the car to allow it to run. The load is checked while the car is not running.

Load Weighing Antinuisance – This N.C. input closes when load is below the threshold of ~0-5% capacity. The controller checks if the quantity of car calls exceeds the maximum threshold given by the controller setting '**LW AntiNui CCMAX**'. If the number of calls exceed this threshold, all car calls are cleared. New car calls may be placed up until this threshold is reached again, allowing for a measure of operation in the event the load weighing system is out of calibration. The load is checked when the doors are fully open and begin closing.

Load Weighing Occupied – This N.O. input closes when load exceeds the threshold of ~0-5% capacity. When tripped, this state may provide a general indication if passengers are in the car. This signal is not recommended, as it is sensitive to the calibration of the Load Weighing device. It is recommended to use a visual system such as a camera to determine the state of occupancy.

3.5.8 Car Operating Panel (C.O.P.) I/O Connections (Board #20)

Car fixture inputs and outputs typically connect to Remote I/O boards mounted in the Car Operating Panel or on the car top. Inputs and outputs on the Remote I/O boards are 24VDC (or 120VAC available on request). Refer to schematic Sheets: CR1, CR2 & CR3 as needed. For specific connections to the assigned Remote I/O board on controller CANbus 0. Typical connections are shown in Table 5 below.

Table 5: Typical C.O.P. I/O Board Connections.

Inputs	TB	Input LED
Independent Service Switch	40	1
Car Call Buttons, 2nd Pole	28X	2
Fire Operation (Phase II) Switch	80, 88	3 or 4
Fire Operation Call Cancel Button	80 & 88	3 & 4
Door Open/Close Buttons	27, 28	5, 6
EMT/Hospital Service Switch	EMT	Varies
Attendant Service Switch	ATT	Varies
Car Call Buttons (1C, 2C, 3C…)	1C, 2C, 3C, …	9-16, …

Outputs	TB	Output LED
Passing Gong	39	1
Nudging Buzzer	92	2
Fire Operation Light/Buzzer	81, 81X	3, 4
Car Traveling Lanterns	83, 84	5 - 8
Car Call Lights	1C, 2C, 3C, …	9 – 16, …
EMT/Hospital Service Light/Buzzer	EMTL, EMTB	Varies
Position Indicators	1F, 2F, 3F, …	Varies
Direction Indicators	36, 37	Varies
Car Call Cutout Bypass Relay	CKO	Varies
Car Light & Fan Cutout Relay	LT	Varies
Barrier Free Gong	BFG	Varies

NOTE: Additional boards may be configured for additional I/O such as for car calls & auxiliary C.O.P. I/O. Refer to the schematic sheets CR1, CR2, CR3, … for job-specific wiring instructions.

3.6 Inspection Operation

To run the car on Inspection Operation, the safety string must be closed. The signals and requirements are similar to construction mode, with the primary difference being that communication with the CT-SIB in the car top being required.

The Safety String & Door Contact Signals M01-M07 & M09-M16 must be ON.

Input M08 (Door Zone) is not required to run on Inspection.

Note: The Bypass Switches may be used on Car Top Inspection or In-Car Inspection only.

The Oil Over-Temperature switch (MR-SIB input M23) and Phase Monitor signal (MR-SIB input M21) must be on.

The Motor Thermal Overload switch (TB:14P-TB:14M) must be jumped or closed.

For controllers not using a solid state starter, additional required signals include: Starting Contactor Safe (MR-SIB input M29) must be on, and the Motor Overload input (MR-SIB input M24) must be off to indicate the starter is ready and not faulted.

Only one Inspection Mode Input (Car Top: 23T, In-Car: 23X, Access: 23A, or Controller: 23) will be energized, and the Normal Operation Input (NRM) should be de-energized.

Press the Up Run and Enable Buttons for the appropriate Inspection mode. For example, Car Top Up Run signal (Terminal 25 / CT-SIB input T10) and Car Top Enable signal (Terminal 23E /CT-SIB T11) will set the Up Direction. The PMP and HM1 relay output will energize, causing the pump to start in preparation of an up run.

The controller will check that the Starting Contactor Safe signal (MR-SIB input M29) is off (does not apply if using soft starter), and then waits until the Up To Speed Input (M22) turns on approx. 1 second later. If this starting sequence is correct and the safety string is still fully closed, then the up run valve will energize.

Down direction behaves in a similar way with the Down Run Button, Down Direction indicator, and Down Run outputs. Note that the starter monitoring inputs are not checked for a down run, because the starter is not being used.

> **NOTE: If Hoistway Access is used to get on top of the car, then the doors will be open when Car Top Inspection is initiated. In this case, the doors will close when the Up (or Down) Run and Run (or Enable) buttons are pressed. If it is required that the doors should only operate manually on Inspection, then the Feature setting "NO CLOSE ON INSP" should be enabled. In this case the doors must be closed manually or by means of the Door Close button on the Door Operator (if provided).**

3.7 Vision 2.0 Door Zone Vane System

3.7.1 Description & Spec

The Vision 2.0 Door Zone Vane System uses an optical sensor to detect 6" door zone targets at each landing.

Purpose: The Door Zone System pairs with the ELGO Absolute Positioning System for learning the position of each floor level, and allows the doors to open independent from an ELGO APS failure.

Mounting Layout: The door zone sensor is mounted on the car top. Vanes are mounted to the rail at each landing.

Car Top Mounting kit: A highly adjustable car top mounting kit is designed to mount directly to the cross-head.

Vane Rail Kit: Each vane rail kit assembly offers +3" of vertical adjustment.

Fishplate Spanning Kit: A fishplate spanning assembly allows further vertical adjustment when a vane spans a rail joint.

Door Zone Sensor Specs:

- Make: CEDES
- Model: GLS 126 NT, NO
- IR optical switch, 24VDC, 120ma, 1ms, 1" gap.
- LED indicates presence of vane: OFF = vane detected.

Features:

- Optical Switch is Non-Contact with no moving parts.
- 1" x 1" Gap provides ample tolerance for car shifting.
- No magnets are required.

Door Zone Kit Contents:

- CEDES Door Zone Sensor
- Car Top Assembly (see Figure 4) – one per kit.
- Standard Vane Assembly (see Figure 5) – one per landing.
- Fishplate Spanning Vane Assembly (see Figure 6) – one for every 5 landings.

Figure 3 - Door Zone Sensor

NOTE: The ELGO APS sensor mounting bracket is part of the Car Top Assembly. Refer to the ELGO APS Installation Section 3.8.2 for specific ELGO tape and sensor installation instructions.

3.7.2 Car Top Mounting Kit Installation Procedure

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	VC0101	30" MOUNTING STRUT	3
2	VC0110	STRUT MOUNTING CLIP	4
3	VC0107	3' X 9' ADJUSTMENT PLATE	1
4	VC0109	CEDES DZ SENSOR BRACKET	1
5	CEDES	CEDES UNIT	1
6	VC0108	ELGO APS MOUNTING BRACKET	1
7	ELGO	ELGO UNIT	1
8	1_2 BOLT	1/2-13 X 1 5/8 BOLT	6
9	1_2 FLAT WASHER	1/2 FLAT WASHER	8
10	1_2 SPLIT WASHER	1/2 SPLIT WASHER	6
11	1_2 NUT	1/2-13 NUT	6
12	5_16 X1 BOLT	5/16-18 X 1 BOLT	2
13	5_16 BOLT	5/16-18 X 1 3/4 BOLT	2
14	5_16 SPLIT WASHER	5/16 SPLIT WASHER	4
15	5_16 FENDER WASHER	5/16 FENDER WASHER	2
16	5_16 NUT	5/16-18 NUT	4
17	5_16 FLAT WASHER	5/16 FLAT WASHER	6
18	M6 BOLT	M6-1X14 BOLT	4
19	M6 SPLIT WASHER	M6 SPLIT WASHER	4
20	M6 NUT	M6-1.0 NUT	4

Figure 4 – Car Top Assembly

1. Refer to Figure 4 for illustration of the completed car top assembly.

   NOTE: Do not tighten down all of the joints until after the sensor is fully aligned with the vane kit assembly on the rail.

2. Fasten two of the 30" Mounting Struts (#1) to the cross-head using the mounting clip (#2) and bolt kit parts (#8, 9, 10, 11).

3. Fasten the CEDES DZ Sensor Bracket (#4) to the 3' X 9' Adjustment Plate (#3) using 5/16" bolt kit parts (#12, 13, 14, 15, 16, 17).

4. Attach the Adjustment Plate (#3) to the third 30" Mounting Strut (#1) and the ELGO APS Mounting Bracket (#6) using 5/16" bolt kit parts (#12, 13, 14, 15, 16).

5. Fasten the mounting strut w/adjustment plate (#1, 3) to the cross-head struts using ½" bolt kit parts (#8, 9, 10, 11).

6. Mount the CEDES Door Zone Sensor (#5) to the CEDES Sensor Bracket (#4) using M6 nuts.

7. Mount the ELGO APS Sensor (#7) to the ELGO Mounting Bracket (#6) using the M6 bolt kit parts (#18, 19, 20). Note, the sensor arrow must be pointing down the hoistway, and the cable must be pointing up.

8. Adjust the car top brackets so that the CEDES and ELGO sensors are aligned with the rail. Further adjustment should be revisited after mounting the vane rail kits.

3.7.3 Vane Rail Kit Installation Procedure

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	BRACKET ASSEM1	DOOR ZONE VANE BRACKET	1
2	10_32 SCREW	SCREW, #10-32 X 0.750"	2
3	VANE	VANE	1

Figure 5 – Vane Assembly

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	BRACKET ASSEM1	DOOR ZONE VANE BRACKET	2
2	10_32 SCREW	SCREW, #10-32 X 0.750"	6
3	17_5 VANE BRACKET	17.5" VANE BRACKET	1
4	VANE	VANE	1
5	53090011	NUT, KEP, #10-32 X 3/8"	2
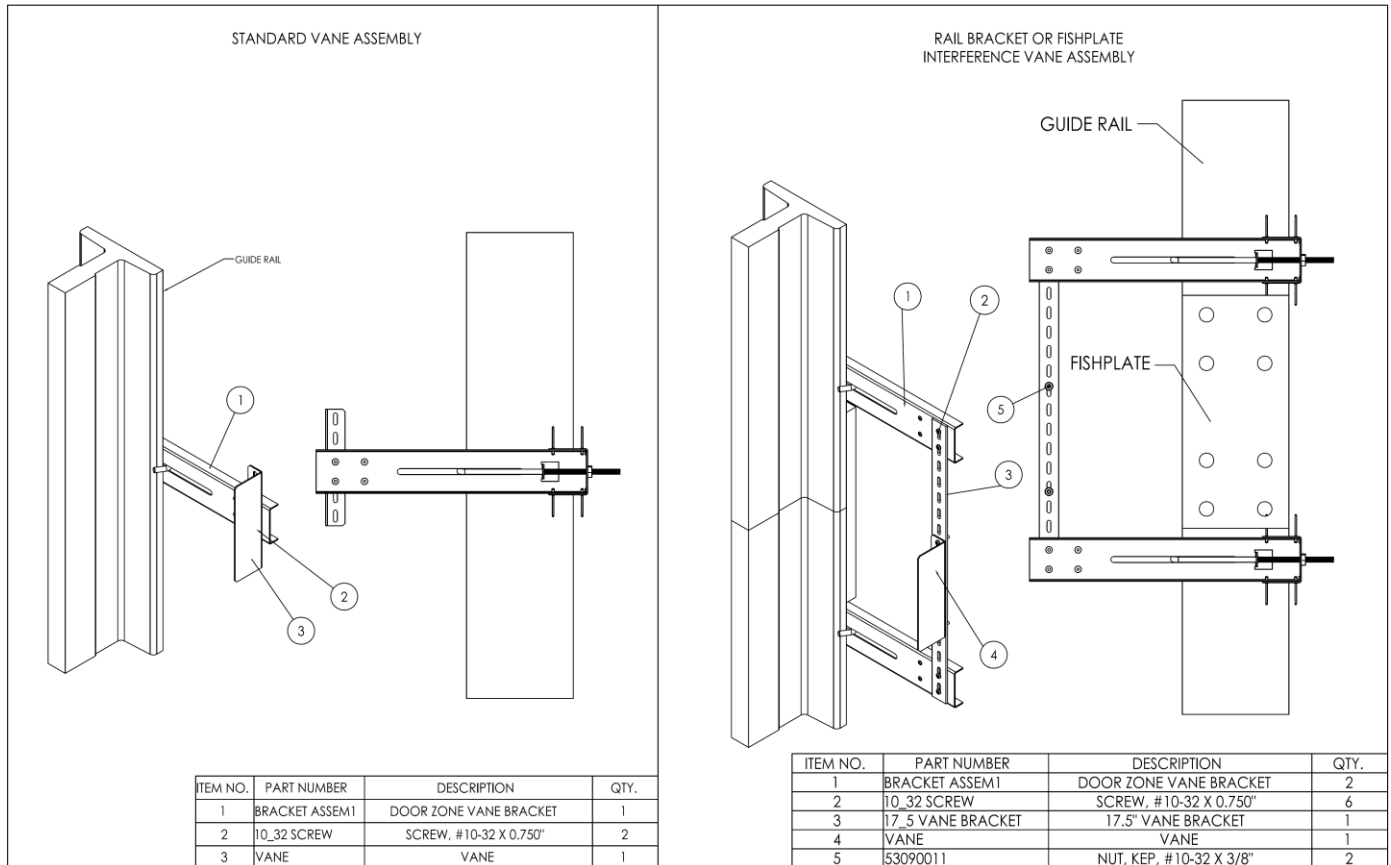
Figure 6 – Fishplate Spanning Vane Assembly

1. Refer to Figure 5 for an illustration of the completed vane rail kit assembly.

2. Fasten a vane (#3) to each Door Zone Vane Bracket using 10-32 bolts (#2) Note: the bracket is tapped.

3. Run the car on inspection to floor level at a particular landing, and mark where the vane should be centered vertically relative to the IR beam spot on the CEDES DZ sensor.

4. Run the car on inspection to a convenient position, and mount the vane bracket (#1) to the rail by tightening the spring clamp. Keep the vane (#3) loose, as to allow vertical adjustment in step 7.

5. Return the car to floor level, and align the car top bracket assembly and vane so they are centered horizontally within the CEDES sensor. The depth of the vane should also be centered in the U-channel.

6. Adjust the 6" vane vertically such that it is centered (+3") to the IR beam, which is 0.4" below the top edge of the U-channel.

> NOTE: The IR beam is not vertically centered within the U-channel. Consider the orientation of the CEDES DZ sensor (i.e. upside down) when centering each door zone vane around the IR beam.
>
> NOTE: Incorrect vane alignment may lead to excessive floor height adjustment during the ELGO learn procedure. Any vane that is more than 1" off-center will require adjustment and a relearn at all applicable landings.

7. Tighten the car top brackets to lock down the horizontal and depth alignment.

8. Repeat Steps 3-6 to install door zone vanes at all landings.

9. For any landings where the vane rail bracket is obstructed by a fish plate at a rail joint, an additional vane rail bracket and 17.5" Extension Plate may be used to span the gap and provide a mounting location for the vane. Refer to the following steps 10-13 where applicable.

3.7.4 Fish Plate Spanning Installation Procedure:

10. Refer to Figure 6 for illustration of the completed fish plate spanning vane rail kit assembly.
11. Mount two rail brackets (#1) to the rail, one above and one below the fish plate at the rail joint.
12. Fasten the 17.5" Extension Plate (#3) to each of the two rail brackets (#1) using 10-32 bolts (#2).
13. Align the Door Zone Vane (#4) to be vertically centered to the CEDES DZ IR Beam while at floor level, and mount using 10-32 bolt kit (#2, 5).

3.7.5 Test the CEDES Door Zone Sensor

NOTE: Refer to the ELGO APS Installation Section 3.9 for testing and adjusting the ELGO APS System.

14. Route the CEDES Door Zone Sensor cable to the car top box, and wire as follows:
    - Brown – 24V, power.
    - Black – 20X, signal.
    - Blue – COM, common.
        (Refer to controller schematics for specific details).

15. Power up the controller and verify the Vision Car Top Inspection Station has power.
16. Verify the LED on the CEDES DZ Sensor is ON while there is nothing in the IR beam.
17. Run the car to a floor such that the Door Zone Vane breaks the IR beam, and verify:
    - The sensor LED turns OFF.
    - The DZ relay turns ON.
    - The Car Top Safety Interface Board (CT-SIB) input LED T08 turns ON.
    - The Machine Room Interface Board (MR-SIB) input LED M08 turns ON.

NOTE: If any signal fails to read, verify wiring or contact VC for technical support.

18. Run to each floor and verify the door zone signals. Adjust where needed.

3.8 ELGO Absolute Positioning System Installation

3.8.1 ELGO LIMAX22 DUE Installation

The ELGO LIMAX22 DUE magnetic tape can be mounted vertically in any quadrant in the shaft, and the sensor head can be mounted onto the car body or car frame. The following installation instructions are provided for mounting and alignment guidelines. Refer to the ELGO LIMAX22 DUE User Manual for further details.

The upper fixation of the magnetic tape is via a rail crossbeam on the top guide rail. The required tensioning of the tape is provided by a tape spring (see Figure 7 below) at the bottom crossbeam and guide rail. A broken tape switch (see Figure 7 below) is mounted above the spring. The switch will stop the car and alert the controller of a broken tape.
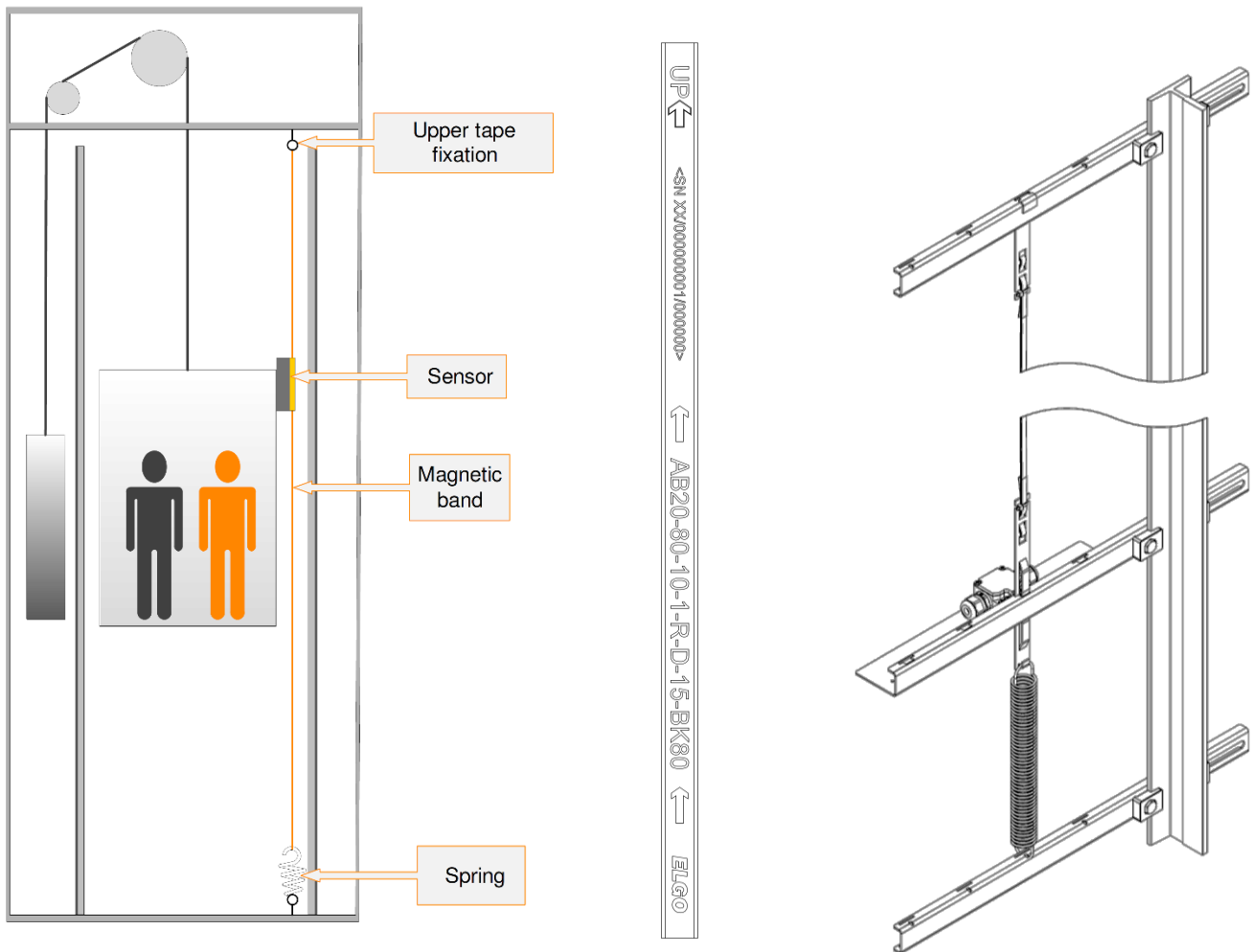
Figure 7: Tape installation with tension spring (left). The "UP" arrow notation on magnetic tape (center) and "TOP" designation on sensor head indicates the direction towards the top of the shaft. The tape mounting assembly includes a broken tape switch (right).

During placement of the magnetic tape in the sensor head, pay attention to the markings on tape & head that point to the top of the shaft. "UP" arrows printed on the magnetic tape and proper sensor head orientation provide positive APS counting during upward travel in the shaft.

WARNING: Wrong orientation of tape vs. sensor head will yield incorrect position readings!

3.8.2 ELGO Tape Mounting & Broken Tape Switch Installation

Figure 8: Mounting Upper Crossbeam

> Install a crossbeam in the top of the shaft by using rail clips. Make sure the clips' screws are securely tightened to at least 15 ft-lb, so crossbeam does not move. Drop the top tape clamp into a slot of the crossbeam as shown. Use any slot provided depending on the installation, however the tape positions closest to the guide rail are preferred.

Figure 9: Attaching Upper End of Tape

> This step is done with the top tape clamp mounted to the crossbeam. Thread the tape through the clamp and back down, as shown. Mind the orientation of the tape – the magnet side must face the sensor body later on. Basically, the fixture works like a self-locking belt. Leave at least 8" of tape at the top end. Press the loops flat in the clamp. There should be a bend in the upper loop. At the end, secure the tape with a cable tie at the bottom of the clamp (see Figure 11).

Figure 10: Attaching Lower End of Tape

> After tape is hung from top cross-beam, unroll the tape while running the car down the hoistway on inspection speed. Attach the lower tape clamp for the broken tape switch to the lower end of tape. Leave at least 8" at the lower end and press the loop flat in the clamp. There should be a break in the lower loop. At the end, secure the tape with a cable tie at the top of the clamp. (See Figure 11).

Figure 8: Mounting Upper Crossbeam

Figure 9: Attaching Upper End of Tape
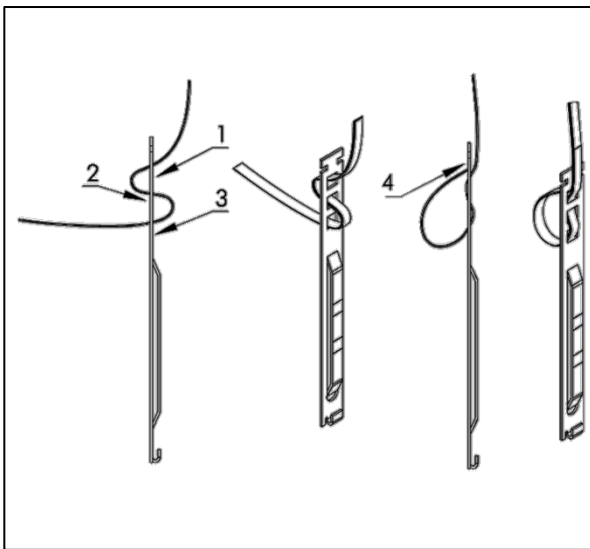
Figure 10: Attaching Lower End of Tape

Figure 11: Securing Tape with Cable Ties

Figure 12: Mounting Lower Crossbeam

Install a second crossbeam in the shaft pit with a spring tensioning distance A = 12" +0.5" below the bottom tape clamp. Make sure that the screws are well tightened to at least 15 ft-lb, so that the crossbeam does not move.

Figure 13: Mounting Broken Tape Switch

The broken tape switch should be (pre-)mounted to third (middle) crossbeam prior to attachment to the guide rail. Mount cable screw-clamp connections (1 or 2 pieces) to the broken tape switch. Align back of switch with the back edge of the metal crossbeam (see arrow). Then, fasten/tighten with screws at 25in-lbs. The broken tape switch may be wired before mounting if desired.
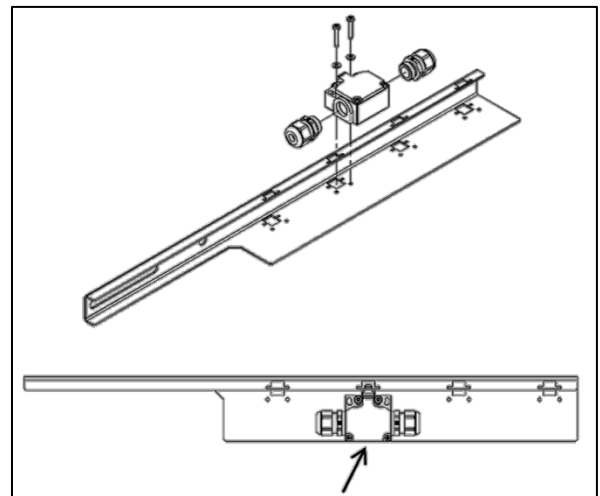
Figure 14: Mounting Tape Switch Crossbeam

Mount the third (middle) crossbeam with the pre-mounted broken tape switch to the guide rail. Vertically align the tape switch to be centered on the lower tape clamp. Fasten the rail clip screws only so tight so that the crossbeam can be moved later for adjustment.

Figure 15: Mounting Tape Tension Spring

Insert lower tape clamp through corresponding slot of tape switch crossbeam, then clip onto tensioning spring of lower crossbeam. (Spring will elongate by 3.5" for 17-22Lbs tension.) Verify spring is correctly placed in the lower crossbeam hole (detail A).

Figure 12: Mounting Lower Crossbeam

Figure 13: Mounting Broken Tape Switch

alternative assembly

Figure 14: Mounting Tape Switch Crossbeam

A

A
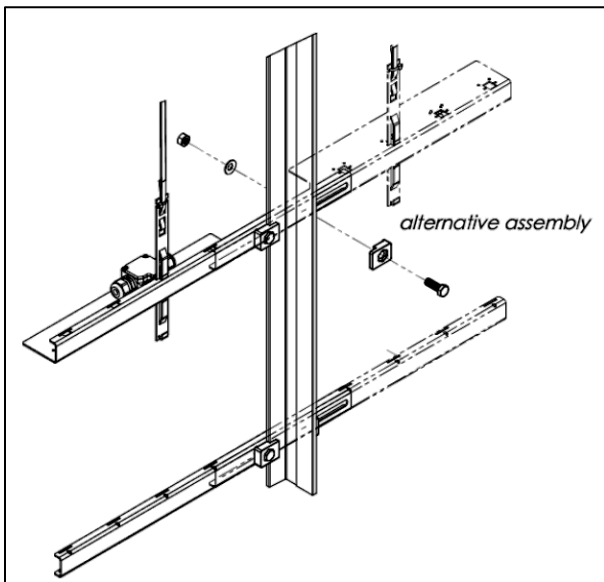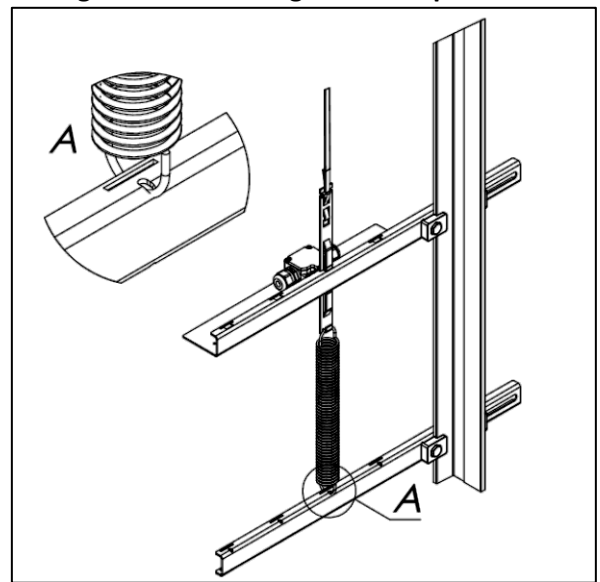
Figure 15: Mounting Tape Tension Spring

Figure 16: Vertical Alignment of Broken Tape Switch

Adjust the height of the tape switch (middle) crossbeam in such a way that only one marking, top & bottom, can be seen on the actuator cam of the lower tape clamp (see detail A). The crossbeam must be mounted perpendicular (90° angle) to the guide rail. When this crossbeam has been correctly positioned, tighten its rail clip screws to 15 ft-lb ensuring the crossbeam does not move.

Warning: incorrect positioning of middle crossbeam can compromise the effectiveness of the broken tape switch.
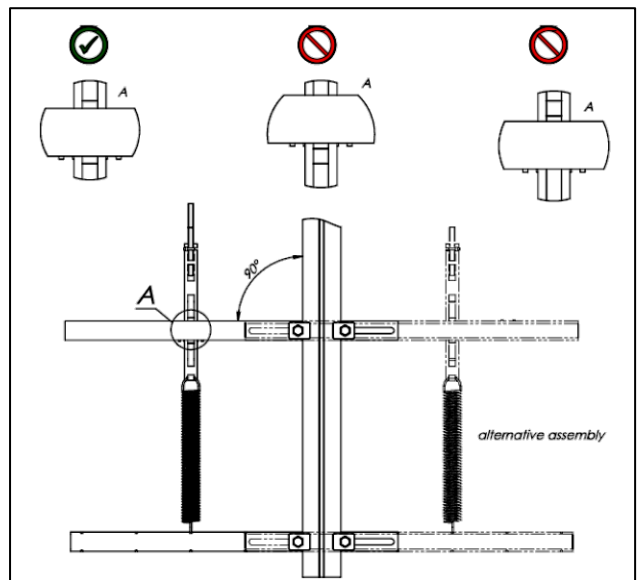
Figure 16: Vertical Alignment of Broken Tape Switch

Figure 17: Activating Broken Tape Switch

Next, the broken tape switch must be activated. To do this, use a screwdriver to pull out the actuator. Take care not to damage the rubber sleeve on the actuator. This ends the installation.
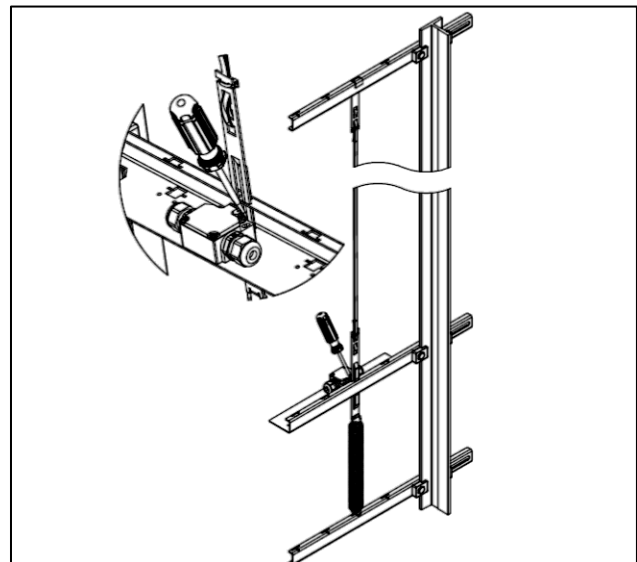
Figure 17: Activating Broken Tape Switch

3.8.3 ELGO Hardware Installation Considerations

The magnetic band on the steel tape is not designed to withstand excessive mechanical wear. It is important therefore to install the system so that mechanical contact between tape and head is between the steel side of the tape and the polymer sensor head guide. These two materials are specifically paired for this application.

Avoiding contact between the magnetic band of the tape and the sensor head can be achieved with a perfectly vertical/parallel installation of the tape, yet in reality this is not practicable. It is preferable therefore to install the tape with a horizontal offset from the sensor head. This arrangement causes slight contact between the steel side of the tape and the polymer guide of the sensor head during operation, and provides for optimal performance of the system.
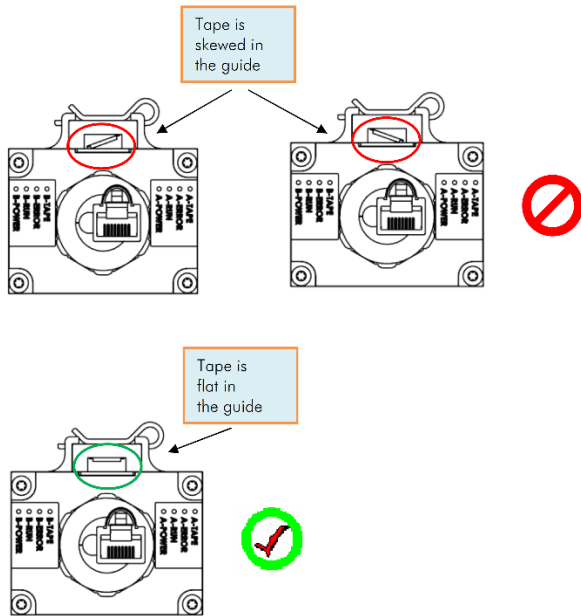
Figure 18: Angular Alignment Guideline
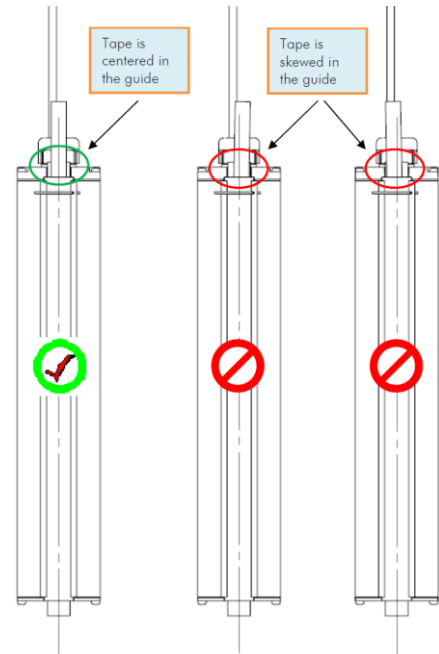
Figure 19: Perpendicular Alignment Guideline
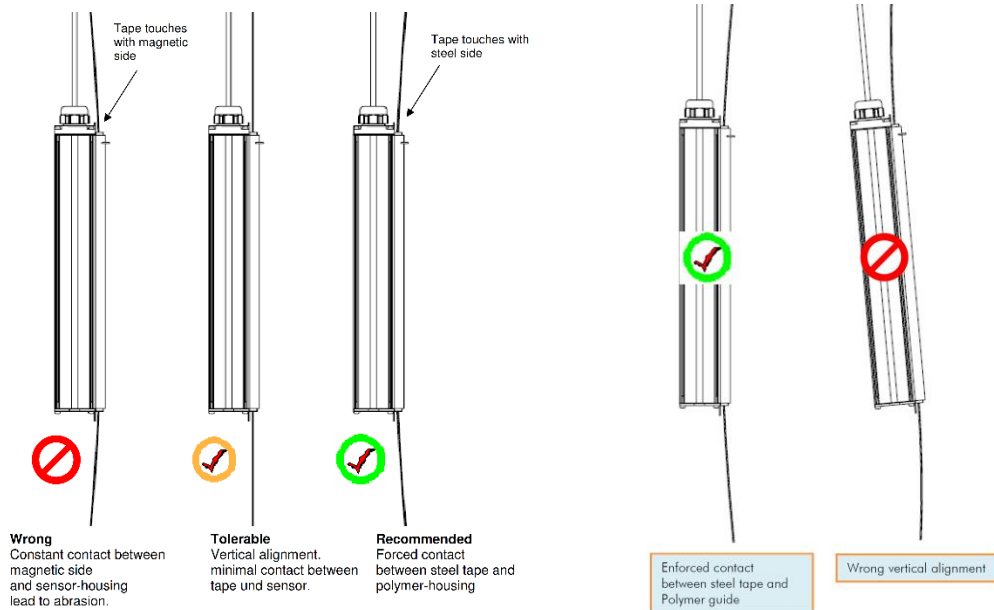
Figure 20: Horizontal Offset Alignment Guideline.

3.8.4 ELGO Sensor Head Installation

Locate the optimal installation space for tape and sensor. Placement is possible at any position in the hoistway.

1. Check for correct orientation of the tape – "UP" arrows on magnetic side must point upward. The magnetic side of the tape must face the sensor head. Refer to Section 3.8.2 for tape assembly mounting instructions.

2. Run the car to the middle of the hoistway on inspection speed.

3. Attach the sensor head to the top of the car using the angle mounting bracket provided. The end of the head with the cable outlet and LEDs must face upward.

4. Adjust the sensor head using the magnetic tape as a reference. First, align the centerline of the head to the centerline of the tape.

5. Adjust now the distance between sensor head and tape. Up to a travel height of 165ft, we recommend an offset of at least 0.6" (15mm). This will ensure steady contact between the steel side of the tape and the polymer guide of the sensor. In higher installations this distance may be increased. (See Figure 20.)

    Pay attention to the perpendicular alignment of the sensor head. Misalignment will cause wear. (See Figure 19.)

6. To attach the tape to the sensor, carefully loosen the cotter key and release/hold the polymer guide. Insert the tape and re-attach the guide with cotter key with the tape in position.

7. Check for proper alignment of tape vs. sensor. Any angular offset should be corrected. (See Figure 18-Figure 20 above.)

8. INSTALLATION CHECK: Values for tape tension and offset between tape and sensor head are guidelines based on experience. In any case, a proper check after installation is mandatory. Contact between the magnetic side of the tape and the sensor head anywhere throughout the hoistway must absolutely be avoided.

    Run an inspection trip the entire length of the hoistway. Observe the system paying attention to the respective positions of tape and sensor. You have achieved an optimal installation if the steel side of the tape is constantly but slightly pressed against the polymer guide of the sensor. At several points in the hoistway, double-check the bottom side of the sensor head. If the sensor is tilted it may look good on top but the tape can still grind along the bottom edge of the sensor. (See Figure 20.)

    After completion of the installation, clean the magnetic tape. Starting at the top of the hoistway, run down on inspection the complete travel distance pulling the magnet band through a dry cloth. Repeat the cleaning process before putting the elevator into service near the completion of the installation.

    Be specifically alert if steel construction work is taking place in the hoistway. Steel particles released by grinding, welding, or such work will adhere to the magnetic band. Clean this debris off instantly as it may have an effect similar to sand paper.

3.9 ELGO Absolute Positioning System Set-Up

3.9.1 Absolute Positioning System Software Configuration

After ELGO APS and Door Zone hardware installation is complete, the controller will need to learn the absolute position of the hoistway. Before following this learn run procedure, become familiar with the ELGO Menu screens for viewing CANbus 1 data '**I/O Status – CAN BUS 1 ELGO APS**' (Section 6.1.10), setting ELGO parameters '**Edit ELGO APS**' (Section 6.1.4.10), and viewing floor position learn data '**Display ELGO Floor Height Data**' (Section 6.1.12).

3.9.1.1 ELGO APS Virtual Input Signals

The controller CPU processes position data from the ELGO sensor and computes various positioning states, replacing the need for hardware terminal limit switch inputs as shown in Table 6.

Table 6: ELGO APS Virtually Generated Selector Signals.

ELGO Virtual Input Signals	Equivalent Terminals	State during ELGO Fault
Up/Down Level	30, 33	OFF
Up/Down Slowdowns	31, 32	OFF
Up/Down Top/Bottom Access Zones	TU, TD, BU, BD	OFF
Floor Reset Switches	1FP, 2FP, 3FP,…	OFF
Up/Down Normal Limits	14, 16	ON
Up/Down Slowdown Limits	18, 19	OFF
Door Zone	20	OFF

The position of each virtual input signal is computed relative to the center of a learned door zone signal at each landing. The computed door zone must be learned from a physical door zone input provided externally by a hardware door zone switch input (terminal 20 / MR-SIB input M08).

If data or communication from the ELGO sensor experiences a malfunction, or if learn data is not calibrated properly, the Vision 2.0 CPU will register a fault and set the ELGO virtual input signals to the state shown in Table 6. In general, during a faulted state, all ELGO input signals are turned OFF with the exception of the Up and Down Normal Limits. The Normal limits are enabled in order to allow the car to be moved on Inspection operation, or home to the nearest door zone while on Normal Operation at slow speed and automatically go into Shutdown.

3.9.1.2 ELGO APS Learn Procedure

The ELGO APS reads position data using two sensors within the ELGO Limax unit (channels A & B). These sensors are offset by a distance of 40mm. Position data for both channel A & B sensors is recorded simultaneously during a learn run. The Vision 2.0 CPU evaluates data from each channel to ensure the ELGO APS is functioning properly.

Verify ELGO Communication Status

1. Ensure that the ELGO sensor is connected to the RJ-45 port of the CT-SIB per the schematic page VT3, and that the ELGO hardware status LEDs are in the correct operational state (see Section 5.11.3). The traveler connections for '**APS CAN1**' should be made at both ends, terminating directly on the MR-SIB and CT-SIB.

```
CAN BUS 1 ELGO APS A
Position     Velocity
 12345mm       123mm/s
100' 10.0"   123.4fpm
```

2. Using the Vision 2.0 CPU screen and keypad, navigate to the '**Show I/O Status**' Menu, and press `1` to view the '**CAN BUS 1 ELGO APS**' screen. Verify that position and velocity data is being read on line 3 (in mm). The position data should read anywhere from 0mm to 260000mm depending on the section of tape being used. The data on the screen is blank if CANbus communication is not established or wired properly.

3. While on the '**Show I/O Status**' screen, verify that the channel "B" position data is 40mm greater than the channel "A" position data. Use the `Nxt` and `Prv` keys to switch between channel "A" and "B".

4. Run the controller on inspection, and verify that the position data on line 3 increases smoothly and that velocity is positive while moving up, and vice versa while moving down.

> **NOTE: If the controller does not move on inspection or is unable to move in one direction, use the ELGO Settings Menu to reset all ELGO settings and clear all position data. Ensure that the Normal or Slowdown limit bypass inputs M25, M26, M27 and M28 are OFF.**

Begin Learn Procedure

5. Ensure that all physical hardware door zone targets are installed and centered such that the door zone sensor is in the middle of each target while at floor level. Fine tuning adjustments of up to 1.0" are allowed. If any door zone target is misaligned outside of 1.0", that target will need to be re-aligned and relearned. Refer to Section 3.9.4 to relearn a single landing as needed, or redo the full hoistway scan learn procedure.

6. Move the car on inspection to floor level of the bottom terminal landing. This will establish the 0' 0" position height, relative to the other floor positions.

> **NOTE: The controller must be on inspection before enabling ELGO APS Learn. ELGO APS Learn is disabled while on Normal Operation.**

7. Navigate to the '**Edit ELGO APS**' screen in the '**Setup Menu**' and press `Ent`. Type the default password 911. Press `Ent` to continue.

```
ELGO APS Learn    Off
Dead Zone Rng    0.2"
Floor To Edit      1
Trim Offset     +0.1"
```

8. With the cursor selected on '**ELGO APS Learn**', press `Ent` to edit this parameter, and press `1` to set this value to "On". Press `Ent` to confirm, which will initiate the learn operation. At any time, the learn may be cancelled by editing and setting this parameter to "Off" by pressing `0` and `Ent` to confirm.

During Learn Run

9. Run the car up on inspection at slow speed until reaching the bottom edge of the top landing door zone.

10. The system actively monitors the ELGO position data while stopped or running up, but the learn mode will be invalidated and cancelled if the system is commanded to run down on inspection. Feel free to stop running the car during the learn run, but resume running up so that the learn mode is not cancelled. Additionally, no timeout will cancel the learn run while the car is stopped.

> **NOTE: Fast speed is disabled during a learn run in order to accurately read the top and bottom edge of each door zone signal as the car passes each floor.**

11. As the car passes each landing, the system will measure and record the bottom edge of each door zone target. The system will automatically increment the floor position each time the door zone input signal is toggled high then low. The bottom landing floor level is computed as 3" below the top edge of the bottom door zone. The floor level at intermediate and top landings are computed as 3" above the bottom edge of each door zone input signal.

> **WARNING If a door zone signal is skipped or if the signal flickers multiple times while passing a floor, the learn data will not compute the correct floor position, and learn procedure must be redone.**

Completing the Learn Run

12. Once the bottom edge of the top terminal landing door zone is registered, the learn operation will automatically end, and the screen will update the display to '**ELGO APS Learn Off**'. The car will stop and the newly calculated positioning signals become active, including the normal limits, etc. Normal Operation may now be enabled and the car may now run floor to floor using car calls and hall calls.

13. Press Esc to exit the ELGO APS Setup Menu, and press 1 to save the floor height data.

> **WARNING: If the screen updated to "Off" before reaching the top terminal landing door zone, there was likely a problem with reading the door zone signal, or the learn was cancelled by the user exiting the setup menu, or by running down.**
>
> **If the screen still reads "ELGO APS Learn On" after reaching the top terminal landing, then the controller is trying to look for a door zone signal at an additional landing. This implies there was a problem with reading the door zone signal at one (or more) of the landings, or the Learn operation was not started at the bottom terminal landing, so the controller is out of sync.**

Fine Adjustment of Floor Level / Dead Zone

14. Navigate to the '**Display ELGO Floor Height Data**' menu screen. These position values are what the ELGO system has measured as the mid-point of the 6" Door Zone targets, and will use for floor level at each landing. Verify that the floor table shows data that accurately represents the travel length between floors. See example below:

```
Floor  1     0' 0.1"
Floor  2     8' 5.9"
Floor  3    17'11.7"
Floor  4    25' 3.5"
```

> **NOTE: The displayed values are calibrated such that 0' 0.0" is defined as the controller position at the start of the Learn operation. It is not necessary for floor level for Floor 1 to be exactly 0' 0.0", since the actual floor level is computed as 3" below the top edge of door zone.**

15. Run the car to each floor on Normal Operation and observe where the car stops after leveling into each floor. Measure the position of the car relative to actual floor level (in inches or millimeters) which can be adjusted in the next steps. If the car stops more than $\pm$ 1.0" above or below the floor, then the door zone target is not properly centered to floor level. After adjusting the door zone target(s), refer to Section 3.9.4 to relearn a single landing as needed, or redo the full hoistway scan learn procedure (steps 1-9).

> **NOTE: To accurately determine the exact floor level correction offset at each landing, use the "Show I/O Status" screen to record the exact position of the car (in mm) while stopped on Normal Operation. Then move the car on inspection to exact floor level and record this new car position (in**

mm). The difference between position values yields the correction offset values to be used in steps 12-14.

WARNING: The floor heights must be adjusted to ensure the car stops within 1/8" of floor level to eliminate a tripping hazard. Even if door zone appears exactly centered, the floor heights must be manually inspected due to potential variation on how the door zone targets are measured during the learn operation.

```
ELGO APS Learn    Off
Dead Zone Rng    0.2"
Floor To Edit      1
Trim Offset     +0.1"
```

16. Navigate to the '**Edit ELGO APS**' screen in the '**Setup Menu**'. Scroll down to the '**Floor To Edit**' item in the menu using `Prv`, and press `Ent` to go into edit mode. Then select the floor number to adjust by pressing the number key of the floor number, and press `Ent` to confirm.

17. Scroll down one line to '**Trim Offset**', which represents the currently saved offset for the floor number selected in the '**Floor To Edit**' line above. To edit different floors, simply change the '**Floor To Edit**' to the desired floor, and edit the '**Trim Offset**' value.

18. Press `Ent` to go into edit mode, then use `Nxt` and `Prv` to increase or decrease the floor height position given by '**Floor To Edit**' by 0.1" per button press. Use `Nxt` to raise the floor height if the car is stopping too low, and use `Prv` to lower the floor height if the car is stopping too high. The floor height position at each floor may be fine adjusted up to +/- 1.0".

19. The entered offset is added to the saved floor height, so a positive offset value will increase the floor height and a negative offset value will decrease the floor height. After changing the offset values, the floor position values on the '**Display ELGO Floor Height Data**' will update to reflect that offset for each respective landing.

NOTE: After adjusting and confirming the Trim Offset while the car is at the updated floor, the car will immediately relevel while on Normal Operation. To accurately verify floor level, run the car away and call it back to the floor to observe the stopping position after a full-speed run from both directions.

20. Repeat steps 17-19 for the remaining landings.

Configure Leveling and Slowdown Positions

21. Navigate to the '**Display Car Top & ELGO APS Data**' menu screen, which displays current state of the Up/Down Leveling, Slowdowns, Normal Limits, Slowdown Limits, Access Zones, and Floor Switches computed by the APS data.

