ES2 Manual (V1.03)
Traction Controller

Higher | Faster | Smoother

ESI ELEVATOR SYSTEMS

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1. ES2 Traction Controller

ES2 Traction Controller is ESI's "higher-faster-smoother" controller designed to handle speeds up to 1,000 FPM.

The controller is designed for maximum reliability with minimum maintenance. A unique and robust CPU, coupled with a series of forced guided relays, provide all the functionality necessary to run the elevator.

- The **CPU unit** provides the control logic.
- **Indicator Lights**:
  - CPU module has red indicator lights for each input and green indicator lights for each output
  - All relays have an internal indicator light (a board mounted LED for board mounted relays) that illuminates when power is provided to the relay coil. This allows the status of all relays to be verified quickly.
- **Touch Enabled Screen** to indicate system status and operate the elevator controller.
- **Safety Circuits**: The safety circuits are controlled by both the CPU and relay structure for maximum reliability and redundancy in all modes of operation.
- **Variable Frequency Drive:** Magnetek, KEB, and other customer specified DRIVE Unit controls the motor and provides motor overload and fault protection.
- **Reverse Phase Relay:** A reverse phase relay on the board provides reverse phase protection to the controller.
- **Connecting the Controller**: A vertical terminal strip provides all interconnecting to the elevator's equipment.
- **Switches/Push Buttons/Slide Switches on ES2:**
  - **Toggle Switches (3)**: Test mode, Hall button disconnect and Automatic Operation/Inspection Operations.
  - **Push button (3)** : Controller Inspection ENABLE, UP, DOWN.
  - **Slide Switches (2)**: Car Door Bypass and Hatch Door Bypass.

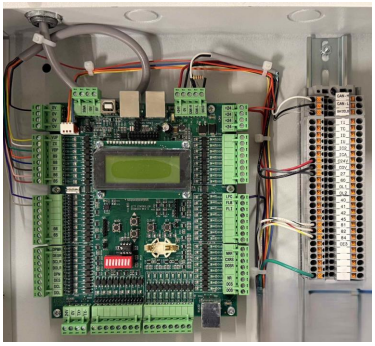
ES2 achieves the consistency of legacy ES1 controller while adding valuable features like Touch Enabled Screen, Higher Speeds and Absolute Positioning System

1.1. ES2 Traction Controller Components

ES2 Traction Controller: Main command center for the ES2 package ensuring smooth operation between COP/TOC/APS/DRIVE

ES2 Car Operating Panel Board (COP) : ES2 ECT Board (ES-CT-COP) is installed in the Car Operating Panel and is the default board to get all the Car Call Inputs and other inputs coming from the COP.

ES2 Top of Car Box (TOC) : ES2 TOC Box includes interface to the ES2 Controller/COP and APS system.



Absolute Position System (APS) : ELGO LIMAX Absolute Positioning System is installed in the hoistway to monitor elevator/car speed and position.

1.2. ES2 Accompanying Manuals and Documentation

ES2 Includes the following documentation for ease of installation:

- **ES2 Quick Start Guide**
- **ES2 User Manual**: Detailed step-by-step procedures on how to install/test/troubleshoot the controller.
- **Drive Manual**: ES2 is compatible with drives normally being used in North America. Each controller will include a drive manual for the drive that is being used on the controller.
    - - M1000
    - - KEB
- **ES2 Drive Parameter List**: ESI Configures all the drives based on data provided by customer. The important Drive Parameters are shared on a job by job basis.
- **ES2 Controller Parameter List**: ES2 Controller Parameter List which is created exclusively for each job
- **Optional Documentation, if following accessories ordered**
    - **ES2 Load Weighing Device**: consists of a detailed description on how to install and calibrate the Load Weighing Device (LWD).
    - **ES2 TEERS**: Provides detailed procedures to setup and install the Emergency Rescue System.
    - **EMIS-100** : In building/premise Monitoring

1.3. Controller Legacy Terminal Name to New Name Mapping

* ESI is transitioning from Legacy Terminal Names/Numbers to more user friendly Terminal names that define the function of the terminal more appropriately.