22. Verify that the values of each target are in the correct state while moving throughout the shaft. All positions are computed relative to the floor position values given by the '**Display ELGO Floor Height Data**' menu, and relative positions may be adjusted using the '**Edit ELGO APS**' menu.

23. To adjust the positions of the selector signals, use the '**Edit ELGO APS**' menu, and refer to Table 7 for specific adjustment details. Initial ELGO settings are set by the factory, as listed in the "Default" column.

3.9.1.3 Edit ELGO APS Setup Menu Parameters

Table 7: ELGO APS Adjustable Settings Menu Parameter Descriptions.

Menu Item	Unit	Min	Max	Default	Description
`ELGO APS Learn`	n/a	n/a	n/a	OFF	Initiates learn mode.
`Dead Zone Rng`	inch	0.1	0.9	0.5"	Width of Dead Zone range, which defines edge of leveling.
`Floor To Edit`	floor	1	Top Ldg	1	Select the floor to be edited using 'Trim Offset'.
`Trim Offset`	inch	-1.0	1.0	0.0"	Floor level offset value for the floor # in 'Floor To Edit'.
`Relevel Offset`	inch	0.0	0.4	0.0"	Leveling offset within Dead Zone (use to center leveling).
`1 Floor Learn`	n/a	n/a	n/a	OFF	Initiates a relearn at a particular floor in 'Floor To Edit'
`Up Level Range`	inch	4.0	12.0	6.0"	Width of Up Level, starting from lower edge of Dead Zone.
`Dn Level Range`	inch	4.0	12.0	6.0"	Width of Down Level, from upper edge of Dead Zone.
`UHS Distance`	inch	6.0	255	6" per 25fpm	Distance of Up Slowdown from below floor level.
`DHS Distance`	inch	6.0	255	6" per 25fpm	Distance of Down Slowdown from above floor level.
`Acc Top Range`	feet	1.0	20.0	8.0'	Length of top landing TU & TD Inspection Access Zones.
`Acc Bot Range`	feet	1.0	20.0	8.0'	Length of bottom landing BU & BD Inspection Access Zones.
`Access Offset`	inch	0.0	36.0	6.0"	The Up and Down Access Zone offset defines how far the car can drift out of a zone, while still being able to run in the opposite direction.
`UHS Limit Dist`	inch	6.0	255	6" per 25fpm minus 1"	Distance of Up Slow Limit below top terminal landing floor level.
`DHS Limit Dist`	inch	6.0	255	6" per 25fpm minus 1"	Distance of Down Slow Limit above bottom terminal landing floor level.
`RESET ELGO SET`	n/a	n/a	n/a	n/a	Use to reset all ELGO settings parameters to factory default.
`CLEAR ELGO DAT`	n/a	n/a	n/a	n/a	Clears all ELGO floor position data. A relearn operation is required.

> **NOTE: The Terminal Limits (Up Normal & Down Normal) are set to 1" from floor level at the terminal landing. This is not adjustable. The Normal Limits are bypassed by default when ELGO is not installed and/or learned. See Section 14.8 to bypass the Normal Limits during a safety test.**

3.9.2 ELGO APS Faults

In general, ELGO APS faults will cause all APS signals to be disabled, while enabling the Up and Down Normal limits, allowing the car to run on inspection or level down to the nearest door zone while on Normal Operation. During an ELGO fault, the '**Car Status**' screen on the Vision 2.0 CPU displays '**ELGO-Err**'. Clearing an ELGO fault requires a manual reset using the Fault Reset input (1X - RST). If the fault does not clear, the ELGO data must be relearned using the ELGO APS Learn Procedure.

3.9.2.1 Door Zone Mismatch

Car Status Display: '**DZ-Error**'

The hardware door zone (Terminal '**20**', MR-SIB input M08) is cross-checked with the virtual door zone position saved during the ELGO APS Learn Operation. The hardware door zone input is used by the controller logic to represent actual door zone, while the virtual door zone target is used as a position reference for all other selector signals. Only the hardware door zone input is used to allow the doors to open, while the virtual door zone is used to determine floor level position. If the hardware and virtual door zone states do not agree during normal operation, this will trigger a Door Zone Mismatch Fault and the controller shuts down. The cause of this

fault may be a malfunctioning or misaligned door zone switch, or the APS position is not properly calibrated. The mismatch fault is checked while at floor level or between floors, being disabled while in leveling, where both the hardware and virtual door zones are expected to transition. See the table below for the expected behavior for a given Virtual and Hardware Door Zone state.

Table 8: Virtual and Hardware Door Zone States.

Position	Virtual DZ State	Hardware DZ State	Description
Dead Zone (not Leveling)	ON	ON	Correct State
	ON	OFF	Faulted State – While on Normal Operation, the car levels down until Hardware DZ = ON.
Leveling Zone	n/a	n/a	DZ states not checked while transitioning during Leveling.
Outside Leveling	OFF	OFF	Correct State
	OFF	ON	Faulted State – Car shuts down while Hardware DZ = ON

3.9.2.2 ELGO Sensor Communication Error

Car Status display: '**ELGO-COMM**'

A communication error between an ELGO APS sensor and the controller CPU or CT-SIB prevents position data from being updated, and causes the controller to disable its APS signals and go on Shutdown. If the system is outside of door zone, it will seek a floor by leveling down until it detects a hardware door zone signal. The system then goes into Shutdown while the communication error persists. If communication is restored with no other fault conditions present, the controller will resume normal operation.

3.9.2.3 ELGO Position Offset Mismatch

Car Status display: '**ELGO-Err**'

The two ELGO APS sensors are positioned 40mm apart within the sensor head, and the controller CPU verifies that the difference between received position data from both sensors is within tolerance, where ELGO channel "B" position data is 40mm greater than ELGO channel "A" position data. If the data compared by the sensors significantly deviates from 40mm while moving, an ELGO Offset Fault is triggered, and the system will stop and level down to the nearest door zone, and go on Shutdown. An ELGO Offset Fault may also be registered if either ELGO Sensor position data is out-of-bounds of either the bottom or top terminal position by +/- 1000 mm.

In practice, this fault should not occur unless the ELGO sensors are installed incorrectly, the ELGO tape is damaged or defective, or if one of the sensors cannot properly read the tape.

3.9.2.4 ELGO Tape Switch Fault

Car Status display: '**PitStp**'

The integrity of the ELGO APS encoded magnetic tape is monitored by a tape alignment switch, which will open if the tension from the tape is lost. The tape switch contacts are connected between terminals 1B-2 in series with the pit stop switch, which is monitored by MR-SIB input M07. If the tape switch opens, the safety string will break and render the system valves inoperable. To allow the car to run, jump the Tape Switch contact (TBs 1B – 2).

3.9.2.5 ELGO Learn Data Error

Car Status display: '**ELGO-Data**'

The system verifies Learn data at the end of a Learn run to ensure that each landing has a measured door zone position, and that no values are in conflict. Until Learn data is saved and verified, the system is in an ELGO faulted state, where only the Normal Limits are functional. Repeat the ELGO APS Learn Procedure until the Learn

data is verified by the controller. If the ELGO APS Learn data is missing, corrupt, or fails to verify, the '**Safety Status**' screen displays '**Fault: ELGO APS Data**', and the '**Car Status**' screen displays '**ELGO-Dat**'.

3.9.2.6 Normal Limit and Slowdown Limit Behavior

While the system is not faulted, the Up and Down Normal Limits are active based on the top and bottom terminal landing positions. If the terminal landing positions were miscalculated (if an ELGO Learn run was performed improperly), the Up or Down Normal Limits may not be operational outside of the calculated limits. It is possible to run the car beyond the APS computed Normal Limits by jumping the hardware Normal Limit MR-SIB inputs (1X – M25 & 1X – M28). The car is prevented from running if the hardware MR-SIB inputs M25 or M28 are jumped while the computed software Normal and Slowdown Limits are active.

3.9.3 Bypassing ELGO APS computed signals

The ELGO sensors (channels A & B) operate as independent systems, and the computed data from each sensor is processed by independent processors. The terminal normal limit and slowdown limit positions are computed using data from the ELGO channel B received and processed by the CT-SIB processor and transmitted to the MR-SIB safety processor via the traveler. The leveling and floor-to-floor slowdown positions are computed using data from the ELGO channel A received and processed by the controller CPU via the MR-SIB. It is possible to temporarily bypass various computed elements of the positioning system by using jumpers or by setting a temporary mode in the CPU settings menu.

To bypass the normal limits

- Run the car on inspection past the normal limit until it stops. Then jump MR-SIB inputs M25 (up) or M28 (down) to resume running the car past the normal limit. If the car is not beyond the normal limit when the M25 or M28 jumper is installed, the car will be unable to run.

To bypass the slowdown limits for one run with ELGO enabled:

- Turn ON the '**DISABLE SLDN LMT**' in the settings menu. This will temporarily allow the car to run Fast Speed one time on inspection or automatic, after which the setting will automatically revert to OFF.

To bypass the slowdown limits for multiple runs:

- Set the UHS Limit (or DHS Limit) to 0 in the ELGO settings menu. Be sure to update the slowdown limit distance to the correct distance after the buffer test.

To bypass the floor-to-floor slowdowns for one run:

- Turn ON the '**DISABLE SLOWDOWN**' in the settings menu. This will temporarily allow the car to run Fast Speed one time on inspection or automatic, after which the setting will automatically revert to OFF. The car will continue running on automatic until reaching the terminal slowdown limit, or timing out based on the Up/Dn Run Shutdown timer.

To bypass the floor-to-floor slowdowns for multiple runs:

- Set the UHS Distance and DHS Distance to 0 in the ELGO settings menu. Be sure to update the values to the correct distance after finishing the test.

To enable/disable the ELGO APS system, go to the '**Edit Adjustable Settings**' screen in the Setup Menu, and navigate to the '**ELGO APS ENABLE**' line item. While ELGO APS is enabled, the '**Display ELGO Floor Height Data**', '**Edit ELGO APS**', and 'I/O Status – CAN BUS 1 ELGO APS' menus are available to navigate.

3.9.4 One Floor Learn

The ELGO Learn procedure (per Section 3.9.1.2) measures the door zone target at each landing, which requires the alignment of the targets to be within 1" of floor level. If a particular door zone target is misaligned in excess of 1", a One Floor Learn procedure allows a particular landing to be relearned without requiring a full hoistway scan.

To relearn a particular landing for the Vision 2 ELGO APS system:

1. On the controller screen go to the Setup Menu -> Edit ELGO APS.

2. The car will need to start in the Door Zone (DZ) of the landing being learned while in Inspection Mode.

3. In the '**Floor to Edit**' row, enter the landing being relearned.

4. Position the car to floor level using Inspection. This position will be saved as the center of leveling & dead zone at this floor.

> **NOTE: The door zone target should be centered around floor level. A One Floor Learn will fail if the measured door zone target is misaligned by more than 1".**

5. Turn on '**1 Floor Learn**' by pressing Ent on the '**1 Floor Learn**' row, then press 1 on the keypad, and then press Ent again. The display should read "ON".

6. Move the car out of Door Zone using Inspection up or down, at which point the display reads "OFF".

7. The controller will validate that the starting position is within +/-1" of the center of Door Zone, and calculate the '**Trim Offset**' based on this. This marks the completion of the 1 Floor Learn.

8. Verify the car stops at floor level while running in both directions, or note how far the car is from floor level.

9. Adjust the stopping position to match floor level using '**Trim Offset**' in the Edit ELGO APS setup menu as needed. (see Section 3.9.1.2, step 18)

10. To save these changes, press Esc to exit the Edit ELGO APS setup menu, and then press 1 to confirm and save the new floor height data.

Error Display Conditions:

When turning on '**1 Floor Learn**', the text on the right shows one of the following:

*   **On/Off** – Indicates the state of 1 Floor Learn Operation, with none of the error conditions below.

*   **Insp** – The car is not on Inspection.

*   **notDZ** – The Door Zone input is not being read by the controller.

*   **Floor** – The '**Floor to Edit**' row does not match where the car position is relative to the landings above and below.

*   **>1.0"** – The Trim Offset cannot be more than an inch from Door Zone center. The Door Zone center needs to be within that range of the floor level to be relearned.

4. Final Adjustments

When the controller is ready to be run in automatic, it is recommended that either a factory reset be performed or the values of the controller CPU settings and features be verified using Sheet VNP of the schematics. To begin, verify the system is configured to job specifications by matching the job number displayed on the second line of the CPU banner screens with the drawing number of the job schematics.

To restore the controller to use factory configured values for setting & timers, a factory reset can be done by using the keypad. Navigate to the Show Setup Menu screen and press Ent. Press Prv to view the Reset Settings menu screen and then press Ent. Then type the password (default pw: 911), and press Ent to confirm.

As the wiring is completed, the following modes of operation should be checked and used.

4.1 Slowdown/Leveling Adjustment

Make your final adjustments for the slowdown targets using the UHS/DHS Slowdown Distance adjustments in the ELGO Setup Menu. Adjust the valve for ride quality. Once valve adjustments are finalized, reduce UHS/DHS distance to reduce leveling time. A rule of thumb is reduce 1" of UHS/DHS Distance per second of leveling time.

> **NOTE: Default factory preset slowdown distances are likely longer than necessary. Adjust the UHS/DHS distances in both up and down direction to reduce extra leveling time and optimize ride time.**

4.2 Position Indicators

Verify that the floor position changes properly as the car goes past each landing. Floor change should take place at the slowdown point before each landing.

If the car is stopped mid-hatch, the floor position will update based on which landing the car is closest to.

If the Position Indicator does not match the actual car position, verify the '**ELGO Floor Heights**' table, and compare with current position using the screen: '**Show I/O Status**'->Press 1 ->'**CANbus 1 ELGO APS**'.

4.3 Independent Service

Independent Service is useful for final tune-up of the car. Initiate Independent Service by turning on the Independent Service Switch in the car, using C.O.P. board input terminal 40.

On Independent Service, hall calls are cancelled and disabled. The car runs from car calls only, and parks with the doors open until the Door Close Button (C.O.P. board input terminal 28/28R) or Car Call Button input (C.O.P. board input terminal 28/28R) is held on at constant pressure.

To run the car from the machine room without the doors opening, use the Door Open Cutout Switch located on the auxiliary relay/switch board mounted to the middle of the MR- SIB, where position UP = cutout.

> **NOTE: If the car does not run, verify that no door protective device (Door Open Button, Safety Edge, Electric Eye, Infra-red Curtain) is holding the doors open. Verify that the car is not stuck in leveling. Verify that the Door Close Limit is de-energized. Verify that all Safety String inputs to the MR-SIB are correct.**
>
> **NOTE: An alternative to using Independent Service for final tune-up is to enable the Door Open K/O Switch, located on the auxiliary relay/switch board mounted to the middle of the MR-SIB, and use the adjacent Door Open Push-Button to initiate door operation. See Section 6.1.3.1 to set car calls from the controller using the LCD screen and keypad.**

4.4 Car and Hall Calls

To observe the operation of the car and hall calls, the system must be in automatic operation. Verify that all car and hall calls work. Since car and hall call inputs are located on the serial I/O boards in the C.O.P. and hall riser, calls may be placed using the keypad while in the 'Car Status' and 'Safety Status' menus. Refer to Section 6.1.3.1 for instructions.

If both up and down hall calls are entered at a landing, and no other calls are in the system, the doors will close after answering one of the calls, then re-open in response to the other call.

A Car or Hall call is canceled when the car initiates slowdown for the call, or when the doors start to re-open for the call if the car is already at the floor.

If there is a condition that causes the elevator to go out of service, such as a stop switch or door timer, all hall calls for that car are cancelled. Car calls are cancelled if the car is rendered inoperable or during a Fire Recall or Medical Emergency Recall operation. For a multi-car group, any unanswered hall calls are transferred to other cars in the group. If all cars are out of service, then all hall calls for the group are cancelled.

4.5 Car Call Security (CKO)

The Vision 2.0 controller can interface with the following security devices using discrete dry contact(s):

- Card Reader

- Car Call Lockout Switches

- Keypad Entry

Depending on the number of calls and available I/O in the car station, the controller security interface uses one of two options.

- Car Call Cutout Inputs – the security interface connects directly to controller inputs, not the fixture.

- Car Call Cutout Bypass Relay - the security interface connects directly to the fixture.

The car call security device interface is bypassed while on fire service, allowing all calls to register on fire operation phase 2.

When a call is secure, a new call will be prevented, but an existing call will remain latched until answered.

> **NOTE: Manually entered car calls using the keypad entry on the "Car Status" menu screen will always override the external security interface. See Section 6.1.3.1 for further details.**

4.5.1 Car Call Cutout Bypass

- The security interface wires directly in series with the car call buttons in the car station.
- "CKO" relay(s) are wired in parallel with the security interface in the car station.
- The "CKO" relay(s) energize while on fire service to bypass the security interface in hardware.
- The security signals do not interface with the controller directly, allowing the security device(s) full control of car calls while the "CKO" relays are OFF.

4.5.2 Car Call Cutout Inputs

- The security interface wires directly to a controller I/O board, with one input per car call used to enable/disable that call. No CKO relays are used.
- CKO inputs are N.O. by default, such that a call is disabled while the CKO input is ON.
- These CKO inputs are disabled while on fire service to bypass the security interface in software.
- The default location of the CKO inputs are in the car station.
    - If the security interface contacts are not in the car station, the CKO inputs may be configured to an I/O board in the machine room.

4.5.3 Card Reader Override Switch

The behavior of the card reader/car call security override switch (if equipped) may be selected using the controller setting '**MCKO SECURITY=OFF**'.

- **"MCKO SECURITY=OFF" is ON** – The MCKO input will disable all car call security and enable all calls.
- **"MCKO SECURITY=OFF" is OFF** – The MCKO input will prevent any new car calls from registering.

4.5.4 Car Call Security Parameters

- To bypass security on Independent Service, turn on controller setting '**CKO ON INDEP**'.
- To invert the CKO inputs to N.C. such that a call is enabled while the CKO input is OFF, turn on the controller setting '**INVERT CKO INPTS**'.

4.6 Hall Call Security

Hall Call security is typically external to the controller and may not be shown on the controller schematics unless specifically requested.

The hall call security enable/disable contact may be wired directly in series with the hall call fixture. The controller has no need to read or bypass the hall call security interface.

If the hall call security interface contacts are unable to be directly connected to the hall fixture, provisions for a hall call security interface may be located in the machine room controller upon request using HCKO inputs. Refer to the schematics for particular wiring connections.

4.7 Door Operation

Verify that any required changes to the door operator, as shown on the door operator drawings, have been made correctly.

Check the Door Open and Close Limits for proper operation. The door limits are wired using N.C. (normally closed) contacts, such that the signal turns OFF while the door is on the limit.

If the doors attempt to open or close for too long, based on the preset time '**DOOR STUCK TIME**', a door open or close fault will trigger.

If a door is unable to fully open, the door will close and the car will then respond to other calls before trying to open the doors again.

If a door is unable to fully close, the doors will fully re-open before trying to close again. For very slow doors, '**DOOR STUCK TIME**' may need to be increased to prevent a nuisance Door Close Fault. The factory default for '**DOOR STUCK TIME**' is normally set at 20 seconds.

To enable Door Nudging to close the door at slow speed while the Electric Eye (EE) or Infrared Curtain Unit (ICU) is active while in Normal Operation, enable the feature settings '**TIMED EYE CUTOUT**' and '**DOOR NUDGING**'. The Nudging timer will start once the doors are ready to close but there is an obstruction (ICU, EE, Safety Edge, or Door Open Button) preventing the door from closing. After the '**ICU CUTOUT TIME**' (adjustable, 20 seconds by default), the nudging buzzer will sound and the door will close at nudging speed even while the EE/ICU is energized, but will remain open if the Door Open Button or Safety Edge is active, unless Fire Service is also active. If the doors are closing when the Nudging Timer trips, the Nudging Buzzer will turn on and the EE/ICU will remain active. If the doors do reopen fully, the EE/ICU will be then cut out.

4.8 Fire Service

Fire Recall (Phase 1) may be initiated by turning off a Smoke Sensor input (82, 82M, or 82F N/C), or by energizing the Hall Fire Switch "On" input. (CAN3 board #0, input UI)

Confirm that the car returns to the correct Main and Alternate landings.

Confirm that the car operates as required on Car Fire Service (Phase 2) operation.

> **NOTE: To reset Hall Fire Recall (Phase 1), most codes require the Fire Bypass input be energized. On 2000 (or later) Fire Code, Fire Recall (Phase 1) resets when the Hall Fire Switch is turned from Bypass to Off.**
>
> **NOTE: If Car Fire Operation (Phase 2) appears to be operating incorrectly, check the Door Open and Close Limits for proper operation. Most codes require that the doors be fully open before allowing a change in the mode of operation on Car Fire Service. Most codes require that Hall Fire Recall (Phase 1) be in effect for the car to return automatically to the designated main fire service landing when the Car Fire Switch is turned to the OFF position.**
>
> **NOTE: To disable Fire Service, set the "NO FIRE SERVICE" feature setting to ON.**
>
> **NOTE: Fire Service behavior is adjustable to match the requirements of various Fire Codes, including A17/B44 national codes for 1998, 2000, 2005, 2007, and 2016, as well as other local codes. The Fire Code settings should be pre-programmed by the factory based on the provided specifications. If changes are required in the field, refer to Section 7.1.2 and page "VNP" in the schematics for the list of available settings, and refer to Section 6.1.4.5 for instructions.**

4.9 Failure Timers

4.9.1 Stuck Button Timer

If a car or hall call button remains on longer than the '**CAR STUCK TIME**' (adjustable) and other calls are registered, the stuck button call is ignored and the car will answer the other call(s). The car returns to the stuck button call as it answers other calls, and the stuck button timer sequence is repeated.

4.9.2 Running Timers

If the car runs for an adjustable time, without changing floors, the running timer shutdown operation is initiated. The car status screen displays '**RunTmr Shutdown**'. The shutdown could be caused by a low oil level, a problem with the motor starter circuit(s), or a problem with the up valve circuit(s). The car will stop running up, then return to the lowest landing and cycle the doors. It will then shut down, allowing only the Door Open Button and door protective devices to operate, if in Door Zone (MR-SIB input 20). Reset the fault by toggling the Fault Reset input (RST).

> NOTE: If a Reverse Phase Relay or Emergency Power circuitry is supplied, these will also initiate a shutdown signal if the inputs are not energized.

If the car stops between floors, it will run down until it enters and then rides off leveling within Door Zone. This prevents the car from parking between floors.

The Up Run Shutdown Timer is adjustable using the setting '**UP RUN SHUTDN TMR**'.

The Down Run Shutdown Timer (if provided) is available by enabling the '**DOWN RUN SHUTDN**' setting, and the timer is adjustable using the setting '**DN RUN SHUTDN TMR**'.

If the car is repeatedly unsuccessful in reaching the next floor during a fast speed run, the car will shut down after 20 attempts on Normal Operation.

4.9.3 Door Fault Timers

If the doors fail to open fully after an adjustable time, the open cycle is canceled. The door time will expire as normal, the doors will close, and the car will continue to answer calls.

If the doors fail to close after an adjustable time (setting '**DOOR STUCK TIME**'), the doors will reopen, and attempt to close again. The doors are then held open for an adjustable time (setting '**DOOR RESET TIME**'). The close cycle repeats until the doors close.

If the doors fail to close after repeatedly cycling the door open/close outputs, the car shuts down after 20 attempts.

4.9.4 Door Check Circuitry (Door Lock Monitoring)

Door Check Circuitry is a feature required by code for elevators with a powered car door that operates horizontally and is mechanically coupled to hall doors.

A Door Contact Check fault registers when all of the following conditions occur:

    a. Car Gate and Hall Doors are physically fully open.

    b. All Car Gate and Hall Door Contact Input(s) are energized for all landings (top: 5T, intermediate: 5, bottom: 5B, front:4 and rear:4R/5R).

    c. The Door Open Limit Input terminals:7X/7XR are de-energized (the car door is fully open).

When a Door Check Fault is initiated, the message '**DrChk**' is displayed on the Car Status screen, and the doors are held open. The fault clears when the offending door contact input(s) go off. The Front and Rear doors are monitored independently, and the offending Car Gate and/or Hall Door Contact is specified in the fault log.

Door checking requires the setting '**DOOR CHECK FAULT**' to be on. Top and Bottom Access Doors must be identified as front or rear using settings '**TOP ACC AT REAR**' and '**BOT ACC AT REAR**'.

4.10 Field Adjustable Features

Refer to Sections 6.1.4.4 and 6.1.4.5 to edit the adjustable settings, timers, and designated landings. Refer to Section 7 for descriptions of all available settings, timers, and designated landings.

The Virginia Controls factory configures the controller with job-specific default settings. Any field changes may be reverted to factory defaults by selecting '**Reset Settings**' via the '**Setup Menu**' submenu, and confirming with the password. All values will revert to the factory defaults shown in the configuration page "VNP" of the drawings. The settings or features that most often need adjustment are door times and fire service return floors.

4.11 Dispatcher Operation

Each controller contains its own dispatcher capabilities and is able to recognize up to 7 other controllers in a multi-car group. Each controller receives and processes controller data for all connected cars, and processes dispatching decisions independently and simultaneously with other controllers.

In a multi-car group, the controller with the lowest index in the group is designated as the lead controller, which is automatically determined by software. The lead controller sends Hall I/O outputs over CANbus 3. Cars must be connected over Ethernet and CANbus 3 in order to be considered connected.

Group communication status may be seen on the '**Display Group Data**' menu screen. See Section 6.1.14 for details.

> NOTE: All controllers in a group must each have a unique controller number, set by dip switches (1, 2, 3) on the Vision 2.0 CPU board. Each controller must also have the same base IP address reference value. See Section 6.1.4.8 for details.

Dispatching hall calls is determined by a route-time minimization algorithm. Every hall call is assigned to the "best" car in the group at any given moment. Once a car has been assigned to a call, it is committed unless conditions change that would allow another car to reach the requested floor faster. A timing parameter '**HC TRANSFER TIME**' in the Adjustable Timers/Landings Settings Menu may be altered to tune the timing threshold before allowing a hall call to be transferred to another car.

4.11.1 Homing Operation

There are several Homing Operation modes available, allowing more customization for car homing behavior. Use the Homing menu in the Setup Menu submenu to adjust the following Homing settings:

Mode 0 – Homing for this car is disabled.

Mode 1 – After homing delay, car is recalled to the main landing.

Mode 2 – After homing delay, car is recalled to the specified homing landing.

Group-only Modes:

Mode 3 – After homing delay, car will move to primary homing landing. If primary homing landing is already occupied, then move to secondary homing landing. If both primary and secondary homing landings are occupied, then do nothing.

Mode 4 – Allows for homing mode 3 to be customized based on the time of day using 4 blocks of time.

    Block 1 (Morning) – example: Cars are recalled to the lobby

    Block 2 (Lunch) – example: Cars are split between the lobby and middle floors

    Block 3 (Afternoon) – example: Cars are distributed at the middle floors

    Block 4 (Night) – Homing is disabled

A car will home if the following conditions are met for the '**HOMING DELAY**' time.

1. Homing is enabled (see above homing mode options).

2. The car is in group operation (not on Inspection, Independent Service, Fire Service, Load Weighing, etc.).

3. The Stop Switch is not thrown.

4. The car is not stuck.

5. The doors are closed (unless using '**PARK OPEN – MAIN**' or '**PARK OPEN ALWAYS**' settings).

6. A car is not already at the homing landing.

7. The car is not running and has no other demand to run.

8. Another car is not running or homing.

Refer to Section 7.1.2.3 for Homing-related adjustable settings such as Homing Delay Time and Group Homing options.

4.11.2 Emergency Power Operation

Emergency Power Operation (if equipped) is a group operation which is processed in each controller's Safety CPU dispatcher program. The Emergency Power input signals are received by all controllers in the connected group.

The Emergency Power input (EP) is always ON while in Normal Operation, and Emergency Power Operation will initiate if the EP input turns OFF for at least 1 second. All cars are recalled to the main landing, running one at a time, until the main door is cycled open then closed. After all cars have been recalled, then one car is selected to run on Normal Operation while the other cars remain on shutdown.

The Emergency Power Pre-Transfer input (EPT) will cause all running cars to stop at the next landing and go out of service while the input is ON. This is used to allow cars in the group to smoothly come to a complete stop during the transition between normal power and emergency power.

The Emergency Power Selection inputs (EPA, EPB, EPC, …) are used to manually select which car is allowed to run on Normal Operation while on Emergency Power. If no inputs are energized, then the first available car is auto-selected to run on Emergency Power while all other cars remain on shutdown. If an auto-selected car happens to go out of service, then the system will attempt to select another car to run on Emergency Power in its stead.

The Car Status screen displays '**Emerg-Pwr**' if the car is currently on Emergency Power, and the Safety Status screen displays '**Emergency Power**' if any car in the group is currently on Emergency Power.

If all cars are able to run simultaneously while on Emergency Power, assuming adequate building electrical provisions, enable the setting '**EM PWR SIMPLEX**'. All cars will recall and transition into Normal Operation independent of any other car in the group.

4.11.3 Medical Emergency Hall Operation / Hospital Service

Medical Emergency Operation is a group operation which is processed in each controller's dispatcher program. When a Medical Emergency hall input is energized, the dispatcher will select the closest available car and force it to recall to that landing by cancelling its current car and hall calls and energizing the Medical Emergency Light and Buzzer. The Medical Emergency Call is held until the assigned car arrives at the landing and opens its doors. The car doors are held open until Medical Emergency Car input is energized or after a timeout '**MED EMERG CANCEL**', adjustable in the timers menu. If the originally selected car goes out of service or does not arrive and open its doors within 30 seconds, then the next closest car is selected to recall to the landing instead.

The Safety Status screen displays '**Medical Emergency**' if Medical Recall is active in the group. The car which is currently being recalled displays '**MEH**' on the Car Status screen.

5. Hardware Description

The standard Vision 2.0 controller package includes the following components:

Machine Room Enclosure:

- Machine Room Safety Interface Board (MR-SIB).

- CPU board.

- Power Supply system.

- Motor Control system.

- CANbus and Ethernet communication networks.

- Color-coded terminal blocks.

Car Top Inspection Station:

- Car Top Safety Interface Board (CT-SIB).

- Fixture power supply.

- Color-coded terminal blocks.

Absolute Positioning System

- LIMAX22DUE positioning system, by ELGO Electronics

Car Operating Panel (C.O.P.):

- I/O board(s) for fixtures, 16pt. (24VDC standard, other voltage configurations available on request)

- Pre-wiring available through fixture company.

Hall Riser:

- I/O boards, 2pt. for Hall Calls & Fire Service recall switch.

- Pre-wiring available through fixture company.

Cables:

- Color-coded traveler, with matched wire-labels for both machine room and car top enclosures.

- Color-coded C.O.P. multi-conductor, with matched wire-labels for both Car Top Inspection Station and C.O.P.

- Hall riser communication cable.
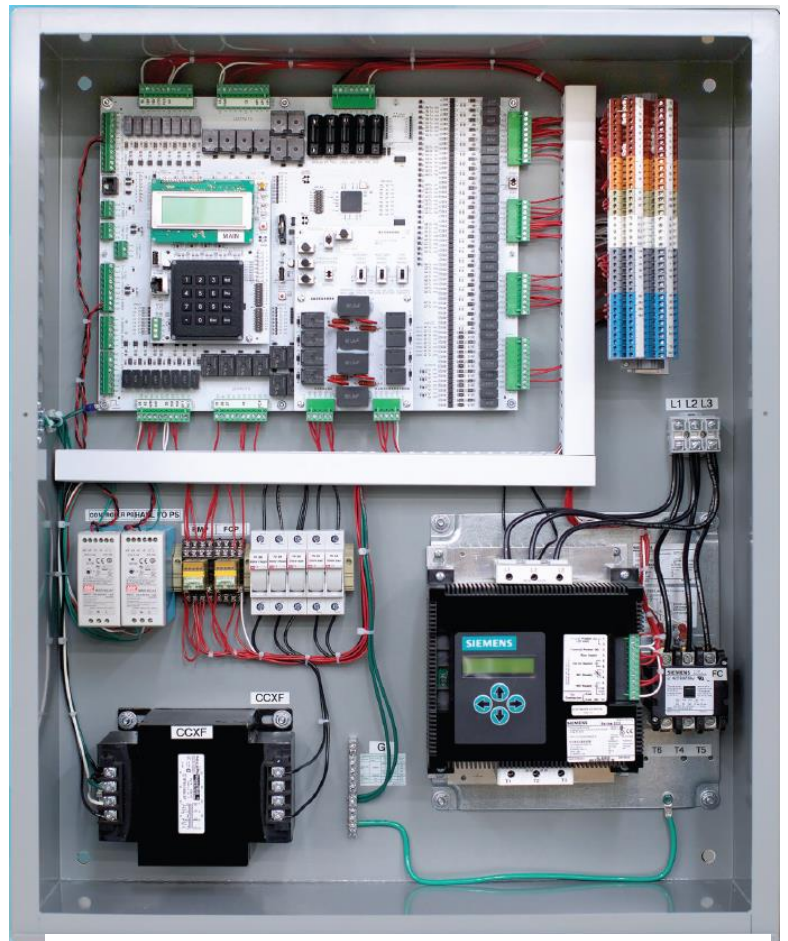
Figure 21: Standard Vision 2.0 Enclosure Layout

The MR-SIB performs many functions. The following list is a summary:

- 32 Safety Inputs (120VAC).
- Provides for connection of the safety string and inspection operation devices.
- Contains the hardware-based Complex Programmable Logic Devices (CPLDs) required by ASME A'17.1 code.
- Provides 4 CANbus communication connections to remote I/O and other CANbus connected systems.
- Provides the connections for an Absolute Positioning System.
- Provides the output relays for hydraulic valve solenoids using an auxiliary relay board.

The CPU performs distinct tasks:

- Runs the application program for the general operation of the elevator, with field configurable settings.
- Monitors the safety string and inspection inputs, w/fault log diagnostics.
- Handles dispatching duties with other Vision 2.0 controllers.
- Includes a 4-line LCD screen and Keypad for user interface.

I/O boards:

- Serial connection to the controller via CANbus.
- May be located where needed, such as in the Hall Riser, Hoistway, Car Top, Car Operator Panel, Machine Room, and within the controller itself.

Power supply system:

- Fuses
- Transformers for controller power and door operator.
- 24VDC supplies for controller & hall riser.
- Phase Monitor (internal to soft-starter, if used)
- Battery backup (B.O.R.I.S.) – when equipped, supplies power to everything but the pump motor.

Motor control system:

- Starter – solid-state, Wye-Delta, or across-the-line.
- Contactors.
- Motor Overload.
- Pump run circuitry & valve control.

Communication network:

- CANbus, 4-channels in controller, 3-channels on car top.
  - Machine Room – 0: Safety & General I/O, 1: Positioning System, 2: PI Driver, 3: Hall riser I/O.
  - Car Top: - 0: Safety & General I/O, 1: Positioning System, 2: spare.
- Ethernet port, for dispatching and remote monitoring.
- Serial, for serial PI driver

5.1 Machine Room Safety Interface Board (MR-SIB)

5.1.1 MR-SIB Layout

The Machine Room Safety Interface Board (MR-SIB) layout is shown in Figure 22 and the descriptions are in Table 9.

Table 9: MR-SIB Layout Descriptions from Figure 22.

##	Description	##	Description
J1	Safety String, Car Gate, and Door Zone inputs	A*	Controller CPU 20-pin header
J2	Hall Door & Lock Contact Inputs	A	Communication status and Power status LEDs
J3	Inspection Access & Starter monitoring inputs	C0	CANbus 0 termination jumpers (controller I/O)
J4	NTS Limit bypass, Car Safety and Inspection inputs	C1	CANbus 1 termination jumpers (positioning)
J1A	Controller CPU Relay Outputs \ Valve Connections	C3	CANbus 3 termination jumpers (hall I/O) and J3G Group CANbus Common Jumper
J2A	CPLD (Safety) Relay Outputs \ Valve Connections	C4	CANbus 3 power supply selection jumper J3P
J5	Controller outputs 9-16	D1	Input status LEDs 1-8 (Board #8)
J6	Controller inputs 9-16	D2	Input status LEDs 9-16 (Board #8)
J7	Controller inputs 1-8	D3	Output status LEDs 1-8 (Board #8)
J8	Controller outputs 1-8	D4	Output status LEDs 9-16 (Board #8)
J9	Fused Power Supply terminals	E	Battery (3V CR2032) for Real Time Clock
J10	Digital to Analog Outputs	F	Fuses M1 – M5
J11	Motor Encoder Speed Input (traction-only)	G	USB port for firmware updates (factory-use)
J12	CANbus 0 connections, to CT-SIB and other I/O	H	CPLD state & I/O LED indicators
J13	Absolute Positioning System CANbus to drive (traction-only)	I	I/O processor DIP switches
J14	Absolute Positioning System CANbus from CT-SIB	J	CPLD safety processor DIP switches
J15	CANbus 2 connection, spare (PI driver board)	L1	Safety input LED indicators M01-M42
J16	CANbus 3 connection, hall riser I/O	L2	Relay monitoring input LED indicators HM1-LM4
J17	CANbus 3 RJ-45 connection, hall riser I/O	L3	Relay monitoring output LED indicators HM1-LM4
		M	mikroBus auxiliary device port (PI driver plugin)
		N	Door Open Cutout Switch
		O	Door Open Button
		P	Controller Inspection Enable Button
		Q	Controller Inspection Up Run Button
		R	Controller Inspection Down Run Button
		S	Hoistway Locks Bypass Switch
		T	Hoistway Doors Bypass Switch
		U	Car Door Bypass Switch
		V	Controller Inspection Switch
		W	Controller Stop Switch
		X	Controller CPU Board
		Y	Auxiliary Relay and Switch Board
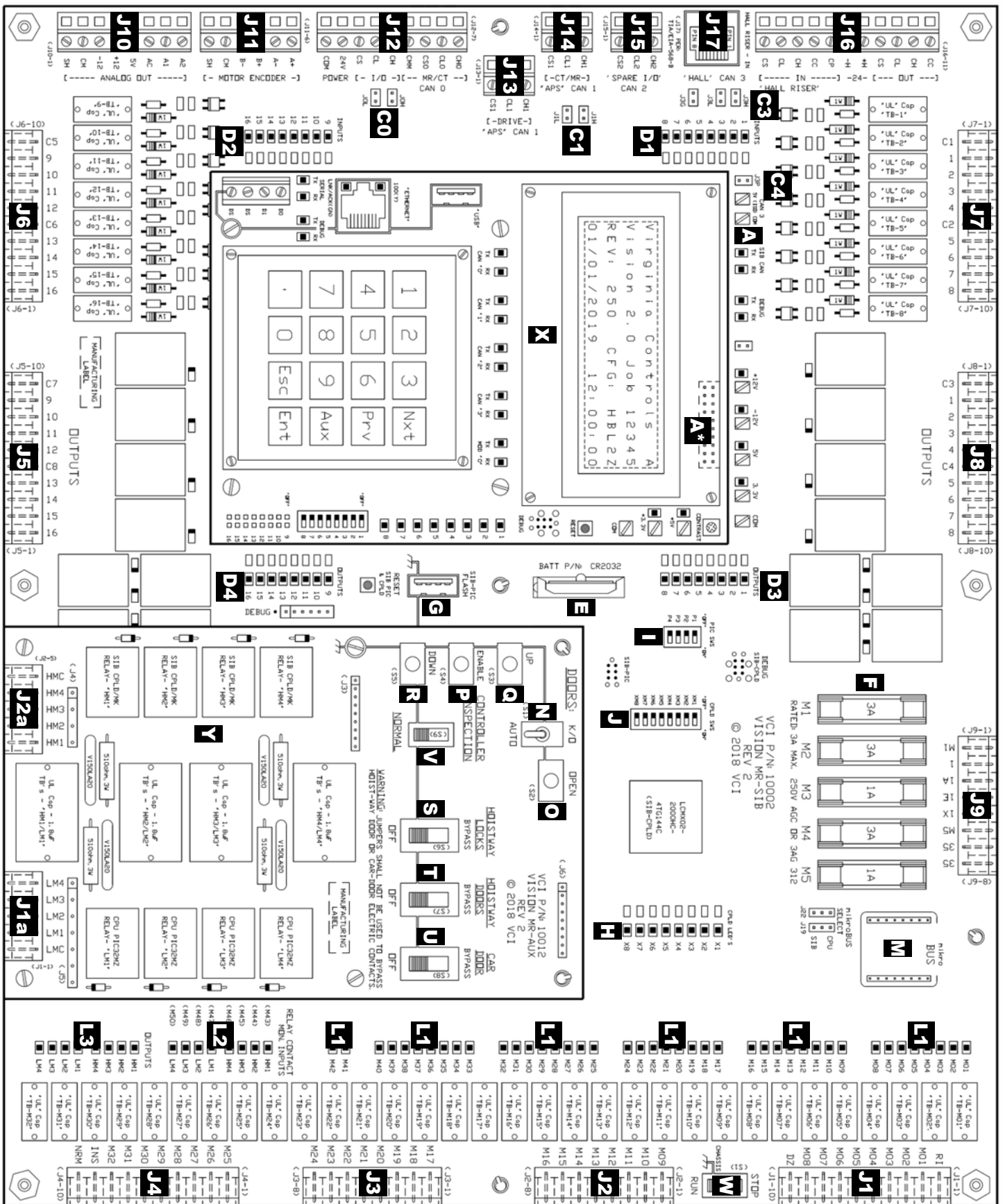
Figure 22: Machine Room Safety Interface Board (MR-SIB) layout.

5.1.2 CANbus I/O Connections

(See MR-SIB items A, A*, C0, C1, C3, J13 – J17 in Figure 22)

(See CT-SIB items J7, J8, J9 in Figure 24)

The MR-SIB acts as a hub for connecting CANbus between the controller CPU, I/O boards, CT-SIB, and Absolute Positioning System (channel A). All CANbus connections are made at the left of the MR-SIB, as seen in Figure 22. The MR-SIB is equipped with 4 CANbus channels.

The CT-SIB acts as a hub for connecting CANbus between the MR-SIB, I/O boards, and Absolute Positioning System (channel B). All CANbus connections are made at the left of the CT-SIB, as seen in Figure 24. The CT-SIB is equipped with 3 CANbus channels.

The MR-SIB and CT-SIB share a connection to CANbus 0, but the other channels are independent, as described below in Table 10.

Table 10: CANbus channels for Machine Room & Car Top SIBs.

CANbus Channel	Machine Room SIB	Car Top SIB
0	Safety & General I/O	Safety & General I/O
1	Absolute Positioning System Channel A	Absolute Position System Channel B
2	PI driver/spare	spare
3	Group & Hall Riser I/O	N/A

Communication status LEDs for each channel are located on the top left of both the MR-SIB & CT-SIB, as well as on the controller CPU.

5.1.2.1 CANbus Termination

Each device on a CANbus channel is considered to be a node, and CANbus connections are made such that nodes are connected in series, with the requirement that each channel be terminated at both ends of the communication cable. A general description for termination of each CANbus channel is shown in Table 11. In general, one end of the communication cable for all of the CANbus channels is terminated at the MR-SIB, while the other end must be terminated at the last device/node in series.

Table 11: CANbus Termination Locations for Each Channel.

CANbus Channel	MR-SIB Termination	Other end Termination
0	MR-SIB jumpers J0H & J0L	C.O.P. I/O board #20
1	MR-SIB jumpers J1H & J1L	ELGO APS sensor
2	Always terminated on MR-SIB	Hall Lantern / C.E.E. PI Driver
3	MR-SIB jumpers J3H & J3L	Hall I/O board at end of riser

J0H & J0L: Termination jumpers for CANbus 0. Install if the MR-SIB is the only machine room device connected to CANbus 0, while being the end node in the channel. See Sheet "VM6" of the schematics for job specific configuration.

J1H & J1L: Termination jumpers for CANbus 1. Install if connecting a CANbus 1 / "Absolute Position" device (ELGO APS channel "A") to the MR-SIB, while being the end node in the channel. See Sheet "VM6" of the schematics for job specific configuration. If another device is connected to CANbus 1, use terminal block J13.

J3G: Jumper for connection of CANbus 3 Common (CC) to ground. Used to ensure that wire CC is grounded at only one point within the CANbus 3/ "Hall Riser" network. See Sheet "VM6" of the schematics for job-specific configuration.

J3H & J3L: Termination jumpers for CANbus 3 / "Hall Riser". These are installed on a single car installation, or on the last controller in line of a multi-car group. See Sheet "VM6" of the schematics for job-specific configuration.

J3P & CAN3 ISO 5V Power Supply: Jumper J3P is used when CANbus 3 is to be powered directly by the onboard MR-SIB 5VDC power supply. Otherwise, the CAN3 ISO 5V Power Supply chip may be used to provide isolated 5VDC power to the channel, which is located under the controller CPU board. This determination is based on the length of the CANbus network and the supplies providing power and ground on the remote end.

> **NOTE: For proper operation, each CANbus channel must be terminated with a 120 ohm resistor at each end of the bus. The MR-SIB and Remote I/O boards contain the resistors to terminate CANbus channels by the installation of two termination jumpers per end.**

The communication cable for each CANbus channel includes a High signal (CH) wire and a Low signal (CL) wire, arranged as a shielded (CS) pair with a separate Common signal wire (CMM for CANbus 0; CC for CANbus 3). To achieve termination, both the High signal and Low signal need to be tied together at the endpoint node(s) through a 120Ω resistor circuit preinstalled on the MR-SIB and I/O boards. Termination is hardwired for the CANbus 2 connection (CH2 & CL2) on the MR-SIB.

The CANbus Common (CMM or CC) signal wire must be referenced to Ground at one and only one node. For all channels besides CANbus 3, CC is referenced to Ground at the MR-SIB. Refer to the schematics for job-specific configuration.

5.1.3 Safety Inputs & Input LEDs

(See MR-SIB & CT-SIB items J1 – J4, L in Figure 22 & Figure 24)

The safety string, limit switch, and inspection inputs are arranged around the right side of both the MR-SIB and CT-SIB. Each input has one or two corresponding LED indicators that light when the input is high. The input LEDs for the MR-SIB range from M01 – M42 & HM1-LM4, while the CT-SIB ranges from T01 – T32. The common reference for each input is the neutral common of the controller, terminal 35. See Section 8.2 or Sheet "VNX" in the schematics for a detailed description of each MR-SIB and CT-SIB input and its corresponding LED indicator(s).

5.1.4 CPLD (Complex Programmable Logic Device)

(See MR-SIB items H, J in Figure 22)

(See CT-SIB items X, T in Figure 24)

There is a CPLD safety processor on both the MR-SIB and CT-SIB of a Vision 2.0 controller. Each CPLD reads and processes the safety inputs using gate logic, serving as a redundant hardware device to the controller CPU. Each CPLD monitors and processes the safety string inputs, limit switches, door contacts, and inspection inputs, such that the valve relays are prevented from energizing if any safety input is in an improper state. The CPLD satisfies the requirement in safety code that safety-related devices be processed by a "non-software-controlled means", eliminating the need for additional external hardware.

The purpose of the CPLD is to

- monitor the safety inputs of the MR-SIB or CT-SIB,
- control the MR-SIB or CT-SIB output relays in tandem with the controller CPU, and
- provide code-required redundancy to the software-based CPU.

Each CPLD independently monitors and processes the safety string inputs and permits or prevents the corresponding safety relay output of the MR-SIB or CT-SIB from energizing based on the state of the safety inputs.

On the MR-SIB, the CPLD directly controls the output relays HM1-4 while the MR-SIB I/O processor controls the output relays LM1-4.

On the CT-SIB, the CPLD directly controls the output relays HT1-4 while the CT-SIB I/O processor controls the output relays LT1-4.

Each CPLD also sends and receives serial data with the controller CPU over SPI-bus, which allows each CPLD to know which mode the controller is in, as well as the state of the I/O from the other devices in the system. See Section 9.1 for details.

Various conditions may cause the CPLD to prevent the valves from energizing, including the following:

Inspection Run Input Fault: An inspection up or down run input for one mode is registered while in a different inspection mode.

Safety String Door Contacts are Open: Any car gate, hall door, or hall lock input is low while the controller is in a mode other than inspection access or door bypass mode. The safety string can still close while using inspection access if the car door input (3 or 3R) and corresponding top or bottom hall door input (4B or 4T) are open, or when using the door bypass switches.

Safety String Limits or Stop Switches are Open: Any of these safety string inputs 1X, 1Y, 1T, 1B, 2, 3, 3A, 3E ,3X, 4A, or 4B are open. Note that releveling in Normal Operation with the doors open while in Door Zone is allowed. The In-Car Stop Switch is also bypassed during a Fire Service Recall or Medical Emergency Recall operation.

Safety String Normal/Inspection Mode Fault: Multiple Inspection mode inputs are active. While on inspection, the CPLD waits for an inspection run input before permitting the valve output relays to energize.

Normal/Slowdown Limits (NTS) are Open: For each valve relay, the corresponding limit switch prevents the valve relay from energizing.
HM1/LM1 – Up Normal. HM2/LM2 – Up Slowdown. HM3/LM3 – Down Slowdown. HM4/LM4 – Down Normal.

No Run Command: The CPLD waits for a run command from the controller CPU before allowing any valve output relay to energize.

DIP switches and LEDs for each CPLD (on MR-SIB and CT-SIB) are used for diagnostics and monitoring in the field. See Section 9.1 for specific details on the CPLD DIP switch and LED descriptions.

5.1.5 Fuses

(See MR-SIB item F in Figure 22)

The fuses on the MR-SIB protect various branches of power for the controller and field wiring. The fuse connections for M1-M4 at the MR-SIB are routed to separate terminal blocks for field-wiring convenience. Table 12 lists the voltage and current ratings of fuses M1-M5. The fuses used are type AGC or 3AG 312 Series glass fuses.

NOTE: Only replace fuses with fuses of the same type and rating.

Table 12: Fuses for MR-SIB.

Label	Current	Voltage	TB	Description
M1	3A	250VAC	1	Car I/O Power Supply
M2	3A	250VAC	1A	Hall I/O Power Supply
M3	1A	250VAC	1E	Emergency Services Power Supply
M4	3A	250VAC	1X	Safety String Power Supply
M5	1A	250VAC	+/-	24VDC Controller Power Supply

5.1.6 Real Time Clock & 3V Battery

(See MR-SIB item E in Figure 22)

The system uses a battery-backed Real Time Clock (RTC) mounted on the MR-SIB to provide time data for the controller CPU.

The RTC is set by the factory, but may be edited using the Time Setup Menu (see Section 6.1.4.12). Daylight savings may be enabled or disabled using the DST Setup Menu.

The RTC is backed up by a CR2032 3V battery. The battery life is approximately 5 years.

NOTE: If the battery fails, the system cannot retain the current time the next time system power is cycled. The time then resets and restarts at the default of 00:00:00, 01/01/2001.

WARNING: Replace the battery with 3V Lithium battery, Part No. CR2032 only. Use of another battery may present a risk of Fire or Explosion.

WARNING: Orient the battery properly in the battery holder. The positive side of the battery is marked on the battery and faces towards the right of the MR-SIB.

WARNING: Do not use a metal (or conducting) device to remove or install the battery.

WARNING: Risk of Fire, Explosion, and Burns. Do not recharge, disassemble, heat above 100°C or incinerate.

Replace a low battery:
1. gently pushing the top of the battery downward until it is clear of the black housing, and then
2. slide it out of the socket.

Insert the new battery:
1. sliding the edge under the metal retaining finger, then
2. aligning it in the black housing.

Be careful not to short out the battery. Dispose of the old battery properly – do *not* incinerate.

The RTC retains its time if the battery is removed and replaced while the controller has power; otherwise, the time resets to the default of 00:00:00, 01/01/2001. If the clock is running fast or slow, this may be adjusted using a calibration value. Use the Time Setup Menu on the controller CPU to edit the time (See Section 6.1.4.12)

5.1.7 Door Open Button

(See MR-SIB item O in Figure 22)

The Door Open Button on the MR-SIB provides a way to open the doors on Normal Operation from machine room. The controller Door Open Button bypasses the Door Open Cutout Switch while pressed.

5.1.8 Door Open Cutout Switch

(See MR-SIB item N in Figure 22)

When the Door Open Cutout Switch is set to '**K/O**', the doors are prevented from opening automatically while on Normal operation and hall calls are also disabled. While the switch is in the '**K/O**' state, car calls may still be placed, and the doors still open if the Door Open Button on the MR-SIB or Car Operating Panel is pressed.

5.1.9 Inspection Switches

(See MR-SIB items P, Q, R, V in Figure 22)

The Controller Inspection switches allow the elevator to run on Inspection from the machine room.

To operate the car, do the following:

Slide the Controller Inspection switch from '**NORMAL**' to '**INSP**'.

To run up, press and hold the '**ENABLE**' button, then press the '**UP**' button.

To run down, press and hold the '**ENABLE**' button, then press the '**DOWN**' button.

The '**UP**' or '**DOWN**' button must be pushed within three seconds of pushing the '**ENABLE**' button or the input is ignored. The car continues to run until either the '**ENABLE**' or '**UP**' or '**DOWN**' buttons are released, or a safety string device has opened. Once the car has stopped, the '**ENABLE**' button must be released before another run can occur.

> **WARNING: Use extreme caution when operating the car from the machine room. Make sure it is safe to run the car.**
>
> **WARNING: The system monitors the run inputs at all times. If any inspection run button is pressed while the car is not in the corresponding inspection mode, including Normal Operation, the system then triggers a fault, and the car immediately shuts down until the offending signal is resolved.**

5.1.10 Door Bypass Switches

(See MR-SIB items S, T, U in Figure 22)

The Door Bypass Switches bypass the Car Gate Contact(s), the Hall Door Contact(s), or the Hall Lock Contact(s), either individually or in combination, as elevator safety code requires. They may only be used while operating in Car-Top Inspection or In-Car Inspection.

Elevator safety code permits the use of these switches to run the car on Car-Top Inspection when the electrical contact(s) of the gate, doors, and/or locks are unable to make up. Enabling any of these switches puts the elevator into Inspection Bypass mode, which disables Normal Operation, Controller Inspection, and Hoistway Access mode.

The following table lists potential bypassed Safety signals and their corresponding MR-SIB inputs:

Bypass Switch	LED	Safety signals bypassed		
Car Door Bypass	M40	Front Car Gate contact	TB:4	input M05
		Rear Car Gate contact	TB:4R	input M06
Hoistway Doors Bypass	M39	Top (Access) Hall Door contact	TB:5T	input M09
		Front Hall Door contacts	TB:5	input M10
		Bottom (Access) Hall Door contact	TB:5T	input M11
		Rear Hall Door contacts	TB:5R	input M12
Hoistway Locks Bypass	M38	Top (Access) Hall Lock contact	TB:6T	input M13
		Front Hall Lock contacts	TB:6	input M14
		Bottom (Access) Hall Lock contact	TB:6T	input M15
		Rear Hall Lock contacts	TB:6R	input M16

WARNING: Use extreme caution when using these switches, and always make sure it is safe to operate the car with these switches activated.

5.1.11 Controller Stop Switch

(See MR-SIB item W in Figure 22)

The controller stop switch breaks the safety string, preventing the car from running. The LED M07 indicates the status of this safety input.

5.1.12 Onboard 12VDC, 5VDC, 3.3VDC Power Supplies

(See MR-SIB items J10, A* in Figure 22)

The MR-SIB receives 24VDC from the controller power supply and uses onboard power supplies to produce 5VDC and 3.3VDC for CANbus drivers, the CPU, and other components. Approved external devices can access +5VDC, +12VDC, or -12VDC power, using the J10 terminal block if the power supply UPS5 is installed by Virginia Controls. The LED indicators for the 5VDC and 3.3VDC power supplies should all be illuminated upon power up. Test points are provided for all the power supplies as a trouble-shooting aid. The 12VDC power supply chip is located under the controller CPU.

5.1.13 Encoder Connections

(See MR-SIB item J11 in Figure 22)

These connections are reserved for Vision 2.0 Traction controllers, and do not apply for hydraulic applications.

5.1.14 Absolute Positioning System (ELGO LIMAX Connections)

(See MR-SIB items J13, J14 in Figure 22)

(See CT-SIB items A, J8 in Figure 24)

The standard connection for the ELGO LIMAX Absolute Positioning System (APS) is directly to the CT-SIB RJ45 port labeled "APS READER". This connection provides 24VDC power to and receives CANbus communication from both ELGO sensors A & B in the LIMAX sensor head. Internal to the CT-SIB, there is circuitry to split channels A & B to be read separately by different devices. ELGO channel A is routed to the CT-SIB terminal block J8, to be read by the controller CPU via the traveling cable and MR-SIB terminal block J14. ELGO channel B is received directly by the CT-SIB processor, which processes the data and transmits computed positioning values back to the MR-SIB and controller CPU using CANbus 0 via the traveling cable.

If the MR-SIB is not the end terminating node on the CANbus 1 positioning channel, connect the next device in series to MR-SIB terminal block J13 and ensure that termination jumpers J1H & J1L are removed.

5.1.15 mikroBUS expansion port

(See MR-SIB & CT-SIB item M in Figure 22 & Figure 24)

A serial PI Driver plug-in board may be installed on the MR-SIB via the mikroBUS expansion port. See Section 5.10 for further details.

5.1.16 Auxiliary Relay Board – MR-SIB Outputs

(See MR-SIB items J1A, J2A, Y in Figure 22)

An Auxiliary Relay Board is mounted on the MR-SIB with 8 relays in 4 pairs to control the 4 hydraulic valve solenoids. Each valve is connected to a pair of Auxiliary Relay contacts, where the HM1-HM4 relays on the left connect to the high voltage common terminal HMC, and LM1-LM4 relays on the right connect to the low voltage common terminal LMC. Each pair of Auxiliary Board Relays operates independently using the following nomenclature:

Table 13: Auxiliary Board Relays Operation.

Valve Relays	HM Relay Terminal J2	LM Relay Terminal J1
Up Level Valve	HM1	LM1
Up Fast Valve / ETSR Switch	HM2	LM2
Down Fast Valve	HM3	LM3
Down Level Valve	HM4	LM4
Common (Hot / Neutral)	HMC	LMC

> **NOTE: The field connections for each valve solenoid do not connect directly to the Auxiliary Relay board terminals. Connect valves to the terminal strip, per the wiring schematics sheet VM4.**

Each pair of Auxiliary Board Relays follow the Run and Stop sequence as shown in Table 14 below. The system actively monitors the state of the relays to check for stuck or malfunctioning relay contacts. If there is a relay monitor fault, the system sets a latched redundancy shutdown, and the relay monitor status is recorded in the fault log. Such a fault is latched through a power loss, requiring the Fault Reset input (RST) on MR-SIB input #16 to be set high to clear the fault.

Table 14: Auxiliary Board Relays Run and Stop Sequences.

Event:	Description:	Relay States: HM	Relay States: LM	Relay Monitors: HM	Relay Monitors: LM
Initial State:	1. HM/LM relays are both open.	Open	Open	Low	Low
Run Sequence:	2. HM relay is commanded to close.	Closed	Open	-	-
	3. HM monitor verifies HM relay is closed.	Closed	Open	High	High
	4. LM relay is commanded to close.	Closed	Closed	-	-
	5. LM monitor verifies LM relay is closed.	Closed	Closed	High	Low
Stop Sequence:	6. LM relays is commanded to open.	Closed	Open	-	-
	7. LM monitor verifies LM relay is open.	Closed	Open	High	High
	8. HM relay is commanded to open.	Open	Open	-	-
	9. HM/LM monitors verify both relays are open.	Open	Open	Low	Low
	10. Go to Step 1.	-	-	-	-
Error Conditions:	HM relay is open, and either monitor input is high.	Open	Open	High	High
	Timeout during any part of Run or Stopping Sequence.	-	-	-	-

NOTE: The system checks for a stuck LM relay contact during a stop sequence (see step 7 above) only during a normal stop. If a safety device or any other abnormality commands the controller to stop, the HM and LM auxiliary relays both open immediately, ensuring the relay contacts are both open.

5.2 Controller CPU board

5.2.1 Hardware Layout
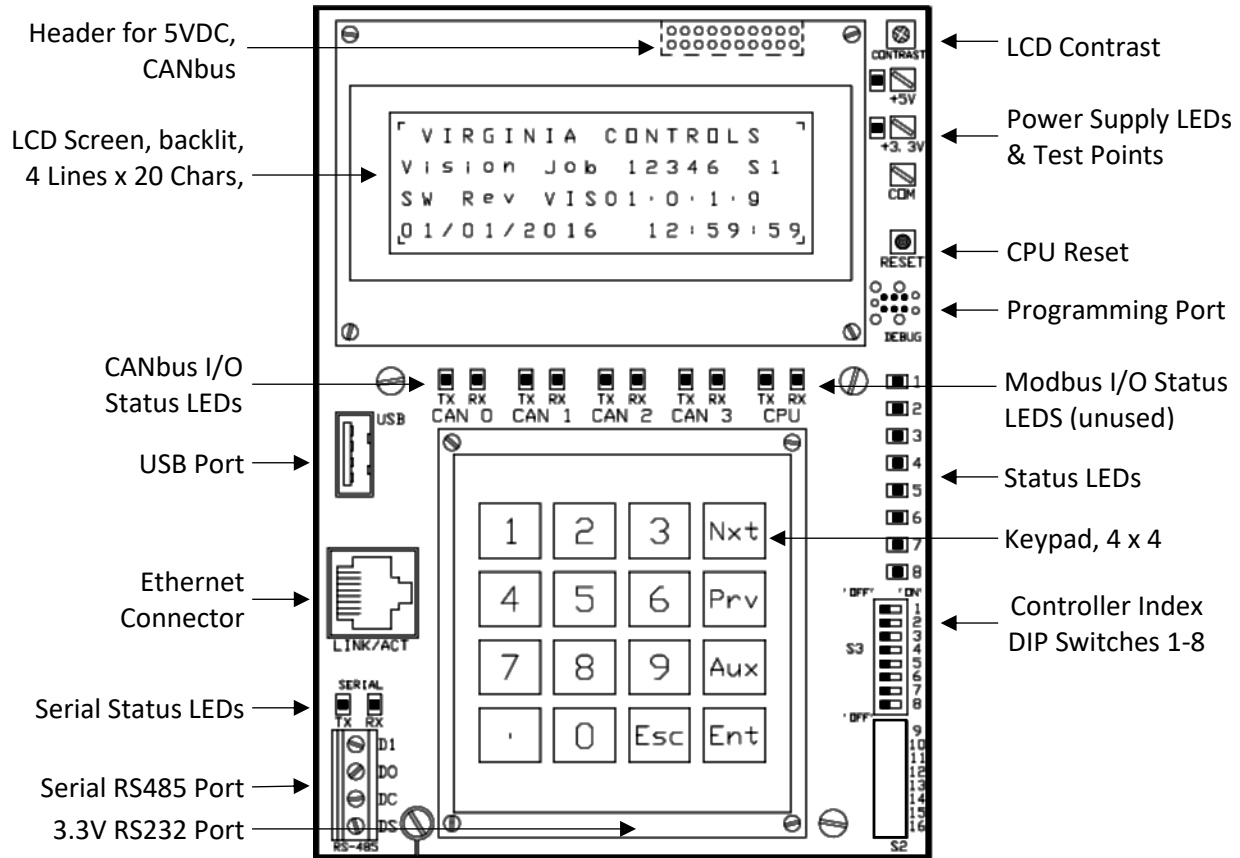
Figure 23: CPU Layout Diagram.

The controller Central Processing Unit (CPU) board contains the hardware that reads the inputs and enables the outputs that control the operation of the elevator. The controller CPU is mounted on the MR-SIB and performs all software tasks and functions. The controller CPU is field programmable via the USB port. This section describes the major components on the board and the function of the connectors and LEDs.

5.2.2 Status LEDs

There are eight LEDs located at the right side of each CPU board.

Status LED 1: Watchdog CPU monitor. It flashes at 1 Hz to indicate that the CPU is running.

Status LED 4: Second screen mode: LED 4 is ON while in status read-only mode, or OFF while in setup mode. Press the **Aux** key to switch between screen modes.

Status LED 5: Flashes while CPU Supercapacitor is charging during power up.

Status LED 6: Flashes while HTTP server has an active connection (see Section 6.2).

Status LED 7: Flashes when group dispatching data from another controller is received.

Status LED 8: Flashes when group dispatching data is being transmitted to other connected controllers.

Status LEDs 1-4: While in the '**Show Memory**' status menu screen, LEDs 5-8 reflect the status of the four two-digit bytes of the top line on the screen, respectively. If the two-digit byte is non-zero, then the corresponding LED is lit. Otherwise, the LED is off if the byte is zero, causing the LED to flash on and off if the data state changes. This feature is useful to visually observe memory data at a faster rate than is refreshed on the LCD screen.

CANbus LEDs: The Tx/Rx LEDs reflect the status and activity of each of the 4 CANbus channels.
Tx: CANbus message transmit – This LED blinks when the CANbus is transmitting.
Rx: CANbus message receive – This LED blinks when the CANbus is receiving.

Serial Status LEDs: The Tx/Rx LEDs reflect the status and activity of the Serial RS485 and RS232 ports.
Tx: Serial RS485/RS232 transmit – This LED blinks when the RS485/RS232 interface is transmitting.
Rx: Serial RS485/RS232 receive – This LED blinks when the RS485/RS232 interface is receiving.

5.2.3 CPU Reset Button

The CPU Reset button is located on the right side of the CPU board display. The CPU Reset button should only be used when performing a software update (refer to Section 7.2). The CPU Reset button restarts the CPU and interrupts any elevator processing immediately. It is recommended to cycle power at the main disconnect to restart elevator processing, rather than resetting the CPU directly.

> **WARNING: Resetting the CPU using the CPU Reset Button prevents the controller from processing and saving any status bits, so the controller will likely not restart in the same state.**

> **NOTE: Pressing the CPU Reset button is _not_ the same as doing a factory reset.**

> **WARNING: Pressing the CPU Reset button resets the CPU, causing all outputs to be turned off and the car to stop immediately.**

5.2.4 DIP Switches

There is one set of 8 DIP switches on the CPU, labeled 1-8.

DIP switches labeled 1-3 set the controller number index (in terms of letters A – H) for group operation.

To define the controller index, set the DIP switches to the binary value of the index as follows in Table 15. The index is defined as an alphanumeric value between A-H to distinguish each controller from another.

Table 15: Controller Index DIP Switch Settings.

	Controller Index							
	A	B	C	D	E	F	G	H
DIP Switch 1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP Switch 2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP Switch 3	OFF	OFF	OFF	OFF	ON	ON	ON	ON

> **NOTE: The Vision 2.0 system can accommodate up to 8 cars connected in a group network. Each controller CPU in a group must have a unique index, so that each controller has a distinct designation.**

DIP switch 4 is ON when performing a software update. The system boot up time is delayed to allow detection of a USB flash drive. Turn DIP switch 4 OFF when not updating software to allow faster boot time.

DIP switches 5-7 are unused.

DIP switch 8 is ON to disable the DHCP server that runs the wireless access point feature. Turn this switch on if there are issues with remote monitoring using the CPU Ethernet port.

5.2.5 LCD Screen

The LCD screen features a 4-line display with 20 characters per line. The contrast may be adjusted using the trim potentiometer directly to the right of the screen on the CPU board. The backlit screen activates upon any keypress and times out after 1 hour of inactivity.

5.2.6 Keypad

The Keypad features a set of 16-button inputs, `0` through `9`, `.`, `Nxt`, `Prv`, `Aux`, `Ent`, and `Esc`. Refer to Section 6 for specific details about how to use the keypad in the context of the menu interface.

5.2.7 Power

The CPU board receives 5V power from the MR-SIB. An onboard 3.3V power supply provides power to the onboard components. The status of the 5V and 3.3V power supplies is shown by LEDs to the right of the display.

There is a supercapacitor under the CPU board display that provides 5V power for the CPU board, permitting a brief period of operation for the CPU and non-volatile RAM when power is removed from the controller. If the MR-SIB detects a power loss of at least 100 milliseconds, the CPU begins a power-down sequence during which status values are saved and the fault log is updated before the supercapacitor loses power. There is a 30-second timer to ensure that the supercapacitor is fully charged. If the CPU has been running for less than 30 seconds, the current state is not saved, and the system will revert to a previously saved state upon next boot up.

If the building power dips briefly and "browns-out," this may trigger a processor reboot following the standard power-down procedure described above. Then the controller automatically restarts in the same state it was in when shutting down and, after a few seconds, goes back into service.

5.2.8 Serial Communication Ports

5.2.8.1 CANbus

The CPU communicates with the MR-SIB, CT-SIB, I/O boards, Absolute Positioning System, and other connected controllers in a group over CANbus via the 2 x 10 pin connector/header between the CPU and MR-SIB.

5.2.8.2 Ethernet

Each CPU has an Ethernet (RJ45) port which allows the controller to communicate over an external network. Possible connections include:

1. Dispatching: Peer-to-peer connection between grouped controllers sharing dispatching status data.

2. Monitoring Interface: available protocols include TCP-IP, Modbus-IP, UDP, or others upon request.

3. Wi-fi Application: If connected to a Wi-fi Access Point, the controller can serve a webpage interface for controlling the CPU keypad and display. See Wi-fi App instructions in Section 6.2 for details.

5.2.8.3 USB

The USB port is used to install software updates and configuration files. Refer to Section 7 for instructions on installing software updates.

5.2.8.4 Serial RS485 & RS232 3.3V Port

The serial RS232 and RS485 ports are used for direct connections with serial devices based on the application. The 6-pin serial RS232 port is located underneath the keypad, and uses a 3.3VDC interface, which is compatible with the USB-to-RS232 cable model # FTDI TTL 232R 3V3. This port is used for factory diagnostics only.

5.2.8.5 Programming Port

The J-tag port to the right of the LCD screen is used by the factory to update microprocessor firmware.

5.3 Car Top Inspection Station (CTIS) Description

The following components are included with the Vision 2.0 Car Top Inspection Station.

5.3.1 Car Top Safety Interface Board (CT-SIB)

- See Section 5.4 for detailed description of the CT-SIB.
- Located on the right, partially under the car top inspection run button panel.
- Factory wired to color-coded terminals blocks.
- Field wiring to communication cables only, as shown on sheets CTC & COP.
- Inputs are 120VAC, designated for door limits, Infrared Curtain Unit, and Load Weighing.
- Outputs, dry contacts, designated for:
    o Door control
    o Safety Processor resolved Car Safety String
    o Fire Light & Buzzer
    o Car Lighting Cutout Relay (upon request)
- Directly interfaces with ELGO APS RJ-45 connecter, J10.
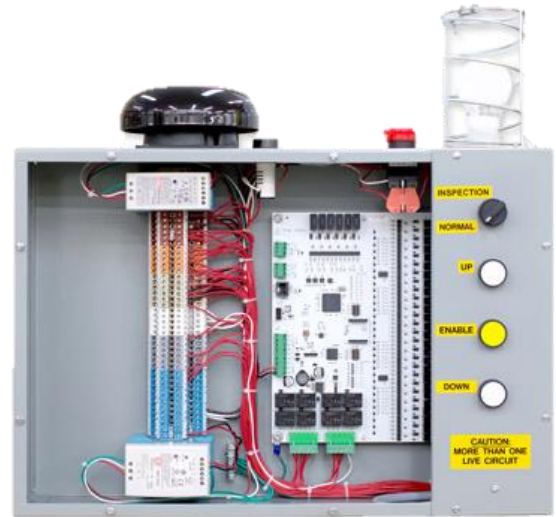
5.3.2 Color Coded Terminal Blocks

- Located in the middle-left of the enclosure.
- Color coded and labeled to match traveling cable and C.O.P. cable coloring and designations.
- Factory Wiring is landed on the right, leaving ample room for customer field wiring on the left.
- See sheets CTC & COP for wiring connection layout.

5.3.3 Car Top Power Supply, 24VDC

- Located at the top of the din rail above the terminal strip.
- Dedicated to powering the CT-SIB, C.O.P. I/O board, ELGO APS, and CEDES DZ switch.
- 120VAC Input Power connects to TBs: 1X & 35.
- 24VDC Output connects to TBs: 24V & COM.
- COM is not grounded, as the common is shared with the machine room MR-SIB power supply, via the traveling cable conductor "CMM".

5.3.4 Fixture Power Supply, 24VDC

- Located at the bottom of the din rail below the terminal strip.
- Dedicated for 24VDC fixtures in the car station. Not used if fixtures require 120VAC.
- 120VAC Input power connected to TBs: 1 & 35.
- 24VDC Output connects to TBs: +C & 35.
- Fixture supply is referenced to ground via TB: 35, which is grounded in the machine room.

> Caution: The 24VDC power supplies, Fixture & Car Top, are designated for specific purposes and should not be cross-wired. The 24VDC fixture supply +C & 35 only connects to the I/O plugs of the C.O.P. I/O board(s). Make sure that the car top power supply terminals 24V & COM are not jumped to +C & 35 on the C.O.P. I/O board(s).

5.3.5 Car Top Inspection Station Miscellaneous Components

The following components are included and prewired as part of the VC Car Top Inspection Station.

Item	Location in CTIS	Voltage	Terminals Used	Schematic Sheet
Alarm Bell	Top	6VDC	AL1, AL2	CTB
Car Top Stop Switch	Top	120VAC	3E, 3Y	VT1 & CTB
Car Top Inspection Sw.	Right	120VAC	1X, 23Y, 23T	VT1 & CTB
Car Top Insp. Enable	Right	120VAC	23T, 23E	VT1 & CTB
Car Top Insp. Up	Right	120VAC	23T, 25	VT1 & CTB
Car Top Insp. Down	Right	120VAC	23T, 24	VT1 & CTB
Fire Light	Top	24VDC	81L or 81, 35	VT2 & CTB
Fire Buzzer	Top	24VDC	81B or 81X, 35	VT2 & CTB
GFCI Outlet	Right	120VAC	115V, NEUT	CTB
Car Top Light & Sw.	Right	120VAC	115V, NEUT	CTB
Door Zone Relay "DZ"	Bottom	120VAC / 24VDC	20X, COM (coil) 1X, 20 (contacts)	VT1
Cab Lighting & Fan Cutout Relay "LIT"	Bottom	120VAC / 24VDC	1 or +C, LT (coil) 115V, PWR (contacts)	VT2

Alarm Bell
- 6VDC Power Supply not provided by VC.
- Polarity may need to be reversed depending on power supply hookup.

Car Top Stop Switch
- Part of the safety string.
- Press down to latch switch in stop state. Rotate to release.

> NOTE: Do <u>NOT</u> slam the Car Top Stop Switch down or force the switch up or risk damaging it.

Car Top Inspection Switch & Run Buttons
- See Section 3.5.2.8 for details on using car top inspection operation.

> NOTE: Jump terminals 23Y – 23B in the Car Top terminal strip if In-Car Inspection is not used.

Fire Light
- Integrated into the Car Top Stop Switch.
- Will illuminate while on fire service.
- Factory wired to terminal 81L.
- Connects to CT-SIB output HT3 by default, unless rear passenger doors are used.
- If rear passenger doors are using CT-SIB output HT3, use spare C.O.P. cable conductor to connect C.O.P. I/O board output 81 to car top terminal 81L.

Fire Buzzer
- Activates while in fire service during recall or shutdown.
- Factory wired to terminal 81B.
- Connects to CT-SIB output HT4 by default, unless rear passenger doors are used.
- If rear passenger doors are using CT-SIB output HT4, use spare C.O.P. cable conductor to connect C.O.P. I/O board output 81X to car top terminal 81B.

GFCI Outlet
- Factory prewired with 14Ga wire using the dedicated 115VAC, 15A car fan, lighting & GFCI circuit.

Light Switch & Car Top Light
- Factory prewired with 14Ga wire using the dedicated 115VAC, 15A car fan, lighting & GFCI circuit.

Door Zone Relay "DZ"

- Coil is driven by the 24VDC Door Zone signal '**20X**'.
- Relay contacts feeds a 120VAC Door Zone Signal to the MR-SIB and CT-SIB, which require 120VAC inputs.

Cab Lighting and Fan Cutout Relay

- Available upon request per job specifications.
- The relay output will remove power to the car lighting and fan circuit after an adjustable timeout, with 5-minutes being the VC configured default. (timer parameter '**CAR LIGHT CUTOUT**')
- 120VAC coil is used if doors are front-only, being prewired by the VC factory using CT-SIB output "LT1" if available.
- 24VDC coil is used when no spare outputs are available on the CT-SIB, typically if using rear doors. The output is configured to the car station I/O board output labeled "LT". This signal needs to be routed to the car top by designating a C.O.P. cable conductor to connect car top terminal "LT" to the car station I/O board output "LT".
- Output contacts are factory prewired with two 16Ga wires in parallel, using the dedicated 115VAC, 15A car fan, lighting & GFCI circuit.

5.3.6 NEMA Rating

The NEMA rating of the standard car top inspection station is NEMA 1.

NEMA 4/12 & 4X ratings are available upon request. To meet NEMA 4/12 and 4X:

- The enclosure will be upgraded to be hinged with a gasketed seal while closed.
- The light socket is upgraded to a weather-proof model.
- The light switch is upgraded with a gasketed weather-proof toggle-switch.
- The GFCI includes a weather-proof spring-cover.

5.3.7 Car Top Field Connections

- Field connections are largely designated to the left of the CTIS, mostly connecting to designated terminals.
- Cables to be routed into car top inspection station:
  - Traveling Cable – supplemental traveling cable may be used where required for Security, etc.
  - C.O.P. Cable (includes in-car stop switches, inspection, PI driver, car lighting supply, alarm button circuit, phone, fixture I/O commons, spares)
  - Board #20 communication & power
  - Door Operator Signals (power, open, close, nudge, common, door limits)
  - Infrared Curtain / Safety Edge & Electric Eye
  - Car Safety String signals (Emergency Exit sw)
  - Miscellaneous Car Top signals (Load Weighing)
  - ELGO APS Sensor (via RJ-45 plug)
  - CEDES Door Zone (TBs: 20X, 24V, COM)

5.3.7.1 Car Safety String and Inspection Connections

See Section 3.5.2.

5.3.7.2 Infrared Curtain/Electric Eye & Safety Edge

See Section 3.5.2.

5.4 Car Top Safety Interface Board

5.4.1 CT-SIB Layout

The Car Top Safety Interface Board (CT-SIB) layout is shown in Figure 24 and the descriptions are in Table 16.

Table 16: MR-SIB Layout Descriptions from Figure 24.

##	Description	##	Description
J1	Car Safety String inputs	A	ELGO APS RJ45 Connection
J2	Car Inspection inputs	C	Communication status and Power status LEDs
J3	Spare inputs	F	USB port for firmware updates
J4	Door limits, Infrared Curtain, Safety Edge inputs	L1	Safety input LED indicators T01-T08
J5	Outputs 5-8	L2	Safety input LED indicators T09-T16
J6	Outputs 1-4	L3	Safety input LED indicators T17-T24
J7	CANbus 0 connections, to MR-SIB and C.O.P. board	L4	Safety input LED indicators T25-T32
J8	CANbus 1 connections, to APS	M	mikroBus auxiliary device port (for future use)
J9	CANbus 2 connections, to door operator/spare	O	Output LED indicators
		P	I/O processor DIP switches
		R	I/O processor & CPLD reset button
		T	CPLD safety processor DIP switches
		X	CPLD state & I/O LED indicators

'UL' Cap 'TB-T01' 'UL' Cap 'TB-T02' 'UL' Cap 'TB-T03' 'UL' Cap 'TB-T04' 'UL' Cap 'TB-T05' 'UL' Cap 'TB-T06'

(J9-3)
CH2
CL2
CS2
J9
'SPARE I/O' CAN 2

(J8-3)
CH1
CL1
CS1
J8
[-CT/MR-]
'APS' - CAN 1

APS READER
A

SIB CAN APS CAN SPR CAN 5V 3.3V COM
TX RX   TX RX   TX RX
C

NOTE: AREA of 3-CAN DRIVERS

CPLD LED'S
X1 X2 X3 X4 X5 X6 X7 X8
X

SIB-PIC FLASH
F

DEBUG SIB-CPLD

LCMX02-2000HC-4TG144C (SIB-CPLD)

CPLD SWS
'OFF' 'ON'
XT1 XT2 XT3 XT4
T

RESET SIB PIC & CPLD
DEBUG TX RX
R

mikro BUS
M

(J7-9)
CH0 CL0 CS0 CMM CH CL CS 24V COM
J7
POWER [- I/O -][-- MR/CT --] CAN 0

JOH
DEBUG SIB-PIC
JOL
DEBUG SIB-PIC

PIC32 MK1024 MCF100 (SIB-PIC)

PIC SWS
'OFF' 'ON'
P1 P2 P3 P4
P

OUTPUTS
HT1 HT2 HT3 HT4
LT1 LT2 LT3 LT4
O

NOTE: AREA of 5VDC SWITCHING POWER SUPPLY

NOTE: AREA of 3.3VDC LINEAR POWER SUPPLY

Q

CHASSIS

HTC HT4 HT3 HT2 HT1 LTX
J6
(J6-6) (J6-1)

LT4 LT3 LT2 LT1 LTC 35
J5
(J5-6) (J5-1)

L1
T01 T02 T03 T04 T05 T06 T07 T08

L2
T09 T10 T11 T12 T13 T14 T15 T16

L3
T17 T18 T19 T20 T21 T22 T23 T24

L4
T25 T26 T27 T28 T29 T30 T31 T32

1W (×many)

'UL' Cap 'TB-T07'
'UL' Cap 'TB-T08'
'UL' Cap 'TB-T09'
'UL' Cap 'TB-T10'
'UL' Cap 'TB-T11'
'UL' Cap 'TB-T12'
'UL' Cap 'TB-T13'
'UL' Cap 'TB-T14'
'UL' Cap 'TB-T15'
'UL' Cap 'TB-T16'
'UL' Cap 'TB-T17'
'UL' Cap 'TB-T18'
'UL' Cap 'TB-T19'
'UL' Cap 'TB-T20'
'UL' Cap 'TB-T21'
'UL' Cap 'TB-T22'
'UL' Cap 'TB-T23'
'UL' Cap 'TB-T24'
'UL' Cap 'TB-T25'
'UL' Cap 'TB-T26'
'UL' Cap 'TB-T27'
'UL' Cap 'TB-T28'
'UL' Cap 'TB-T29'
'UL' Cap 'TB-T30'
'UL' Cap 'TB-T31'
'UL' Cap 'TB-T32'

(J1-1)
T01 T02 T03 T04 T05 T06 T07 T08
J1
(J1-8)

(J2-1)
T09 T10 T11 T12 T13 T14 T15 T16
J2
(J2-8)

(J3-1)
T17 T18 T19 T20 T21 T22 T23 T24
J3
(J3-8)

(J4-1)
T25 T26 T27 T28 T29 T30 T31 T32
J4
(J4-8)

Figure 24: Car Top Safety Interface Board (CT-SIB) layout

5.4.2 CT-SIB Outputs

(See CT-SIB items Q, J5, J6 in Figure 24)

The CT-SIB is equipped with 8 output relays which are used for the car safety string, door control and other Car Top Inspection Station outputs. The outputs are separated into three groups across the terminal blocks J5 & J6.

Output Common:	HTC		LTX		LTC			
Output Terminal:	HT1	HT2	HT3	HT4	LT1	LT2	LT3	LT4

The commons are separated to allow flexibility to wire the output common to different connections, depending on the door operator or Car Top Inspection Station output requirements. Refer to the schematics page "VT2" for job-specific wiring.

5.5 Input/Output (I/O) Boards

Input/Output (I/O) boards are used to connect field devices to the controller via serial interface. Wiring of discrete signals is done to removable terminal blocks, while serial connection is made back to the controller via CANbus over a shielded twisted pair. Fuses are provided externally, not on the I/O boards.

There are two available types of I/O boards:

- the 16 point Remote I/O board, for servicing many I/O points in one location, and

- the 2 point Hall I/O board, for connecting small fixtures in the hall.

Each board communicates with the controller using CANbus and is interchangeable in the field using DIP switches to set the board address. The features and hookups for the Hall I/O board and Remote I/O board are similar and are described in the context of each component in the following sections.

The Remote I/O board receives inputs that are 24VDC, (or 120VAC on request), and provides dry relay contact outputs through a common terminal. The Hall I/O board receives inputs and sends outputs at 24VDC. See Figure 25 for the layout of the Remote I/O board and Figure 26 for the layout of the Hall I/O board. Both I/O Board types are powered by 24VDC.

5.5.1 Remote (16-In/16-Out) I/O Board

Remote Input/Output Boards are used to connect CPUs with field devices. These boards can be located in the controller, in the machine room, on the car top, in the C.O.P., and in the hoistway as required. Wiring is made to the removable terminal blocks at the top and bottom of the Remote I/O boards. Fusing for their I/O is provided externally on the MR-SIB, not on the I/O boards. See Figure 25 for the layout of the Remote I/O board. Board power is 24VDC, and the inputs are 24VDC (or 120VAC upon request), while relay outputs can be customized to the application.
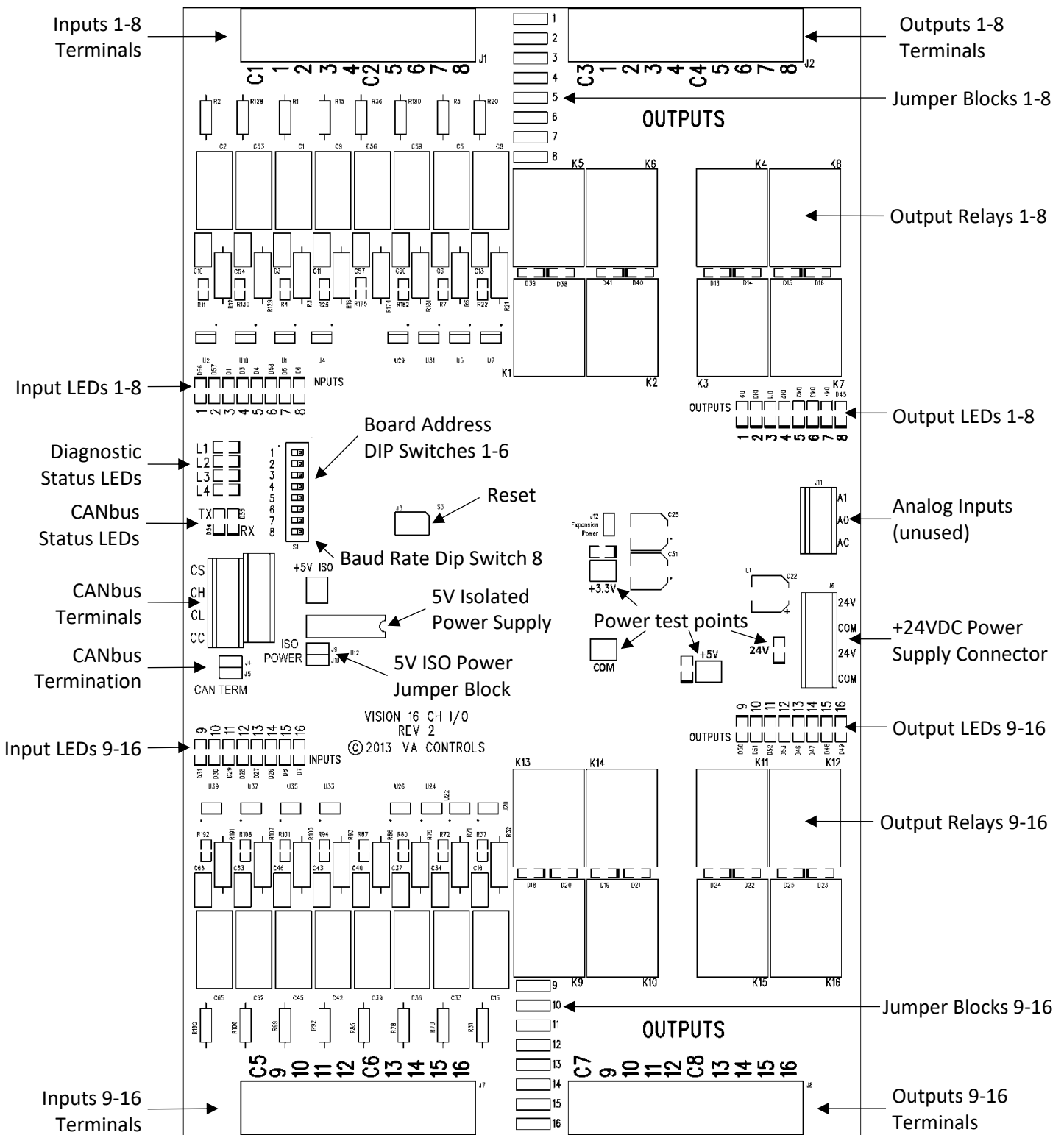
Figure 25: 16 Point Remote I/O Board Layout (drawn to scale).

5.5.1.1 Board Address DIP Switches

DIP Switches 1-6: These switches assign a CANbus node address number to each I/O board using binary values, converted to decimal, ranging from 0 to 63. For a given board address value, set the corresponding DIP switches to ON such that the sum of each binary-to-decimal converted value equals the desired board address number. Refer to Table 17 for the binary-to-decimal conversion for each DIP switch.

Table 17: Board Address DIP Switch Binary to Decimal Conversion.

DIP Switch # (binary)	1	2	3	4	5	6
Value (decimal)	1	2	4	8	16	32

> **NOTE: If a board has failed, its replacement must be set to the same address as the board it is replacing.**
>
> **NOTE: I/O board communication and input/output status may be monitored using the "Show I/O Status" menu screen. Refer to Section 6.1.10.**

DIP Switch 7: Unused.

DIP Switch 8: When OFF, the CANbus baud rate is set to 125 kBPS. When ON, the baud rate is 250 kBPS. Remote I/O boards used by the Vision 2.0 controller are always configured for 125 kBPS.

5.5.1.2 Connections

24VDC Power: Each Remote I/O board is powered by 24VDC using terminals '**24V**' and '**COMM**', located on the right side of the board. There are two sets of these terminals on each board, tied together electrically to allow for series connections.

CANbus: Remote I/O boards communicate via CANbus over 4 connections: CAN High (CH), CAN Low (CL), CAN Common (CC), and cable shield (CS). There are two sets of CANbus terminals on each board, tied together electrically to allow for series connections.

Inputs 1-16: The inputs of the Remote I/O board are normally 24VDC (or 120VAC on request). The physical connections for inputs 1-8 are at the top left of the Remote I/O board while inputs 9-16 are connected at the bottom left. Each group of 4 inputs has an input common terminal labeled **C1, C2, C5,** or **C6.**

Outputs 1-16: The outputs of the Remote I/O boards are relays with N.O. contacts. The physical output connections for outputs 1-8 are at the top right of the Remote I/O board, and outputs 9-16 are connected at the bottom right. Each group of 4 outputs has a single output common terminal labeled **C3, C4, C7,** or **C8**. Refer to the schematics to determine whether the output commons are high (24VDC), low (0V), or open (P-contactor safe outputs "PT" and "PC").

> **NOTE: The terminal blocks for the inputs and outputs are removable, so before power is applied, remove the terminal blocks and check for grounds at the terminal blocks.**

5.5.1.3 I/O & Status LEDs

Input LED: Input state LEDs are provided for each of the 16 inputs. The LED for each input is on when there is 24VDC (or 120VAC on request) across the input pin and its corresponding common.

Output LED: Output state LEDs are provided for each of the 16 outputs. The LED for each output illuminates when the board receives an ON command over CANbus for that output. When the output is on, the corresponding relay is energized, connecting the outputs connector pin to its corresponding common.

Tx: CANbus message transmit – This LED indicates that the I/O board is transmitting on the CANbus.

Rx: CANbus message receive – This LED indicates that there is traffic on the CANbus.

L1: Watchdog indicator – This LED toggles on and off once per second to indicate the board processor is active.

L2: Transmit status – This LED indicates the I/O board is attempting to transmit input data over CANbus.

L3: Receive status – This LED indicates the I/O board has received output data over CANbus.

L4: Receive Timeout – This LED indicates that the I/O board has not received data from the CPU for > 2 seconds.

Power Indicators: 24V, 5V, 3.3V indicators – These LEDs indicate that power is active on the CPU board. There are voltage test points for each of the 24V, 5V, and 3.3V, referenced to COM.

5.5.1.4 Jumper Blocks

5VDC Isolated Power Supply: Each board has a built-in 5VDC power supply for its onboard processor that is able to power its own CANbus driver as well. However, for CANbus networks extending beyond the immediate controller (e.g. Car and Hall), an isolated 5V power supply chip 'U12' must be installed. This chip allows the CANbus drivers of those boards to function with a shared common, which is referenced to ground either back at the controller or to another specific point. (The U12 chip should be tie-wrapped in place.) If the isolated power supply chip U12 is *not* called for in the drawings, then jumpers J9 and J10 must be installed. These jumpers connect a CANbus driver to the onboard 5V supply and connect CAN Common, or "CC", to the 24VDC power-supply common. Refer to the drawings for job-specific details.

I/O Jumpers: Each of the 16 inputs and outputs have a jumper block that can tie the corresponding input and output terminals together. The jumper blocks for inputs/outputs 1-8 are located in the upper middle of the board, and the jumper blocks for inputs/outputs 9-16 are located in the lower middle of the board between corresponding input and output terminal blocks. These are used primarily to achieve a 3-wire call system, where a call push-button and indicator can be tied together. When used, I/O connections are made to the output terminal blocks of the I/O boards.

CANbus Termination: Each CANbus channel requires termination at the nodes at each end of the bus. One node of each bus is typically terminated internally at the MR-SIB, while termination at the other end node is made at the last I/O board or device in the chain. To terminate the bus at an I/O board, insert jumpers on pin headers J4 and J5.

> **NOTE: Only place termination jumpers at the last endpoint node for a given CANbus channel. If termination is present on any node between the endpoints, the CANbus communication may not function.**

Expansion Power Jumper: This +5VDC jumper port is available for powering any expansion boards that may be mounted on top of the Remote I/O board. This port is presently unused and is for the factory's future use.

5.5.2 Hall (2-In / 2-Out) I/O Board

Hall Input/Output Boards are available for modular connection in the hall riser, specifically for use with 24VDC fixtures. These compact boards are designed to fit within the hall riser fixture boxes for hall calls and hall lanterns. Wiring is made to the removable terminal block at the bottom of the Hall I/O boards. The Hall I/O power supply, located in the controller, provides 24VDC to the boards and their I/O, as well as overcurrent protection. See Figure 26 for the layout of the Hall I/O board. Hall call fixtures must be provided with LED call indicators and limited to approximately 50mA. Hall lanterns must be provided with LED arrow indicators, but are limited to 750mA when combined with the load of the solid state gong.
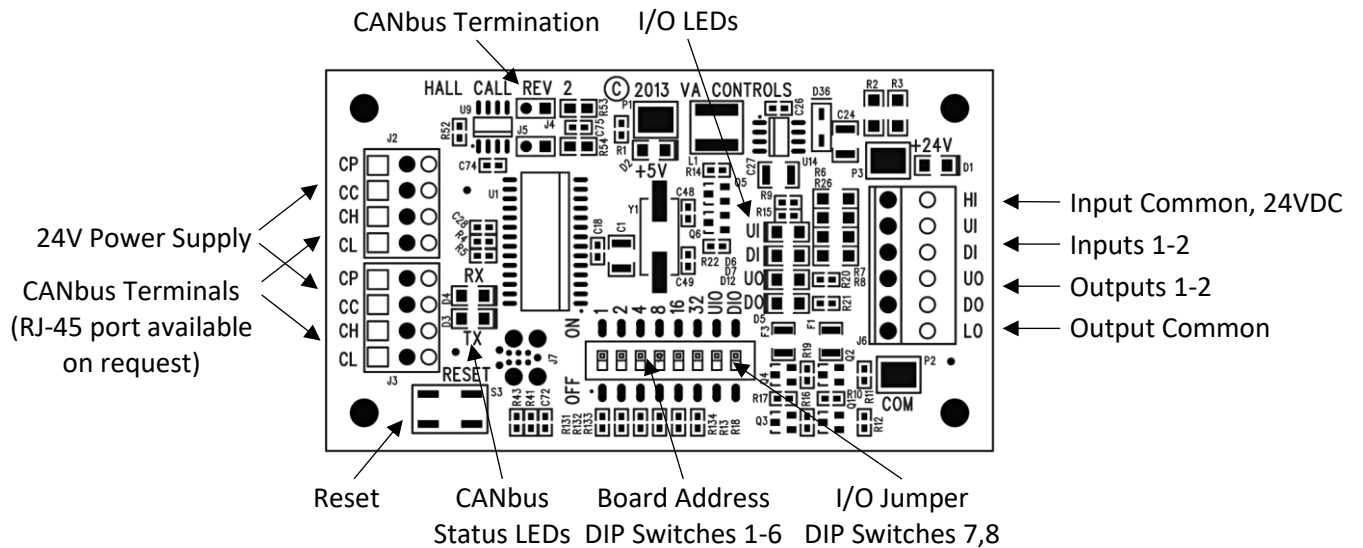
Figure 26: 2-In/2-Out Point Hall I/O Board Layout (drawn to scale)

Hall I/O Boards with RJ-45 Ethernet connection ports are available for convenient installation. Connect the boards in series using shielded CAT5e cable. The two RJ-45 ports on each board are interconnected, so connections between boards can be made to either port. Connect the entire series of boards to the RJ-45 port on the MR-SIB labelled "HALL CAN 3". This provides power and serial communication to every Hall I/O board. Wire 24VDC hall fixtures to the boards as shown in the job schematics.