Controller Type	Legacy Terminal Name	New Terminal Name	Function
Both	#32	#GOV1	Governor Switch
Both	#32A	#GOV2	Governor Switch/Governor Switch Input
Both	#34	#DCB	Front Door Contact Bottom (Swing/Manual Doors Only)
Both	#34A	#DCBI	Front Door Contact Bottom-Intermediate
Both	#34AR	#DCBIR	Rear Door Contact Bottom-Intermediate
Both	#34D	#DCTI	Front Door Contact Top-Intermediate
Both	#34DR	#DCTIR	Rear Door Contact Top-Intermediate
Both	#34R	#DCBR	Rear Door Contact Bottom
Both	#35	#DCT	Front Door Contact Top/Front Door Contact Input
Both	#35R	#DCTR	Rear Door Contact Top/Rear Door Contacts Input
Both	#40	#CSC1	Car Safety Circuit
Both	#41	#CSC2	Car Safety Circuit/Safety Chain Input
Both	#42	#ICGS	In-Car Inspection Switch Input
Both	#43	#DLT	Front Door Lock Top/Front Door Locks Input
Both	#43A	#DLTI	Front Door Lock Top-Intermediate
Both	#43AR	#DLTIR	Rear Door Lock Top-Intermediate
Both	#43D	#DLBI	Front Door Lock Bottom-Intermediate
Both	#43DR	#DLBIR	Rear Door Lock Bottom-Intermediate
Both	#43R	#DLTR	Rear Door Lock Top/Rear Door Locks Input
Both	#44	#DLB	Front Door Lock Bottom
Both	#44R	#DLBR	Rear Door Lock Bottom
Both	#45	#GS	Front Gate Switch Input
Both	#45R	#RGS	Rear Gate Switch Input
Hydraulic	#65	#LW	Load Weighing 80% Input
Hydraulic	#66	#OLD	Load Weighing 110% Input
Both	#68	#OOS	Out of Service Key Switch Input
Both	#69	#CTL	Car to Lobby Key Switch Input
Both	#74	#OOSL	Out of Service Light Output
Both	#90	#AFR	Smoke & Heat Detector at Prime Floor Input
Both	#90B	#HFD	Hatch Smoke & Heat Detector Input
Both	#91	#FCOM	Fire Service Common
Both	#92	#PFR	Smoke & Heat Detector at All Floors Except Prime Floor Input
Both	#92B	#MFD	Machine Room Smoke & Heat Detectorv
Both	#93	#FR	Fire Reset/Bypass Input
Both	#94	#FLS	Fire Lobby Switch Input

Both	#97L	#LFI	Lobby Fire Light Output
Traction*	#BY	#PBS	Primary Brake Switch
Traction*	#BZ	#EBS	Emergency Brake Switch
Both	#HW	#PFS	Pit Flood Switch Input
Both	#IC2	#ICI	In-Car Inspection Input
Both	#ICA	#ACC	Access Input
Hydraulic	#OT	#OTS	Over Temperture Switch Input
Both	#PRS1	#OPS	Pressure Switch Input
Both	#SAB	#SABI	Sabbath Service Key Switch Input
Both	#SAL	#SABO	Sabbath Service Light Output
Both	#TC	#TCI	Top of Car Inspection Input
Both	#TPR4	#TOL	Motor Thermal Overload Input
Traction	#X10	#TRS1	TEERs Switch
Traction	#X11	#TRS2	TEERs Switch/TEERs Input

* On the Brake Terminals

1.4. Legacy COP I/O Names to New I/O Name Mapping

* ESI is transitioning from Legacy Input/Output Names/Numbers to more user friendly Input/Output names that define the function of the Input/Output more appropriately.

Input#	Legacy COP Input Name	New COP Input Name	Function
18	28H	DH	Front Door Hold Button
19	28HR	DHR	Rear Door Hold Button
20	62	SB	S-Button
21	70	ATTN	Attendant ON
22	71	ATTD	Attendant UP
23	72	ATTU	Attendant DN
24	73	ATTB	Attendant Bypass
25	24	DC	Front Door Close Button
26	28	DO	Front Door Open Button
27	50	IND	Independent Service
28	95	FC2N	Fire Phase II ON
29	100	FC2O	Fire Phase II OFF
30	96	FC2C	Fire Phase II Call Cancel
31	24R	DCR	Rear Door Close Button
32	28R	DOR	Rear Door Open Button