Terminate CAT5e/RJ45 cables according to T1A/EIA-568-B standards:

PIN#	SIGNAL	COLOR
8	N/A	BR
7	N/A	BR/W
6	CP	GN
5	CC	BL/W
4	CP	BL
3	CC	GR/W
2	CH	OR
1	CL	OR/W

5.5.2.1 Board Address DIP Switches

DIP Switches 1-6: These switches assign a CANbus node address number to each I/O board using binary values, converted to decimal, ranging from 0 to 63. For a given board address value, set the corresponding DIP switches to ON, such that the sum of each binary-to-decimal converted value equals the desired board address number. Refer to Table 17 for the binary-to-decimal conversion for each DIP switch.

> **NOTE: If a board has failed, its replacement must be set to the *same address* as the board it is replacing.**
>
> **NOTE: I/O board communication and input/output status may be monitored using the "Show I/O Status" menu screen. Refer to Section 6.1.10.**
>
> **NOTE: Hall I/O baud rates are fixed at 125 kBPS.**

DIP Switch 7/8 – UIO/DIO: When DIP switch 7 is set ON, input 1 (UI) is electrically tied to output 1 (UO). Similarly, when DIP switch 8 is set ON, input 2 (DI) is electrically tied to output 2 (DO). These settings allow the use of one wire between call push-button and indicator to be connected to the I/O board at terminal '**DO**' or '**UO**'. When either of these switches are set to OFF, the UI or DI input and UO or DO output may be read and controlled independently of each other.

5.5.2.2 Connections

24VDC Power: Each Hall I/O board is powered by 24VDC, at terminals '**CP**' (Can Power) and '**CC**' (Can Common). There are two sets of these terminals on each board, tied together electrically, to allow for series connections. These terminals are a part of the CANbus communication connections, and they typically receive one of the 2 pairs within the Hall I/O CANbus communication cable. In this case, the board power supply and CANbus signals share the same common reference of '**CC**'.

CANbus: Hall I/O boards communicate via CANbus over 2 connections: CAN High (CH) and CAN Low (CL). There are two sets of these terminals per board, tied together electrically, to allow for series connections. These terminals receive the second pair within the Hall I/O CANbus communication cable, which is intended for communication signals rather than power. The "common" connection always required in a series of CANbus nodes is '**CC**' described above in item "24VDC Power". The cable shield ('**CS**') of the communication cable should connect on one end of each cable to a grounded fixture box per, Sheet "HL1".

Inputs UI, DI: The inputs for the Hall I/O boards are 24VDC. The two inputs for the Hall I/O boards are labeled '**UI**' and '**DI**', where '**UI**' is considered input 1 and '**DI**' is input 2 in the '**Show I/O Status**' screen. The up hall call input is generally connected to '**UI**', and the down hall call input is generally connected to '**DI**'. But the inputs may be connected to Fire Service or Emergency Power devices, as needed. The 24VDC source for input contacts is terminal '**HI**', which is internally connected to the '**CP**' terminal. Inputs are referenced to a common of 0VDC at the '**CC**' terminal.

Outputs UO, DO: The outputs for the Hall I/O boards are 24VDC. The two outputs for the Hall I/O boards are labeled '**UO**' and '**DO**', where '**UO**' is considered output 1 and '**DO**' is output 2 in the '**Show I/O Status**' screen. The up hall call output is generally connected to '**UO**', and the down hall call output is generally connected to '**DO**', but the outputs may be connected to a Fire Service or Emergency Power indicator, as needed. The 24VDC source for the outputs is terminal '**HI**' which is internally connected to the '**CP**' terminal. Outputs are powered across 24VDC and a 0VDC common at terminal '**LO**', which is tied to the '**CC**' terminal.

> **NOTE: The terminal blocks for the inputs and outputs are removable, so *before* power is applied, remove the terminal blocks and check for grounds at the terminal blocks.**

Programming Port: Each board has a J-Tag port "J7" used for updating the board firmware. This port is for factory use only.

5.5.2.3 I/O & Status LEDs

Inputs UI, DI: Input LEDs illuminate if there is 24VDC across an input and its input common LO. LEDs UI and DI are located near the center of the board just above the input/output connections.

Outputs UO, DO: Output LEDs illuminate if the controller commands an output bit to be set ON. Doing so enables the output's respective output transistor to close the output terminal to the 24VDC output common '**HI**'. LEDs UO and DO are located near the center of the board just above the I/O connections.

Tx: CANbus message transmit – This LED blinks when the CANbus is transmitting from that board.

Rx: CANbus message receive – This LED blinks when the CANbus is receiving at that board.

Power Indicators: 24VDC and 5VDC indicators – These LEDs indicate that power is active on the CPU board. There are voltage test points for each of the 24VDC and 5VDC indicators referenced to the COM point.

5.5.2.4 Jumper Blocks

CANbus Termination: Each CANbus channel requires termination at the nodes at both ends of the communication network. One end node of each channel is typically terminated at the MR-SIB, while the other end node is typically terminated at an I/O board. To terminate CANbus at an I/O board, place jumpers on pin headers J4 and J5.

> **NOTE:** Only place termination jumpers at the last endpoint node for a given CANbus channel. If termination is present on any node between the endpoints, the CANbus communication may not function.

5.6 CANbus & Ethernet Communication Networks
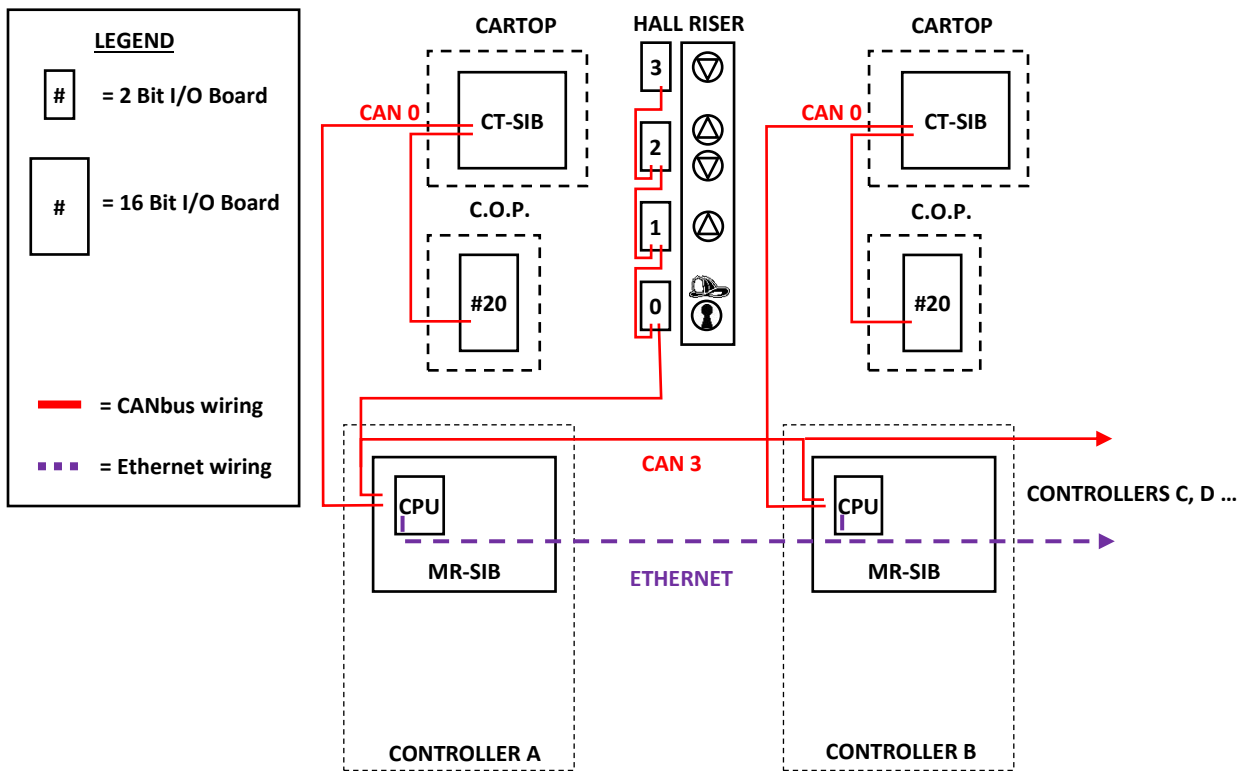
Figure 27: CANbus and Ethernet network representative diagram.

5.6.1 CANbus Configuration

There are 4 CANbus channels on the MR-SIB, used to serially connect all I/O boards to the machine room controller for processing. Each of these channels is distinct, categorized by controller I/O, positioning data, shared group I/O, and a spare channel for other accessory devices. CANbus connections are made at the left side of the MR-SIB and each device is linked in series. A representative diagram of the CANbus networks is shown in Figure 27 above and on Sheet "VM6" in the wiring schematics.

Table 18: CANbus channels for MR-SIB and CT-SIB.

CANbus Channel	MR-SIB	CT-SIB
0	CT-SIB and I/O boards	Shared with MR-SIB
1	Absolute Positioning System sensor "A"	Absolute Positioning System sensor "B"
2	Hall Lanterns & PI Driver	Spare/Door Operator control
3	Hall I/O boards and shared group I/O	

For group operation, controllers share CANbus 3 for the shared Hall Riser, and one controller is automatically designated as lead dispatch controller. The lead controller controls CANbus 3 outputs and, if the lead controller goes offline, a new lead controller is then designated and assumes control of CANbus 3 outputs.

5.6.2 Ethernet Configuration

Each controller CPU communicates its status to every other controller CPU on the Ethernet network using the UDP protocol. Use the 'Show Group Data' menu screen for Ethernet and CANbus communication status of connected cars (see Section 6.1.14). Each controller requires a unique IP address which may be edited from the factory default using the 'BEGIN IP SETUP' menu screen (see Section 6.1.4.8).

An Ethernet switch is required for group operation when there is more than one peer-to-peer connection needed, such as a group with more than two controllers or if a remote monitoring system is also connected.

5.7 Power System

5.7.1 Transformers
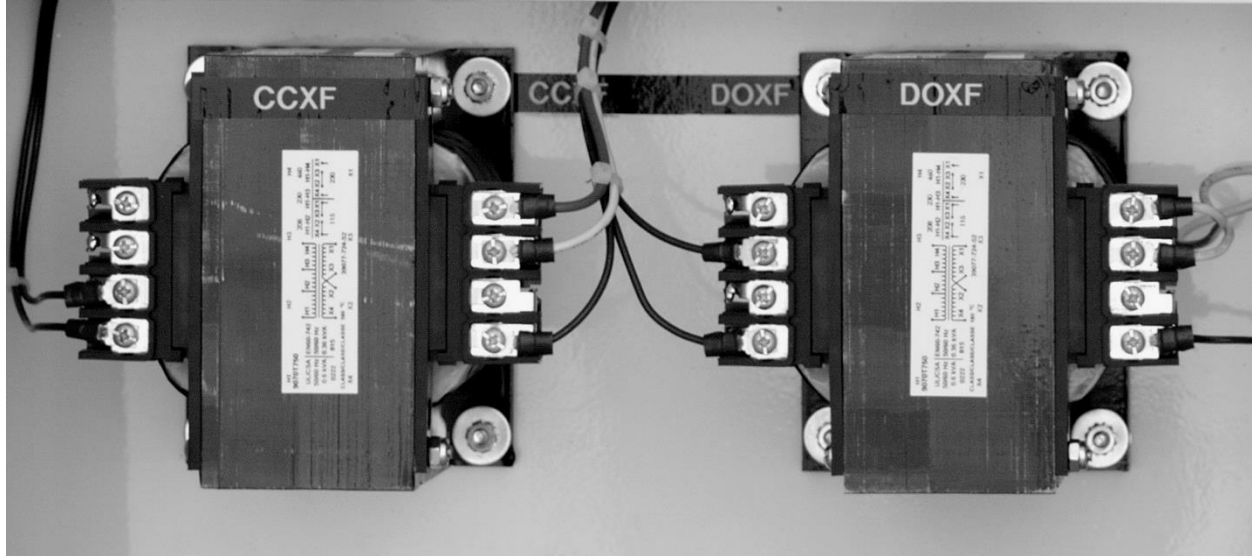
Figure 28: Control Transformers

"CCXF" is the Control Circuit Transformer, which provides the controller with 120VAC. The primary connections vary depending on the Building Power. See the schematic for sizing and wiring information.

 "EPXF" is the Emergency Power Transformer. This is used with a BORIS battery unit to provide step-up transformed power for door operator systems requiring more than 120VAC. The size and quantity of these transformers depend on the type of doors used. See the schematic for sizing and wiring information.

5.7.2 Fuses

Table 19: Fuses.

Label	Current	Voltage	Description
F1	3A	600V	L1 to Controller, Phase Monitor, Door Operator Transformer (no BORIS)
F2	3A	600V	L2 to Controller, Phase Monitor, Door Operator Transformer (no BORIS)
F3	3A	600V	L3 to Phase Monitor, Door Operator Transformer
F4	6A	250V	CCXF Secondary to Controller or BORIS
F5	5A	250V	Door Operator Transformer or Controller with BORIS (if needed)
F6 +	5A	250V	Door Operator Transformer with BORIS (if needed)

NOTE: Only replace fuses with the same type and rating. The fuse type and specific ratings may vary between controllers. Refer to the schematics for correct fuse specifications.

5.7.3 Phase Monitor

If provided, the phase monitor unit provides protection for the pump motor by continuously monitoring under and overvoltage, voltage unbalance, phase loss, and phase reversal.

A trip delay is provided to prevent nuisance tripping. A restart delay is provided to prevent short cycling after a momentary power outage. Upon application of line voltage, the restart delay begins. The output relay is de-energized during restart delay and the LED flashes green.

Under normal conditions, the output energizes and the LED glows green after the restart delay. Under voltage, over voltage, and voltage unbalance must be sensed for a continuous trip delay period before the output is de-energized. The output does not de-energize if the fault is corrected during the trip delay. The LED flashes red during the trip delay, then glows red when the output is de-energized. The restart delay begins as soon as the

output relay de-energizes. If the restart delay is completed when the fault is corrected, the output relay energizes immediately.

The output relay does not energize if a fault or phase reversal is sensed as the three phase voltage is applied. The LED alternately flashes green then red if a phase reversal is sensed.

Reset is automatic upon correction of a fault.

5.7.4 24VDC Power Supply

Several 24VDC power supplies are used to provide 24VDC for the MR-SIB, CT-SIB, I/O boards, positioning system, and other devices interfaced with the controller. The provided power supplies have onboard over-current protection. If the output is shorted, then the output is turned off. If the power supply output is 0 volts:

1. remove the load from the Power Supply,

2. then measure the output again, and

3. check the load to make sure it is not shorted.

> **NOTE: Output voltages outside of 24VDC +/- 10% may cause erratic operation.**

5.8 Motor Control

A wide variety of motor starting options are available. Please consult the as-built schematics to determine the exact starting configuration.

5.8.1 Solid-State Starting

The Solid-State Starter consists of two main components: the solid-state starter and the fault contactor.

The solid-state starter provides current limited starting and overload protection for the pump motor. The starter also monitors potential fault conditions: shorted SCR, overload, phase reversal, and loss of phase.

The fault contactor pulls in as soon as three phase power is applied to the starter. The contactor then remains in until three phase power is removed or a fault condition occurs.

The controller monitors the "Up To Speed" contact (TBs 5 – 6) through the MR-SIB input M22 and detects a stuck open or stuck closed condition during every run. The starter also provides a phase monitor contact that is read by the MR-SIB input M21, which is required to be high at all times.

The run command for the starter is driven by the PMP relay. If the starter is faulted, the starter may be reset by cycling power. A faulted starter results in putting the controller in shutdown, which then requires the controller to be reset using the Fault Reset input (RST).

The controller may disable the fault contactor (FC) using a relay, FCP. To prevent the FCP relay output, use the shutdown defeat input.
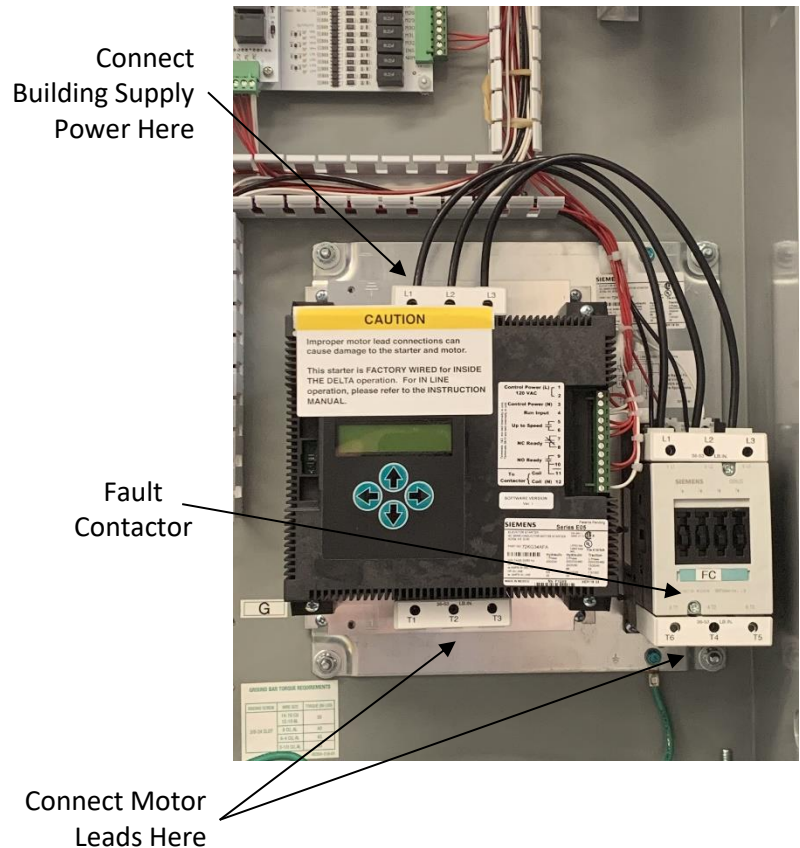
WARNING: The fault contactor does not provide electrical isolation when opened if wired in delta.

5.8.2 Across-the-line Starting

When using an across-the-line starter, the pump motor activates when the PMP relay energizes for an up run. After approximately 1 second (modifiable using the '**PUMP RUN TRU DLY**' timer setting), the up valve relay(s) energize. The PM contactor is monitored using auxiliary contacts to ensure the pump is up to speed before energizing the valves, and to ensure that the pump turns off at the end of each run.

When stopping, the controller immediately drops the PMP output and valve relays. The RC circuit on the PMP relay allows PMP to stay energized briefly to ensure the pump runs long enough for the valves to open.
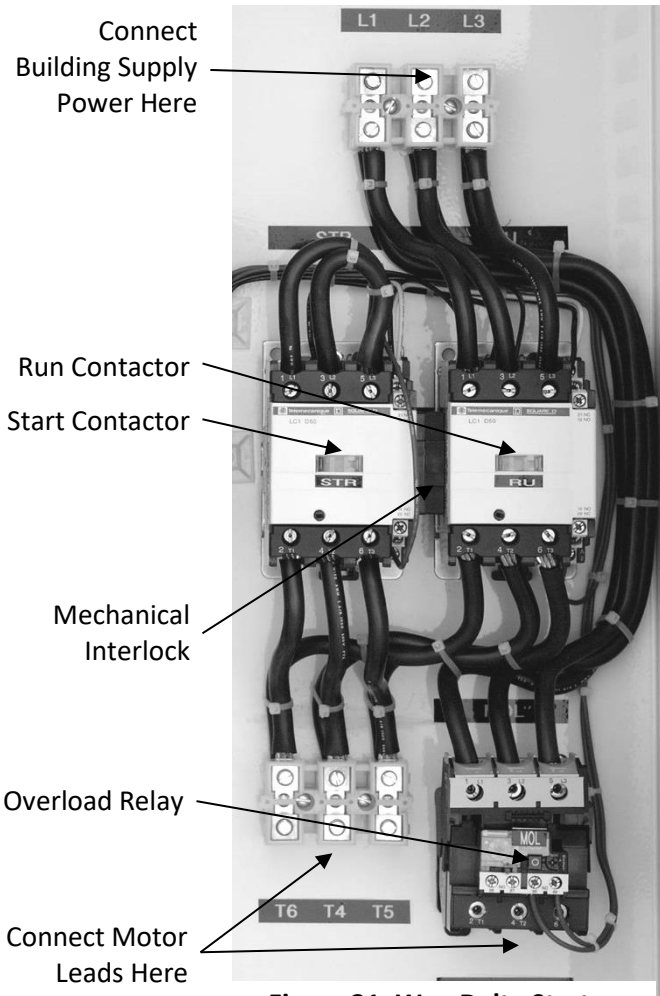
Figure 31: Wye-Delta Starter
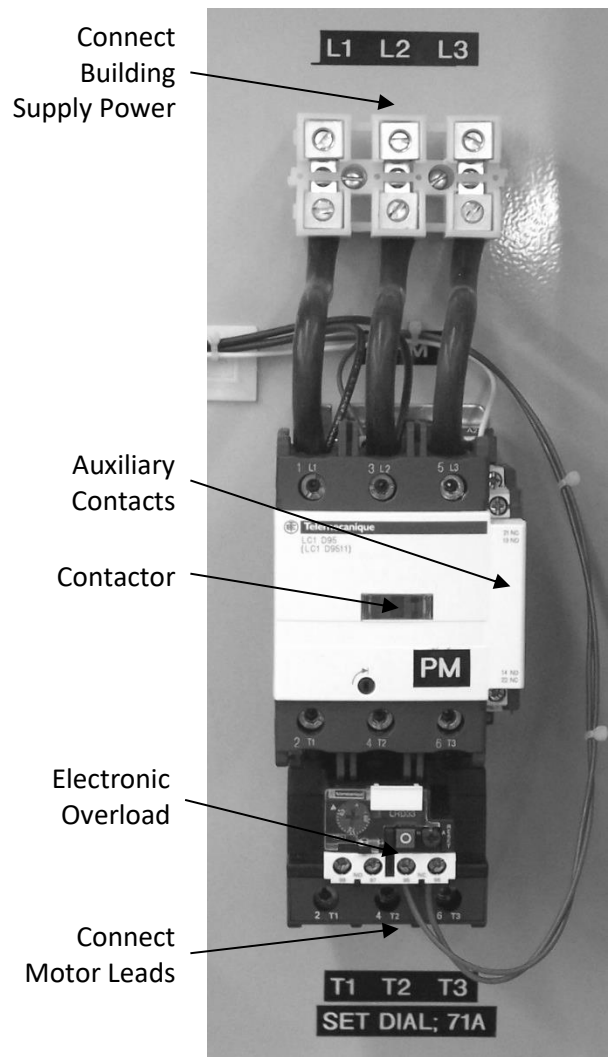
Figure 30: Across-the-Line Starter

5.8.3 Wye-Delta Starting

The Wye-Delta starter uses the STR and RU contactors to more smoothly transition between starting torque mode (STR) and running torque mode (RU). When starting an up run, the PMP relay is energized, which closes the STR contactor. After approximately 1 second (modifiable using the '**PUMP RUN TRU DLY**' timer setting), the TRU relay energizes and the starter switches to the RU contactor.

When stopping, the controller immediately drops the PMP output and the valve relays. The RC circuit on the PMP relay allows PMP to stay energized briefly to ensure the pump runs long enough for the valves to open.

5.9 BORIS (Battery Operated Rescue Initiation System)

BORIS is a fast transfer, line-interactive, uninterruptible power supply. It is designed to

- prevent blackouts, brownouts, sags, swells, and surges from reaching the protected load under normal conditions,

- filter out small utility-line fluctuations, and

- isolate the protected load from large disturbances by internally disconnecting from the utility line while supplying power from its internal batteries until the utility line returns to normal.

While operating on battery, an internal alarm intermittently beeps. The "ON/TEST" button may be pressed to silence the alarm. If the line utility does not return and the battery continues to power the protected load, a low battery shutdown may occur.

Advance warning of a low-battery condition begins approximately two minutes before the final shutdown. This alarm is a continuous beeping sound and cannot be silenced. Normally, this condition should not occur (if the batteries were previously charged fully) due to the 5-minute timeout feature upon line power loss.

Special features include

- surge protection,

- EMI/RFI filtering,

- high and low voltage correction, (without draining the batteries), as well as

- automatic battery testing during power up and every 14 days thereafter.

User-replaceable batteries can be replaced without having to remove power from the loads.

For installation instructions and operation details, consult the *Battery Operated Rescue Initiation System Operating Manual*. A copy of this manual can be obtained from our website at **www.vacontrols.com**.
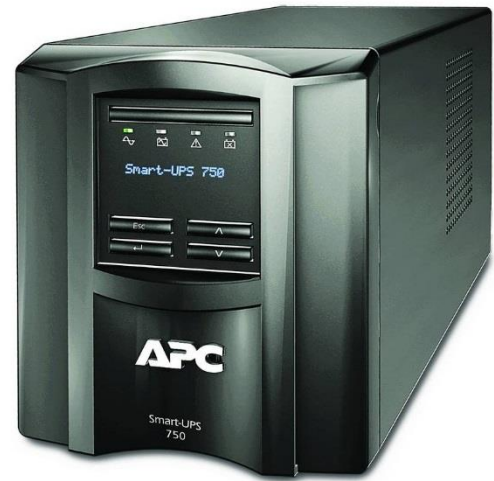
5.10 Position Indicator (PI) Driver Board

5.10.1 VCI-001 PI Driver Specs

Communication Protocol: CANbus, via MR-SIB CANbus 2.

Terminal Designations:

Controller Terminals	PI-1	PI-2	PI-3
MICRO COMM Terminals	COM	24VDC	Data

On-board LED indicators: fire service (PI blanking), strobe, and direction/travel arrows.

Serial interface board includes the following virtual signals:

- Position Indicator floor numbers & labels.

    o Supports up to 3-digit displays.

    o Editable via Setup Menu->Edit PI Labels. (See Section 6.1.4.14)

- PI Blanking at non-main landings is set by DIP switch #2 on the PI device.

- Serial Traveling Lanterns.
    o DIP switches on MICROCOMM lantern set landing #, front/rear.
    o DIP switch #2 on PI driver board sets 2-stroke down lantern signals.

- Status Indicating Messages for Fire Service, Door Nudging, Independent Service, Load Weighing Overload, Emergency Power, Inspection. See schematics sheet VPI.

- Voice Annunciator signals, including strobe, position, and status messages.

- Custom messages for voice and scrolling marquee available on request.

Application Considerations:

- A single PI driver board can communicate up to 17-18 distinct PI/lantern/voice annunciator devices. If more devices are required, a repeater module MREPT-2 is needed.

- Power supply sizing is based on load, not qty of devices. If MICROCOMM network extends over 300ft, a voltage booster/repeater module MREPT-2 is needed due to resistive losses.

- If PI labels for front & rear should be different, an additional PI driver board is required.

- Discrete PI driver models (SCHDUE, SMCDU) are compatible with Vision 2.0, but are only used by request.

5.10.2 VCI-001 PI Driver Troubleshooting

- '**NC**' will flash if there is a communication error or if no ELGO floor position data is learned yet.

- The PI will update during the ELGO learn to indicate which floor has been learned.

- PI display on the PI driver board reflects the data coming from the Vision 2.0 controller over CANbus. If this does not match the PI in the hall or call, verify field wiring or troubleshoot PI device.

- If seeking to power a hall call riser while the non-lead car-A controller is not yet installed, the PI power supply may be temporarily connected to MR-SIB terminals +H and -H.

5.11 Absolute Positioning System – ELGO LIMAX22 DUE

5.11.1 ELGO APS Overview

LIMAX22 DUE by ELGO is an absolute positioning system (APS), which consists of the LIMAX22 DUE sensor and a magnetic tape containing encoded position information.

The LIMAX22 DUE consists of two independent sensors embedded in an aluminum housing. Both sensors perform the same function and operate independently, offset by 40mm along the tape. The controller CPU and CT-SIB safety processor independently monitor the functionality of both sensors to ensure proper operation. This redundancy is required by code such that if one sensor fails, the second sensor permits safe operation of the elevator, allowing it to stop at a landing during a single-point malfunction.

The LIMAX22 DUE is easy to mount and flexible enough to install anywhere in the shaft. Using a mounting kit, the tape is suspended in the shaft while being fed through the plastic guide in the sensor housing. After proper installation, tape measurement is virtually contactless, since the guide is only used to align the tape a defined distance from the sensor.

The LIMAX22 DUE magnetic measurement system is robust and suitable for environmentally-demanding applications. Dust, dirt, moisture, smoke, and temperature do not affect the contactless measurement.

The maximum encoded tape length is 850 ft (260 m) and operates up to 1000 fpm (50 m/s). The magnetic tape contains encoded position data with a resolution of 1mm. Each sensor measures and computes position and velocity data, which is transmitted to the controller CPU and CT-SIB over separate CANbus channels. The LIMAX22 DUE is designed to meet SIL 3 specifications in the sectors of position and speed detection.

Table 20: Technical Data – LIMAX22 DUE.

Mechanical data		Environmental condition	
Measuring principle	Absolute Position Encoded Magnetic Tape	Storage temperature	-25… +85 °C
Repeat accuracy	+/- 1 mm	Operating temperature	-10… +70 °C (-25… +85 °C by request)
System accuracy in µm at 20°C	+/- (1000 µm + 20 µm x L) L = measuring length in meters	Protection task	IP50
		Electrical data	
Distance between the sensor and the magnetic tape	4 mm	Supply	10 – 30 VDC
Distance between two sensors along magnetic tape	40 mm	Ripple	10 – 30 V: < 10 %
		Current draw	Max. 0.4 A
Sensor housing material	Aluminum	Interfaces	SSI, CAN, RS422 CANopen (DS406, DS417),
Sensor housing dimensions	L x B x H = 317 x 55 x 55 mm	Resolution	1 mm
Necessary magnetic tape	AB20-80-10-1-R-D-15-BK80	Travel speed	Max. 50m/s (physical)
Max. measuring length	260 m	Cable length	3 m standard-cable length
Cable connection	RJ45, shielded		
Weight	Ca. 550 g without cable Cable: ca. 60 g per meter		

5.11.2 ELGO APS Wiring Configuration

Each of the two LIMAX22 DUE sensors are internally wired independently using the configuration shown in Table 21. Refer to pages "VT3" & "CPS" of the schematics for a specific wiring diagram to the CT-SIB in the Car Top Inspection Station.

LIMAX22 DUE power is provided by a 24VDC power supply in the Car Top Inspection Station, which is fed through the CT-SIB via the hardwired RJ45 connector. 24VDC power is shared by sensor A and sensor B.

Channel A is passed through from the RJ45 connector to terminal block J8, where it is passed through the traveling cable to the MR-SIB terminal J14. Channel B is processed directly by the CT-SIB I/O processor, and the data is then retransmitted to the controller CPU via CANbus 0.

Table 21: ELGO APS Wiring Configuration.

Signal Description	Wire Color	PIN #
CAN L sensor A	White/orange stripe	1
CAN H sensor A	Orange solid	2
0V GND sensor A	White/green stripe	3
+Vcc sensor A	Blue solid	4
0V GND sensor B	White/blue stripe	5
+Vcc sensor B	Green solid	6
CAN L sensor B	White/brown stripe	7
CAN H sensor B	Brown solid	8

CANbus termination is provided internally at each LIMAX22 DUE sensor, while termination jumpers are required at the MR-SIB (J1H/J1L). The controller CPU and CT-SIB I/O processor are configured to receive and process CAN data only from its designated sensor.

5.11.3 ELGO APS Status LEDs

Each sensor has a bank of status LEDs located on the upper edge of the housing, as shown in Figure 32.

During normal operation, the status LEDs for both sensors should be in the following states:

- TAPE: OFF = Tape media sensed
- ERROR: OFF = System Operational
- RUN: Flashing = Communication Active
- POWER: ON = Power Supply OK

See Table 22 for specific status LED information.
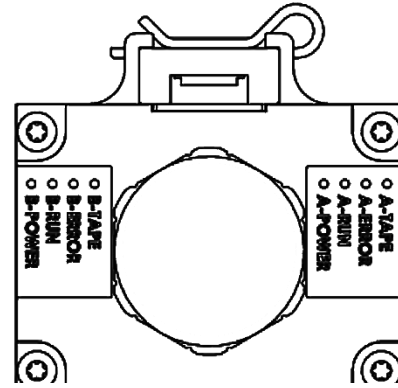
Figure 32: Status LEDs on housing.

Table 22: ELGO LIMAX22 DUE Status LED Descriptions.

LABEL	COLOR	DESCRIPTION	LED STATE
TAPE	YELLOW	Magnetic Tape Status	ON = Magnet tape is missing OFF = Magnet tape available
ERROR	RED	Interface Status	ON = State error, system not operational OFF = State OK, system ready for operation
RUN	GREEN	Device Status	ON = device status OK OFF = device status NOT OK
PWR	YELLOW	Supply Voltage	ON = Supply voltage OK OFF = Supply voltage not provided

5.11.4 ELGO APS Maintenance

The LIMAX22 DUE sensor and positioning system requires little maintenance. On the occasion of regular elevator inspection and maintenance, do the following:

- Perform an optical inspection of proper alignment between sensor and band. Worn tape guides indicate possible alignment error. Check for proper band alignment along the complete travel distance. Correct, if necessary, as described in the installation procedure.

- Perform an optical inspection of the magnetic band. Check for abrasions or other mechanical damages. Small mechanical damages (scratches, dents, or even small chips) do not interfere with the measuring performance. However, a damaged band is more exposed to mechanical stress and prone to further wear.

- Check for proper tension of the magnetic band, as the tension can decrease over time. Readjust if necessary.

- Inspect the polymer guide for wear. Clean if dust and dirt have accumulated between the polymer guide and sensor case. The polymer guide is a wearable part. Replace as necessary.

- Clean the magnetic band. With a dry, clean cloth, begin at the head of the hoistway and ride down the complete travel distance, pulling the magnetic band through the cloth.

6. Vision 2.0 User Interface

6.1 Main CPU - LCD & Keypad Interface

6.1.1 Main CPU – Screens

Press **Esc** to show
Banner Screen

```
Virginia Controls  A
Vision 2.0 Job 54321
REV:1440  CFG: HCL9Z
08/14/2023  12:34:56
```

Press any key from
Banner Screen to
Show Car Status

```
<-PRV          NXT->
   Press ENTER To
   Show Car Status
```

```
111 222222 333333333
44 55 66 77777 8888#
FL1 FL2 FL3 FL4 FL5
No Calls / 1C,2U,3D
```

```
<-PRV          NXT->
   Press ENTER To
  Show System Status
```

```
Machine Room SIB   OK
Machine Room IO    OK
Car Top       SIB  OK
Car Op Panel IO    OK
```

```
<-PRV          NXT->
   Press ENTER To
  Show Safety Status
```

```
Mode: Normal Service
Fault:
Term:
### CURRENT FAULT
```

The normal sequence is to press **Nxt** & **Prv**
to scroll between the desired menu items.
Press **Ent** to use the menu item.
Press **Esc** to return to the main menu.
Press **Aux** to enable/disable Setup Menu.

```
<-PRV          NXT->
   Press ENTER To
   Display Car Top
   & ELGO APS Data
```

```
T01   Roped Sfty ON
T02 Emrg Exit Sw ON
T03 CTop Stop Sw ON
T04 InCar StopSw ON
```

```
<-PRV          NXT->
   Press ENTER To
   Display Machine
     Room Data
```

```
M01 1Y GovernrSw ON
M02 1T Roped Saf ON
M03 1B Final Lmt ON
M04 2   Pit Stop ON
```

↓ = Press **Nxt**

↑ = Press **Prv**

```
<-PRV          NXT->
   Press ENTER To
   Show I/O Status
```

```
CAN BUS 0 M01 – M16
  Inputs
  1111 1111
  1111 1111
```

→ = Press **Ent**

← = Press **Esc**

```
<-PRV          NXT->
   Press ENTER To
   Show Fault Log
```

```
   FAULT LOG VIEW
1 – SYS FAULT LOG
2 – APP FAULT LOG
0 – CLEAR FAULT LOG
```

To "Show Memory"
(see next page)

Main CPU – Screens (continued)

To "Show Fault Log"
(see prev. page)

Press `Esc` to show
Banner Screen

```
<-PRV           NXT->
    Press ENTER To
    Show Memory
```

```
A0000000 00 00 00 00
A0000004 00 00 00 00
A0000008 00 00 00 00
A000000C 00 00 00 00
```

```
<-PRV           NXT->
    Press ENTER To
  Display Group Data
```

```
Group Comm Status
          ABCDEFGH
Ethernet  M───────
CANBus 3  M───────
```

```
<-PRV           NXT->
    Press ENTER To
  Display ELGO Floor
     Height Data
```

```
Floor 1   0' 0"
Floor 2  10' 1"
Floor 3  20' 2"
Floor 4  30' 6"
```

```
<-PRV           NXT->
    Press ENTER To
    View Counters
```

```
Counters:  "."=Reset
Trips: UUUUUU/DDDDDD
Doors: FFFFFF/RRRRRR
Level: ULULUL/DLDLDL
```

```
<-PRV           NXT->
    Press ENTER To
   Show Setup Menu
```

```
<-PRV           NXT->
    Press ENTER To
    Edit Adjustable
  Settings/Features
```

See Section 6.1.4

for Setup Menu

The normal sequence is to press `Nxt` & `Prv` to scroll between the desired menu items.
Press `Ent` to use the menu item.
Press `Esc` to return to the main menu.
Press `Aux` to enable/disable Setup Menu.

↓ = Press `Nxt`
↑ = Press `Prv`
→ = Press `Ent`
← = Press `Esc`

To "Show Car Status" (see prev. page)

6.1.2 Banner Screen

```
Virginia Controls  A
Vision 2.0 Job 54321
REV:1440  CFG: HCL9Z
08/14/2023  12:34:56
```

The Banner Screen displays general information for the controller that distinguishes it from other systems, based on Job # and software version.

- The first line always contains '**Virginia Controls**', followed by the controller alphanumeric index.
- The second line identifies the controller as the '**Vision 2.0**' model, followed by the Job serial number. If the controller is not configured, the Job serial number displays '**No Config**.'
- The third line displays the current software revision number and configuration version.
- The fourth line displays the current date and time.

> **NOTE: The CFG term will display a flashing "BATT" message if the MR-SIB battery is low and needs replacing.**
>
> **NOTE: Contact Virginia Controls for technical support if any other flashing messages are displayed next to "CFG". This indicates a problem with either the software or hardware and the controller may not run properly.**

6.1.3 Car Status

The '**Show Car Status**' screen displays the car status. Each area of the screen displays one of several messages that allow the user to see what the elevator is doing. Pressing the `Esc` key transitions the screen to the menu selection screen. It is recommended to leave the '**Car Status**' screen on the LCD. Doing so allows a technician to quickly see a fault and state of the controller without having to scroll between screens.

6.1.3.1 Car and Hall Call Entry

The keys `0` through `9`, `Ent`, `Nxt`, `Prv`, and `.` may be used to manually enter car calls and hall calls from this screen.

- Type the desired floor number for the call using the keys `0` through `9`, and the result will be displayed on the right-most side of the second line of the screen (see message 8888#).

- Press `.` to change the call from a front opening call to a rear opening call, and then the letter '**R**' appears beside the entered floor number.

- After entering the desired floor number,

  o Press `Ent` to assign a car call.

  o Press `Nxt` to assign an up hall call.

  o Press `Prv` to assign a down hall call.

- If the entered call is not enabled in the '**Setup Menu – Floor Openings**' menu, the call is ignored.

- Press `Esc` to return to the previous screen.

> **NOTE: If connected in a multi-car group, only the lead controller accepts hall call inputs using the keypad.**
>
> **NOTE: Any calls placed to landings or door openings that are not configured are ignored.**

6.1.3.2 Messages Displayed on the "Car Status" Screen

Each area of the screen displays one of several messages. The numbers in the sample screen below indicate the message areas. Depending on the status of the car, the appropriate message replaces the number group.

```
111 222222 333333333
44 55 66 77777 8888#
FL1 FL2 FL3 FL4 FL5
No Calls / 1C,2U,3D
```

Message 111 displays one of the following messages:

- **CON**: Construction Mode is active. All other inspection modes are disabled.

- **INS**: The car is not in Normal Operation mode. This may mean Car Top Inspection, In Car Inspection, Inspection Access, Controller Inspection, or Door Bypass Operation is active, or no inspection mode inputs are active. Refer to the Safety Status Screen for further details on which mode of inspection is active.

- **EMTC**: EMT (Emergency Medical Technician Service) Car Operation mode is active.

- **MEC**: Medical Emergency Car Operation mode is active.

- **IDS**: Independent Service Operation mode (C.O.P. I/O Board #20, input #1, TB:40) is active.

- **EMTH**: The car is responding to a EMT (Emergency Medical Technician Service) Call from the Hall.

- **CMD**: The car is responding to a Commandeering Call from the Hall.

- **MEH**: The car is responding to a Medical Emergency or EMT Call from the Hall.

- **ATT**: The car is in the Attendant Service Operation mode.

- **NRM:** The car is in Normal Operation and not in any of the inspection modes described above.

Message 222222 displays one of the following messages:

- **INSMod**: An Inspection Mode Fault has been detected. This fault occurs when there are more than one inspection mode inputs active at the same time, specifically the mode inputs for Car Top Insp (TB:23T), In-Car Insp (TB:23X), Insp Access (TB:23A), Controller Insp (TB:23 with switch set to Insp), and/or Normal Operation. This fault will auto-reset when the inspection inputs are not indicating a conflict.

- **RunFlt**: A run fault, indicating a malfunctioning starter contactor or solid-state starter up-to-speed contact, monitored by MR-SIB input M22. Toggle the Fault Reset input (RST) to reset the fault.

- **ETSFlt**: A Redundancy Fault for the Up ETSR Switch Input (TB:18X) or Down ETSR Switch Input (TB:19X) has been detected. The ETSR input is monitored and should be high during an Up Fast speed run; otherwise, there must be a fault in the ETSR wiring (TB:18X), the ETSR device has failed, the Up Run Relay valve connection (HM1) is failing, or the Up Slowdown Limit switch has failed while the floor position is incorrect. Toggle the Fault Reset input (RST) or cycle the power to reset the fault.

- **RedJRM**: A Redundancy Fault in Jack Resynchronization circuit which bypasses the Bottom Final Limit has been detected. The JRM monitoring input between the JR and JRX relays was on while the Jack Resync Operation mode was off, indicating a jumped or stuck relay contact in the safety string at TB:1B or TB:1BX. Toggle the Fault Reset input (RST), or cycle the power to reset the fault.

- **OilVis**: The Oil Viscosity Operation mode is active. The car returns to the lowest landing and turns on the pump (Inputs PMP and HM1), but not the valve relay outputs.

- **DRnTmr**: The car has tripped the Down Run Shutdown timer (Timer Setting "DN RUN SHTDN TMR").

- **SHUNT**: The Shunt Trip mode is enabled from the Shunt Trip input (85). In this mode, the car stops at the next landing, opens its doors, and shuts down.

- **RunTmr**: The car has tripped the Up Run Shutdown timer (Timer Setting "UP RUN SHTDN TMR").

- **DZ-Flt**: A Door Zone Fault was detected. The Door Zone input (TB:20) was stuck on during the slowdown of a fast speed run and before an Up or Down Level switch input (30 or 33) came on. Check the Door Zone sensor.

- **GovSw**: The Governor Switch input is low, MR-SIB input M01 (TB:1Y).

- **RopeSw**: The Roped Safety Switch (shaft) input is low, MR-SIB input M02 (TB:1T).

- **Finals**: The Final Limit Switches input is low, MR-SIB input M03 (TB:1B).

- **CTStop**: The Car Top Stop Switch input is low, CT-SIB input T03 (TB:3).

- **ICStop**: The In-Car Stop Switch input is low, CT-SIB input T04 (TB:3X).

- **PitStp**: The Pit Stop Switch input is low, MR-SIB input M04 (TB:2).

- **MRStop**: The Machine Room Controller Stop Switch input is low, MR-SIB input T07 (upper left of MR-SIB).

- **CarSaf**: The Car Safety Switch input is low, MR-SIB input T01 (TB:3A).

- **EmExit**: The Emergency Exit Hatch Switch input is low, MR-SIB input T02 (TB:3E).

  StopSw: A Stop Switch safety string input(s) on either the MR-SIB or CT-SIB is low. Check MR-SIB inputs M04 & M07 (TB:2), and CT-SIB inputs T03 (TB:3) & T04 (TB:3X).

- **SafStr**: The safety string inputs for either the MR-SIB or CT-SIB is low, which may be caused by any safety string device being open at TB: 1X, 1Y, 1T, 1B, 3A, 3E.

- **LevSws**: Both of the Leveling Switch inputs (30 and 33) are on at the same time. (IP8300 only)

- **SMOKE**: The Machine Room/Shaftway Fire sensor input (82F) is energized.

- **FIRE-2**: The car is in Fire Service Operation mode in the Car (Phase 2).

- **FIRE-1**: The car is in Fire Service Recall mode (Phase 1).

- **FLOOD**: The car is on Flood Operation from the Flood input (FLS).

- **Out-DZ**: The car has stopped outside the Door Zone (TB:20) while in Normal Operation.

- **Auto**: The car is in Automatic/Normal Operation and will respond to car and hall calls.

- **EPT**: Emergency Power Pre-Transfer is active. Car will stop and shut down at nearest landing.

- **EmPwr**: Emergency Power / Generator operation is active.

- **DoorKO**: Door Cutout "test" switch is active. Door opening and Hall Calls are disabled.

- **NoCall**: The car is not answering Hall Calls while in Normal Operation mode, which may be caused by Inspection, Independent Service, Fire Service, Medical Emergency Service, Shutdown, Door Check Fault, etc. The cause is likely shown in one of the other car status or fault messages.

Message 3333333333 displays one of the following messages:

- **CPLDSwERR**: Construction mode DIP switches XM7 & XM8 are ON while <u>not</u> on Construction Mode.

- **MRSIB-ERR**: CANBus 0 communication with the MR-SIB is disrupted. Troubleshoot by removing connections to terminals CH0 & CL0.

- **CTSIB-ERR**: CANBus 0 communication with the CT-SIB is disrupted. Typical with Traveling Cable disconnected. Verify Traveling Cable connections CH0 & CL0.

- **COP-ERROR**: CANBus 0 communication with the car station (C.O.P.) I/O board #20 is disrupted. Verify power and communication connections between the car top and the car station I/O board #20.

- **CAN0Error**: A configured CANbus device is not communicating on CANbus channel "0" with the controller CPU. This may apply to the MR-SIB, CT-SIB, or configured I/O board losing communication, or an incorrectly configured board is communicating.

- **CAN1Error**: The ELGO Absolute Positioning System Sensor is not communicating, Channel A and/or B.

- **CAN2Error**: A configured CANbus device is not communicating on CANbus channel "2", or an incorrectly configured board is communicating. NOTE: the CANBus PI Driver board does not transmit to the controller CPU, so this is not an indication that the PI driver is or is not receiving communication from the controller CPU.

- **CAN3Error**: A configured CANbus device is not communicating on CANbus channel "3" with the controller CPU. This likely indicates a wiring issue between I/O boards on CANbus 3, or a DIP switch configuration issue.

- **BORIS−EmP**: The Battery Lowering input (M24) is off.

- **OilTempSw**: The Oil Over-Temperature Switch input (M23, TB:P) is OFF.

- **Bad−Power**: The Reverse Phase Monitor "Ready" input (M21, TB:RDY) is off, while the Battery Lowering input (NP) was on. Or the Motor Overload input is tripped, if applicable.

- **LowOilSw**: The Low Oil Switch input #2 (TB:LOS) is ON.

- **NegPresSw**: The Oil Negative Pressure Switch input (TB:16P) is low and the Negative Pressure Operation mode is active. In this mode, the car only responds to car calls and hall calls that are above the current landing. Only the Door Open Button function responds at the current landing.

- **LWOverld**: The Load Weighing Overload input (TB:LWO) is ON. Car will shut down with doors open until load is reduced.

- **JackResyn**: The car is in Jack Resynchronization Mode. In this mode, the car runs down past the bottom landing, bypassing the down normal (and bottom final if applicable) to fully compress the jack.

- **DZ-Error**: A door zone redundancy mismatch has been detected. The door zone input (M08, TB:20) is OFF while at floor level, or is stuck ON while running between floors. Check fault log for more details.

- **ELGO-Comm**: ELGO Communication on CANbus 1 is down. Check CH1 & CL1 connections & ensure ELGO unit is plugged into the CT-SIB.

- **ELGO-Data**: ELGO floor height data is empty. Perform ELGO Learn Procedure to measure and save floor heights. See Section 0.

- **ELGO-Err**: A generic ELGO APS fault is present, and the car shuts down while in door zone until the fault condition is corrected and reset. All computed selector signals are disabled, while the Up and Down Normal Limits are enabled in order to allow the car to run at slow speed to the nearest door zone or to be run on inspection.

- **Shutdown**: The car is in shutdown. Check the fault log for further details on the cause of the shutdown.

- **Emerg-Pwr**: The Emergency Power input (TB:EP) is off.

- **CarToMain**: Car-To-Lobby is active. The car will answer remaining car calls and park at the main landing.

- **Homing**: Car is homing to the designated landing. Homing activates after the car (or group) is idle.

- **Power-OK**: None of the other fault conditions exist. The car is on normal power and not on shutdown.

Message 44 displays one of the following messages:

- The car position is displayed as a number between 1 and 64, with 1 as the bottom landing.

- If the floor position is not known (such as on initial installation), then message 44 shows "?".

Message 55 displays one of the following messages:

- **UP**: The car is running up.

- **DN**: The car is running down.

- **DC**: The car gate and hall doors contact inputs are ON.

- **DO**: The car gate and/or hall doors contact inputs are OFF.

Message 66 displays one of the following messages:

- **UL**: The car is leveling up.

- **DL**: The car is leveling down.

- **FS**: The car is running fast speed.

- **SS**: The car is running slow speed.

- **DZ**: The car is in the Door Zone.

- **OD**: The car is not running, and it is not in the door zone. Door Zone is not registered while on inspection.

Message 77777 displays one of the following messages relating to the door operator open/close limits.

- **DrChk**: The Door Contact Inputs (TBs: 4, 4R, 5, 5B, 5T, 5R) indicate that all door contacts are closed but the Door Closed Limit(s) are ON.

- **DrLmt**: The Door Open Limit (F/R) and the Door Close Limit (F/R) are both OFF. This indicates the door limits are not properly connected using N.C. inputs.

- **OPNG**: The door open output is active, and a door (Front or Rear) is opening.

- **DrLck**: A door lock input (TB:6, 6B, 6R, 6T) is not closed while the retiring cam is active.

- **DPM**: The Door Position Monitoring (DPM) input (CT-SIB input T05) is low, preventing the car from running.

- **CLSG**: A door(s) (Front or Rear) is closing. Note that the door close output is ON while the car is running.

- **OPEN**: A door(s) (Front or Rear) is fully open.

- **CLSD**: The doors are fully closed.

- **AJAR**: The doors have stopped and are not fully open or fully closed.

Message 8888# displays one of the following messages:

- **CTSaf**: The car top safety string (TBs: 4A & 4B) is low or the relay check sequence check for stuck contacts indicates a failure. Verify connections to CT-SIB outputs HT1 & HT2 and traveling cable connections to terminals 4A & 4B in both car top and machine room.

- **ConSw**: Construction Mode CPLD DIP switches XM7 & XM8 are active. These are required to be ON while on Construction Mode and are required to be OFF while not on Construction Mode.

- **Nudge**: Door Nudging Operation is active.

- **TDOpn**: The Door Open Timer has tripped because the doors failed to open fully within the adjustable time '**DOOR STUCK TIME**.'

- **TDCls**: The Door Close Timer has tripped because the doors failed to close fully within the door stuck time.

- **T-EYE**: The Electric Eye/Infrared Curtain Unit Cutout Timer has tripped. The Electric Eye/Infrared Curtain Unit Input(s) 27E & 27ER are cut out.

- **LWByp**: The Load Weighing Bypass device is tripped, which will cause all hall calls to be bypassed until the car weight is reduced.

- **DHOB**: The Door Hold Open Button/Switch input (TB:27X/27XR) is the most recent reason for the door reopening or being held open.

- **PrkDO**: Parking with Door Open is active and is the most recent reason for the door being held open.

- **MRDOB**: The Machine Room Door Open Button (MR-SIB input M34) is the most recent reason for the door reopening or being held open.

- **ICU**: The Infrared Curtain, CT-SIB input T31, TB:27E (front) / T27, TB:27ER (rear), is the most recent reason for the door reopening or being held open.

- **DOB**: The Door Open Button in the C.O.P. (TB:27/27R) is the most recent reason for the door reopening or being held open.

- **SE**: The Safety Edge, CT-SIB input T32, TB:27S (front) / T28, TB:27SR (rear), is the most recent reason for the door reopening or being held open.

- **Homing**: The car is in process of Homing to the designated homing landing.

- **PrkDo**: The car is parking with doors open at the designated homing landing. The door(s) will close automatically when the car receives a demand to run.

- **0FPM/###**: While running, the car speed is displayed in feet per minute (FPM) as measured by the ELGO Absolute Positioning System.

- **(Floor #):** The entered floor number used for entering car calls and halls calls from the keypad is displayed if none of the other conditions above are present. If the entered call has been set to be a rear opening using the key $\boxed{.}$, the letter '**R**' appears to the right of the entered floor number.

Message FL1 FL2 FL3 FL4 FL5 displays the fault code history for the 5 most recent, but not necessarily active, APP faults present in the system, where the leftmost fault (FL1) is the most recent fault. Refer to the fault log to see specific fault details, such as the timestamp and car status bits.

4th Line Call Status: All Car Calls or Hall Calls registered to this car will be displayed.

- No Calls = default while no calls are present
- # = Floor
- C = Car Call entered
- U = Up Hall Call entered
- D = Down Hall Call entered
- R = Rear Call
- H = Commandeering or Medical Emergency Call

4th Line Fault Message: If there is a currently active fault condition, the fourth line of the car status displays the fault code and description. If multiple fault conditions exist, the most recent fault is displayed. After the fault condition clears, the fourth line of the car status display then resumes showing the call status information.

6.1.4 Main CPU - Setup Menu

6.1.4.1 Main CPU - Setup Menu Screens

↓ = Press **Nxt**   ↑ = Press **Prv**   → = Press **Ent**   ← = Press **Esc**

```
<-PRV          NXT->        NO SHRT DR TIME   ON      Save Settings?
  Press ENTER To        *   TIMED EYE CUTOUT OFF
  Edit Adjustable           DOOR NUDGING      ON      0 = No
  Settings/Features         1 STROKE DN LANT ON       1 = Yes
```

```
<-PRV          NXT->        NUMBER OF LDGS     8       Save Settings?
  Press ENTER To        *   MAIN FIRE LDG      1
  Edit Adjustable           ALT. FIRE LDG      2       0 = No
  Timers/Landings           DOOR TIME HALL    50       1 = Yes
```

```
<-PRV          NXT->        Floor Openings  1-8       Floor Openings
  Press Enter To        *      1 2 3 4 5 6 7 8           1 2 3 4 5 6 7 8
  Show/Edit Openings        Nxt-> Floors <-Prv       F  F F F - - - - -
                            Ent->Edit Esc->Quit      R  R - - R - - - -
```

```
<-PRV          NXT->        ELGO APS Learn    OFF
  Press ENTER To        *   Dead Zone Rng   0.2"
  Edit ELGO APS             Floor To Edit      1
                            Trim Offset     +0.1"
```

```
<-PRV          NXT->        Reset Counters?       *   Reset Complete
  Press ENTER To
  Reset Counters            0 = No
                            1 = Yes                   Press ESC
```

```
<-PRV          NXT->        Homing Mode:       0
  Press ENTER To        *
  Edit Homing Settings
                            Homing Disabled
```

```
<-PRV          NXT->        Floor 1       " G"    .   Reset PI Data Opts:
  Press ENTER To        *   Floor 2       " M"
  Edit PI LABELS            Floor 3       " 1"        1. Reset to NULL
  TBD                       Floor 4       " 2"        2. Set to FLOOR
```

```
<-PRV          NXT->           Real Time Clock
  Press ENTER To        *   Time: 12:59:59
  Begin Time Setup          Date: 12/31/2015
                             Day: Mon    Cal:+000
```
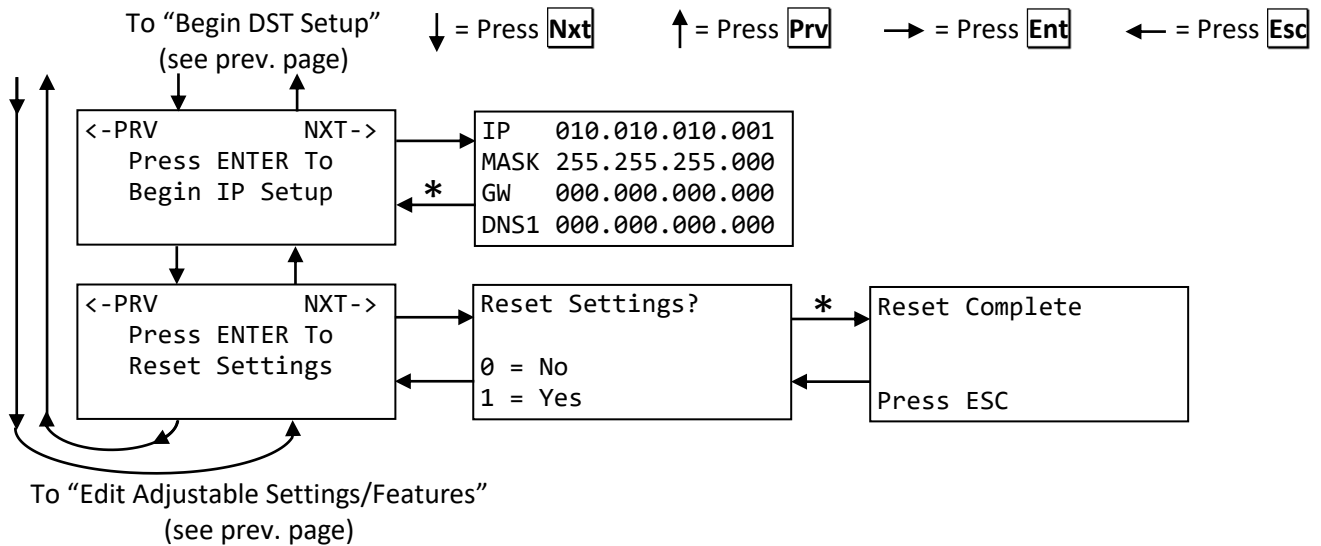
The normal sequence is to press **Nxt** & **Prv** to scroll between the desired menu items.
Press **Ent** to use the menu item.
Press **Esc** to return to the main menu.
Press **Aux** to enable/disable Setup Menu.

```
<-PRV          NXT->        Daylight Saving Time
  Press ENTER To        *   DST:Off      Inactive
  Begin DST Setup           Beg: mm/dd End:mm/dd
                            Start:mm/w Stop:mm/w
```

✻ = Enter Password to Continue

6.1.4.2 **Main CPU - Setup Menu Screens (continued)**

To "Begin DST Setup"   ↓ = Press `Nxt`   ↑ = Press `Prv`   → = Press `Ent`   ← = Press `Esc`
(see prev. page)

```
<-PRV          NXT->
   Press ENTER To
   Begin IP Setup
```
*
```
IP    010.010.010.001
MASK 255.255.255.000
GW    000.000.000.000
DNS1 000.000.000.000
```

```
<-PRV          NXT->
   Press ENTER To
   Reset Settings
```
```
Reset Settings?

0 = No
1 = Yes
```
*
```
Reset Complete


Press ESC
```

To "Edit Adjustable Settings/Features"
(see prev. page)

> **NOTE: The Setup Menu is disabled while using the second-screen mode, where the `Aux` key toggles between Full Access Setup mode (CPU LED #4 = OFF) and Status-only mode (CPU LED #4 = ON). After a system boot, the CPU screen will default to Full Access Setup mode.**

6.1.4.3 **Enter Password**

```
Enter Password to
   Confirm

Password:
```

When attempting to enter a menu screen that allows for changes to be made to the controller, the password entry screen acts as a safeguard against unauthorized changes. The default password is 911.

1. Press `Ent` to confirm password, or press `Esc` or to return to previous screen.

2. If password is accepted, you may continue to the next screen; otherwise, press `Esc` to return to the previous menu and any changes made are then reverted.

A job-specific password may be used if the '**SECURE PASSWORD**' feature is enabled. Please refer to the job schematics or contact Virginia Controls for this unique password.

> **NOTE: When entering a settings or timers menu, all changes are immediately applied while in the settings menu. This allows live settings or timer edits while the controller is running. A reminder of this is displayed on the password entry screen.**

> **WARNING: Settings may be edited while the controller is active. While most settings may not noticeably affect the controller behavior while in Normal Operation, it is recommended that the controller be manually taken out of service while making modifications to the settings and timers.**

6.1.4.4 **Edit Adjustable Timers/Landings**

The Edit Adjustable Timers/Landings menu displays and edits the values for timers, landings, and other numerical settings. System memory (FRAM) retains all values in this menu in case of power loss. Descriptions for the Edit Adjustable Timers/Landings Menu items may be found in Section 7.1.1.

1. Use the `Nxt` and `Prv` buttons to scroll between settings.

2. Press `Ent` to edit the setting.

3. For numerical settings such as timers or counters, enter the desired number using the keypad.

4. To confirm the settings change, press **Ent** and the value is immediately applied to the controller.

5. Press **Esc** to return back to the Setup Menu.

6. When exiting the menu, press **1** to confirm and save all changes, or press **0** to cancel all changes and revert all settings to the values saved prior to entering this menu.

For numerical settings, the standard minimum and maximum editable range is 0 – 999. Certain settings, such as timers and landings, are further restricted to a defined range, and any entered edits that are out-of-bounds are changed to the maximum or minimum limit. For example, the Main or Alternate Fire Service Landing cannot exceed the highest landing.

See Section 9 for a list of standard feature timer and numerical settings. The factory tailors the available settings to the job specifications. Refer to the schematic for job-specific factory settings and defaults.

6.1.4.5 Edit Adjustable Settings/Features

The Edit Adjustable Settings/Features menu displays and edits available feature settings, which may be in the ON or OFF state. System memory (FRAM) retains all values in this menu in case of power loss. Descriptions for the Edit Adjustable Settings/Features Menu items may be found in Section 7.1.2.

1. Use the **Nxt** and **Prv** buttons to scroll between settings.

2. Press **Ent** to edit the setting.

3. For two-state Boolean (ON/OFF) settings, press **1** to enable the setting (ON), or press **0** to disable the setting (OFF).

4. To confirm the settings change, press **Ent**. The value is saved and immediately applied to the controller.

5. Press **Esc** to return to the Setup Menu.

6. When exiting the menu, press **1** to confirm and save all changes, or press **0** to cancel all changes and revert all settings to values saved prior to entering this menu.

See Section 9 for a list of standard feature settings. The factory tailors the available settings to the job specifications. Refer to the schematic for job-specific factory settings and defaults.

6.1.4.6 Reset Settings

All settings, timers, and the floor openings table may be reset to factory-configured default values using this menu option. To reset the user-defined settings to factory configured defaults,

1. Press **1** to confirm.

2. Enter the password.

3. Press **Ent** to confirm or press **0** to cancel.

> **WARNING: Resetting clears all settings and system state variables to factory-configured settings from the configuration file.**

Refer to the schematic configuration page for job-specific factory settings and defaults.

6.1.4.7 Reset Counters

To reset the up and down run counters and front and rear door cycle counters,

1. Press **1** to confirm.

2. Enter the password.

3. Press **Ent** to confirm or press **0** to cancel.

Counters for run events and door cycles are viewable in the main menu listing under '**View Counters**'. Counters may be directly reset in the '**View Counters**' screen by pressing the ⎡.⎦ key.

6.1.4.8 IP Setup Menu

The IP Setup Menu is preconfigured by the factory. This menu is available to update the IP Address, Gateway, DNS, or MAC Address to the controller. These settings must be configured correctly in order for the controllers to communicate dispatching and monitoring data over an Ethernet network.

Table 23: IP Setup Menu Settings.

	Data Format	Description
IP	10 .10 .10 .2	Controller CPU Static IP Address - if using default address 10.10.10.2, actual controller CPU IP address is computed using DIP switches (see below).
MASK	255.255.255.0	Mask
GW	10 .10 .10 .1	Gateway
DNS1	10 .10 .10 .2	DNS1
DNS2	0 .0 .0 .0	DNS2
DHCP	ON/OFF	Enable DHCP Server mode – The Vision CPU will assign IP addresses to connected devices (for use with Wireless Access feature).
HTTP	ON/OFF	Enable HTTP Server – This enables the Wireless Access feature.
MAC	0004A3000000	MAC Address
HOST	VISION_MZ_CPU	Host name

1. Use the **Nxt** and **Prv** buttons to scroll between IP Setup Menu Settings.

2. Press **Ent** to edit the setting.

3. While editing a setting, use the **Nxt** and **Prv** buttons to scroll the cursor left and right along the available digits.

4. Use the keypad to enter the desired number.

5. Press **Ent** to confirm and save the changes.

6. To enter hexadecimal values, use the **.** key to add 8 to the previously entered value.

The conversion table is as follows:

$$\boxed{2} + \boxed{.} = A \qquad \boxed{3} + \boxed{.} = B \qquad \boxed{4} + \boxed{.} = C \qquad \boxed{5} + \boxed{.} = D \qquad \boxed{6} + \boxed{.} = E \qquad \boxed{7} + \boxed{.} = F$$

The MAC Address is set by the factory to a unique address. The Gateway, DNS1, and DNS 2 settings should be set to 0.0.0.0, unless otherwise specified in the schematics.

> **NOTE: The IP settings are pre-configured by the factory, and should not be modified in the field. It may be necessary to update the IP address if a CPU is ever replaced or updated. If the IP addresses are not set correctly, other controllers in a group network may not recognize the system.**

The IP address for the controller CPU is calculated using the "IP Reference" value, based on Table 24. The default IP address reference value is 10.10.10.2, but may be adjusted if necessary to avoid IP conflict with other connected systems. If that is the case, all controllers in a connected group must use the same "IP reference" value menu setting.

The computed IP address is determined based on the controller number to ensure each CPU in a connected group has a unique IP address, based on the following rule:

RULE: Multiply the controller number index (0-based) by 2, then add 2, and then add to the IP reference value.
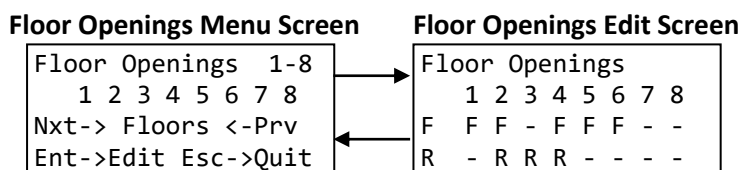
This rule allows for cross-compatibility between Vision 1.0 and Vision 2.0 systems, where dispatching systems in a group communicate using even-numbered IP addresses.

Controller Number	DIP sw 1	DIP sw 2	DIP sw 3	IP Reference Value	Computed CPU IP Address
A	OFF	OFF	OFF	10.10.10.2	10.10.10.2
B	ON	OFF	OFF	10.10.10.2	10.10.10.4
C	OFF	ON	OFF	10.10.10.2	10.10.10.6
D	ON	ON	OFF	10.10.10.2	10.10.10.8
E	OFF	OFF	ON	10.10.10.2	10.10.10.10
F	ON	OFF	ON	10.10.10.2	10.10.10.12
G	OFF	ON	ON	10.10.10.2	10.10.10.14
H	ON	ON	ON	10.10.10.2	10.10.10.16

After updating the CPU IP settings, the CPU must be rebooted. Restart the CPU by either cycling power or using the CPU Reset button next to the LCD screen.

6.1.4.9 Show/Edit Floor Openings

Floor Openings Menu Screen

```
Floor Openings  1-8
   1 2 3 4 5 6 7 8
Nxt-> Floors <-Prv
Ent->Edit Esc->Quit
```

Floor Openings Edit Screen

```
Floor Openings
   1 2 3 4 5 6 7 8
F  F F - F F F - -
R  - R R R - - - -
```

The Floor Openings menu views and edits the current door openings configuration at each landing. The factory configures door openings at each landing based on job specifications. Only door openings pre-configured by the factory may be enabled or disabled, which prevents any non-physical door openings from being enabled. All door openings above the top landing are also permanently disabled.

1. Press **Ent** to proceed to the Floor Openings Edit screen, and press **Esc** to return to the Floor Openings Menu Screen. The Edit screen displays the current configuration of door openings at each floor. A blinking cursor highlights a particular floor number, and the front (F) or rear (R) opening.

2. Press **1** to enable a floor, and press **0** to disable a floor at the cursor position. The display then shows (F) or (R) if the floor opening is enabled, or (-) if the floor opening is disabled.

3. Scroll between floors using **Nxt** and **Prv**.

4. To edit the rear openings, scroll past the front openings (top line) by continuing to press **Nxt** until the cursor reaches the bottom line of the screen.

Each screen contains 8 landings. For systems with greater than 8 landings, use **Nxt** and **Prv** while on the Floor Openings Menu Screen to select which landings to edit in groups of 8, including 1-8, 9-16, etc. The number of landings available to edit depends on the number of landings settings parameter.

When making changes to the floor openings, the system requires a password to confirm the changes.

> **NOTE: The factory configures the floor opening table using a job-specific configuration file, based on the ordered specifications. A factory reset clears the floor openings table and sets it to factory-configured settings. Contact Virginia Controls if any changes to the configured floor openings are needed.**

6.1.4.10 Edit ELGO APS Settings

When using an ELGO Absolute Positioning System, the parameters and Learn Procedure may be accessed using this menu. Refer to Section 3.9 for details on using each menu item, and how to perform the ELGO APS Learn Procedure.

6.1.4.11 DST (Daylight Savings Time) Setup Menu

```
Daylight Saving Time
DST:Off      Inactive
Beg: mm/dd End:mm/dd
Start:mm/w Stop:mm/w
```

Daylight Savings may be enabled and customized using the DST Setup Menu.

1. Use the **Nxt** and **Prv** buttons to select between DST ON/OFF and the customizable Starting/Stopping Month/Week DST settings.

2. Press **Ent** to edit the setting.

3. While editing the '**DST**' setting, use the **1** key to enable DST (On) and **0** to disable DST (Off).

4. Press **Ent** to confirm.

The controller then automatically adjusts the time on the DST beginning and end times if the '**DST**' setting is set to ON. Otherwise, it operates using Standard Time (ST).

- The second line of the display shows whether DST is currently active or inactive for the current time and date.

- The third line of the display shows the calculated beginning and ending dates for DST for the current year, where (mm) represents the 2-digit month, and (dd) is the 2-digit day of the month.

- The fourth line displays the computed Starting/Stopping Month (mm) and Week (w) DST rules that are used to calculate the actual beginning and ending DST schedule, shown in the third line of the display.

The current rules for DST (as of 2021) were set by the United States Congress in 2007, where DST begins at 2:00 am on the 2nd Sunday of March and ends at 2:00 am on the 1st Sunday of November, which are the set factory defaults.

After changing the DST settings, the settings update when exiting the DST Setup Menu.

5. Press **Esc** to exit the menu, enter the password.

6. The settings then update immediately upon confirming the password by pressing **Ent**.

6.1.4.12 Time Setup Menu

```
    Real Time Clock
Time: 12:59:59
Date: 12/31/2015
 Day: Mon    Cal:+000
```

The time setup menu sets the time, date, and calibration for the Real Time Clock (RTC) located on the MR-SIB. After being set using this menu, the RTC provides time data to the controller CPU.

1. Use the `Nxt` and `Prv` buttons to select between Time, Date, or Calibration settings.

2. Press `Ent` to edit the setting. A blinking cursor indicates which setting is currently being edited.

3. While in edit mode, enter the desired number using the keypad.

4. To confirm the settings change, press `Ent` to proceed to the next item, or `Esc` to go to the previous item.

Based on the entered date, the current day of the week is displayed on the 4th line.

When changing the RTC settings, the time updates when exiting the Time Setup Menu. Press `Esc` to exit the menu, and enter `1` to save the time.

The RTC calibration value is preset by the factory to fine-tune the RTC accuracy relative to internet standard time. If the clock seems to be running fast over time, increasing the calibration value slows the clock, and vice-versa to speed up the clock. A change of 1 calibration count speeds up or slows down the clock by approximately 44 milliseconds/day, allowing for very precise control. The RTC calibration ranges from -127 to +128. Use the `.` key to change the calibration sign between +/-.

The RTC is designed to auto-calibrate when connected in a multi-car group. The lead controller acts as the time master, and all other controllers automatically adjust their RTC calibration to match the time of the lead controller.

6.1.4.13 Homing Settings Menu

```
Homing Mode:    0 | Homing Mode:      1 | Homing Mode:      2 | Homing Mode:      3
                  |                     |                     |  Primary    Floor 1
  Homing Disabled | Homing to Main Floor| Homing to Floor ##  |  Alternate  Floor 2
```

The Homing Settings Menu is used to customize homing behavior, and selects between 4 homing modes. Use the top line of the screen to select the homing mode by pressing `Ent` and then the number of the desired mode as follows:

Mode 0 – Homing for this car is disabled.

Mode 1 – After homing delay, the car is recalled to the main landing.

Mode 2 – After homing delay, the car is recalled to the specified homing landing.

Mode 3 – After homing delay, the car moves to homing landing 1. If homing landing 1 is already occupied, then the car moves to homing landing 2. If both homing landing 1 and 2 are occupied, then the car does not move.

Mode 4 – Allows for homing mode 3 to be customized based on the time of day using 4 blocks of time that repeat every 24 hours.

Block 1 (Morning) – example: Cars are recalled to the lobby.

Block 2 (Lunch) – example: Cars are split between the lobby and middle floors.

Block 3 (Afternoon) – example: Cars are distributed at the middle floors.

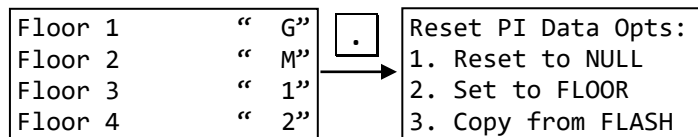Block 4 (Night) – Homing is disabled.

```
┌────────────────────────┐┌────────────────────────┐┌────────────────────────┐┌────────────────────────┐
│Homing Mode:        4   ││Homing Mode:        4   ││Homing Mode:        4   ││Homing Mode:        4   │
│ Time Step (1-4)   1    ││ Time Step (1-4)   2    ││ Time Step (1-4)   3    ││ Time Step (1-4)   4    │
│  Morning      06:00    ││ Lunch         11:30    ││ Afternoon    12:30     ││ Night         17:00    │
│  Pri: 1   Alt: 2       ││ Pri: 3   Alt: 1        ││ Pri: 3   Alt: 2        ││ Homing Disabled        │
└────────────────────────┘└────────────────────────┘└────────────────────────┘└────────────────────────┘
```

Use the 2nd line of the Homing Mode 4 screen to select one of the 4 blocks of time to be edited on lines 3 and 4. For each block, the starting time may be edited by using the 3rd line, and the Primary and Alternate Homing floors may be edited using the 4th line.

1. Use the **Nxt** and **Prv** keys to scroll between lines.

2. Press **Ent** to edit that line's data.

3. Press **Esc** to cancel each edit. The data is updated immediately.

The ending of each time block is defined by the starting time of the next time block, so the system cycles through each time block sequentially, such that one block is active at any given moment. Blocks 1-3 provide two homing landings (only the Primary Floor is used if not connected in group operation), which behave like Homing Mode 3, while Block 4 is available to disable homing. If only one homing landing is desired while in group operation, set both the primary and alternate floor to the same landing. It is possible to skip a time block by defining its starting time to match the next block's starting time, effectively giving it a duration of zero time. While editing the starting times for each block, the system rejects edits that cause a conflict with the time of the next or previous block, where the starting time of one block is later than the starting time of the next block.

6.1.4.14 Position Indicator (PI) Edit Menu

```
┌──────────────────────┐        ┌──────────────────────┐
│Floor 1        "  G"  │  ┌─┐   │Reset PI Data Opts:   │
│Floor 2        "  M"  │  │.│   │1. Reset to NULL      │
│Floor 3        "  1"  │  └─┘──►│2. Set to FLOOR       │
│Floor 4        "  2"  │        │3. Copy from FLASH    │
└──────────────────────┘        └──────────────────────┘
```

Available in software versions REV:1315 and up. (See Banner Screen for software revision #).

Applicable to CANbus or Serial-connected PI driver boards, standard with Vision 2.0.

Key Actions:

**Nxt** / **Prv**: Scroll up/down, or left/right **Aux** : N/A (jump to 2nd screen)

Ent : Edit/Confirm **Esc** : Exit Menu **.** : Reset PI Data Options

Press to cycle through text options, using alphanumeric phone entry:

1 : 1   **2** : 2, A, B, C   **3** : 3, D, E, F

4 : 4, G, H, I   **5** : 5, J, K, L   **6** : 6, M, N, O

7 : 7, P, Q, R, S   **8** : 8, T, U, V   **9** : 9, W, X, Y, Z

. : Reset Options **0** : 0, (space), *, - , + , /

PI Reset Data Options: (press **.**)

1. **Reset to NULL** – clears all PI labels and sets each label to blank spaces.

2. **Set to FLOOR** – clears all PI labels and sets each label to match the floor number.

3. **Copy from FLASH** – clears all PI labels and sets to factory default, configured to match the schematics.
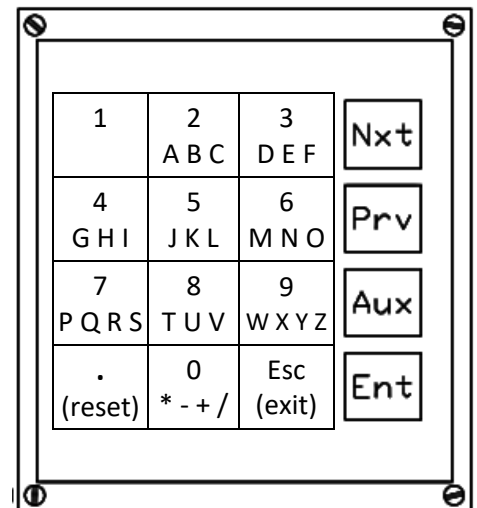
6.1.5 Machine Room Data

```
M01 1Y GovernrSw ON
M02 1T Rope Sfty ON
M03 1B Final Lmt ON
M04 2   Pit Stop ON
```

This menu monitors the 50 MR-SIB inputs, which are read by the controller CPU. The '**Show I/O Status**' menu displays similar information, but this menu provides a descriptive label for each input for convenience. The left side describes the terminal block label, the middle contains the input description label, and the right side describes the current input state.

The MR- SIB inputs are cross-checked by the controller CPU, comparing input data from both the CPLD and MR-SIB I/O processor. If there is a cross-check conflict, then '**ERR**' will be displayed, indicating a hardware issue. If no data is being received from the MR-SIB I/O processor, then '**– – –**' is displayed, indicating a hardware issue.

Use the $\boxed{\text{Nxt}}$ and $\boxed{\text{Prv}}$ keys to scroll through the menu one item at a time, and use the $\boxed{1}$ and $\boxed{4}$ keys to page up and page down four items at a time.

For the full list of 50 MR-SIB inputs, refer to the list found in Section 8.2 or the "VNX" page of the schematics.

6.1.6 System Status

```
Machine Room SIB  OK
Machine Room IO   OK
Car Top      SIB  OK
Car Op Panel IO   OK
```

The System Status menu shows the communication status of all connected boards and devices at a glance. Use the $\boxed{\text{Nxt}}$ and $\boxed{\text{Prv}}$ keys to scroll up and down the screen. If the status is not OK, then that device is not communicating.

6.1.7 View Counters

```
Counters:  "."=Reset
Trips: U00000/D00000
Doors: F00000/R00000
Level: UL0000/DL0000
```

The View Counters menu shows the accumulated total of:

- Up runs (U00000)
- Down runs (D00000)
- Front door cycles (F00000)
- Rear door cycles (R00000)
- Up re-leveling events (UL0000)
- Down re-leveling events (DL0000)

The up or down run counter increments every time the car initiates fast speed to move to another floor while in Normal Operation.

The front or rear door cycle counter increments every time the door close limit input activates, indicating the door has been opened from a closed position.

The up or down re-level counter increments if the car initiates a slow-speed run while on a leveling target. The counter does not increment during a normal fast speed run and is intended to capture an event when the car re-levels while already stopped at a landing, such as anti-creep up-level or leveling correction after overshooting a landing.

The counters may be reset by pressing $\boxed{.}$ and entering the password, or by using the '**SETUP MENU – RESET COUNTERS**' menu, as described in Section 6.1.4.7.

6.1.8 Internal Memory
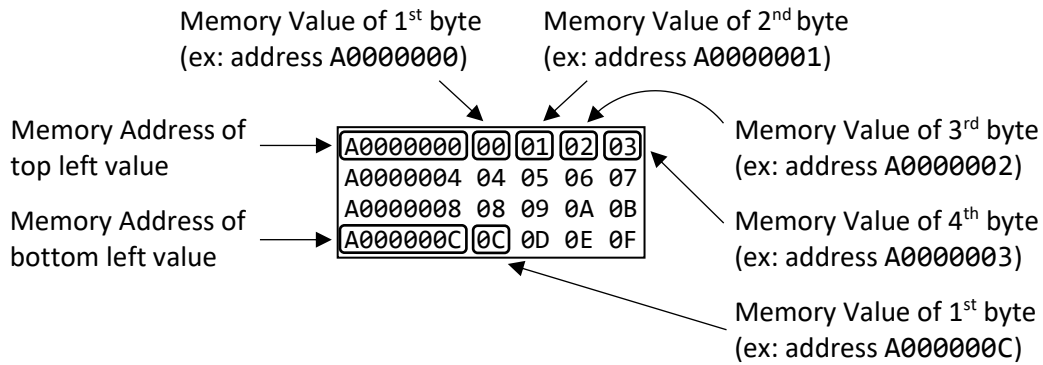
The '**Show Memory**' screen shows the live contents of the CPU memory map, which is specific to the controller firmware version number. This menu is primarily used for factory troubleshooting. Contact Virginia Controls technical support for assistance before attempting to use the memory map.

The left 8 digits of the Memory menu display the hexadecimal address of the leftmost byte, followed by 4 pairs of digits, which each represent 8 bits (or one byte) of data. The readable memory ranges from

- 0XA0000000 to 0XA001FFFF, which is CPU Static RAM (SRAM), and

- from 0x9D0000000 to 0x9D07FFFF, which is CPU FLASH Memory.

Flash memory is accessed by entering $\boxed{0}$ and SRAM is accessed by entering $\boxed{8}$.

6.1.8.1 Navigating Internal Memory Menu

A specific memory location can be accessed by scrolling, using the following keypad commands.

Press $\boxed{1}$ to decrease by 1000 (Hex).

Press $\boxed{4}$ to increase by 1000 (Hex).

Press $\boxed{2}$ to decrease by 100(Hex).

Press $\boxed{5}$ to increase by 100 (Hex).

Press $\boxed{3}$ to decrease by 10 (Hex).

Press $\boxed{6}$ to increase by 10 (Hex).

Press $\boxed{Nxt}$ to decrease by 4 (Hex).

Press $\boxed{Prv}$ to increase by 4 (Hex).

Press $\boxed{Esc}$ to return to the menu screens.

Press $\boxed{0}$ to access FLASH memory.

Press $\boxed{8}$ to access SRAM memory.
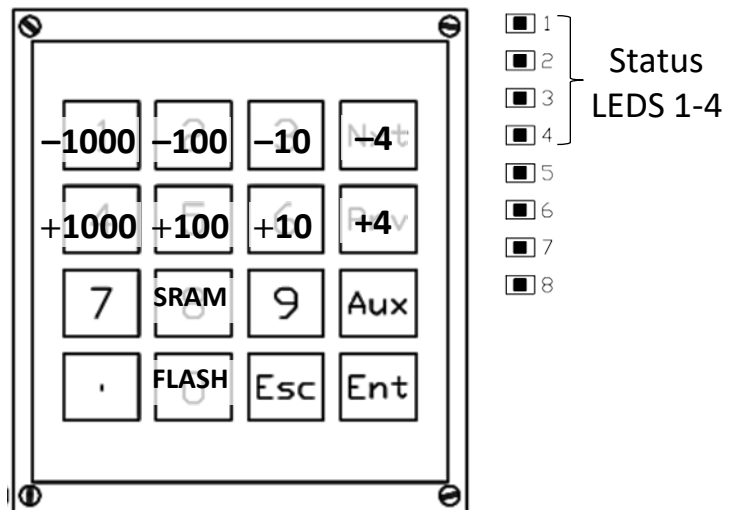
Figure 33: Keypad layout and Status LEDs in Memory mode.

6.1.8.2 Internal Memory Status LEDs

The Status LEDs 1 – 4 on the right side of the CPU board (see Figure 33) have an assigned behavior while in '**Show Memory**' mode. Each LED corresponds to the logic state of one of the four 2-digit memory bytes on the top line of the display. Status LED 1 corresponds to 1st memory byte, LED 2 corresponds with the 2nd memory byte, and so on. Each Status LED is lit as long as the corresponding memory byte is not equal to zero (00), and is off while the byte is equal zero (00). This allows the LEDs to show rapid changes in the status of the internal memory more reliably than using the LCD screen.

6.1.9 Fault Log

```
   FAULT LOG VIEW          NUM    FAULT    SYS
 1 - SYS FAULT LOG         01/01/2021 12:59:59
 2 - APP FAULT LOG         COD ..FAULT_LABEL..
 0 - CLEAR FAULT LOG       FL:## Stat:ABCDEFGH
```
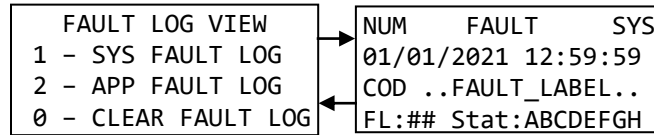
- The Fault Log is divided into two sections, which may be selected when first entering the fault log menu. See Section 9.2 for fault log descriptions.

- The System Fault Log (SYS) includes relevant system information events and faults involving the CPU, CANbus network, group communication, MR-SIB, CT-SIB, I/O board, or Auxiliary Relay board status.

- The Application Fault Log (APP) includes operational events and faults, such as Fire Service, Stop Switches, Door faults, starter and running timeouts.

- Each entry in the fault log is further categorized as either a FAULT or EVENT, as displayed in the center of the top line of the fault log display. This helps describe the fault log entry at a glance, where an EVENT refers to a noncritical change in the state of the elevator system while a FAULT refers to the likely cause of a malfunction.

- Use the `Nxt` and `Prv` keys to scroll between faults in chronological order, where the most recent fault number is set to 001 (see NUM in diagram above). Older faults are incremented consecutively, and up to 480 faults may be stored before newer faults overwrite them.

- Use the `3` and `6` keys to page up and page down in 10 fault increments.

- The second line of the display shows the timestamp for the fault, to the nearest second. If multiple faults occur at the same time, the faults display in order of occurrence.

- The third line of the display shows the fault code (COD) and fault label. Refer to Section 9.2 for a description of all faults and events in fault code order.

- The fourth line of the display shows additional information provided for each logged fault or event. The information displayed depends on the type of fault and is described in the fault log descriptions in Section 9.2. Most faults provide the following standard information:

- If the data is displayed in this format: "FL:## Stat:ABCDEFGH":
  - FL:## refers to the current floor.
  - Stat:ABCDEFGH is the car status when the fault occurred.

- There are 8 car-status bits, labeled in order from left to right as ABCDEFGH. Each of these status bits are described in Table 25.

Table 25: Car Status Bits

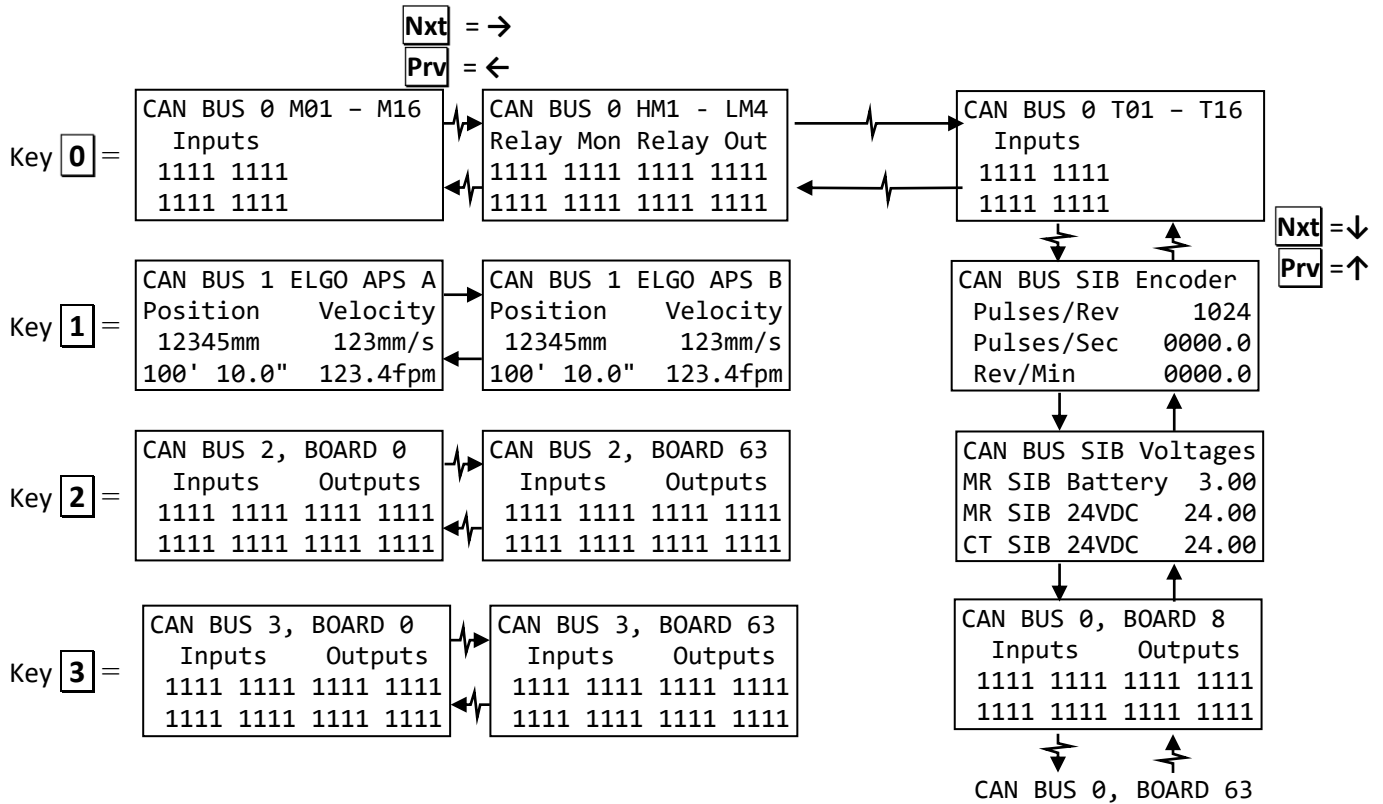| Status Bit	Status Description
FL:##	Floor Position: 1 = bottom landing
A	Car Door Contacts Status
B	Safety String & Hall Doors Status
C	Door Open Limit
D	Door Locks (inputs M13 - M16)
E	Direction Status: Up = 1, Down = 0
F	The car was running
G	The car was running in fast speed
H	Door Zone

6.1.9.1 Clearing the Fault Log

> NOTE: Clearing the fault log is not recommended. Old faults are automatically overwritten once the log is filled to its 480-fault capacity. A password is required to clear the fault log.

- To clear the APP fault log data, press `0` while viewing the APP fault log

- To clear the SYS fault log data, press `0` while viewing the SYS fault log.

- To clear both the APP and SYS fault logs at once, press `0` while on the fault log menu screen.

6.1.10 I/O Status

The Show I/O Status menu displays live data for the I/O boards, MR-SIB inputs, CT-SIB inputs, analog inputs, encoder data, and absolute position & speed data. This allows for remote monitoring of all I/O, not all of which being accessible in the machine room. All I/O is read through CANbus, so this menu is organized by CANbus channels 0 - 3 and data received by the board.

```
                                   Nxt = →
                                   Prv = ←

Key 0 =  ┌──────────────────┐  ┌──────────────────┐        ┌──────────────────┐
         │CAN BUS 0 M01 – M16│  │CAN BUS 0 HM1 - LM4│        │CAN BUS 0 T01 – T16│
         │    Inputs        │  │Relay Mon Relay Out│        │    Inputs        │
         │  1111 1111       │  │1111 1111 1111 1111│───────▶│  1111 1111       │
         │  1111 1111       │  │1111 1111 1111 1111│◀───────│  1111 1111       │
         └──────────────────┘  └──────────────────┘        └──────────────────┘
                                                                                Nxt = ↓
                                                                                Prv = ↑
Key 1 =  ┌──────────────────┐  ┌──────────────────┐        ┌──────────────────┐
         │CAN BUS 1 ELGO APS A│  │CAN BUS 1 ELGO APS B│      │CAN BUS SIB Encoder│
         │Position   Velocity│  │Position   Velocity│       │ Pulses/Rev    1024│
         │ 12345mm    123mm/s│  │ 12345mm    123mm/s│       │ Pulses/Sec  0000.0│
         │100' 10.0" 123.4fpm│  │100' 10.0" 123.4fpm│       │ Rev/Min     0000.0│
         └──────────────────┘  └──────────────────┘        └──────────────────┘

Key 2 =  ┌──────────────────┐  ┌──────────────────┐        ┌──────────────────┐
         │CAN BUS 2, BOARD 0 │  │CAN BUS 2, BOARD 63│       │CAN BUS SIB Voltages│
         │  Inputs   Outputs │  │  Inputs   Outputs │       │MR SIB Battery  3.00│
         │1111 1111 1111 1111│  │1111 1111 1111 1111│       │MR SIB 24VDC   24.00│
         │1111 1111 1111 1111│  │1111 1111 1111 1111│       │CT SIB 24VDC   24.00│
         └──────────────────┘  └──────────────────┘        └──────────────────┘

Key 3 =  ┌──────────────────┐  ┌──────────────────┐        ┌──────────────────┐
         │CAN BUS 3, BOARD 0 │  │CAN BUS 3, BOARD 63│       │CAN BUS 0, BOARD 8 │
         │  Inputs   Outputs │  │  Inputs   Outputs │       │  Inputs   Outputs │
         │1111 1111 1111 1111│  │1111 1111 1111 1111│       │1111 1111 1111 1111│
         │1111 1111 1111 1111│  │1111 1111 1111 1111│       │1111 1111 1111 1111│
         └──────────────────┘  └──────────────────┘        └──────────────────┘

                                                              CAN BUS 0, BOARD 63
```

1. Press the number keys 0 through 3 to navigate to the corresponding CANbus channels 0 – 3.

2. Press Nxt and Prv to scroll between the I/O board numbers 0 – 63, based on which boards are communicating and configured. If a board displays all dashes ' – ', then the board is not communicating. If the board index does not match the configuration, the board will display its data based on its DIP switch assigned board number.

> NOTE: The MR-SIB inputs 1-16 and outputs 1-16 are designated as CANbus 0 board #8.

For Remote I/O boards (16-In / 16-Out), the 16 inputs are shown using the left two columns, and the 16 outputs are shown using the right two columns. For Hall I/O boards (2-In / 2-Out), only the first 2 input bits are used on the left two columns, and only the first 2 output bits are used on the right two columns.

When using an Absolute Positioning System (APS) on CANbus 1, the positioning data is displayed in place of CANbus 1 in the '**Show I/O Status**' menu. The menu displays the absolute position counts in mm, and the converted position in feet and inches in real time. Velocity is displayed in both mm/s and feet per min. Press Nxt and Prv to switch between ELGO channel "A" and "B", which should always read 40mm apart.

```
┌──────────────────┐
│  Firmware Version│
│  Bus 0 - Board 08│
│      1.0.1.6     │
│                  │
└──────────────────┘
```

Press the **.** key to see the I/O Board Processor firmware version of an I/O board, MR-SIB, or CT-SIB.

6.1.11 Display ELGO APS & Car Top Data

```
T01   Roped Sfty  ON
T02 Emrg Exit Sw  ON
T03 CTop Stop Sw  ON
T04 InCar StopSw  ON
```

This menu displays the commonly-used Car Top I/O and ELGO positioning signal states while at the controller, as an alternative to the Car Status and I/O Status menus. The '**Show I/O Status**' menu displays specific I/O board inputs and outputs as bits, while this menu provides a descriptive label for each input for convenience. The left side describes the terminal block label, the middle contains the input description label, and the right side describes the current input state, '**ON**' or '**OFF**'.

1. Use the Nxt and Prv keys to scroll through the menu one item at a time.

2. Use the 1 and 4 keys to page up and page down four items at a time.

For items not included in this list, refer to the '**Show I/O Status**' menu for the full list of inputs and outputs on all I/O boards.