Output#	Legacy COP Output Name	New COP Output Name	Function
17	28H	DHL	Front Door Hold Light
18	N/A	HWL	High Water Light
19	28HR	DHLR	Rear Door Hold Light
20	N/A	OPEN	Open for future use
21	N/A	OPEN	Open for future use
22	5	ATBO	Attendant Buzzer
23	6	ATDL	Attendant Up Light
24	7	ATUL	Attendant Down Light
27	61	SPG	Stop & Passing Gong
28	97	FCL	Fire Light In Car
29	97B	FB	Fire Buzzer In Car
30	67	LWLB	Load Weighing Light & Buzzer

1.5. Legacy TOC I/O Names to New I/O Name Mapping

* ESI is transitioning from Legacy Terminal Names/Numbers to more user friendly Terminal names that define the function of the terminal more appropriately.

Input#	Legacy TOC Input Name	New TOC Input Name	Function
9	OL	DOL	Front Door Open Limit
11	28E	DES	Front Door Edge Sensor
13	ROL	DOLR	Rear Door Open Limit
14	DLR	DCLR	Rear Door Close Limit
15	28ER	DESR	Rear Door Edge Sensor
18	65	LW	Load Weighing 80%
19	66	OLD	Load Weighing 100%

Output#	Legacy TOC Output Name	New TOC Output Name	Function
9	OX	DOS	Front Door Open Signal for the Operator
10	CX	DCS	Front Door Close Signal for the Operator
13	OXR	DOSR	Rear Door Open Signal for the Operator
14	CXR	DCSR	Rear Door Close Signal for the Operator
22	97I	FLI	Fire Light Top of Car
23	97BI	FLB	Fire Buzzer Top of Car
24	LCP	LFC	Light & Fan Control

1.6. Pre Power Check Out

Prior to shipment, the controller is given a series of thorough tests to ensure proper operation. However, it is possible that components could have loosened or been damaged during shipment. Therefore, before applying power, it is a good idea to check the following:

- Check for loose components.
- Check that no components were damaged in shipping
- Check all rectifier connections are tight and not shorted
- Make sure all plug in relays are fully inserted and seated.
- Check that all CPU terminal strips fully inserted
- Make sure all toggle switches are in the down position.
- CONFIRM input power supply. The input power supply specifications are printed near the terminals.

1.7. Intial Power Turn On/ES2 Ground Safety

CAUTION: High Voltage can cause serious and fatal injury. Extreme caution should be exercised when working on or near this controller. Only qualified personnel should attempt to start-up or troubleshoot this controller.

1. Connect the main power line to Terminal Block connectors L1, L2, and L3. Terminal Block is at the bottom of Controller.
2. Check the voltage across terminals #L1, #L2 and #L3. Verify that the voltage reading is what the controller is built for.
3. The Reverse Phase Relay (RPR) should be lit. If the RPR is not lit then reverse the #L1 and #L2 wires.
4. Typically, voltage across the Primary side of the control transformer should be 208VAC and the voltage across the Secondary side of the transformer should be 120VAC.
5. The Secondary side of the transformer ties into the RB board where power is routed to different parts of the controller.
6. Verify the following terminal pairs should have 120VAC present:
   - #27 - #60
   - Controllers with E-Brake (Emergency Brakes) #GOV1- #60 (with CT Relay energized)
   - Controllers with Rope Gripper #OVS1-#60 (with CT Relay Energized)
   - #FCOM(#91) - #60
7. Verify the following terminal pairs have 24vdc which is a feed from PS #2:
   - #31 - #22
   - #30 - #22 (with Hall Button Switch ON)

8. If job is using ESI Digital Position Indicators (DPI-XX)'s verify the following terminal pairs have 24vdc which is a feed from PS #2:
   - #1L - #2L

If all voltages are within range and all safety circuits are properly wired, running the car on Construction Mode with Top of Car Inspection should be done first. See the Construction Mode/sequence of operation for a full description of this procedure

1.8. Default Setup

ESI aims to deliver ES2 Controller based on specifications as given by customers. Please double check the controller configuration to ensure that specifications have not changed between when the controller was ordered and it being installed.