6.1.12 Display ELGO Floor Height Data

```
Floor  1    0' 0.1"
Floor  2    8' 5.9"
Floor  3   17'11.7"
Floor  4   25' 3.5"
```

When using the ELGO Absolute Positioning System, this screen displays the floor position data for each landing, relative to the bottom landing. Use this menu to verify that the floor positions have been learned properly by comparing the displayed values to the actual floor heights. The current position may be seen using the '**Show I/O Status – CAN BUS 1 ELGO APS**' menu. The position 0' 0" is the starting point of the ELGO APS Learn Procedure at the bottom landing. There are two independent sensors within the ELGO unit, offset by 40mm, and this floor height data is shared between the controller CPU (channel A) and CT-SIB (channel B). The position of each landing may be fine adjusted +/- 0.5" using the '**Edit ELGO APS**' screen in the Setup Menu. See Section 3.9.1.3 for details.

6.1.13 Safety Status

```
Mode: Normal Service
Fault:
Term:
### CURRENT FAULT
```

The Safety Status screen contains information on the current Inspection Mode, and whether there is an existing fault in the inspection string or run relays.

If there is an inspection fault or run relay fault, the Safety Status screen displays the fault conditions on the 2nd and 3rd line of the Safety Status screen. All inspection and relay faults then latch a shutdown, requiring a manual reset by toggling the Fault Reset input (RST). If a fault is currently active, the 4th line displays the fault label until the fault condition is cleared.

The 1st line of the display describes the currently active mode of operation, as shown in the following Table 26:

Table 26: 1st Line of Display - Currently Active Modes of Operation.

Mode	Description	Terminals	LED indicators
Normal Service	Normal Operation mode is active.	23 & NRM=ON	M42
Controller Ins	Controller Inspection mode is active.	23 & INS = ON	M41
Insp Access	Inspection Access mode is active.	23A	T16
Bypass Sws	Bypass Operation mode is active.	n/a (use switches)	M38 or M39 or M40
In Car Insp	In Car Inspection mode is active.	23X	T13
In Car Bypass	In-Car Bypass mode is active.	23X	T13
Car Top Insp	Car Top Inspection mode is active.	23T	T09
CarTop Bypass	Car Top Bypass mode is active.	23T & 26	T09
Leveling	Releveling while on Normal Operation.	NRM & 20 & leveling	M42 & M08
Construction	Construction mode: (if enabled)	INS w/CPLD sws 7 & 8	M41
None	No inspection or normal mode input is active, or there are conflicting mode inputs. The controller is inoperable.	23,23A,23T,23X = OFF	T09, T13, T16, M42, M41 = OFF
CANbus # Comm Error	CANbus communication for channel #X is disrupted.	n/a	n/a

The 2nd line of the display describes the fault description, as shown in the following Table 27.

Table 27: 2nd Line of Display – Fault / Group Status Descriptions.

Fault	Description
Insp Str Open	Inspection String is open. No inspection or normal mode input is active.
Insp Mode Flt	Inspection Mode Fault. More than one inspection or normal mode input is active.
Insp Run Input	Inspection Run Input Fault. An inspection run input is active while not in the correct mode.
Normal Op Flt	Normal Operation Fault. An inspection mode or run input is active while on normal operation.
Run Relay Err	A run relay error (LM1-LM4 or HM1-HM4) has been detected. A relay monitoring input has detected a stuck open or closed relay contact. Refer to the fault log for specific details.
UpSlowdown Flt	(not used with ELGO APS) The Up Slowdown Limit input (M26) was on while floor position is at the top terminal landing. Or, the input was off while not at the top terminal landing according to the PI.
DnSlowdown Flt	(not used with ELGO APS) The Down Slowdown Limit input (M27) was on while floor position is at the bottom terminal landing. Or, the input was off while not at the bottom terminal landing according to the PI.
Up Normal Flt	The Up Normal Limit input (M25) is off while the car position according to the PI is not at the top terminal landing.
Dn Normal Flt	The Down Normal Limit input (M28) is off while the car position according to the PI is not at the bottom terminal landing.
Shutdown Defeat	The controller is in Shutdown Defeat mode. Most shutdown faults are defeated or auto-reset.
Fire Service Active	At least one car in a multi-car group is in Fire Recall or Fire Operation (Phase 2) mode.
Medical Emergency	At least one car in a multi-car group is in Medical Emergency Recall or Car operation mode.
Emergency Power	At least one car in a multi-car group is in Emergency Power Recall or EP Run mode.
ELGO APS Data	The ELGO Absolute Positioning System data is not learned. Car may run on inspection only.
ELGO APS Comm	The ELGO Absolute Positioning System communication status is down. Check connections.

The 3rd line of the display contains the terminal and label for the offending inspection mode input, inspection run input, or relay which is the cause of the fault, as shown in the following Table 28:

Table 28: 3rd Line - Terminals and Labels.

Term	Offending Inspection Input	MR-SIB/CT-SIB input Terminals	MR-SIB/CT-SIB LEDs
`23T   Car Top Sw`	Car Top Inspection switch	23T	T09
`23X In Car Sw`	In-Car Inspection switch	23X	T13
`23A Access Sw`	Inspection Access switch	23A	T16
`Controller Sw`	Controller Inspection switch	23 & INS	M41
`23N Normal Op`	Normal Operation	23 & NRM	M42
`23E Car Top En`	Car Top Insp Enable input	23E	T11
`25 Car Top Up`	Car Top Insp Up Run input	25	T10
`24 Car Top Dn`	Car Top Insp Down Run input	24	T12
`25X In Car Up`	In-Car Insp Up Run input	25X	T14
`24X In Car Dn`	In-Car Insp Down Run input	24X	T15
`Bypass Gate Sw`	Car Gate Bypass switch	Car Gate Bypass switch	M40
`Bypass Door Sw`	Hall Doors Bypass switch	Hall Doors Bypass switch	M39
`Bypass Lock Sw`	Hall Locks Bypass switch	Hall Locks Bypass switch	M38
`25T Access T U`	Top Access Up Run input	25T	M17
`24T Access T D`	Top Access Down Run input	24T	M18
`25B Access B U`	Bottom Access Up Run input	25B	M19
`24B Access B D`	Bottom Access Down Run input	24B	M20
`Controller En`	Controller Insp Enable input	Controller Enable switch	M36
`Controller Up`	Controller Insp Up Run input	Controller Up Run switch	M35
`Controller Dn`	Controller Insp Down Run input	Controller Down Run switch	M37
`Car Ins Normal`	CT-SIB Normal Operation input	23	T07

6.1.14 Display Group Data

```
 Group Comm Status
           ABCDEFGH
Ethernet  M-------
CANBus 3  M-------
```

The Display Group Data screen contains information on the connection status of Vision 2.0 controllers in a multi-car group. Each controller in a group needs to be connected via Ethernet and CANbus 3. This menu displays the communication status for Ethernet and CANbus 3 of each connected controller. Each column references the controller number, labeled A – H, and the communication status may be decoded as follows:

Table 29: Display Group Data Communication Status.

M	"ME": This represents the place holder for the controller's own number.
U	"UP": The communication with this controller is active.
–	The communication with this controller is not active, and was not seen previously.

NOTE: Use the Display Group Data menu to confirm that all controllers are connected and communicating in a multi-car group.

6.2 Wireless Screen Access

6.2.1 Description

The Vision 2.0 Hydraulic Controller may be configured for Wireless Screen Access (WSA). This allows the installer/maintainer to access all of the controller's LCD screens wirelessly through a dedicated Wireless Access Point (WAP) with a user supplied handheld smartphone or tablet with WiFi and web browser capabilities.

The controller CPU contains all of the software required, so there is no software to install on the phone or tablet.

6.2.2 WAP Installation

The recommended WAP is TP-Link AC1350 Ceiling Mount Access Point Model EAP225 – although other WAP will also work.

The EAP225 has the following features:

- 1000 MHz Ethernet
- Power Over Ethernet (POE) providing 24VDC power on the Ethernet cable
- Dual 2.4 and 5 GHz bandwidth
- Wall or Ceiling mounting

Mount the WAP on the hoistway wall, at approximately the midway point.

Run CAT5 or better Ethernet cable from the WAP to the provided power supply. Connect the power supply to any convenient 120VAC outlet in the machine room or hoistway. Connect another Ethernet cable from the power supply to the supplied Ethernet switch if this is a group installation or directly to the RJ45 Ethernet connector (J7) on the CPU card for a simplex installation. Ensure that the green light on the WAP is on solid.
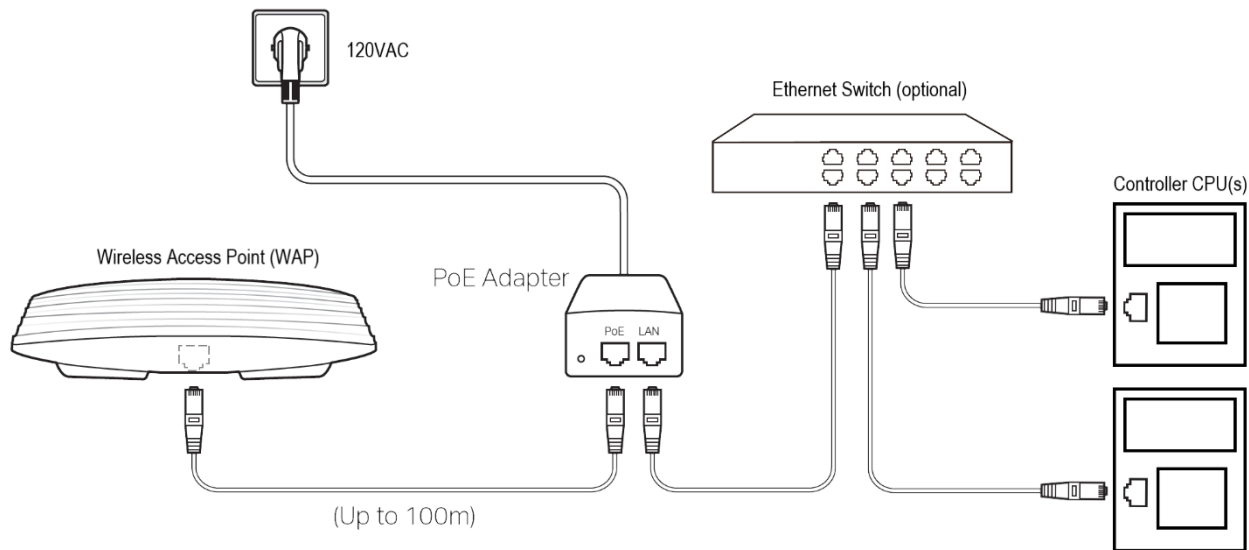
Figure 34: Wireless Access Point Power over Ethernet (PoE) suggested hookup diagram

6.2.3 WSA Operation

On the controller CPU, navigate to the **Setup Menu** -> **Begin IP Setup** menu screen. Ensure that both the DHCP and HTTP line items are turned ON to enable the WSA feature.

From the WiFi settings on the phone or tablet, select the TP-Link WAP, 2.4Ghz. After a few seconds, the device may display a warning message that internet access is not available. This message is expected and can be ignored.

> **NOTE: If the device disconnects while looking for a network with Internet access, this may be remedied using the network settings on your device. Contact VC support for assistance if needed.**

Open a web browser on the phone or tablet and enter www.vision.us for a simplex installation or www.visiona.us for the first car of a multi-car group. For car B of a multi-car group, enter www.visionb.us. For car C, enter www.visionc.us, etc. If the controller does not connect, then alternatively manually enter the IP address of the controller into the browser, which is 10.10.10.2 by default for car A. Refer to Section 6.1.4.8 for help identifying the controller IP address.

A duplication of the CPU LCD panel and keypad is displayed on the phone or tablet screen. All of the menus, screens and keypad functions available at the CPU are available on the phone or tablet.

> **NOTE: The CPU LCD and WSA always display the same data.   Changing the screen on the CPU changes the display on the WSA and vice versa.**

Connection Status Indicator
Blinks RED while connected.

If not blinking, check your network connection settings and refresh the page.
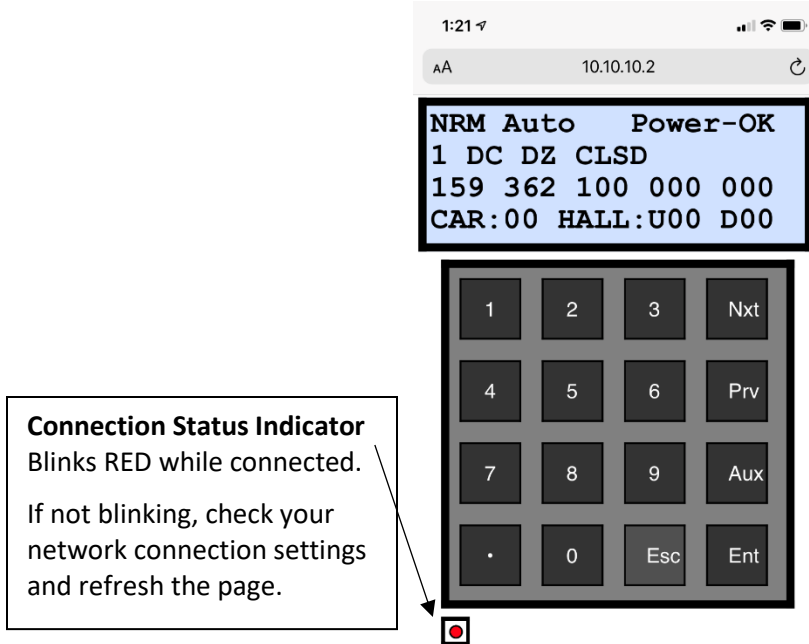
Figure 35: Wireless Screen Access display

6.2.4 WSA Security

Security in a wireless environment is a valid concern.

By default, the TP-Link WAP is configured as an open network, meaning that it does not require a password. Security can be enabled and a password set by following the instructions included with the WAP. The choice to enable security is left up to the installer.

As already described, the Vision 2.0 Controller CPU requires a password to change any settings, reset the log files, etc. Without the password, status and fault log information may be viewed, but nothing can be changed.

The ultimate protection for a wireless network is to secure it by unplugging either the WAP power supply or the WAP Ethernet cable whenever WSA is not in use.

7. System Configuration

Each Vision 2.0 controller is pre-configured by the factory with job-specific I/O board inputs and outputs, and factory defaults for settings, timers, and landing information based on the specifications. The controller serial number (job number) is shown on the CPU banner screen (see Section 6.1.2).

If the controller configuration file is corrupted or missing, the system cannot operate properly. If an incompatible configuration file is loaded, the banner screen displays 'ptomVerFlt'. If this is the case, contact Virginia Controls technical support for assistance and follow the instructions in Section 7.2.3 to load the provided configuration file update.

Field changes to the settings and timers are available using the setup menu (see Section 1.1.1). The descriptions for available settings are found below. Factory defaults for each setting and timer may be found in the configuration page (VNP) of the job-specific schematics. The number of landings is preset by the factory. If the factory setting is incorrect, contact Virginia Controls technical support for assistance.

I/O board configuration is printed in the job-specific schematics for each installed I/O board. Any changes to the I/O board inputs or outputs may only be made by the factory. If changes are desired, contact Virginia Controls technical support for assistance.

Door openings at each landing are also pre-configured by the factory. Users may enable or disable the door openings using the 'ptom**Edit Floor Openings**' menu (see Section 6.1.4.9). Users are restricted from enabling door openings that are not pre-configured by the factory. Contact Virginia Controls technical support if the door openings need to be changed.

The controller number is configured using DIP switches on the controller CPU (see Section 5.2.4), where controller 0 is labeled "A", up to controller 7 labeled "H". Each controller in a group must have a unique controller number. If a change to the controller configuration is required, contact Virginia Controls technical support for assistance. Follow the instructions in Section 7.2 to update the controller software and configuration file using a USB flash drive.

7.1 Adjustable Settings and Timer Descriptions

The following sections include the list of all possible settings and timers that may be present in the Settings and Timer menus for a given controller. The list is preconfigured by the factory, and only items related to features in the job specifications are displayed.

Refer to the configuration sheet (VNP) in the drawings to see the settings and features provided for each particular job. The Settings listed here are standard. (NOTE: editable values range from 0 to 999, unless otherwise stated).

> **NOTE: Not all settings shown below are available for a given controller. If a desired setting is not provided, contact Virginia Controls technical support for assistance.**

7.1.1 Adjustable Timers/Landings/Numerical Setting Descriptions

`NUMBER OF LDGS`   **Number of Landings** – This is the number of landings that the controller can serve, and is a value typically between 2 and 8 for a hydraulic elevator, unless custom software is provided.

> NOTE: The "NUMBER OF LDGS" setting is read-only, and only adjustable by the factory. If the number of landings needs to be changed, contact Virginia Controls technical support for assistance.

`MAIN FIRE LDG`   **Main Fire Landing** – This is the number corresponding to the designated Main Fire Landing and is a number between 1 and 8. The maximum value for this setting is the '**NUMBER OF LDGS**' setting.

`ALT. FIRE LDG`   **Alternate Fire Landing** – This is the number corresponding to the Alternate Fire Landing and is a number between 1 and 8. The maximum value for this setting is the '**NUMBER OF LDGS**' setting.

`SHTDN DEF MODE`   **Shutdown Defeat Mode** – This setting selects the behavior of the shutdown defeat input (DFT). If the shutdown defeat input is jumped, shutdown defeat is activated until the time expires based on the following table. Once the time expires, the input must be toggled off before being active again. The factory default setting is 1 week, which is the value "3".

Table 30: Shutdown Defeat Time Expiration.

Setting Value	Shutdown Defeat Input Expiration Time
0	1 Scan (one-shot)
1	1 Hour
2	1 Day (24 hours)
3	1 Week (7 days)

7.1.1.1 Tenth of a Second Timers

The following settings are for timers. The timer values are in tenths of a second.

`DOOR TIME HALL`   **Door Time, Hall Call** – This is the amount of time that the doors remain open (after fully opening) when the car has stopped in response to a hall call. After this time, the doors start to close.

> NOTE: If a car call is entered while the doors are open, the door time is reduced to the "DOOR TIME CAR" setting. If the Door Close Button is pressed while the doors are open, the door time is reduced to the "DOOR TIME SHORT" setting. This setting is normally 50, for a time of 5 seconds.

`DOOR TIME CAR`   **Door Time, Car Call** – This is the amount of time that the doors remain open (after fully opening) when the car has stopped in response to a car call and there is no hall call present at that landing. After this time, the doors start to close.

> NOTE: If a car call is entered, or the Door Close Button is pressed while the doors are open, the door time is reduced to the "DOOR TIME SHORT" setting. This normal setting is 20, for a time of 2 seconds.

`DOOR TIME SHORT`   **Door Time, Short** – This is the amount of time that the doors remain open (after fully opening) when they have reopened in response to a Door Open Button/Safety Edge/Electric Eye/Infrared Curtain and no hall call is entered. After this time, the doors start to close. The normal setting is 10, for a time of 1 second.

`ETSR SW FS CHECK`   **ETSR Input Fast Speed Check Time** – This is the amount of time between the initiation of an up fast speed run and the system check of the ETSR input. If the input is low, the controller drops the fast speed valve relay and prevents the car from running on fast speed.

`REVERSAL DELAY` **Reversal Delay** – This is the minimum time the car waits before changing direction. Normally the doors cycle when the car stops, and that time exceeds the Reversal Delay. But if the car reverses on Fire Service, or for some other reason, without cycling the doors, then this setting determines the delay before running in the other direction.

`PMP RUN TRU DELY` **PUMP TRU Starter Delay** – This is the adjustable delay between the PMP output starting the pump and the TRU output energizing the valves and the Wye-Delta transition, (if applicable). This delay is intended to allow the pump to come up to speed before energizing the valves. If a delay is not desired, set this value to 0.

`DR REVERSE DELAY` **Door Reversal Time Delay** – This is the adjustable delay which defines the minimum time when transitioning between opening and closing. Increasing this prevents the door operator from reversing direction too quickly. The default is 0.2 seconds. This adjustment is only available upon request.

7.1.1.2 One Second Timers

The following settings are for timers. The timer values are in seconds.

`UP RUN SHTDN TMR` **Up Run Shutdown (Low Oil) Time** – If the car runs up without passing a floor for this time, then shutdown is initiated. The car stops, runs down to the bottom landing, cycles its doors, and shuts down. The car can be returned to service by toggling the Fault Reset input (1X-RST). The default setting is 25 seconds.

`DN RUN SHTDN TMR` **Down Run Shutdown Time** – If the car runs down without passing a floor for this amount of time, the car stops immediately and a shutdown sequence is initiated. If the controller is within the door zone, the car cycles its doors once, then shuts down. Otherwise, the car stops and is inoperable until reset by toggling the Fault Reset input (1X-RST). The default setting is 25 seconds. The down run shutdown timer may be enabled or disabled using the parameter '**DOWN RUN SHUTDN**' in the settings menu.

`DR NUDGING TIME` **Door Nudging Time** – This is the time delay before initiating door close nudging while on normal operation, if the features '**DOOR NUDGING**' and '**TIMED EYE CUTOUT**' are enabled. A call must be registered, and the car must be in automatic operation. The timer resets when the doors are fully closed, or when the car starts a floor-to-floor run. The normal setting is 25 seconds.

`ICU CUTOUT TIME` **Electric Eye Cutout Time** – This is the time delay before cutting out the Electric Eye Input, after it has been continuously energized. It resets when the car runs to the next floor. Turn on the setting '**TIMED EYE CUTOUT**' to enable this feature. The default setting is 20 seconds.

`CAR STUCK TIME` **Car Stuck Time** – This is the amount of time before disabling calls from the same landing as the car, so that the car can answer other registered calls. This operates as a stuck-button timer. If the door is being held open by a door open button or safety edge input, the door will stay open and a '**CAR STUCK**' event is logged in the Fault log. The default setting is 15 seconds.

`DOOR STUCK TIME` **Door Stuck Time** – This is the time delay before stopping a door open or close cycle. This timeout would apply during a door open cycle if the door open limit input is not transitioned, or during a door close cycle if the door close limit input is not transitioned. The default setting is 20 seconds.

`DOOR RESET TIME` **Door Stuck Reset Time** – This is the amount of time that the doors are held open after failing to close properly, before retrying to close. The default setting is 10 seconds.

`KILL IDS ON FIRE` **Delay Before Canceling Independent Service on Fire Service** – This is the time delay before Independent Service is cut out when Fire Service Phase 1 is initiated. This feature can be modified by the features '**NO TIME KILL IDS**', '**NEVER KILL IDS**', and '**KILL IDS IMMED**' that determines if and when Independent Service is cut out on Fire Service. The default setting is 30 seconds.

`DR CLOSE ON FIRE` **Door Close Delay Time on Fire Service** – This is the time delay before closing the doors after the car has returned to the designated fire landing and the car is in shutdown. This is required on 2000 (or later) Fire Code. The default setting is 30 seconds.

`DN RUN ON JK RES` **Maximum Down Run Time On Jack Resynch** – The Jack Resynchronization operation is stopped when the car has been running down at the bottom landing after this time. This allows the car to return to service if the Jack Collapsed Switch Input fails or is not provided. This value is only used with the Jack Resynch feature. The default setting is 30 seconds.

`IN-USE-LITE TIME` **In-Use Light Time** – This timer determines how long the In-Use light is left on after a call is answered. The default setting is 6 seconds.

`DR HOLD OPEN BTN` **Door Hold Open Button Timer** – This determines how long the door is held open after pressing and releasing the DHOB input. Set the value to "0" if using a switch.

`MED EMERG CANCEL` **Medical Emergency Mode Cancel Time**– After a Medical Emergency Recall is initiated, the car opens its doors for this amount of time, allowing transition to Medical Car Operation mode. After this timeout, Medical Emergency mode is cancelled and the car returns to Normal service.

7.1.1.3 Ten Second Timers

The following settings are for timers. The timer values are in tens of seconds.

`PI CUTOUT TIME` **Position Indicator Cutout Time** - This is the time delay before turning off the Position Indicators after the car becomes idle. If the doors are opened, or the car starts in response to a call, then the Position Indicators turn on again. The normal setting is 30, for a time of 300 seconds or 5 minutes. To keep the PI's on at all times or when using a digital PI driver board, enter a value of "0".

`OIL VISC DELAY` **Oil Viscosity Delay Time** – This is the time delay after an oil viscosity churn run start before an oil viscosity churn event may start again. This allows the pump to cool down after a previous oil viscosity churn before starting again.

`OIL VISC RUNNING` **Oil Viscosity Run Time** – While the Oil Viscosity input is on (TB:OVC), this sets the duration of an oil viscosity churn.

`CAR LIGHT CUTOUT` **Car Light Cutout after Inactivity** – The car light cutout relay output (TB:LIT) activates after the car has been inactive for this timeout value. The inactivity timer begins when the car is on Normal (automatic) operation with the doors closed and no car operating panel buttons have been pressed. As long as the doors remain closed and no C.O.P. buttons are pressed, the car lights will turn off when the timer has elapsed.

`P-CONTACTOR HOLD` **P-Contactor Shutoff (Hold) Time** – When using Wye-Delta or Across-The-Line contactor starting, the potential (P) contactor may be allowed to open if no calls are placed after this shutoff time. To keep the P-contactor energized at all times, set this parameter to 0.

7.1.1.4 Custom Timer Settings

`JACK RESYNC DAYS` **Auto Jack Re-Sync Time Days** (in days) – The Jack Resynchronization is repeated at this interval. Automatic Jack Resynch must be enabled using the '**AUTO JACK RESYNC**' setting. If the '**JK RES TMR=10min**' setting is enabled, then this timer interval is in multiples of 10 minutes, rather than days. This timer is only used with the Jack Resynchronization feature.

`JACK RESYNC HOUR` **Auto Jack Resynch Time Hour** (in hours) – This setting determines the hour of the day (0:00 through 23:00) that Auto Jack Resynch initiate. This setting is only used with the Jack Resynchronization feature, and '**AUTO JACK RESYNC**' is enabled in the settings menu.

`45DAY SHUTDN CLK` **Maintenance Shutdown Clock** (in 45 day intervals) – If the feature is enabled, the elevator shuts down for maintenance after 45 days multiplied by the entered value. This feature is only available on request.

`ANTI-NUIS STOPS` **Anti-Nuisance Max # of Calls with no Electric Eye** (# of car calls) – If anti-nuisance is enabled, this determines the number of times the elevator stops without triggering the electric eye input, implying the car is stopping without a passenger entering or leaving the elevator. This feature is automatically disabled if there is a malfunction wherein the electric eye input is stuck off.

`SCREEN TIME (HR)` **Backlit Screen Timeout** (in hours) – This is the amount of time the backlit screen will stay active after the most recent activity using the keypad. The screen backlight will turn off after this amount of time since the keypad has been idle. Set to '0' to disable the timeout and keep the backlight on indefinitely.

`LW AntiNui CCMAX` **Load Weighing Anti-Nuisance, Max Car Call Threshold** (# of car calls) – This value represents the maximum number of car calls allowed when the load weighing anti-nuisance input is active, indicating the car is too empty. If there are too many calls while the car load is too light, all car calls are cancelled.

`EP CAR SELECTION` **Emergency Power Car Select** (Car #) – Use this parameter to programmatically select a car for running on emergency power. Only applies if an Emergency Power Select Switch fixture is not used.

`SHTDN RUN ATMPTS` **Shutdown Run Attempts** – This quantity determines the number of times the controller will shutdown after failed repeated attempts to close the doors and/or run to the next landing. Default is 20 attempts.

7.1.2 Adjustable Settings/Features/(ON/OFF) Setting Descriptions

`NO SHRT DR TIME` **No Shortened Door Time** – Normally, the Door Open Button/Safety Edge/Electric Eye/Infrared Curtain shorten the door time. Enable this feature to prevent these devices from shortening the door time. The Door Close Button still shortens the door time.

`TIMED EYE CUTOUT` **Timed Electric Eye Cutout** – Enable this feature to allow disabling of the Electric Eye input after the preset time. (See the timer setting '**ICU CUTOUT TIME**' for the delay before cutting out the Electric Eye). This feature is often provided in the Electric Eye unit itself.

`DOOR NUDGING` **Door Nudging** – Enable this feature to allow the door to close at reduced nudging speed while the nudging buzzer is active and the doors are closing. The nudging buzzer initiates if a call is registered and the doors have been prevented from closing for the preset Door Nudging time.

> **NOTE: Door Nudging operation requires an optional Nudging Buzzer output and Reduced Speed Door Closing output.**

`1 STROKE DN LANT` **One Stroke Down Lanterns** – The lanterns are normally provided with two strokes for the down direction. Enable this feature to provide only one stroke for the down direction.

`SLOW SPD ON INSP` **Slow Speed on Inspection** – Enable this feature to run slow speed on Inspection. This is normally required if the car speed is 125fpm or above.

`ENABLE I.C.U.` **Proximity Detector** – Enable this feature if a Proximity Detector (such as an Infrared curtain) is used. Enabling this feature disables the Safety Edge input (TB:27S) on Fire Service. It also initiates the Door Nudging feature while the doors are closing on Fire Service. The Proximity Detector may be connected to the Safety Edge Input or the Electric Eye Input, as desired. (The Electric Eye Input (TB:27E) is subject to the Timed Electric Eye Cutout and Nudging timer, whereas the Safety Edge Input is not.)

`ENABLE SHORT FLR` **Enable Short Floor Positioning** – The Short Floor selection applies to installations where the floor height is less than twice the slowdown distance, which requires special programming when transitioning between floors. If using the ELGO Absolute Positioning System, the slowdowns are computed like floor switches, and any overlapping leveling targets are automatically cut out based on which landing the car intends to stop at. (Check for specific instructions for the job if any)

`NO FIRE SERVICE` **Disable Fire Service** – Turn this feature on to disable Fire Service. This feature should be turned on if Fire Service is not provided. It may also be turned on during initial installation, if the Smoke Sensors or Fire Switches have not yet been installed.

`2000+ FIRE CODE` **Enable 2000+ ANSI Fire Code** – Turn this feature on to enable 2000 or later National Fire Code. When turned off, the default code is 1998 Fire Code.

`2005+ FIRE CODE` **Enable 2005+ ANSI Fire Code** – Turn this feature on to enable 2005 or later National Fire Code. You must also turn on the 2000+ Fire Code feature.

`2007+ FIRE CODE` **Enable 2007+ ANSI Fire Code** – Turn this feature on to enable 2007 or later National Fire Code. You must also turn on the 2000+ and 2005+ Fire Code features.

`2016+ FIRE CODE` **Enable 2016+ ANSI Fire Code** – Turn this feature on to enable 2016 or later National Fire Code. You must also turn on the 2000+, 2005+, and 2007+ Fire Code features.

`NYC FIRE CODE` **Enable New York Fire Code** – Turn this feature on to enable New York 2001 Fire Code.

`CHICAGO 01 FIRE` **Enable 2001 Chicago Fire Code** – Turn this feature on to enable 2001 Chicago Fire Code.

`DETROIT FIRECODE` **Enable Detroit, MI Fire Code** – Turn this feature on to enable Detroit Fire Code. This disables Fire Operation (phase 2) when a Machine Room Smoke Sensor initiates fire service.

`REMOTE FIRE SW` **Enable Building Remote Fire Switch for 2000 Fire Code** – Turn this feature on to enable the Remote Fire Switch on 2000 Fire Code. The input for this feature must be assigned for this feature to work properly.

`USE MN SMK 82FM` **Enable Flashing Hat Fire Sensor Recall To Alternate** – Turn on this parameter to enable the 82FM input, which is a designated fire sensor input which will initiate the flashing fire hat and recall to the alternate. Use this input for Machine Room or Shaft sensors that are located at the main landing. This parameter pairs with the '**FLASHING HAT N/C**' parameter.

`FLASHING HAT N/C` **Flashing Hat Fire Sensors are N.C. (Normally Closed)** – Turn on this feature to set all Machine Room & Shaft fire sensor inputs which initiate the flashing fire hat (82F & 82FM) to be read as a Normally Closed (N.C.) input. The legacy 82F input is N.O. while the newer fire service interface design requires all fire sensors to be N.C. This parameter pairs with the '**USE MN SMK 82FM**' parameter.

`KILL IDS IMMED` **Kill Independent immediately on Fire Service** – Turn this feature on to allow Fire Service to override Independent Service immediately.

`NO TIME KILL IDS` **No Timed Kill of Independent on Fire Service** – Turn this feature on to prevent Fire Service from overriding Independent Service while the doors are open. Independent Service must be turned off or the doors closed by the operator to allow the car to run on Fire Service.

`NEVER KILL IDS` **Never kill Independent on Fire Service** – Turn this feature on to prevent Fire Service from overriding Independent Service. Independent Service must be turned off to allow the car to run on Fire Service.

`FIRE MAIN = REAR` **Main Fire Landing at Rear Opening** – Turn this feature on to use the rear opening at the designated main fire landing, instead of the front opening. If there is only one opening at the designated main fire landing, then this feature has no effect.

`FIRE ALT = REAR` **Alternate Fire Landing at Rear Opening** – Turn this feature on to use the rear opening at the alternate fire landing, instead of the front opening. If there is only one opening at the alternate fire landing, then this feature has no effect.

`NO SHUNT ON FS2` **Disable Shunt Trip on Fire Service Phase 2** – Turn this feature on to disable Shunt Trip operation when the car is on Fire Service Phase 2.

`SHUNT ON INSPECT` **Enable Shunt Trip on Inspection** – Turn this feature on to enable Shunt Trip operation when the car is on Inspection.

`NO FS2-RET LATCH` **Disable Fire Service Return Latch on 2000 Fire Code** – Turn this feature on to disable the holding circuit on Fire Service Phase 2 Return on 2000 (or later) Code. This allows the Return mode to be cancelled by turning the Fire Switch to the "On" position. Check the appropriate code to see if this is required or allowed.

`4 WIRE CALLS` **Enable Separate Call I/O (4 Wire Calls)** – Turn this feature on to enable separate wiring for the inputs and outputs for both car and hall calls. If this feature is disabled, then the car and hall call inputs are connected to the corresponding outputs.

`4 WIRE CAR CALLS` **Enable Separate Car Call I/O (4 Wire Calls)** – Turn this feature on to enable separate wiring for the inputs and outputs for car calls. If this feature is disabled, then the car call inputs are connected to the corresponding outputs.

`4 WIRE HALLCALLS` **Enable Separate Hall Call I/O (4 Wire Calls)** – Turn this feature on to enable separate wiring for the inputs and outputs for hall calls. If this feature is disabled, then the hall call inputs are connected to the corresponding outputs.

`DOOR CHECK FAULT` **Enable Door Check Feature** – Turn this feature on to enable the Door Check feature. This allows the status of the Car Door and the Hall Doors to be checked according to the appropriate codes.

`HALL LANT = CAR` **Use Car Lantern outputs for Hall Lanterns** – Turn this feature on to use the Car Lantern outputs as Hall Lanterns. If there are only two landings, then the Hall Lanterns can be connected directly to the Car Lantern outputs. If there are more than two landings, then additional external relays are needed to enable the appropriate lantern at each floor.

`NO BORIS & FIRE` **Do Not Run On Fire Service and BORIS** – Turn this feature on to prevent the car from running if Fire Service is enabled while on battery backup operation.

`NO SHUTDN & FIRE` **Do Not Run on Fire Service and Shutdown** – Turn this feature on to prevent the car from running if Fire Service is enabled while on shutdown. If this feature is not enabled, the car is allowed to run down on Fire Service and shutdown.

`SHUTDN AT MAINFL` **Allow Stop at Upper Floor on Shutdown** – Turn this feature on to allow the car to stop at an upper floor on shutdown if it is the main floor. Check with the appropriate codes to see if this is allowed or required.

`CKO ON INDEPEND` **Enable Car Call Cutout Override on Independent** – Turn this feature on to energize the CKO Car Call Cutout Override output on Independent Service. This allows car calls to be registered without the use of access keys.

`DIR IND ON ATTEN` **Direction Indicators show actual direction on Attendant** – Turn this feature on to make the Attendant Direction Indicators show the direction that the car will run next. If this feature is not enabled, they show whether there are calls registered in either direction. For example, with this feature off and the car at an intermediate floor with calls above and below the car, then both Attendant Direction Indicators would be on, since there are calls above and below the car. If the feature was enabled, then the indicators would be the same as the normal Direction Indicators, and only one indicator would be on, depending on which direction had actually been selected.

`ME BUZZ ON INDEP` **Medical Emergency Buzzer on Independent only** – Turn this feature on to change the operation of the Medical Emergency Buzzer output. With the feature disabled (factory default), the buzzer sounds when the car is returning to the Medical Emergency floor in response to the hall Medical Emergency Switch. If the feature is enabled, the buzzer sounds if the car is on Independent Service and a hall Medical Emergency Switch is turned on. This alerts the operator to release the car.

`ALLOW DOB – FRNT` **Always Enable Door Open Button at Front Openings** – Turn this feature on to allow the Front Door Open Button to always open the doors at selective/walkthrough openings (where there is a front and rear opening at the same landing). With this feature disabled, the doors must have been opened, or still be open, for the Door Open Button to operate. This allows a measure of security at these landings. The Door Open Button(s) is always enabled while on Fire Operation (Phase 2) or Medical Emergency operation.

`ALLOW DOB – REAR` **Always Enable Door Open Button at Rear Openings** – Turn this feature on to allow the Rear Door Open Button to always open the doors at selective/walkthrough openings (where there is a front and rear opening at the same landing). With this feature disabled, the doors must have been opened, or still

be open, for the Door Open Button to operate. This allows a measure of security at these landings. The Door Open Button(s) is always enabled while on Fire Operation (Phase 2) or Medical Emergency operation.

`FLOOD TO 3RD LDG` **Flood Return Landing is 3 (not 2)** – Turn this feature on to make the car return to the third landing from the bottom if Flood Service is initiated. The default floor is the second floor from the bottom.

`FLOOD TO TOP LDG` **Flood Return Landing is Top Landing (not 2)** – Turn this feature on to make the car return to the top landing if Flood Service is initiated. The default floor is the second floor from the bottom.

`FLOOD OVER INDEP` **Flood overrides Independent, Attendant & Medical Emergency** – Turn this feature on to allow Flood Service to override Independent Service, Attendant Operation and Medical Emergency Operation. If this feature is not enabled, the car remains under the control of the operator if the Flood Service input is energized.

`FLOOD OVER SHTDN` **Flood overrides Shutdown (Low Oil, Reverse Phase Monitor etc.)** – Turn this feature on to allow Flood Service to override shutdown functions that would normally return the car to the bottom landing. In this case, the car still is not able to run up, but Flood Service remains in effect even though a shutdown feature is in effect.

`BORIS OVER FLOOD` **Do Not Run on Flood and BORIS** – Turn this feature on to prevent the car from running if Flood Service and BORIS Battery Backup operation are initiated at the same time.

`FLD NOT BLO MAIN` **Do Not Run Down Below Main on Flood and Shutdown** – Turn this feature on to prevent the car from running if it is at or below the Main Floor and the car is on Flood Service and Shutdown Operation.

`FIRE OVER FLOOD` **Fire Service Overrides Flood Operation** – Turn this feature on to allow Fire Service to override Flood Service. The car returns to the designated Main Fire Floor, even if that is the bottom landing.

`FLOOD OVER FIRE` **Flood Operation Overrides Hall Fire Service** – Turn this feature on to allow Flood Service to override Fire Service and cause the car to leave the bottom landing, even if that is the designated Fire landing. If this feature is not set, then whichever feature (Fire Service or Flood Service) is initiated first takes precedence.

`USE SHUNT TRIP` **Enable Shunt Trip Delay Feature** – Turn on to enable the delayed Shunt Trip feature. If the Shunt input is energized, the car cancels all existing calls, stops normally at the nearest landing, and then shuts down once the doors are opened.

`USE LOW OIL SW` **Enable Low Oil Switch Feature** – Turn on to enable the Low Oil Switch feature, which connects to input TB:LOS. This feature can be turned off to disable the Low Oil Switch if it was supplied, but is not required.

`INVERT LOWOIL SW` **Invert Low Oil Switch Input** – Turn on to invert the Low Oil Switch input (TB:LOS) to be N.C. such that Low Oil operation will activate if the input goes low. The default is OFF for a N.O. low oil switch.

`USE BORIS INPUT` **Enable Battery Lowering Feature** – Turn on to enable the Battery Lowering (BORIS) feature. The MR-SIB input (M24) must be assigned for this feature to work properly.

`NO CLOSE ON INSP` **Disable Door Close on Inspection** – Turn on to prevent the Door Close output from energizing if the doors are already open while on Inspection. This requires the doors to be closed manually. If this feature is left disabled, the Door Close output energizes when the operator attempts to run the car on Inspection. If the doors are already closed, then the Door Close Output is energized while the car is running on Inspection.

`ALLOW FDL ON EF2` **Enable False Down Leveling on Car Fire Service** – Turn on to allow the car to False Down Level when it stops between floors, on Fire Service Phase 2. False Down Level is used to return a car to a landing if it stops outside the door zone. The default is to disable False Down Leveling on Fire Service Phase

2, so that the car only runs when a car call is registered. If this feature is not enabled and the car is on Fire Service Phase 2 and the Stop Switch has been opened then closed, then a car call button must be pressed to initiate False Down Level.

`PARK OPEN ALWAYS` **Enable Park with Doors Open (all landings)** – Turn on to make the car park with the doors open at all landings.

`PARK OPEN - MAIN` **Enable Park with Doors Open (Main landing)** – Turn on to make the car park with the doors open at the main landing only.

`MECar OVER FIRE` **Medical Emergency Car Operation overrides Fire Service** – Turn on to override fire service while the car is in Medical Emergency Car Operation.

`ENABLE EMT` **Enable EMT Operation** – Turn on to enable EMT service.

`EMT CALL CANCEL` **Enable Call Cancel while on EMT Operation** – Turn on to cancel car calls while on EMT in-car operation and the car EMT switch is turned to the off position. If this feature is not enabled, the EMT key can be turned off before arriving at the destination floor, in preparation for exiting the elevator. If this feature is enabled, turning the key off cancels existing car calls, and the car stops at the next floor.

`SECURE PASSWORD` **Secure Password** – Enable this feature to use a job-specific password for changing settings, floor openings, or resetting settings and counters. If this feature is disabled, the default password for all menus is "911". Contact Virginia Controls Technical Support for access to this unique password.

`BOT ACC AT REAR` **Bottom Access is at Rear Door** – Turn on to set the Bottom Access Door to use the rear door; otherwise, a front door is assumed. This setting is used by the door-checking feature.

`TOP ACC AT REAR` **Top Access is at Rear Door** – Turn on to set the Top Access Door to use the rear door; otherwise, a front door is assumed. This setting is used by the door-checking feature.

`BINARY FLR RESET` **Enable Binary Floor Resets** – Turn on to enable the Absolute Floor Encoding feature of a pulsing selector (e.g.: IP8700) which updates the current floor position based on the floor reset signals active while stopped in door zone. If 3 landings are used, then UHS resets to landing 3, DHS resets to landing 1, and neither UHS/DHS resets to landing 2. For 4+ landings, the 1FP, 2FP, 4FP, and 8FP reset targets are arranged such that each floor contains the corresponding binary count of signals.

`ANTI-NUISANCE` **Cancel Car Calls if No Electric Eye/Safe Edge** – Turn on to enable the Anti-Nuisance feature, where all car calls are canceled after several consecutive runs where the electric eye input is not tripped, implying that no passengers are entering or leaving the elevator. The number of calls is adjustable using the '**ANTI-NUIS STOPS**' setting.

`CANCEL CC ON REV` **Cancel Car Calls on Direction Reversal** – Turn on to cause all car calls to be cancelled when the car changes direction. This provides a degree of Anti-Nuisance for extra calls that were entered likely out of sequence.

`DOORS HOLD LIGHT` **Hold Car Light on with Doors Open** – Turn this feature off to allow the car light to turn off after inactivity while the doors are being held open. If this feature is on, the car light stays on while the doors are open.

`AUTO JACK RESYNC` **Enable Auto Jack Resynch Operation** – Turn this feature on to enable the Auto Jack Resynchronization operation. This feature causes the car to recall to the bottom terminal landing, to bypass the down normal and bottom final (if applicable), to move down at slow speed for a preset amount of time, and to be commanded to move up at slow speed until it reaches floor level. The '**JACK RESYNC DAYS**' timer determines the interval of days between each automatic Jack Re-synchronization event.

`JK RES AFTER INS` **Do Jack Resynchronization When Inspection Switch Is Cycled** – Enable this feature to initiate the automatic Jack Resynchronization whenever the Inspection Switch is turned from Inspection to Normal. This feature is only used with the Jack Resynchronization feature.

`JK RES NO PRS SW` **Disable Negative Pressure Switch on Jack Re-synch** – This feature allows the Jack Resynch operation to occur, even if the negative pressure switch input is not active. The negative pressure switch input is bypassed internally until the Jack Resync sequence completes.

`JK RES TMR=10min` **Jack Resync Timer unit: 1 = 10 minutes, 0 = 1 day** – This feature allows the Jack Resync Day timer to be shortened to be in units of 10 minute increments. Use this selection if requiring a Jack Resync feature to occur more frequently than 24 hours.

`DISABLE NEGPRESS` **Disable Negative Pressure Switch** – Turn this feature on to not use the negative pressure switch input.

`DOWN RUN SHUTDN` **Enable Down Run Shutdown Timer** – Use this feature to enable the down run shutdown timer.

`WYE-DELTA START` **Check Wye-Delta Starter Run Input** – Enable this feature when using a Wye-Delta or Across-the-Line starter to check the starter contactor run monitoring input at the end of each run. If the run input does not turn on within 3 seconds of the PMP output turning off, a fault and shutdown are latched. Disable this feature if using a soft starter, where the run input is not used.

`ELGO APS ENABLE` **Enable ELGO Absolute Positioning System** – Enable this feature when using an ELGO Absolute Positioning System (APS). This setting may be used to temporarily disable the use of an ELGO APS during installation, at which point jumpers must be used to enable the Normal Limit inputs (M25 & M28).

`INCAR INSP 1C&2C` **Use Car Call Buttons 1C & 2C for In-Car Inspection** – Enable to use the 1C and 2C car call inputs to run down and up respectively for In-Car Inspection. Otherwise, use the 24X and 25X terminals (CT-SIB inputs T14 and T15).

`DOVER TKE VALVES` **Dover/Thyssenkrupp I2 Valves** – This feature changes the valve relay sequencing to accommodate Dover/Thyssenkrupp I2 valves, which require the up slow valve to be de-energized while the up fast valve is energized. The default is for the up slow valve to be energized while running both up fast and up slow speed.

`DHOB FULLY OPEN` **Door Hold Open Button/Switch while door is fully open** – Enable this feature to require the door to be fully open before latching the door hold open signal. This feature is OFF by default, which will cause the door to re-open in addition to holding the door open for the preset time.

`DRHOLD BTN BLINK` **Door Hold Open Button Indicator Blink** – Enable this feature to blink the Door Hold Open Button Indicator. The indicator will remain lit (or blink) while the door hold timer is active.

`SNG BTN COLLECT` **Single Button Collective Operation** – Enable this feature to use Single Button Collective Operation. Make sure that Selective Operation setting '**SELCT COLLECTIVE**' is OFF. If both '**SNG BTN COLLECT**' and '**SELCT COLLECTIVE**' features are turned OFF, then Single Automatic Pushbutton Operation is enabled.

`SELCT COLLECTIVE` **Selective Collective Operation** – Enable this feature to use Selective Collective Operation. Make sure that Single Button Collective Operation setting '**SNG BTN COLLECT**' is OFF. If both '**SNG BTN COLLECT**' and '**SELCT COLLECTIVE**' features are turned OFF, then Single Automatic Pushbutton Operation is enabled.

`SLACKROP NO FIRE` **Slack Rope Bypass Shutdown on Fire** – Enable this feature to force the car to stop at the nearest floor while the controller is in fire service. If this setting is disabled, then the slack rope shutdown will be delayed while on fire service until the car stops at its next destination that may be more than one floor away.

`DISABLE SLOWDOWN` **Disable Floor-to-Floor Positioning & Slowdowns** – Turn on this parameter to temporarily bypass slowdown and stopping to test the NTS system (set DISABLE SLDN LMT = ON) or perform a buffer test (set DISABLE SLDN LMT = OFF). This will temporarily allow the car to run Fast Speed indefinitely one time on inspection or automatic. The parameter will automatically revert to OFF after the next fast speed run. It may also time out based on the Run Shutdown timer.

`DISABLE SLDN LMT` **Disable NTS (Terminal Slowdown Limits)** – Turn on this parameter to arm a buffer test by temporarily bypassing the NTS terminal slowdown limits for the next run. To perform a buffer test, also set DISABLE SLOWDOWN = ON to allow the car to run indefinitely for the next run. Otherwise if DISABLE SLOWDOWN = OFF, the car will stop normally. The parameter will automatically revert to OFF after the next fast speed run. It may also time out based on the Run Shutdown timer.

`EMERGENCY POWER` **Enable Emergency Power** – Turn on this parameter to enable emergency power generator operation, which includes auto-return and auto/manual-select and the pre-transfer (EPT) input. If turned off, the controller will continue to run normally independent of the generator signals.

> **NOTE: To allow multiple cars to run independently while on emergency power, turn on "EMPWR SIMPLEX MODE" (see Section 7.1.2.2).**

`SLOWDOWN LMT FLT` **Enable Slowdown Limit Fault Checking (IP8300 only)** – Enable this feature to monitor the state of the NTS terminal slowdown limit switch(es) at each landing. Each terminal limit switch input should be OFF at its corresponding terminal landing, and should be ON while at any other landing. This does not apply for an ELGO APS equipped system, which is standard for Vision 2.0.

`CONSTRUCTION MOD` **Construction Mode** – Turn on this feature to enable construction mode. Construction mode allows the car to run while there are no connections or communication to the car top via traveling cable. All other modes of inspection and normal operation will be disabled while construction mode is active. See Section 0 for further details.

`CE CAN PI Enable` **Enable CEPI CANbus PI Driver Interface (for C.E.E. MICRO COMM devices)** – Enable this feature to use the VCI-001 CANbus PI Driver hardware interface. Enabled by the factory when the hardware is provided.

`CE SERIAL PI En` **Enable Serial PI Driver Interface (for C.E.E. MICRO COMM devices)** – Enable this feature to use the VC Serial PI Driver plug-in module hardware interface. Enabled by the factory when the hardware is provided.

`PI MESSAGE LABEL` **Enable CEPI Message Labels (for C.E.E. MICRO COMM devices)** – Enable this feature to display the flashing alternating messages on inspection or fire service. See sheet "VNP" for a description of all available messages. This feature also enables Voice Annunciator messages. Requires a Vision-compatible VCI-001 or serial PI driver board.

`SWING/HDN RISER` **Swing/Hidden/Inconspicuous Riser** – Enable this feature to designate this controller as a swing car, which will remove itself from group operation and run using a designated hall riser. This mode will activate using a designated input in the swing car.

`CARSAFETY SW BYP` **Car Safety Switch Bypass** – Turn on this feature to allow the car to run on inspection while the roped hydraulic car safeties input (TB:3A, CT-SIB input:T01) is low. The feature may only be enabled if the TB:3A input is low, and will revert to OFF once power is restored to the TB:3A input.

`DPM FAULT CHECK` **Door Position Monitoring (DPM) Fault Check** – Turn on this feature to enable Door Position Monitoring (DPM) redundancy checking. DPM checking involves comparing the DPM input to the state of the car gate input(s) (TBs:4/4R & MR-SIB M05/M06) and the door close limit (DCL) while the door is fully open or fully closed. If faulted, the door will attempt to re-open and close until the DPM input is able to match the state of DCL. DPM is not a standard feature, but is available upon request.

`INVERT DPM N/C` **Invert Door Position Monitoring (DPM) Input** – Turn on this feature to invert the DPM input to be read as a Normally Closed contact, to match the door close limit. By default, the DPM input is read as Normally Open contact, to match the car gate input. '**DPM FAULT CHECK**' must be enabled.

`DPM NONSELECTIVE` **Door Position Monitoring, Non-Selective Mode –** Turn on this feature to use a single DPM input for both front & rear doors, where the front & rear DPM contacts are wired in parallel if N.C. or in series if N.O. The DPM input must indicate that both car gate doors are closed in order to run. '**DPM FAULT CHECK**' must be enabled.

`MCKO SECURTY=OFF` **Master Car Call Security Override Switch Mode** – Turn on this feature to cause the master car security switch (if equipped) to disable security and override the card reader or car call lockout switches, allowing all car calls to register. Turn off this feature to cause the master car security switch to disable all car calls from registering. Typical default is ON.

`INVERT CKO INPTS` **Invert Car Call Cutout Switch/Card Reader Inputs** – Turn on this feature to configure the secure car call lockout (CKO) inputs to be active low. In other words, a car call is enabled if the CKO input is high and a car call is disabled if the CKO input is low. The default (OFF) is for car calls to be enabled if the CKO input is low and car calls to be disabled if the CKO input is high.

`FS2 INCARSTP BYP` **Bypass In-Car Stop Switch to allow Door Operation while on Fire Operation (phase 2)** – By default, tripping the in-car stop switch disables the door close output, causing the door close button to be inoperable. Turn this feature on to allow the door open and close buttons to function while on Fire Operation (phase 2) while the in-car stop switch is tripped. Use the parameter based on interpretation of the ASME A17.1 2.27.3.3.1.d.

`FS2 FIRESTOP BYP` **Bypass Fire Stop Switch to allow Door Operation while on Fire Operation (phase 2)** – By default, tripping the fire stop switch fully disables door operation (open & close), causing the door open and close buttons to be inoperable. Turn this feature on to allow the door open and close buttons to function while on Fire Operation (phase 2) while the fire stop switch is tripped. Use the parameter based on interpretation of the ASME A17.1 2.27.3.3.1.d.

`SF PH2 INCAR BYP` **Fully Bypass In-car Stop Switch while on Fire Phase 1 & Phase 2** – Turn this feature on to fully bypass the in-car stop switch when Fire Phase 1 is initiated, including Phase 2, until Fire Service is reset. Use the parameter based on interpretation of ASME A17.1 2.27.3.

`COMMANDEERING SW` **Enable Commandeering** (Factory Configured Setting) – Turn on this feature to configure the commandeering switch inputs and enable the commandeering fault code.

`HOLD DOOR OPEN` **Hold Door Open Output** – Turn on this feature to hold the door open output while the door is fully open, which is required for certain door operator types. The default (OFF) behavior is to turn off the door open output when the door open limit is tripped.

`HOLD DOOR CLOSE` **Hold Door Close Output** – Turn on this feature to hold the door close output while the door is fully closed, which is required for certain door operator types. The default (OFF) behavior is to turn off the door close output when the door close limit is tripped. The door close output will always turn on while the car is running regardless of this feature.

`HOLD DR OVERLAP` **Hold Door Overlap** – Turn on this feature to cause an overlap of door close and open outputs during a door reversal, which is required for certain door operator types. The default (OFF) behavior is to prevent the door close and open outputs to turn on at the same time, and both outputs must be off for a brief adjustable time '**DR REVERSE DELAY**' during a transition from open to close and vice versa.

`INVERT NUDGING` **Invert Door Nudging Output** – Turn on this feature to invert the door nudging speed output, such that the door closes at normal speed while the nudging output is on, and the door closes at reduced nudging speed while the nudging output is off. This is required for certain door operator types.

`BORIS MAIN LDG` **Battery Lowering Stops at Main Landing** – Turn on this feature to lower the car to the main landing during a battery lowering event and shut down. If the car is already below the main landing, the car will lower to the bottom terminal landing and shut down. The default (OFF) behavior is for the car to always lower to the bottom terminal landing during a battery lowering event.

`BORIS NEARST LDG` **Battery Lowering Stops at Nearest Landing** – Turn on this feature to lower the car to the nearest landing during a battery lowering event and shut down. The car will shut down and not run if the car is already at a landing. The default (OFF) behavior is for the car to always lower to the bottom terminal landing during a battery lowering event.

`FLASH BORIS LITE` **Flash Battery Lowering Light** – Turn on this feature to cause the battery lowering light to flash during a battery lowering event.

`1" ANTI-CREEP` **Extend Anticreep to 1"** – Turn on this feature to extend the range of an anticreep releveling event to 1" below floor level, as allowed by ASME A17.1 code 3.26.3.1. The default (OFF) behavior will cause the car to always relevel at the bottom edge of dead zone to always maintain the car at floor level. This feature only applies while the car is idle with doors closed, but will have the effect of reducing the frequency of anti-creep relevel events. If the car is outside of the dead zone, the car will first relevel to floor level before opening the door to prevent a tripping hazard.

`REMOTE CCALL Ph2` **Enable Remote Call on Fire Phase 2** – Enable this feature to allow remote car calls to be registered while on Fire Phase 2. This selection is not recommended as it may take control of the elevator away from fire personnel while in use.

`USE PARKING SW` **Enable Parking Switch Feature** – Enable this feature to use a parking switch input to enable homing operation. Turn off this feature to always enable homing using the standard homing timers.

7.1.2.1 Manual/Power Freight Door Settings

`NONPASSENGR DR F` **Front Door is Non-Passenger Type** – Enable this feature if the <u>front</u> door type is non-passenger, such as manual or power freight doors. This removes the automatic operation of the door operator signals, and adjusts the controller logic to meet code. This parameter is configured by the factory.

`NONPASSENGR DR R` **Rear Door is Non-Passenger Type** – Enable this feature if the <u>rear</u> door type is non-passenger, such as manual or power freight doors. This removes the automatic operation of the door operator signals, and adjusts the controller logic to meet code. This parameter is configured by the factory.

`OPEN MAIN DR Ph1` **Hold Doors Open On Fire 1** – Enable this feature to hold doors open during Fire Recall phase 1. This feature is normally off to allow the doors to be closed manually at the Fire Return landing (Main or Alternate) during Fire Recall phase 1.

`HOLD MAIN DR Ph2` **Enable Fire 2 Hold At Main On Fire 1** – Enable this feature to enable Fire Operation phase 2 Hold at the fire return (main or alternate landing) during Fire Recall phase 1. This holds the doors open at the fire return landing during Fire Recall phase 1, since the door open / close buttons would be disabled.

`AUTO CLOSE CCALL` **Enable Door Auto Close From Car Calls** – Enable this feature to enable a door auto close signal when a car call is registered.

`ENABLE AUTOCLOSE` **Enable Door Auto Close with Manual Doors** – Enable this feature to enable a door auto close signal. This feature must be enabled to allow the '**AUTO CLOSE CCALL**' and '**AUTO CLOSE HCALL**' features to work.

`AUTO CLOSE HCALL` **Enable Door Auto Close From Hall Calls** – Enable this feature to enable a door auto-close signal when a hall call is registered.

`AUTO CLOSE TIMED` **Enable Door Auto Close After Timeout** – Enable this feature to enable a door auto-close signal after an adjustable timeout '**AUTO CLOSE TIMER**' in seconds.

`AUTO CLOSE DELAY` **Door Auto Close Delay Time (x1 sec)** – When the setting '**AUTO CLOSE TIMER**' is enabled, this is the amount of time before a door auto-close signal will be initiated.

`SHTDN MAIN DRCLS` **Allow Door Close At Main On Fire & Shutdown** – Enable this feature to allow a door close signal at the fire return landing (main or alternate) while on fire and shutdown.

`LANTERNS AT STOP` **Enable Car Lantern After Stop** – Enable this feature to enable the car lantern outputs after a stop, even if the door does not open. This feature mostly applies when using manual doors.

`COURION Ph2 REOP` **Enable Courion Door Reopen On Fire 2** – Enable this feature to enable Courion-type power freight doors to reopen while on Fire Operation phase 2.

`MANUAL DR 2007+` **Fire Operation change allowed after doors close** – Enable this feature to enable 2007+ code operation with manual doors. This feature allows change in fire operation mode with doors closed if they were opened once at the fire return landing (main or alternate).

7.1.2.2 Group/Dispatching Settings

`EP AUTO SELECT` **Emergency Power Auto/Manual Select** – When using Emergency Power, this setting determines whether the Emergency Power Select switch is used as a manual select or auto select switch. If Auto Select is enabled and no car is selected, the dispatcher automatically selects one car to run on automatic operation. Otherwise, if no car is selected, no cars are allowed to run on automatic operation.

`FLASH HALL FIRE` **Enable Flashing Hall Fire Light** – Enable to make the Hall Fire Light flash if the Machine Room Smoke Sensor has tripped. By default the car Fire Light flashes, but not the hall Fire Light.

`NO FS PH2 LIGHT` **No Hall Fire Light if in Group and Fire Operation (Phase 2)** – Enabling this setting causes the Hall Fire Light to go out if there is a car in Fire Operation (phase 2) while the other cars are returned to Normal Operation using the Fire Reset switch. This setting only applies for a multi-car group.

`INVERT SMOKE SWS` **Fire Sensors are Normally Open Inputs** – Turn this feature on if the Smoke Sensor inputs are normally open on normal operation and closed when a fire is detected. The default is to use Smoke Sensors that are closed on normal operation and open when a fire is detected.

`ENABLE CODE BLUE` **Enable Medical Emergency Hospital Operation (CODE BLUE)** – Turn on to enable Medical Emergency Hall and Car operation.

`EMPWR SIMPLEX` **Emergency Power Simplex Mode** – Enable this feature to allow this car to run on emergency power independent of other connected controllers. This would apply if the building generator capacity is large enough to run multiple cars simultaneously while on emergency power, or if this controller has its own designated generator circuit independent from the other controllers.

`HALLCALL SIMPLEX` **Hall Call Simplex Mode** (Factory Configured Setting) – Enable this feature to allow simplex controllers to be connected over Ethernet, while having separate hall risers. This applies when multiple simplex controllers all share the same generator and need to communicate during emergency power recall and run sequencing.

`DISABLE UDP BCST` **Disable Dispatching Communication via UDP Protocol** - Enable this feature to disable controller broadcast communication of Vision 2.0 dispatching data. Use this feature when connected for remote monitoring, and the connected IT network is incompatible with the standard Vision 2.0 dispatching UDP protocol.

7.1.2.3 Homing/Dispatching Settings

`HOMING DELAY` **Homing Delay Time** (in seconds) – This is the delay before homing a car to the home landing, after it has answered all calls, and is sitting with its doors closed. The default setting is 60 seconds.

`HC TRANSFER TIME` **Dispatching Hall Call Transfer Reassignment Time** (in seconds) – This value determines how hall calls are reassigned in a multi-car group. Normally when a hall call is entered, the car that can service the call fastest is assigned to the call. But after assignment, a different car may be able to service the call sooner should it be reassigned. To stabilize the system, however, calls are reassigned only when the time saved equals or exceeds this value.

`HOME IF ANY FREE` **Home if any Car is Idle/Free** (Group Homing Mode 3 or 4 only) – Enable this feature to start the homing delay timer if any car is idle or at rest. If not enabled, the homing timer starts after all cars are at rest. Enabling this feature improves homing responsiveness, while disabling allows homing to occur only after there is no more demand.

`LOBBY STARTS TMR` **No Car at Lobby Starts Homing Timer** (Group Homing Mode 3 or 4 only) – Enable this feature to start the homing delay timer as soon as the primary homing landing is unoccupied and does not currently have a car homed to it. Use this setting to allow homing to be initiated sooner if there is no car at the primary homing landing.

`SIMULTANEOUS HOM` **Simultaneously Home to Primary and Alternate Landing** (Group Homing Mode 3 or 4 only) – Enable this feature to allow multiple cars to home simultaneously to the Primary and Alternate Homing landings after the homing timer elapses. Disable this feature to allow only one car to home at a time. The car first homes to the Primary homing landing, then, after another homing delay time, to the Alternate homing landing. Disable this feature to reduce homing activity while there is no demand.

`HCALLS GOTO FREE` **Hall Calls Go to Free Car** (Group Homing Mode 3 or 4 only) – Enable this feature to prioritize hall calls to be answered by the free car if this car is homed. If there are too many calls for the free car to answer in a timely fashion, then calls are still transferred to the homed car. Disable this feature to allow a homed car to respond to nearby hall calls equally with the free car.

`ALT HOMES TO PRI` **Car at Alternate Homes to Primary** (Group Homing Mode 3 or 4 only) – Enable this feature to allow a car currently homed to the Alternate homing landing to home to the primary homing landing if no other car is free.

7.2 Software Updates via USB

7.2.1 Overview

7.2.1.1 File Types

The controller software is installed and updated on the controller CPU with two files:

Application file (.hex)

- Includes the full elevator program, dispatcher, user interface, and system initialization data.
- Defines the "REV" of the controller program, as seen on the banner screen.
- Typically not controller specific.
- Update to add/edit controller features, operation, bug fixes, etc.

Configuration file (.cfg)

- Sets the job specific configurations for the I/O board inputs and outputs.
- Sets the factory presets for all settings, timers, number of landings, and door openings at each landing.
- Defines the "Config" version as seen on the banner screen.
- Typically controller specific.
- Update to change I/O locations, doors/landings, and factory presets for settings, timers & PI labels.

7.2.1.2 File Naming Conventions

File names are defined by the VC factory, and follow these general naming convention rules:

Example Filename using Job # Format:

"M" indicates Main CPU → M 12345 A 3 . cfg ← File Type
VC Serial/Job Number ↗ ↑ ↖ Controller-specific Revision #
Car designation in group (A,B,C...)
Blank if Simplex or all grouped cars have same I/O.

Example Filename using Acronym Format:

"H" = Hydraulic → H CL 9 Z . hex ← File Type
Control Logic Version ↗ ↑ ↖ "Z" = Standard, "C" = Custom
Configuration Format Version

> **NOTE: Specific instructions for each controller will be provided by the factory to specify the file names for each software update file to be loaded.**

7.2.1.3 Pre-Update Recommendations

When loading a configuration file, the existing parameters and presets will be reset to factory default, as listed on the controller parameter sheet "VNP".

Before loading the configuration file, take note of the existing parameters in the '**Setup Menu -> Edit Adjustable Settings/Features**' and '**Setup Menu -> Edit Adjustable Timers/Landings**' menu screens, and compare with the controller parameter sheet "VNP". Consider writing the existing parameters on the "VNP" sheet for future reference. After the software update, navigate to the setup menu and edit the changes as desired.

7.2.2 Steps to Update Application File

1. Copy the *.hex and *.md5 files provided by Virginia Controls onto a formatted USB flash drive. File names may vary as the application software is updated over time. The .hex file will be loaded onto the controller CPU, while the .md5 is a checksum file to verify the .hex file is not corrupt.

> **NOTE: It is recommended to remove all files on the USB drive other than those used for the Vision 2.0 software update. If other files exist on the USB flash drive, it increases the time for the CPU to read the drive contents. Consider formatting the flash drive to fully clear the flash memory if reading time is excessive.**

2. Insert the USB flash drive into the USB port of the controller CPU to be re-programmed.

3. Set controller CPU DIP switch #4 to ON. This will increase the boot loader delay time to allow the USB flash drive to be read.

> **NOTE: Not all USB flash drives are compatible with the Vision 2.0 CPU board, even while using DIP Switch #4. For best results, only use the VC-branded USB flash drive provided with the controller.**

4. Press the CPU Reset button on the CPU board, or cycle power, to cause the system to reboot and read data from the USB flash drive.

```
1 – Load Config
2 – Load Application

Enter Selection:
```

> **NOTE: The controller will skip past this load screen and boot the application if the USB flash drive is not detected.**

5. Press `2` to proceed to the '**Load Application**' file menu.

6. The screen displays all available *.hex programs on the USB drive. The system automatically detects whether any of the application *.hex file(s) on the USB drive match the currently loaded program on the CPU by displaying an asterisk (*) beside the loaded file name.

```
Application Files
 1 HBL8Z.HEX
 2 HBL9Z.HEX (*)
File # to load: 0
```

7. Select the desired *.hex file to load by pressing the corresponding number key (`1` – `9`). Use the `Nxt` and `Prv` keys to scroll up and down the list as needed.

8. Wait for the screen to complete programming of the application file. During this process, the display shows '**Erasing Flash**' and then '**Programming Flash**'.

> **WARNING: Do not cycle power, press the CPU Reset button, or remove the USB flash drive while the controller is re-programming. Wait for the system to automatically reboot in order to safely remove the USB drive.**

9. After the system programs the CPU, the screen will again display the option to load another application or configuration file. If loading another file, repeat steps 1-8. To verify the correct application file is loaded, repeat steps 2-6 and verify the asterisk (*) is displayed next to the desired filename.

10. After installing all desired file updates, remove the USB flash drive and set controller CPU DIP switch #4 to OFF.

11. Manually reboot the CPU by either cycling power or pressing the CPU Reset button.

12. To verify the application file is loaded properly, verify the "REV" version on the banner screen matches the info from VC (if provided).

7.2.3 Steps to Update Configuration File

> **NOTE: When loading a new configuration file, all settings, timers, and door openings are reset to factory defaults.**

1. Copy the *.cfg files provided by Virginia Controls onto a formatted USB flash drive. File names may vary as the application software is updated over time.

2. Insert the USB flash drive into the USB port of the controller CPU to be re-programmed.

3. Set controller CPU DIP switch #4 to ON. This will increase the boot loader delay time to allow the USB flash drive to be read.

4. Press the CPU Reset button on the CPU board, or cycle power, to cause the system to reboot and read data from the USB flash drive.

```
1 – Load Config
2 – Load Application

Enter Selection:
```

5. Press $\boxed{1}$ to proceed to the '**Load Config**' file menu.

6. The screen displays all available *.cfg programs on the USB drive. The system automatically detects whether any of the configuration *.cfg file(s) on the USB drive match the currently loaded program on the CPU by displaying an asterisk (*) beside the loaded file name.

```
Configuration Files
 1 M12345.CFG
 2 M123452.CFG (*)
File # to load: 0
```

7. Select the desired *.cfg file to load by pressing the corresponding number key ($\boxed{1}$ – $\boxed{9}$). Use the $\boxed{\text{Nxt}}$ and $\boxed{\text{Prv}}$ keys to scroll up and down the list as needed.

8. Wait for the screen to complete programming of the configuration file.

> **NOTE: The configuration file loads very quickly, and the screen will quickly return to the File Selection menu.**

9. After the system programs the CPU, the screen will again display the option to load another application or configuration file. If loading another file, repeat steps 1-8. To verify the correct application file is loaded, repeat steps 2-6 and verify the asterisk (*) is displayed next to the desired filename.

10. After installing all desired file updates, remove the USB flash drive and set controller CPU DIP switch #4 to OFF.

11. Manually reboot the CPU by either cycling power or pressing the CPU Reset button.

12. To verify the configuration file is loaded properly, verify the "CFG" version on the banner screen matches the info from VC (if provided).

8. Controller Nomenclature

8.1 Relay Nomenclature

The symbols listed below are typical symbols. Refer to the schematic for all relays and contactors actually used on a particular job. The function of the relay or contactor is shown on the schematic by its coil.

Table 31: Relay Nomenclature.

SYMBOL	DESCRIPTION
C, CR	DOOR CLOSE RELAY (IN MODSS ON TOP OF THE CAR, IF USED)
CKO, CKO1-2, …	CAR CALL CUTOUT BYPASS RELAY
FC	MOTOR FAULT CONTACTOR (SOFT-START)
FCP	SOFT STARTER FAULT PILOT RELAY
JR, JRX	JACK RESYNCH BOTTOM FINAL LIMIT BYPASS RELAY
LIT	CAR FAN AND LIGHTING POWER CUTOUT RELAY
MOL	MOTOR OVERLOAD CONTACTOR
N, NR	DOOR CLOSE NUDGING RELAY (IN MODSS ON TOP OF THE CAR, IF USED)
NP	EMERGENCY POWER BATTERY SUPPLY TO DOOR OPERATOR
O, OR	DOOR OPEN RELAY (IN MODSS ON TOP OF THE CAR, IF USED)
P, PX	POTENTIAL CONTACTOR, RELAY
PIX, PIX1-2, …	PI BLANKING RELAY
PM	STARTER (ACROSS THE LINE START)
PMP	PUMP MOTOR PILOT RELAY (110VDC)
RP	REVERSE PHASE MONITOR
RU	MOTOR RUN CONTACTOR (WYE-DELTA START)
SHT	SHUNT TRIP DELAY RELAY
STR	MOTOR START CONTACTOR (WYE-DELTA START)
TRU	WYE-DELTA MOTOR RUN RELAY (WYE-DELTA START)
UPS	UNINTERUPTABLE POWER SUPPLY (BATTERY BACKUP) SOURCE POWER
VA, VB, VC, …	VOLTAGE TRANSFER RELAY (GROUP OPERATION)

8.2 MR-SIB LEDs and Input Descriptions

The MR-SIB inputs for the controller CPU use input LEDs M01 – M42. Note that some input LEDs do not have a corresponding MR-SIB terminal. This list is also available in sheet "VNX" of the schematics.

Table 32: MR-SIB inputs and corresponding LEDs list.

Connector	Controller TB's	MR-SIB Label	Input LED	UL Cap	Function
J1-1	1Y	R1			Spare – not used
J1-2	1Y	M01	M01		GOVERNOR SWITCH
J1-3	1T	M02	M02		ROPED HYDRAULIC SAFETIES CONTACT
J1-4	1B	M03	M03		FINAL LIMIT SWS.
J1-5	2	M04	M04		PIT STOP SWITCH & ELGO TAPE SWITCH
J1-6	4	M05	M05		CAR DOOR CONTACT
J1-7	4R	M06	M06		REAR CAR DOOR CONTACT
J1-8	2	M07	M07		CONTROLLER STOP SWITCH
J1-9	20	M08	M08		DOOR ZONE
J1-10	20	DZ			DOOR ZONE (SPARE TB)
J2-1	5T	M09	M09		TOP (ACCESS) DOOR
J2-2	5	M10	M10		INTERMEDIATE FRONT HALL DOORS
J2-3	5B	M11	M11		BOTTOM (ACCESS) DOOR
J2-4	5R	M12	M12		INTERMEDIATE REAR HALL DOORS
J2-5	6T	M13	M13		TOP (ACCESS) LOCK
J2-6	6	M14	M14		INTERMEDIATE FRONT HALL LOCKS
J2-7	6B	M15	M15		BOTTOM (ACCESS) LOCK
J2-8	6R	M16	M16		INTERMEDIATE REAR LOCKS
J3-1	25T	M17	M17		TOP ACCESS "UP"
J3-2	24T	M18	M18		TOP ACCESS "DOWN"
J3-3	25B	M19	M19		BOTTOM ACCESS "UP"
J3-4	24B	M20	M20		BOTTOM ACCESS "DOWN"
J3-5		M21	M21		PHASE MONITOR
J3-6		M22	M22		STARTER UP-TO-SPEED
J3-7	P	M23	M23		OIL OVER-TEMPERATURE
J3-8	NP	M24	M24		NORMAL POWER / BATTERY LOWERING
J4-1		M25	M25		UP NORMAL LIMIT BYPASS
J4-2		M26	M26		SPARE / DOWN SLOWDOWN LIMIT
J4-3		M27	M27		SPARE / UP SLOWDOWN LIMIT
J4-4		M28	M28		DOWN NORMAL LIMIT BYPASS
J4-5		M29	M29		SPARE / MOTOR OVERLOAD INPUT
J4-6		M30	M30		SPARE / STARTING CONTACTOR "SAFE" INPUT
J4-7	4A	M31	M31		CAR SAFETY STRING #1
J4-8	4B	M32	M32		CAR SAFETY STRING #2
J4-9	23	INS	M41		CONTROLLER INSPECTION SW.
J4-10	23	NRM	M42		NORMAL OPERATION
Aux Relay Board	N/A	N/A	M33		DOOR & HALL CALL K/O INPUT
			M34		DOOR OPEN P.B. INPUT
			M35		CONTROLLER INSP. "UP" P.B.
			M36		CONTROLLER INSP. "ENABLE" P.B.
			M37		CONTROLLER INSP. "DOWN" P.B.
			M38		HALL LOCKS BYPASS SW. INPUT
			M39		HALL DOORS BYPASS SW. INPUT
			M40		CAR GATE BYPASS SW. INPUT

Connector	Controller TB's	MR-SIB Label	Input LED	UL Cap	Function
J1(*)-1	35	LMC			RUN (CPU) RELAY OUTPUT COMMON
J1(*)-2	LM1	LM1	LM1		RUN (CPU) RELAY OUTPUT #1 & INPUT MONITOR
J1(*)-3	LM2	LM2	LM2		RUN (CPU) RELAY OUTPUT #2 & INPUT MONITOR
J1(*)-4	LM3	LM3	LM3		RUN (CPU) RELAY OUTPUT #3 & INPUT MONITOR
J1(*)-5	LM4	LM4	LM4		RUN (CPU) RELAY OUTPUT #4 & INPUT MONITOR
J2(*)-1	HM1	HM1	HM1		SAFE (CPLD) RELAY OUTPUT #1 & INPUT MONITOR
J2(*)-2	HM2	HM2	HM2		SAFE (CPLD) RELAY OUTPUT #2 & INPUT MONITOR
J2(*)-3	HM3	HM3	HM3		SAFE (CPLD) RELAY OUTPUT #3 & INPUT MONITOR
J2(*)-4	HM4	HM4	HM4		SAFE (CPLD) RELAY OUTPUT #4 & INPUT MONITOR
J2(*)-5	2	HMC			SAFE (CPLD) RELAY OUTPUT COMMON
J9-1	35	35			I/O COMMON, NEUTRAL
J9-2	35	35			I/O COMMON, NEUTRAL
J9-3	M5	M5			FUSE M5 – CONTROLLER POWER SUPPLY
J9-4	1X	1X		N/A	FUSE M4 – SAFETY STRING POWER SUPPLY
J9-5	1E	1E			FUSE M3 – EMERGENCY SERVICES POWER SUPPLY
J9-6	1A	1A			FUSE M2 – HALL I/O POWER SUPPLY
J9-7	1	1			FUSE M1 – CAR I/O POWER SUPPLY
J9-8	M1	M1			FUSED INCOMING POWER SUPPLY

8.3 CT-SIB LEDs and Input Descriptions

The CT-SIB inputs for the controller CPU use input LEDs T01 – T32. This list is also available in sheet "VNX" of the schematics.

Table 33: CT-SIB inputs and corresponding LEDs list.

Connector	Controller TB's	CT-SIB Label	Input LED	UL Cap	Function
J1-1	3A	T01	T01		CAR POWER INPUT
J1-2	3E	T02	T02		EMERGENCY EXIT SW.
J1-3	3	T03	T03		CAR TOP / FIREFIGHTERS STOP SW.
J1-4	3X	T04	T04		IN CAR STOP SW.
J1-5		T05	T05		SPARE
J1-6		T06	T06		SPARE
J1-7	23	T07	T07		CAR TOP NORMAL
J1-8	20	T08	T08		DOOR ZONE
J2-1	23T	T09	T09		CAR TOP INSPECTION SW.
J2-2	25	T10	T10		CAR TOP INSP. "UP" P.B.
J2-3	23E	T11	T11		CAR TOP INSP. "ENABLE" P.B.
J2-4	24	T12	T12		IN CAR INSP "DOWN" OR SPARE
J2-5	23X	T13	T13		IN CAR INSPECTION SW.
J2-6	25X	T14	T14		IN CAR INSP "UP" OR SPARE
J2-7	24X	T15	T15		CAR TOP INSP. "DOWN" P.B.
J2-8	23A	T16	T16		INSPECTION ACCESS SWITCH
J3-1		T17	T17		SPARE
J3-2		T18	T18		SPARE
J3-3		T19	T19		SPARE
J3-4		T20	T20		SPARE
J3-5		T21	T21		SPARE
J3-6		T22	T22		SPARE
J3-7		T23	T23		SPARE
J3-8		T24	T24		SPARE

Connector	Controller TB's	CT-SIB Label	Input LED	UL Cap	Function
J4-1	7XR	T17	T25		DOOR OPEN LIMIT, REAR
J4-2	8XR	T18	T26		DOOR CLOSE LIMIT, REAR
J4-3	27ER	T19	T27		INFRARED CURTAIN UNIT / ELECTRIC EYE, REAR
J4-4	27SR	T20	T28		SAFETY EDGE, REAR (IF USED)
J4-5	7X	T21	T29		DOOR OPEN LIMIT, FRONT
J4-6	8X	T22	T30		DOOR CLOSE LIMIT, FRONT
J4-7	27E	T23	T31		INFRARED CURTAIN UNIT / ELECTRIC EYE, FRONT
J4-8	27S	T24	T32		SAFETY EDGE, FRONT (IF USED)
J5(*)-1	35	35			CT-SIB INPUTS COMMON
J5(*)-2	35	LTX			CAR TOP OUTPUTS 3-4 COMMON
J5(*)-3	35	LTC			CAR TOP OUTPUTS 5-8 COMMON
J5(*)-4	LIT / NR	LT1	LT1		CAR LIGHTING K/O RELAY / DOOR NUDGING REAR
J5(*)-5	O	LT2	LT2		DOOR OPEN FRONT
J5(*)-6	C	LT3	LT3		DOOR CLOSE FRONT
J5(*)-7	N	LT4	LT4		DOOR NUDGING FRONT
J6(*)-1	4A	HT1	HT1		CAR SAFETY STRING OUTPUT #1
J6(*)-2	4B	HT2	HT2		CAR SAFETY STRING OUTPUT #2
J6(*)-3	81L / OR	HT3	HT3		CAR TOP FIRE SERVICE LIGHT / DOOR OPEN REAR
J6(*)-4	81X / CR	HT4	HT4		CAR TOP FIRE SERVICE BUZZER / DOOR CLOSE REAR
J6(*)-5	1X	HTC			CAR TOP OUTPUTS 1-2 COMMON

9. Controller Diagnostics
9.1 CPLD LED Indicators
9.1.1 MR-CPLD

Table 34: MR-CPLD, DIP switches 1-3 only.

DIP Sw XM1:	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP Sw XM2:	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP Sw XM3:	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP Sw XM4:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
DIP Sw XM5:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
LED X1:	Door Zone Input	M01	M09	M17	M25	M33	M41	HM1 Input
LED X2:	Car Top Inspection Mode	M02	M10	M18	M26	M34	M42	HM2 Input
LED X3:	In Car Inspection Mode	M03	M11	M19	M27	M35	n/a	HM3 Input
LED X4:	Bypass Operation Mode	M04	M12	M20	M28	M36	n/a	HM4 Input
LED X5:	Inspection Access Mode	M05	M13	M21	M29	M37	n/a	HM1 Input
LED X6:	Controller Inspection Mode	M06	M14	M22	M30	M38	n/a	HM2 Input
LED X7:	Normal Operation	M07	M15	M23	M31	M39	n/a	HM3 Input
LED X8:	Safety String Status	M08	M16	M24	M32	M40	n/a	HM4 Input
All OFF:	No Operation Mode							

Table 35: MR-CPLD, DIP switches 1-4 only.

DIP Sw XM1:	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP Sw XM2:	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP Sw XM3:	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP Sw XM4:	ON	ON	ON	ON	ON	ON	ON	ON
DIP Sw XM5:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
LED X1:	Safety String: 1B,1X,1Y,1T,2	HM1 Run	HM1 Output	n/a	n/a	n/a	blink	blink
LED X2:	Safety String Car Top: 4A & 4B	HM2 Run	HM2 Output	n/a	n/a	n/a	blink	blink
LED X3:	Safety String: Door Contacts	HM3 Run	HM3 Output	n/a	n/a	n/a	blink	blink
LED X4:	Safety String: Normal/Inspection	HM4 Run	HM4 Output	n/a	n/a	n/a	blink	blink
LED X5:	Up Normal Limit	LM1 Run	LM1 Output	n/a	n/a	n/a	blink	blink
LED X6:	Up Slowdown Limit	LM2 Run	LM2 Output	n/a	n/a	n/a	blink	blink
LED X7:	Down Slowdown Limit	LM3 Run	LM3 Output	n/a	n/a	n/a	blink	blink
LED X8:	Down Normal Limit	LM4 Run	LM4 Output	n/a	n/a	n/a	blink	blink

Table 36: MR-CPLD, DIP switches 1-3, with DIP switch 5 ON.

DIP Sw XM1:	OFF	ON	OFF	ON	OFF	ON	OFF	ON	ON
DIP Sw XM2:	OFF	OFF	ON	ON	OFF	OFF	ON	ON	ON
DIP Sw XM3:	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON
DIP Sw XM4:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
DIP Sw XM5:	ON	ON	ON	ON	ON	ON	ON	ON	ON
LED X1:	Serial In 0	Serial In 8	Serial In 16	Serial In 24	Serial In 32	Serial In 40	Serial In 48	Serial In 56	n/a
LED X2:	Serial In 1	Serial In 9	Serial In 17	Serial In 25	Serial In 33	Serial In 41	Serial In 49	Serial In 57	n/a
LED X3:	Serial In 2	Serial In 10	Serial In 18	Serial In 26	Serial In 34	Serial In 42	Serial In 50	Serial In 58	n/a
LED X4:	Serial In 3	Serial In 11	Serial In 19	Serial In 27	Serial In 35	Serial In 43	Serial In 51	Serial In 59	n/a
LED X5:	Serial In 4	Serial In 12	Serial In 20	Serial In 28	Serial In 36	Serial In 44	Serial In 52	Serial In 60	n/a
LED X6:	Serial In 5	Serial In 13	Serial In 21	Serial In 29	Serial In 37	Serial In 45	Serial In 53	Serial In 61	n/a
LED X7:	Serial In 6	Serial In 14	Serial In 22	Serial In 30	Serial In 38	Serial In 46	Serial In 54	Serial In 62	n/a
LED X8:	Serial In 7	Serial In 15	Serial In 23	Serial In 31	Serial In 39	Serial In 47	Serial In 55	Serial In 63	n/a

Table 37: MR-CPLD, CONSTRUCTION MODE, with DIP switches 7 & 8 ON

DIP Sw XM1:	OFF	OFF	**ON**	OFF
DIP Sw XM2:	OFF	OFF	OFF	**ON**
DIP Sw XM3:	OFF	OFF	OFF	OFF
DIP Sw XM4:	OFF	**ON**	ON	ON
DIP Sw XM5:	OFF	OFF	OFF	OFF
DIP Sw XM6:	OFF	OFF	OFF	OFF
DIP Sw XM7:	**ON**	**ON**	**ON**	**ON**
DIP Sw XM8:	**ON**	**ON**	**ON**	**ON**
LED X1:	Door Zone Input	Safety String: 1B,1X,1Y,1T,2	HM1 Run	HM1 Output
LED X2:	Safety String Car Top: 4A & 4B	Safety String Car Top: 4A & 4B	HM2 Run	HM2 Output
LED X3:	Construction Run Up (25B)	Safety String: Door Contacts	HM3 Run	HM3 Output
LED X4:	Construction Run Down (24T)	Inspection/Normal Mode Safe	HM4 Run	HM4 Output
LED X5:	Construction Mode (CPU setting = ON)	Up Normal Limit	LM1 Run	LM1 Output
LED X6:	Controller Inspection input (M41)	Up Slowdown Limit	LM2 Run	LM2 Output
LED X7:	n/a	Down Slowdown Limit	LM3 Run	LM3 Output
LED X8:	n/a	Down Normal Limit	LM4 Run	LM4 Output

DIP switches all OFF: Displays door zone, inspection mode, and safety string status.

DIP switches 1-3 combo: The MR-CPLD reads the M01-M42 LED indicators, which refer to the corresponding Main CPU MR-SIB input. See MR-SIB Inputs nomenclature table in Section 8.2 or the Job-specific schematics.

DIP switches 1-3 ALL ON: Displays the HM1-4 and LM1-4 monitoring inputs (M43-M50).

DIP switch 4 ON: Displays safety string status and slowdown and normal limit status.

DIP switches 1,4 ON: Displays the relay output command from the controller CPU, prior to MR-CPLD processing.

DIP switches 2,4 ON: Displays the relay output state, computed after MR-CPLD processing.

DIP switch 1,2,3,4 other: Spare unused CPLD LEDs. Settings 14 – 15 blink to indicate CPLD is active.

DIP switch 5 ON: Displays the serial inputs 0-63 transmitted to the MR-CPLD serially over SPI-bus from the controller CPU computed values, which supplement the MR-SIB safety inputs. See Table 40 in Section 9.1 for specific descriptions.

DIP switches 7,8 ON: Construction mode is enabled within the MR-CPLD when DIP switches. 7 & 8 are active. Various monitoring LED states are available, as shown in Table 37.

9.1.2 CT-CPLD

Table 38: CT-CPLD, DIP switch settings 0-7.

Num Value:	0	1	2	3	4	5	6	7
DIP Sw XT1:	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIP Sw XT2:	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIP Sw XT3:	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIP Sw XT4:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
LED X1:	Door Zone Input	T01	T09	T17	T25	Safety String: input T01	HM1 Run	HM1 Output
LED X2:	Car Top Inspection Mode	T02	T10	T18	T26	Safety String: inputs T02,T03	HM2 Run	HM2 Output
LED X3:	In Car Inspection Mode	T03	T11	T19	T27	Safety String: input T04	HM3 Run	HM3 Output
LED X4:	Bypass Operation Mode	T04	T12	T20	T28	Inspection/Normal Mode Safe	HM4 Run	HM4 Output
LED X5:	Inspection Access Mode	T05	T13	T21	T29	HM1 Output 4A	LM1 Run	LM1 Output
LED X6:	Controller Inspection Mode	T06	T14	T22	T30	HM2 Output 4B	LM2 Run	LM2 Output
LED X7:	Normal Operation	T07	T15	T23	T31	n/a	LM3 Run	LM3 Output
LED X8:	Car Safety String Status	T08	T16	T24	T32	n/a	LM4 Run	LM4 Output
All OFF:	No Operation Mode							

Table 39: CT-CPLD, DIP switch settings 8-13.

Num Value:	8	9	10	11	12	13
DIP Sw XT1:	OFF	ON	OFF	ON	OFF	ON
DIP Sw XT2:	OFF	OFF	ON	ON	OFF	OFF
DIP Sw XT3:	OFF	OFF	OFF	OFF	ON	ON
DIP Sw XT4:	ON	ON	ON	ON	ON	ON
LED X1:	Door Zone Input	Serial In 0	Serial In 8	Serial In 16	Serial In 24	Serial In 32
LED X2:	Safety String Car Top: 4A & 4B	Serial In 1	Serial In 9	Serial In 17	Serial In 25	Serial In 33
LED X3:	Construction Run Up (25B)	Serial In 2	Serial In 10	Serial In 18	Serial In 26	Serial In 34
LED X4:	Construction Run Down (24T)	Serial In 3	Serial In 11	Serial In 19	Serial In 27	Serial In 35
LED X5:	Construction Mode (CPU setting = ON)	Serial In 4	Serial In 12	Serial In 20	Serial In 28	Serial In 36
LED X6:	Controller Inspection input (M41)	Serial In 5	Serial In 13	Serial In 21	Serial In 29	Serial In 37
LED X7:	n/a	Serial In 6	Serial In 14	Serial In 22	Serial In 30	Serial In 38
LED X8:	n/a	Serial In 7	Serial In 15	Serial In 23	Serial In 31	Serial In 39

DIP switches all OFF: Displays door zone, inspection mode, and safety string status.

DIP switch setting 1-4: The MR-CPLD reads the T01-T32 LED indicators, which refer to the corresponding Main CPU CT-SIB input. See CT-SIB Inputs nomenclature table in Section 8.2 or the Job-specific schematics.

DIP switch setting 5: Displays safety string status and slowdown and normal limit status.

DIP switch setting 6: Displays the relay output command from the controller CPU, prior to CT-CPLD processing.

DIP switch setting 7: Displays the relay output state, computed after CT-CPLD processing.

DIP switch setting 8: Construction mode monitoring states. Note: CT-CPLD processing is bypassed while using construction mode.

DIP switch settings 9-13: Displays the serial inputs 0-39 transmitted to the CT-CPLD serially over SPI-bus from the controller CPU computed values, which supplement the CT-SIB safety inputs. See Table 41 in Section 9.1 for specific descriptions.

DIP switch settings 14-15: Spare unused CPLD LEDs. Setting 15 will blink to indicate CPLD is active.

9.1.3 CPLD Serial Input Descriptions

The controller CPU computes and transmits the following serial inputs to the MR-CPLD & CT-CPLD over SPIbus via the MR-SIB & CT-SIB I/O processors, respectively. This is required for the case when an absolute positioning system (APS) replaces the MR-SIB inputs for access zones or slowdown and normal limits. Each CPLD also requires information from the controller when releveling with the doors open, or to run while the Emergency Stop Switch is bypassed while in Fire Service. Additionally, provisions are made in the case where In Car inspection run inputs are being channeled through the C.O.P. CANbus I/O network instead of being input to the SIB.

Table 40: MR-CPLD Serial Input Descriptions.

Serial In 0	Up Normal Limit Bypass (APS computed)
Serial In 1	Down Normal Limit Bypass (APS computed)
Serial In 2	Up Slowdown Limit Switch Bypass (APS computed)
Serial In 3	Down Slowdown Limit Switch Bypass (APS computed)
Serial In 4	Top Access Up Zone Up (APS computed)
Serial In 5	Top Access Down Zone (APS computed)
Serial In 6	Bottom Access Up Zone (APS computed)
Serial In 7	Bottom Access Down Zone (APS computed)
Serial In 8	Emergency Stop Switch Bypass (during Fire Service Recall or EMT Service Recall)
Serial In 9	Releveling mode (Up/Down Level & Door Zone during Normal operation)
Serial In 10	Top Access Rear Door settings bit '**TOP ACC AT REAR**'
Serial In 11	Bottom Access Rear Door settings bit '**BOT ACC AT REAR**'
Serial In 12	In Car Inspection Up Run input from C.O.P. I/O Board
Serial In 13	In Car Inspection Down Run input from C.O.P. I/O Board
Serial In 14	Jack Resync Down Normal Limit Bypass
Serial In 15	Construction mode (setting '**CONSTRUCTION MOD**' = ON)
Serial In 32	CT-SI– T01 - Car Safety Switch Input
Serial In 33	CT-SI– T02 - Car Emergency Exit "Hatch" Switch Input
Serial In 34	CT-SI– T03 - Car Top Stop Switch Input
Serial In 35	CT-SI– T04 - In Car Stop Switch Input
Serial In 38	CT-SI– T07 - Car Top Normal Input
Serial In 39	CT-SI– T08 - Door Zone Input
Serial In 40	CT-SI– T09 - Car Top Inspection Mode Input
Serial In 41	CT-SI– T10 - Car Top Inspection Up Run Input
Serial In 42	CT-SI– T11 - Car Top Inspection Enable Input
Serial In 43	CT-SI– T12 - Car Top Inspection Down Run Input
Serial In 44	CT-SIB T13 – In-Car Inspection Mode Input
Serial In 45	CT-SIB T14 – In-Car Inspection Up Run Input
Serial In 46	CT-SIB T15 – In-Car Inspection Down Run Input
Serial In 47	CT-SIB T16 – Hoistway Inspection Access Input

Serial In 0	MR-SIB M17 – Top Access Up Run Input Command
Serial In 1	MR-SIB M18 – Top Access Down Run Input Command
Serial In 2	MR-SIB M19 – Bottom Access Up Run Input Command
Serial In 3	MR-SIB M20 – Bottom Access Down Run Input Command
Serial In 4	Top Access Up Zone (APS computed)
Serial In 5	Top Access Down Zone (APS computed)
Serial In 6	Bottom Access Up Zone (APS computed)
Serial In 7	Bottom Access Down Zone (APS computed)
Serial In 8	Emergency Stop Switch Bypass (during Fire Service Recall or EMT Service Recall)
Serial In 9	Releveling mode (Up/Down Level & Door Zone during Normal operation)
Serial In 10	Car Safety Input Bypass, used to allow temporary bypass of the T01 CT-SIB input
Serial In 11	spare
Serial In 12	In-Car Inspection Up Run input from C.O.P. I/O Board
Serial In 13	In-Car Inspection Down Run input from C.O.P. I/O Board
Serial In 14	spare
Serial In 15	Construction mode (setting '**CONSTRUCTION MOD**' = ON)
Serial In 16	MR-SIB M41 – Controller Inspection Input
Serial In 17	MR-SIB M42 – Normal Operation Input
Serial In 26	MR-SIB M35 – Controller Inspection Up Run Input
Serial In 27	MR-SIB M36 – Controller Inspection Enable Input
Serial In 28	MR-SIB M37 – Controller Inspection Down Run Input
Serial In 29	MR-SIB M38 – Hall Locks Bypass Switch Input
Serial In 30	MR-SIB M39 – Hall Doors Bypass Switch Input
Serial In 31	MR-SIB M40 – Car Gate Bypass Switch Input

9.1.4 CPLD LEDs Fault Indicators

In addition to showing the safety string and inspection status, the CPLD LEDs blink when there is an offending inspection run input or conflicting inspection mode inputs while using CPLD DIP switch setting 0.

For example, if LED 2 and LED 5 are blinking, then both of the mode inputs for Car-Top Inspection and Inspection Access are active, causing the CPLD to fault and preventing the relay outputs from energizing. Or, if LED 3 is solid and LED 6 is blinking, the In-Car inspection mode input is active, but a controller inspection up or down run input is also active, preventing the car from running.

Use these LEDs to correct inspection string wiring. There is no way to bypass the CPLD and allow the car to run if any safety string or inspection fault condition exists. Refer to the fault log for details if a CPLD fault condition is present. The CPLD automatically resets if the fault condition is corrected.

9.2 Fault Log Descriptions

9.2.1 SYS (SYSTEM) Fault/Event Descriptions

Table 42: System Fault/Event descriptions list.

#	CODE	FAULT/EVENT DESCRIPTION
1	SYS LOG RESET	The SYS Fault Log was cleared. Press "0" in the fault log menu to clear the fault log.
2	SYSTEM BOOT	Indicates system has initialized upon processor boot.
3	POWER FAIL	Upon power down, relay outputs are shut off, and non-volatile parameters are saved.
4	I/O CAN UP	CANbus communication is restored for Channel:X Board:X.
5	I/O CAN DOWN	CANbus communication is lost for Channel:X Board:X.
6	I/O CAN MULTI	Multiple boards have the same CANbus node DIP switch index for Channel:X Board:X. Communication is restored once the DIP switches are corrected.
7	CAN TX LOST	CANbus message transmit timeout.
8	CAN RX OVERFLOW	CANbus message receive overflow.
9	CAN BUS RESET	CANbus Channel:X has been reset because of communication timeout.
10	MR SIB CAN UP	CANbus communication between controller CPU and MR-SIB processor is active.
11	CT SIB CAN UP	CANbus communication between controller CPU and CT-SIB processor is active.
13	MR SIB CAN DN	CANbus communication between controller CPU and MR-SIB processor is lost.
14	CT SIB CAN DN	CANbus communication between controller CPUand CT-SIB processor is lost.
15	DSP SIB CAN DN	CANbus communication between DSPIC and SIB is lost.
18	WATCHDOG TIMEOUT	The system processor has malfunctioned and restarted from a hardware Watchdog timeout feature.
19	HALL OUT START	This controller has been designated for setting CANbus 3 Hall I/O board outputs. This is default if acting as a simplex with no other connected controllers. Otherwise, the lead controller is based on having the least controller number of the connected group.
20	HALL OUT STOP	CANbus 3 Hall I/O board outputs have been reassigned to another controller. This event triggers when a controller turns off its own CANbus 3 Hall I/O outputs when it detects another lead controller. This is not applicable while in simplex mode.
22	CPLD MISMATCH	The MR-CPLD or CT-CPLD inputs state are conflicting with the MR-SIB or CT-SIB inputs.
23	SAFETY NORMAL	System has recovered from safety fault condition (faults 24-52), including jumped safety string input, inspection mode fault, and up/down normal/slowdown limit. The fault code for the corresponding cleared fault condition is displayed on the 4th line in the log.
24	RUN RELAY FAULT	A relay fault occurred in the Main and Safety Relay Output state machine. This may occur from a stuck or jumped relay contact or a relay sequencing error. Refer to Section 5.1.16
25	SAFETY 1Y FAULT	MR-SIB input M01 (TB:1Y) is off while any other safety string MR-SIB input after TB:1Y is on.
26	SAFETY 1T FAULT	MR-SIB input M02 (TB:1T) is off while any other safety string MR-SIB input after TB:1T is on.
27	SAFETY 1B FAULT	MR-SIB input M03 (TB:1B) is off while any other safety string MR-SIB input after TB:1B is on.
28	SAFETY 2 FAULT	MR-SIB input M04 (TB:2) is off while any other safety string MR-SIB input after TB:2 is on.
29	SAFETY 3 FAULT	CT-SIB input T01 (TB:3) is on while CT-SIB input TB:1X is off.
30	SAFETY 3X FAULT	CT-SIB input T04 (TB:3X) is on while CT-SIB input 1X is off.
33	SAFETY 3E FAULT	CT-SIB input 3E is on while CT-SIB input 1X is off.
34	SAFETY 5 FAULT	MR-SIB input M10 (TB:5) is on while MR-SIB input M04 (TB:2) is off.
35	SAFETY 5B FAULT	MR-SIB input M11 (TB:5B) is on while MR-SIB input M04 (TB:2) is off.
36	SAFETY 5R FAULT	MR-SIB input M12 (TB:5R) is on while MR-SIB input M04 (TB:2) is off.
37	SAFETY 5T FAULT	MR-SIB input M10 (TB:5T) is on while MR-SIB input M04 (TB:2) is off.
38	SAFETY 6 FAULT	MR-SIB input M14 (TB:6) is on while MR-SIB input M04 (TB:2) is off.
39	SAFETY 6B FAULT	MR-SIB input M15 (TB:6B) is on while MR-SIB input M04 (TB:2) is off.

40	SAFETY 6R FAULT	MR-SIB input M16 (TB:6R) is on while MR-SIB input M04 (TB:2) is off.
41	SAFETY 6T FAULT	MR-SIB input M13 (TB:6T) is on while MR-SIB input M04 (TB:2) is off.
42	SAFETY M07 FAULT	MR-SIB input M07 is on while MR-SIB input 2 is off.
43	INSPECT NO MODE	No inspection mode input active. This includes any of the input TBs:23T, 23X, 23A or INS, or Construction Mode is partially enabled.
44	INSPECT MODES>1	Conflicting inspection mode inputs are active. Two or more of the input TBs:23T, 23X, 23A or INS are active
45	NORMAL MODE FLT	Conflicting inspection mode inputs are active while on Normal Operation (NRM).
46	INSP RUN FLT	An inspection run input is active while in a conflicting mode.
47	UP NORMAL FLT	(not used with ELGO APS equipped systems) The Up Normal Limit input (M25) is off while the car position, according to the PI, is not at the top terminal landing.
48	UP SLOWDOWN FLT	(not used with ELGO APS equipped systems) While in door zone and normal operation, the Up Slowdown Limit input (M26) is off while not at the top terminal landing, or the input is on while at the top terminal landing.
49	DN SLOWDOWN FLT	(not used with ELGO APS equipped systems) While in door zone and normal operation, the Down Slowdown Limit input (M27) is off while not at the bottom terminal landing, or the input is on while at the bottom terminal landing.
50	DOWN NORMAL FLT	(not used with ELGO APS equipped systems) The Down Normal Limit input (M28) is off while the car position, according to the PI, is not at the bottom terminal landing.
51	RTC BATTERY LOW	The real time clock battery is low. Replace battery on the MR-SIB with a 3V model CR2032.
52	ELGO OFFSET FLT	The measured difference between ELGO APS position data of channels A & B is out of tolerance with the expected 40mm offset, or the position is out-of-bounds of the top or bottom terminal by over +1000 mm.
53	ELGO APS COMM UP	CANbus communication between controller CPU and ELGO sensor (channel A or B) is active.
54	ELGO APS COMM DN	CANbus communication between controller CPU and ELGO sensor (channel A or B) is lost.
55	ELGO APS DATA UP	Non-zero ELGO position data is being read from the tape.
56	ELGO APS DATA DN	ELGO position data from the tape is lost. The tape is either defective or not properly installed.
57	CT SAFETY RELAY	The CT-SIB car safety string output relay check while on normal operation failed. Check the connections of 4A & 4B and verify communication with the CT-SIB.

9.2.2 APP (APPLICATION) Fault/Event Descriptions

Table 43: Application Fault/Event descriptions List.

#	CODE	TYPE	FAULT DESCRIPTION
99	APP LOG RESET	Event	The Application Fault Log has been cleared. Press "0" in the fault log menu to clear the fault log.
100	APPLICATION STRT	Event	The system has rebooted and the application has successfully started.
101	UP RUN TMR SHTDN	Fault	Car was running up too long when going between floors, based on the field adjustable timer '**UP RUN SHTDN TMR**'.
102	UP LVL TMR SHTDN	Fault	Car was running up too long during a relevel, based on the field adjustable timer '**UP RUN SHTDN TMR**'.
103	EMERGENCY POWER	Fault	The Emergency Power input (TB:EP) went low, and Emergency Power operation has initiated.
104	DOORS NOT OPEN	Fault	The door open output was on too long, and the doors did not open at all (DCL-TB:8X = OFF).
105	PARTIAL DR OPEN	Fault	The door open output was on too long, and the doors opened partially, but not fully. (both DOL-TB:7X = ON & DCL-TB:8X = ON)
106	DRCLS FULLY OPEN	Fault	The door close output was on too long, and the doors did not close at all. (DOL-TB:7X = ON)
107	DRCLS FLT DCL ON	Fault	The door close output was on too long, and the doors did not fully close. (both DOL-TB:7X = ON & DCL-TB:8X = ON)
108	GATE NOT CLOSED	Fault	The door close output was on too long, and the doors closed (DCL-TB:8X = OFF), but the gate input (TB:4) is still low.
109	DOORS NOT CLOSED	Fault	The door close output was on too long, and the doors closed (DCL-TB:8X = OFF), but the hall door contact inputs are still low. (TB:5, or if using front access: TB:5B, TB:5T)
110	LOCKS NOT CLOSED	Fault	The door close output was on too long, and the doors closed (DCL-TB:8X = OFF), but the hall door locks inputs are still low. (TB:6, or if using front access: TB:6B, TB:6T)
111	FRNT DRCLOSE TMR	Fault	The front door close output was on too long before a run while doors were closed.
112	REAR NOT OPEN	Fault	The rear door open output was on too long, and the doors did not open at all. (Rear DCL-TB:8XR = OFF)
113	PARTIAL RD OPEN	Fault	The rear door open output was on too long, and the doors opened partially, but not fully. (both Rear DOL-TB:7XR = ON & Rear DCL-TB:8XR = ON)
114	RDCL FULLY OPEN	Fault	The rear door close output was on too long, and the doors were fully open (RDOL off).
115	RDCL NOT OPEN	Fault	The rear door close output was on too long, and the doors did not fully close (both Rear DOL-TB:7XR = ON & Rear DCL-TB:8XR = ON).
116	RGATE NOT CLOSED	Fault	The rear door close output was on too long, and the doors closed, but the rear gate input (TB:4R) is still low.
117	RDOOR NOT CLOSED	Fault	The rear door close output was on too long, and the doors closed, but the rear hall door contact inputs are still low. (TB:5R, or if using rear access: TB:5B, TB:5T)
118	RLOCK NOT CLOSED	Fault	The rear door close output was on too long, and the doors closed, but the rear hall door lock inputs are still low. (TB:6R, or if using rear access: TB:6B, TB:6T)
119	REAR DRCLOSE TMR	Fault	The rear door close output was on too long before a run while doors were closed.
120	CAR DELAYED	Event	The car had a direction, but did not run for an adjustable time, likely due to the door being held open by a door open button, safety edge, or electric eye input.
121	SAFETY OPENED	Fault	The car stopped during a run, and the safety string was opened, which includes terminals 1B, 1T, 1Y, 2, 3, 3A, 3E, or 3X.
122	DCL TRIPPED ON	Fault	The car stopped during a run, and the door close limit (TBs:8X or 8XR) was on.
123	CAR GATE OPENED	Fault	The car stopped during a run, and the car gate input (TBs:4 or 4R) was open.
124	HALL DOOR OPENED	Fault	The car stopped during a run, and a hall door contact (TBs:5, 5R, 5B, 5T) was open.
125	STOP OUT OF DZ	Fault	The car stopped during a run, safety and door string was closed/normal.

#	CODE	TYPE	FAULT DESCRIPTION
126	DOOR ZONE OFF	Fault	The door zone input M08 (TB:20) went off while the car was stopped.
128	LEVEL OUT OF DZ	Fault	The car stopped outside of door zone (input M08/TB:20) after releveling. Check Door Zone or overshoot caused by valve adjustment.
129	DOOR GATE CHECK	Fault	The Car Gate input (TBs:4 or 4R) was ON while the car door was open, according to the door open limit. (TBs:7X or 7XR = OFF)
130	HALL DOOR F CHK	Fault	The front hall door contact inputs (TBs: 5,5B, & 5T) was on while the front car gate was open. (TB:7X = OFF)
131	HALL DOOR R CHK	Fault	The rear hall door contact inputs (TBs: 5R, 5B, & 5T) was on while the rear car gate was open. (TB:7XR = OFF)
132	HALL+GATE F CHK	Fault	The front car gate and hall door contact inputs (TBs: 4, 5,5B, & 5T) were ON while the front door was open. (TB:7X = OFF)
133	HALL+GATE R CHK	Fault	The rear car gate and hall door contact inputs (TBs: 4R, 5R,5B, & 5T) were ON while the rear door was open. (TB:7XR = OFF)
134	UL+DL BOTH ON	Event	The up and down level inputs were on at the same time.
135	EFS HALL SW 82X	Event	Fire service was initiated by the hall recall fire switch input. (Hall I/O board #0, input UI)
136	EFS SENS ALT 82	Event	Fire service was initiated by the hall smoke sensors which recall to the main landing. (TB:82)
137	EFS SENS MN 82M	Event	Fire service was initiated by the main landing smoke sensor, which recalls to the alternate landing (TB:82M).
138	EFS SMK 1st 82F	Event	Fire service was initiated by the machine room heat/smoke sensor (TB:82F).
139	EFS SMK 2nd 82F	Event	The machine room heat/smoke sensor input (TB:82F) has tripped ON.
140	SHUNT TRIP	Fault	The shunt trip sensor input (TB:85) tripped ON.
141	DOOR ZONE STUCK	Fault	The door zone switch input M08 (TB:20) came on before leveling during the slowdown sequence in Normal Operation. This implies a stuck/malfunctioning door zone sensor.
144	NORMAL+CINS FLT	Fault	Inspection Mode Fault: Normal Operation mode input M42 and Controller Inspection mode input M41 were both on.
145	CINS+OTHER FLT	Fault	Inspection Mode Fault: Controller Inspection input M41 (TB:23) was on with either In-Car Inspection input T13 (TB:23X), Inspection Access input T16 (TB:23A), Car-Top Inspection input T09 (TB:23T), or Door Contact Bypass switch inputs (M38, M39, M40).
146	NORMAL+OTHER FLT	Fault	Inspection Mode Fault: Normal Operation input M42 (TB:23) was on with either In-Car Inspection input T13 (TB:23X), Inspection Access input T16 (TB:23A), Car-Top Inspection input T09 (TB:23T), or Door Contact Bypass switch inputs (M38, M39, M40).
147	ACCESS+OTHER FLT	Fault	Inspection Mode Fault: Inspection Access input T16 (TB:23A) was on with either In-Car Inspection input T13 (TB:23X), Car-Top Inspection input T09 (TB:23T), or Door Contact Bypass switch inputs (M38, M39, M40).
148	ICINS+TCINS FLT	Fault	Inspection Mode Fault: Car-Top Inspection input T09 (TB:23T) and In-Car Inspection input T13 (TB:23X) were both on.
149	DOOR LOCK OPENED	Fault	The car stopped during a run, and a hall door lock contact (TBs:6,6R,6B,6T) was open.
150	FLOOR PI RESET	Event	Every time the car stops at a floor, the floor reset inputs (1FP, 2FP, 4FP, UHS, DHS) are compared to the current floor position. If a reset occurs that changes the floor position, this event then indicates that the car position was out of sync.
151	CAR TOP STOP SW	Event	The Car Top Stop switch safety string input T03 (TB:3) is opened
152	CONTROLLER STOP	Event	The Controller Stop switch safety string input M07 (TB:2) is opened.
153	IN CAR STOP SW	Event	The In-Car Stop switch safety string input T04 (TB:3X) is opened.
154	GOVERNOR SW: 1Y	Event	The Governor switch safety string input M01 (TB:1Y) is opened.
155	ROPED HYDRO: 1T	Event	The Roped Hydraulic Safety Switch safety string input M02 (TB:1T) is opened.
156	FINAL LIMIT: 1B	Event	The Final Limit switch safety string input M03 (TB:1B) is opened.
157	STOP PIT SW: 2	Event	The Pit Stop switch safety string input M03 (TB:2) is opened.
158	NORMAL LIMIT TOP	Fault	The top Normal Limit was turned off while in Normal Operation.

#	CODE	TYPE	FAULT DESCRIPTION
159	NORMAL LIMIT BOT	Fault	The bottom Normal Limit was turned off while in Normal Operation.
160	FLOOD SWITCH	Fault	Flood switch input (TB:FLS) has tripped on, and FLOOD mode has activated. The car recalls to the designated flood landing and is taken out of service.
161	MOTOR OVERLOAD	Fault	The Motor Overload (MOL) monitoring input has tripped.
162	PHASE MONITR RDY	Fault	The Phase Monitor (RP) input has tripped.
168	MED EMRGNCY HALL	Event	Medical Emergency Hall recall operation initiated to recall floor.
169	MED EMRGNCY CAR	Event	Medical Emergency Car operation initiated, and hall calls are disabled.
171	ELGO DZ MISMATCH	Fault	The ELGO APS computed Door Zone is out of alignment with the hardware DZ input M08 (TB:20).
172	LOAD WEIGHING OL	Fault	The Load Weighing Overload input is ON. All car calls and hall calls will be disabled and door will open until load is reduced.
173	CAR SAFTY 3A FLT	Fault	The Car Safeties safety string input T01 (TB:03) is opened. This safety string input may be bypassed using the setting '**BYPASS CAR SAFTY**' while on inspection (see Section 7.1.2) or by using construction mode (Section 3.3.3).
174	CAR EMRGNCY EXIT	Fault	The Emergency Exit switch safety string input T02 (TB:3E) is opened.
175	HALL POWER FAULT	Fault	The Hall I/O power monitoring input is OFF, indicating fixture power supply failure.
176	NTS LIMIT STOP	Fault	The car ran onto a terminal slowdown limit while running fast speed, and the NTS system has activated and dropped the car to slow speed. Normally the car has already dropped out of fast speed before running onto a terminal slowdown limit. Review the UHS/DHS Slowdown Limit distances and the UHS/DHS Slowdown distances to ensure the limit distance(s) is less than the slowdown distance(s).
177	ELGO DZ REDUNDCY	Fault	The door zone input is not matching the state of the ELGO computed door zone at floor level. This fault code registers alongside the fault code 171: ELGO DZ MISMATCH, and provides additional information of car position, and state of the door zone inputs. Example: FL:01 1110 19'11.7" FL = Floor number 1st digit = MR-SIB input M08 2nd digit = CT-SIB input T08 3rd digit = ELGO computed door zone 4th digit = n/a Car position where fault occurred (' = ft, " = inches).
178	DPM DROPEN CHECK	Fault	Door Position Monitoring (DPM) N.O. input is ON while the car door is fully open.
179	DPM CLOSE FAULT	Fault	Door Position Monitoring (DPM) N.O. input is OFF while the front door is fully closed.
180	DPM RCLOSE FAULT	Fault	Door Position Monitoring (DPM) N.O. input is OFF while the rear door is fully closed.
181	DPM OPENED INRUN	Fault	Door Position Monitoring (DPM) N.O. input turned OFF while running, stopping the car.
182	SHTDFT TIMED OUT	Event	The Shutdown Defeat timer has expired. TB:SHTDFT input is disabled until cycling power.
201	LOW OIL SWITCH	Fault	The Low Oil switch input (TB:LOS) has tripped.
202	OIL TEMPERATURE	Fault	The Oil Over Temperature switch input (TB:P) has tripped.
203	DOWN RUN TIMER	Fault	The car was running down too long when going between floors, based on the field adjustable timer '**DN RUN SHTDN TMR**'. This feature is enabled using the setting '**DOWN RUN SHUTDN**'.
204	DOWN LEVEL TIMER	Fault	The car was running down too long during a relevel, based on the field adjustable timer '**DN RUN SHTDN TMR**'. This feature is enabled using the setting '**DOWN RUN SHUTDN**'.
205	BORIS LOWERING	Fault	The Battery Lowering input (M24) went low, and BORIS operation is initiated.
206	UTS=ON POST RUN	Fault	Up to Speed input (M22) was ON after the car stopped if '**WYE-DELTA START**' setting is not enabled.
208	ETS REDUNDANCY	Fault	ETSR input (TBs:18X or 19X) was off while the car was running up fast speed.
209	JRM REDUNDANCY	Fault	Jack Resync monitor input (TB:JRM) was high while not in Jack Resync operation, resulting in a redundancy fault.

#	CODE	TYPE	FAULT DESCRIPTION
210	DR CLOSE SHUTDN	Fault	The car attempted to close the doors 20 times without getting to the next floor. Use the fault reset input TB:RST to clear the shutdown.
211	UPRUNTMR UTS=OFF	Fault	Up Run Timer tripped and Up To Speed input (M22) was OFF. The starter did not get up to speed or RU contactor did not energize.
212	UPRUNTMR STR=OFF	Fault	Up Run Timer tripped and Starting Contactor Safe input (M29) was ON. This implies that STR and RU did not energize.
213	START REDUNDANCY	Fault	The Starting Contactor Safe input (M29) was OFF after the car stopped, if '**WYE-DELTA START**' setting is enabled.
214	UTS REDUNDANCY	Fault	The Starting Contactor Safe input (M29) and Up to Speed input (M22) were both on. This implies that the Up to Speed input is stuck on at the end of a run, or the Starting Contactor Safe input is stuck off during a run.
215	JACK RESYNC	Event	The Jack Resynchronization Mode has activated, based on the parameters from the settings menu.
216	OIL NEGPRESS SW	Fault	Oil Pressure switch (TB:16P) has tripped OFF, and NEGPRES mode has activated. The car is not able to run down until the input is restored.
217	FS FAILED > 20X	Fault	The car was unable to run to the next floor after attempting 20x times, so the car will shut down. Use the fault reset input TB:RST to clear the shutdown.
218	SLACKROPE SW FLT	Fault	The slack rope switch input is tripped. Use the slack rope switch reset input to clear the shutdown.

10. Parts List

All parts are commercially available from the manufacturer, or from Virginia Controls (Ask for the Parts Department.) Parts are subject to change without notice. Consult Virginia Controls for current pricing information. Non-standard material is identified on the schematic. Refer to the schematic for non-standard parts not listed here.

DESCRIPTION	MANUFACTURER	PART #
RELAYS, PHASE MONITORS		
4PDT, 120VAC, Plug-In Relay	Idec	RU4SA110
4PDT, 110VDC, Plug-In Relay	Idec	RU4S-D110
4PDT, 24VDC, Plug-In Relay	Idec	RU4S-D24
Phase Monitor	MotorSaver	202
CONTACTORS, STARTERS, OVERLOAD		
Soft Starter (example:40 HP / 50A @ 480VAC)	Siemens	Ex: 72KG34AFP
Terminal Block	–Bussman	W TBAT - 100
TRANSFORMERS, FUSES, TERMINALS		
115/230V, 300VA Transformer	SquareD	9070T300D136
Battery Lowering UPS (750VA)	APC	SUA750
Outlet Box		
Grounding Bar	SquareD	PK0GTA-6
24VDC Power Supply (230/115V Input)	Meanwell	MDR-60-24
Duplex Outlet (15A) & Box	GFCI	
250V Instantaneous Fuse	Bussman	Type BAF
250V Fuse Holder	Klemsan	E2541000
Track for 250V Fuse Holders	Wago	DIN-35
3 Pole Terminal, 600V, 50A	Klemsan	K305130
600V Time Delay Fuse	Bussman	Type FNQR
MISCELLANEOUS COMPONENTS AND HARDWARE		
1"W x 2"H Duct	Beta	WH1X2
1"W x 3"H Duct	Beta	WH1X3
MICRO-PROCESSOR		
Microprocessor CPU board	Virginia Controls	10001
16-in/16-output Remote I/O Module	Virginia Controls	10004-24V / 10004-120
2-in/2-output Hall I/O Module	Virginia Controls	10005-T / 10005-M
Keypad	Virginia Controls	VISION-KEYPAD
LCD screen	Virginia Controls	VISION-LCD
Machine Room Safety Interface Board	Virginia Controls	10002
Car Top Safety Interface Board	Virginia Controls	10003

DESCRIPTION	MANUFACTURER	PART #
MR-SIB battery for Real Time Clock	PANASONIC	CR2032
MISCELLANEOUS		
1"W x 2"H Duct	Beta	WH1X2
1"W x 3"H Duct	Beta	WH1X3
Neons, On Relay Panel	I.D.I.	1030
Varistors (See Schematic For Sizes)	Movistar	V150LA2, V150LA10, V150LA20, V275LA10, V275LA20, V275LA40
CAN Cable – 22Ga-TP w/Shield	Beldon	2424C, 3105a
Pushbutton, on Switch Panel	Carling	
Toggle Switch, on Switch Panel	Carling	
Digital PI Driver Board	CE Electronics	SHCDUE-C1X / VCI-001
Fan Kit	Ice Qube	IQ150FPW-126-SS-N4X

11. Troubleshooting Suggestions

(to be provided in future manual update)

11.1 Factory Assistance

IMPORTANT: If troubleshooting assistance is required from Virginia Controls, get the following information before calling:

- **THE VIRGINIA CONTROLS DRAWING NUMBER** (located on serial tag, or bottom right of the schematic).

- **AN EXACT DESCRIPTION OF THE PROBLEM.**

- **THE STATUS OF ALL THE INPUT AND OUTPUT POINTS.**

- **THE STATUS OF THE LIGHTS ON THE POWER SUPPLY.**

Contact Virginia Controls at (804) 225-5530 for technical assistance. Additional troubleshooting instructions may be given, depending on the nature of the problem. VC office hours are 8:00AM – 4:30PM EST. If after-hours support is needed, please request an appointment ahead of time.

12. Controller Maintenance

WARNING: MAKE SURE THE POWER IS OFF BEFORE CONNECTING OR DISCONNECTING ANY CONNECTORS, ADDRESS JUMPERS OR CABLES ON THE CPU OR I/O BOARDS.

12.1 Periodic Maintenance

WARNING: Turn off the power before touching the terminals or wiring.

Check that all wires are tight and properly located in the terminals. Make sure no stray stands of wire are sticking out of the terminal strips.

Check the Motor Starter contacts and Door Operator contacts, (if provided), for wear.

Make sure all relays are fully seated in their sockets.

If any varistors are provided in parallel with inductive loads (such as the Valve Solenoids or Motor Starter), check that they are physically sound. Look for signs of burn marks. Replace them if they look damaged.

Check the MR-SIB battery. This can be done by cycling the power, then checking to make sure the onboard clock is still correct. To check the time, look at the 4th line of the banner screen on boot up. If the date had been set, and it now shows the date as 01/01/2001, then the battery is dead. Change the battery and set the time.

Keep the controller clean and dry. Power supplies and processor chips in particular should be kept clean of dust and other debris. Keeping the machine room itself clean helps keep the controller clean.

12.2 Parts Replacement

12.2.1 CPU Exchange

To swap out the CPU board, do the following:

1. Turn off the power to the controller.

2. Note the location of all cables and wires. It is recommended that all cables and wires be marked so that they can be returned to the correct terminal or connector and oriented properly.

3. Remove the four screws holding the CPU board in place.

4. Remove the CPU board.

5. Install the new CPU board in the reverse order, ensuring that the pins are aligned with the pin connector.

12.2.2 Input/Output Board Exchange

To exchange an I/O board, do the following:

1. Change the Address Switches on the new I/O board to match the board it will replace.

2. Turn off the power to the controller.

3. Unplug all the removable I/O terminal strips from the top and bottom of the I/O board. It is not usually necessary to mark the terminal blocks, since the wiring normally holds them in the proper place. If there is any doubt about their location, mark the terminal blocks to show where they should be re-installed.

4. Disconnect the CANBus and 24VDC power wires from their respective terminals.

5. Remove the screws holding the I/O board in place.

6. Install the new I/O board by reversing the previous steps.

7. Ensure that all termination jumpers, power supply chips, and I/O jumper blocks are swapped with the new board.

13. Frequently Asked Questions

Suggestions for other Frequently Asked Questions are welcomed. Please submit them to Virginia Controls Technical Support.

13.1 Questions on Field Devices

Q.   Are the Reset Targets Necessary When Using a Pulsing Selector?

A.   Yes.

The reset targets are required at the terminal landings, as shown on the car top selector installation sheet, to establish or reset the floor position at the terminal landings.

Q.   The Doors Do Not Operate Properly on Fire Service.

A.   Check the Door Open and Door Close Limit Switches for proper operation. Most problems with Fire Service are a result of one or both of these switches not operating properly. Also check to make sure the correct Fire Code has been selected in the Adjustable Settings and Features. Refer to the schematic adjustment sheet.

13.2 Questions on the Controller

Q.   How Do I Reset All Settings and Features Back to the Original Values?

A.   Use the Settings Reset Menu. (Follow the instructions in Sections 6.1.4.6) To reset Counters, use the Reset Counters Menu (Section 6.1.4.7). To clear the Fault Log, refer to Section 6.1.9.1. To reset ELGO Absolute Positioning Data, use the ELGO Menu (Section 6.1.4.10).

Q.   How do I check the current values of the settings and features?

A.   Use the Edit Adjustable Settings Menu. (Follow instructions in Sections 6.1.4.5)

Q.   How do I reset a latched fault or shutdown?

A.   Toggle the Reset input "RST" by momentarily connecting a jumper between TB: 1X – RST, which is typically located on MR-SIB input 16. If a fault condition is not currently present, the latched fault then resets. Otherwise, the fault re-latches. Use the Shutdown Defeat input jumper to prevent a nuisance fault from latching during installation and troubleshooting, TB: 1X – DFT (MR-SIB input 15).

Q.   How do I prevent a fault or shutdown condition from latching?

A.   Use the Shutdown Defeat input jumper to prevent a nuisance fault from latching during installation and troubleshooting: TB: 1X – DFT (MR-SIB input 15). The shutdown defeat input expires after an adjustable timeout, ranging from 1 hour to 1 week. Refer to Section 7.1.1 for more information. The reset input "RST" is only able to reset shutdowns that are currently latched, but does not defeat existing shutdown conditions.

14. Periodic Testing Procedures

14.1 Testing of reverse phase relay (when equipped)

This test demonstrates the outcome of a power phase fault, when a phase monitor is equipped.

1. Remove any one of the three power leads connected to the phase monitor. The system then displays '**Bad-Power**' and shuts down.

2. Replace the wire to reset the fault condition.

14.2 Testing of the Low Oil Run Shutdown Timer

This test demonstrates the low oil shutdown feature, which will time out return the car to the bottom landing.

1. With the car at a lower landing, place a call at the top landing.

2. After the car travels several feet, but before the car reaches the destination landing, remove the field wire from terminal 14P at the controller.

3. The pump motor and car should stop, with the controller still attempting to run in the up direction.

4. Allow the car to sit for about 30 seconds. The exact time depends on the setting of the low oil timer. When the low oil timer trips then the controller goes into LOW OIL shutdown and returns to the lowest floor.

5. Replace the wire on terminal 14P and jump 1X-RST (bottom left of MR-SIB) to reset the controller.

   > **NOTE: Testing the low oil timer while on Fire Service will cause the Fire (Hat) Light to flash.**

14.3 Testing of leveling/anticreep device

This test verifies the releveling and anticreep feature of the controller.

1. With the car on automatic operation and level at a floor, open the pressure relief valve and allow the car to drift below the floor.

2. When the pump motor starts running, close the pressure relief valve. The car then levels back into the floor, indicating that the anti-creep/leveling device is working properly.

14.4 Running the car onto the stop ring

This test allows the car to run beyond the up normal limit and run onto the stop ring.

1. Verify that there are no passengers in the car and that it is safe to proceed.

2. On automatic operation, run the car to the top landing. After the door cycles, place the car on inspection operation at the controller.

3. Using the up inspection button in the controller, run the car up past the Up Normal Limit until it stops.

4. Jump out the hardware input for the Up Normal Limit Bypass at the controller by placing a temporary jumper on terminals 1X – M25, directly on the MR-SIB.

5. Using the up inspection buttons in the controller, run the car onto the stop ring.

6. Run the car down via the inspection buttons in the controller.

7. Remove the jumper installed on terminals 1X – M25.

14.5 Hydraulic pressure tests

This test allows the car to run beyond the up normal limit to build head pressure.

1. Verify that there are no passengers in the car and that it is safe to proceed with the test.

2. The pressure test may be done with or without test weights as desired. If weights are to be used, run the car on automatic to the most convenient landing and load the weights on the car.

3. On automatic operation, run the car to the top landing. After the door cycles, place the car on inspection operation at the controller.

4. Using the up inspection button in the controller, run the car up past the Up Normal Limit until it stops.

5. Jump out the hardware input for the Up Normal Limit Bypass at the controller by placing a temporary jumper on terminals 1X – M25, directly on the MR-SIB.

6. Using the up inspection buttons in the controller, run the car onto the stop ring and allow the pressure to build.

7. Observe the pressure gauge on the valve to determine the proper relief pressure. Adjust overpressure valve as needed.

8. Run the car down via the inspection buttons in the controller to relieve the overpressure in the system.

9. Remove the jumper installed on terminals 1X – M25.

10. Perform leak test(s) as required by code.

14.6 Testing auxiliary power battery lowering (B.O.R.I.S.)

This test removes power to the BORIS unit, and demonstrates lowering while on battery power.

> **NOTE: Upon request, a Battery Lowering Test switch may be provided to test battery lowering. Otherwise, follow the procedure below.**

1. Install a jumper wire across the mainline & shunt trip disconnect auxiliary contact(s), terminals L5 – L5A.

2. Run the car to an upper landing on automatic operation.

3. When the car stops open the mainline disconnect.

4. The car then returns to the lowest landing and cycles the door.

> **NOTE: Battery lowering will return the car to the bottom landing by default. To customize the return location to the main landing, turn on parameter "BORIS MAIN LDG". To customize the return location to the nearest landing, turn on parameter "BORIS NEARST LDG".**

5. Remove the jumper installed in step 1. The controller then completely shuts down due to no power, but the battery unit remains active.

6. Restore power at the mainline disconnect.

14.7 Testing the Oil Negative Pressure Switch

This test activates the negative pressure switch, and demonstrates the car is unable to answer calls in the down direction.

1. Run the car to an intermediate landing, (or to the top landing for 2 stop elevators), on automatic operation.

2. Remove the wire from the pressure switch at controller terminal 16P.

3. Place a call at the bottom landing.

4. The car should remain at the floor and not attempt to run down. The car should also respond to the door open button in the car, but not a hall call at the same landing. The car is allowed to run up from a car or hall call.

5. Replace the wire on terminal 16P, and put the car back into service.

14.8 Normal Terminal Stopping Devices

The Up & Down Normal Limits are computed by the ELGO Absolute Positioning System. No hardware switches are required. The Up Normal Limit will stop the car approx. 1" above floor level at the upper terminal landing. The Down Normal Limit will stop the car approx. 1" below floor level at the bottom terminal landing.

> **NOTE: The Up & Down Normal Limits are bypassed while the ELGO APS system is not fully installed, does not have floor position data, or is in an error state, causing the computed state of the normal limits to be indeterminable. While on inspection, this allows the car to run at slow speed. While on Normal Operation, the car is allowed to perform a rescue operation, where the car will level down at slow speed until reaching door zone, at which point the car will stop and shut down with doors being operable.**
>
> **NOTE: Hoistway Inspection Access cannot be used to test the Up & Normal Limits. The Inspection Access Zones are set to stop the car at floor level. Use Car Top Inspection or Controller Inspection to test the Normal Limits.**

14.8.1 Up Normal Limit Test

1. Run the car to upper terminal landing.

2. Put the car on inspection.

3. Run the car up on inspection. Verify the car stops approximately 1" above floor level.

4. Put the car on normal operation. Verify the car levels back to floor level.

14.8.2 Down Normal Limit Test

1. Run the car to lower terminal landing.

2. Put the car on inspection.

3. Run the car down on inspection. Verify the car stops approximately 1" below floor level.

4. Put the car on normal operation. Verify the car levels back to floor level.

14.9 Normal Terminal Slowdown Limit Devices

The NTS system (Up & Down Slowdown Limits) is set and computed by the ELGO Absolute Positioning System - channel B. No hardware switches are required.

While within range of the terminal landing(s), the NTS system will remove power to the fast speed valves. This action is independent from the normal slowdowns, computed by ELGO APS - channel A.

The position of the Up and Down Slowdown Limits are adjustable using '**Setup Menu**' -> '**Edit ELGO APS**' menu (see Section 3.9.1.3).

> NOTE: Disabling the Normal Slowdowns will disable the ELGO APS – channel A positioning system. During the next run, the car will run up or down indefinitely, not stopping at any landing until the NTS (ELGO APS – channel B) is reached at the terminal landing.

14.9.1 Up Slowdown Limit Test

1. Put the controller on Normal Operation.

2. Run the car to an intermediate landing, ideally one or two floors below the upper terminal landing.

3. Using the Vision 2.0 CPU keypad, navigate to the Setup Menu -> Edit Adjustable Settings/Features menu.

4. Turn ON the parameter "DISABLE SLOWDOWN". Press `Prv` to scroll down the list, and press `Ent`->`1`->`Ent`.

5. Navigate to the Car Status screen by pressing `Esc` 4 times.

6. Place a call at any landing above the current car position (i.e. top terminal landing). Press the floor number using the digits `0`-`9`, then press `Ent`.

7. Observe the car runs up at fast speed, and continues to run until reaching the UHS (Up High Speed) Terminal Slowdown Limit. The test parameter will revert to OFF.

8. Observe the car stop at the top terminal landing. If the car overshoots the landing, it will level back down to floor level.

9. The NTS test is complete. The car will return back to normal operation.

14.9.2 Down Slowdown Limit Test

1. Put the controller on Normal Operation.

2. Run the car to an intermediate landing, ideally one or two floors above the bottom terminal landing.

3. Using the Vision 2.0 CPU keypad, navigate to the Setup Menu -> Edit Adjustable Settings/Features menu.

4. Turn ON the parameter "DISABLE SLOWDOWN". Press `Prv` to scroll down the list, and press `Ent`->`1`->`Ent`.

5. Navigate to the Car Status screen by pressing `Esc` 4 times.

6. Place a call at any landing above the current car position (i.e. bottom terminal landing). Press the floor number using the digits `0`-`9`, then press `Ent`.

7. Observe the car runs down at fast speed, and continues to run until reaching the DHS (Down High Speed) Terminal Slowdown Limit.

8. Observe the car stop at the top terminal landing. If the car overshoots the landing, it will level back up to floor level. The test parameter will revert to OFF.

9. The NTS test is complete. The car will return back to normal operation.

14.10 Buffer Test

A buffer test will run the car at contract speed onto the buffers at the bottom terminal landing.

1. Put the controller on Normal Operation.

2. Run the car to an intermediate landing, ideally one or two floors above the bottom terminal landing.

3. Using the Vision 2.0 CPU keypad, navigate to the Setup Menu -> Edit Adjustable Settings/Features menu.

4. Turn ON the parameter "DISABLE SLOWDOWN". Press `Prv` to scroll down the list, and press `Ent`->`1`->`Ent`.

5. Re-enter the Edit Adjustable Settings/Features menu.

6. Turn ON the parameter "DISABLE SLOWDN LMT". Press `Prv` to scroll down the list, and press `Ent`->`1`->`Ent`.

7. Navigate to the Car Status screen by pressing `Esc` x4 times.

8. Place a call at any landing below the current car position (i.e. bottom terminal landing). Press the floor number using the digits `0`-`9`, then press `Ent`.

9. Observe the car runs down at fast speed, and continues to run indefinitely until striking the buffer at contract speed.

10. Put the controller on Controller Inspection. Verify the controller stops trying to run down. The test parameters will revert to OFF.

11. Jump out any applicable safeties that may have tripped. Verify that the safety string inputs M01-M07 are all high.

12. Run the car up on inspection away from the buffers until the car is within leveling range of floor level.

13. Put the car on Normal Operation. The buffer test is complete.

14.11 Emergency Terminal Speed Reducing (ETSR) Switch

This test demonstrates the Emergency Terminal Speed Reducing (ETSR) switch removes power from the fast speed up valve independent of the ELGO absolute positioning system.

> **NOTE: The ETSR switch can be demonstrated by removing the wire connection to terminal 18X. Or someone on top of the car can physically open the switch while it's running.**

Test 1: Demonstrate while stopped.

1. Disconnect the ETSR switch from the controller at terminal **18X**.

2. Run the car up on automatic and see that the car cannot run fast speed and, therefore, the car does not leave the floor and relevels.

3. Replace the wire on terminal **18X**.

Test 2: Demonstrate while running.

4. Run the car up on automatic at fast speed.

5. While the car is running, disconnect the ETSR switch from the controller at terminal **18X**.

6. Verify the car slows down from fast speed and proceeds at leveling speed until reaching a landing, or the run shutdown timer expires.

7. If a fault is triggered, jump the MR-SIB input #16, 1X – RST, or cycle power to reset.

8. Replace the wire on terminal **18X**.

14.12 Testing the Car Safety Switch and Governor Switch

These tests demonstrate that opening the safety string will stop the car.

Car Safety Switch

1. In the car top inspection station, remove the field wire at terminal **3A**.

2. Verify that the car will not run on inspection or automatic operation.

3. Replace the wire at terminal **3A**.

4. Mechanically open the car safety switch and see that the car cannot run. Reset the switch when done.

> NOTE: For a roped hydraulic application, the car safety switch connections to TB:3A may be temporarily bypassed from the machine room while on car top inspection or controller inspection. This will allow a mechanic to run the car on inspection while the car safeties are opened. Enable the feature by turning on the setting "CARSAFETY SW BYP" using the Setup Menu – Adjustable Settings/Features. This bypass mode is disabled while on Normal Operation.

Governor Switch

1. In the machine room, remove the field wire at terminal **1Y**.

2. Verify that the car will not run on inspection or automatic operation.

3. Replace the wire at terminal **1Y**.

4. Mechanically open the governor switch and see that the car cannot run. Reset the switch when done.

14.13 Testing of Jack Resynch Operation (when equipped)

This test demonstrates a manual jack resynchronization event.

1. On the Vision 2.0 CPU, navigate to Setup Menu->Edit Adjustable Settings/Features menu screen.

2. Press `Nxt` / `Prv` to find the setting '**JK RES AFTER INS**' and turn it ON by pressing `Ent`, then `1`, then `Ent`. Exit the menu by pressing `Esc` then `1` to save.

3. With the car on automatic and no calls registered, cycle the controller inspection switch to inspection and then back to automatic.

4. Verify the car then runs down below the bottom floor onto the springs for a preset time, as defined by the timer parameter '**DN RUN ON JK RES**'.

5. The car will automatically run up at leveling speed and stop at the bottom terminal landing. This completes the jack resynchronization operation.

6. Turn OFF the setting '**JK RES AFTER INS**' while in the Adjustable Settings menu by pressing `Ent`, then `0`, then `Ent`. Exit the menu by pressing `Esc` then `1` to save.

> NOTE: The Jack Resynchronization Operation may be configured on a repeating schedule by enabling the setting "AUTO JACK RESYNC" and adjusting the timer parameters "JACK RESYNC DAYS" and "JACK RESYNC HOURS". The recommended default schedule is every 2-days.
>
> NOTE: To change the "JACK RESYNC DAYS" parameter to represent 10-minute increments, enable the setting "JK RES TMR=10min"
>
> NOTE: Turn on "JK RES NO PRS SW" to bypass the negative pressure switch (terminal 16P) during Jack Resynchronization Operation.

14.14 Testing Firefighter's Emergency Operation

14.14.1 Phase 1 Emergency Recall Tests

Refer to the controller schematics sheets VM5 & FS for fire sensor wiring, and refer to sheets CR & HL3 for fire service key switch and fixture wiring, which can vary based on programming configuration.

> NOTE: Refer to national and local code requirements to verify fire service operation.

14.14.1.1 Designated Main Landing Fire Sensor Test

Fire Sensor input 82M is a N.C. input that recalls to the alternate fire landing. Fire service is initiated if the 82M input goes low.

1. With the car on automatic operation and running normally, set off the main floor smoke sensor, or remove wire 82M at the controller.

2. See that the car runs to the alternate fire landing with the fire hat in the car & hall is lit but not flashing.

3. Reset Fire Service (See Section 14.14.1.4).

14.14.1.2 Alternate Landing Fire Sensor Test

Fire Sensor input 82 is a N.C. input that recalls to the designated main fire landing. Fire service is initiated if the 82 input goes low.

1. With the car on automatic operation and running normally, set off a non-main floor smoke sensor, or remove wire 82 at the controller.

2. See that the car runs to the designated main fire landing with the fire hat in the car & hall is lit but not flashing.

3. Reset Fire Service (See Section 14.14.1.4).

14.14.1.3 Machine Room / Shaftway Fire Sensor Tests

Fire Sensor input 82F is used for sensors that recall to the designated main fire landing and flash the fire hat.

Fire Sensor input 82FM is used for sensors that recall to the alternate fire landing and flash the fire hat.

The inputs 82F & 82FM are configured as N.C. by default (setting '**FLASHING HAT N/C**' = ON), to ensure that fire service is not defeated by a loss of power to the sensors. The setting '**FLASHING HAT N/C**' = ON. Fire service is initiated with the flashing hat if the 82F or 82FM input(s) go low.

For legacy systems, the default wiring for 82F is N.O. (setting '**FLASHING HAT N/C**' = OFF) Input 82FM does not apply for legacy wiring. This requires an additional pole on each sensor to be wired in parallel with the other sensors to inputs 82 & 82M based on which landing it should recall to. Fire service is initiated with the flashing hat if the 82F input goes high, but the input 82 or 82M should simultaneously go low to select the appropriate recall landing.

Recall to Designated Main Landing w/Flashing Hat Test:

1. With the car on automatic operation and running normally, set off a shaftway or machine room smoke sensor away from the main landing, or initiate fire service in the controller as follows:

    a. **If "FLASHING N/C" = OFF**: Jump 1E – 82F for 2 seconds.

    b. **If "FLASHING N/C" = ON**: Remove wire 82F in the controller.

2. See that the car runs to the designated main fire landing and that the fire hat in the car flashes on and off intermittently.

3. Reset Fire Service (See Section 14.14.1.4).

Recall to Alternate Landing w/Flashing Hat Test:

1. With the car on automatic operation and running normally, set off a shaftway or machine room smoke sensor near the main landing, or initiate fire service in the controller as follows:

    a. **If "FLASHING N/C" = OFF**: Jump 1E – 82F and simultaneously remove the wire on 82M in the controller within 1 second.

    b. **If "FLASHING N/C" = ON**: Remove wire 82FM in the controller.

2. See that the car runs to the alternate fire landing and that the fire hat in the car flashes on and off intermittently.

3. Reset Fire Service (See Section 14.14.1.4).

14.14.1.4 Resetting Fire Service

1. Restore the fire sensor(s) to their normal state, remove any jumpers and reconnect any removed field wires to terminals 82, 82M, 82F, 82FM.

2. Reset Fire Service one of two ways:

    a. Turning the key switch to the RESET position.

    b. Temporarily enabling and disabling the '**NO FIRE SERVICE**' setting in Setup Menu->Edit Adjustable Settings/Features menu screen.

> **NOTE: If the car is still on phase 2 fire operation, resetting fire service using the key switch will not immediately turn off phase 2 fire operation, per code. Rather, once the phase 2 fire operation key switch is set to OFF, the car will immediately go into normal operation and will not return to the main landing.**
>
> **NOTE: Enabling "NO FIRE SERVICE" will fully disable all fire service signals, including the fire sensors, phase 1, and phase 2.**

14.14.2 Phase 2 Fire Operation Tests.

1. Initiate phase 1 fire recall by turning the hall fire service key switch to the ON position. The car should arrive at the designated main landing and open its doors.

2. In the car, place the car on phase 2 fire operation by turning the key switch to the ON position, which enables input 80 on the Car Station I/O board.

> **NOTE: The door must be fully open in order to enable fire operation phase 2 while on phase 1.**

3. Run the car to various floors and verify proper door operation, as required in local and national codes.

4. When the tests are done, return the car to the designated main fire service landing on phase 2 fire service, and place the phase 2 key switch back to the OFF position, which enables input 88 on the Car Station I/O board.

5. Reset Fire Service phase 1 (See Section 14.14.1.4)

INDEX

N

O

P

R

S

Slowdown Limits · 15, 38, 41, 42, 44, 59, 127, 158
    bypassing for safety test · 44
Slowdowns · 15, 38, 39, 41, 42, 44, 46, 59, 94, 113, 126, 139, 140, 142, 148, 158
Software Updates · 66, 132, 133
Starter · 5, 6, 8, 9, 10, 11, 13, 27, 50, 54, 55, 84, 85, 94, 110, 119, 126, 149, 150, 152
Stop Switch · 17, 18, 19, 43, 47, 62, 128
Swing/Hidden/Inconspicuous Riser · 127
System Status Menu · 108

T

Temperature · 4, 88
Termination jumpers · 57, 58
Time Setup · 60, 106, 152
Timers · 46, 51, 52, 100, 101, 117, 118, 119, 120, 132, 134
Transformer · 54, 82, 150
Traveling Cable · 1, 8, 10, 12, 17, 19, 20, 63, 68, 70, 89, 97, 127

U

Up To Speed · 27, 84, 136, 148, 149
USB · 55, 65, 66, 67, 71, 117, 132, 133, 134

V

Valve · 7, 10, 55, 63, 152
Vane · 28, 29, 30, 31
Voice Annunciator · 87, 127

W

WARRANTY · 2
Wi-Fi Application · 67, 115, 116
Wye-Delta Starting · 2, 6, 54, 85, 119, 120, 126, 135, 148, 149