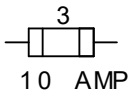
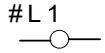
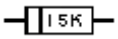
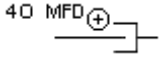
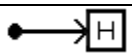
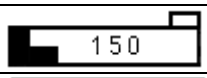
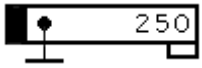
1.9. Conventions

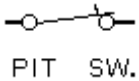
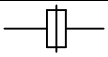
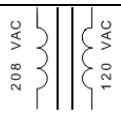
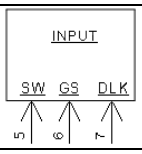
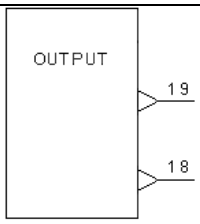
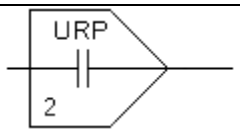
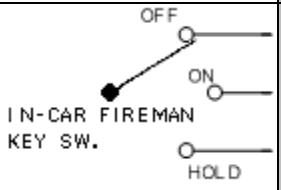
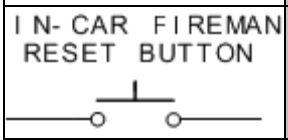
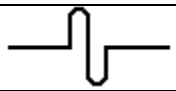
This manual uses the following terms and conventions to indicate parts of the controller and operation:

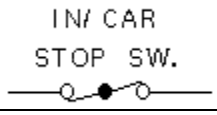
- CPU – main processing board, that houses the touch enabled screen. The 'Brains' to the controller.
- I/O Board – Expansion boards that provide additional inputs and output to the controller.
- Energized – Power is applied to the relay coil, and the relay has operated.
- De-energized – Power is not applied to the relay coil, and the relay is at rest.
- Activated – A signal is applied to the input terminal on the CPU or CPU expansion board.
- De-activated – A signal is not applied to the input terminal on the CPU or CPU expansion board.
- Symbol – a letter or letter number code referring to a relay or terminal.
  Example: PX
- Symbol number/number – A contact pair on a relay
  Example: PX 1/7
- Symbo [number] – An input / output on the CPU board.
  Example: Input [1] /Output [1]
- Symbol{number-number} – An input / output on an expansion board. The first number indicates which I/O board, the second indicates the terminal.
  Example: Input [1-13]
- #symbol - A terminal on the connection terminal strip.
  Example: #OF1
- #symbol to #symbol – Indicates an external electrical connection between two terminals.
  Example: #27 to #28

1.10. Legend

Following Table outlines the symbols used in the ESI Drawings/Prints. Please refer to this table whenever you have any questions regarding symbols on the ESI Drawings/Prints.

Symbol	Symbol Name	Notes
	**Fuse**	Top Number represents the fuse number. Bottom Number represents the Amperage.
	**Terminal**	The Lettering (beginning with#) represents the terminal name.
	**Normally Open Contact (Contactor)**	The Lettering represents the Contactor Name (i.e. P) and the Number represents the Contact Number (i.e. 1)
	**Normally Closed Contact (Contactor)**	The Lettering represents the Contactor Name (i.e. P) and the Number represents the Contact Number (i.e. 6)
	**Normally Open Contact (Relay)**	The Lettering represents the Relay Name (i.e. Z) and the Numbers represents the Relay Terminals (i.e. 1 and 7)
	**Normally Closed Contact (Relay)**	The Lettering represents the Relay Name (i.e. I) and the Numbers represents the Relay Terminals (i.e. 5 and 8)
	**Relay Coil**	The Lettering represents the Relay Name (i.e. TC). The small circle to the right of the Relay represents the Right Terminal of the Coil.
	**Resistor**	The Lettering represents the resistor value (i.e. 15kΩ)
	**Capacitor**	The Lettering represents the capacitance value (i.e. 40µF)
	**Diode**	Represents a rectifier diode
	**Switch**	The Lettering represents the name of the switch (i.e. BOT FINAL). NOTE: Switch shown in Closed Position.
	**Region**	This symbol is used to refer to a different area on the drawing (i.e. Area Labeled H)
	**Resistor**	The Lettering represents the resistor value (i.e. 150Ω)
	**Resistor (Tapped)**	The Lettering represents the resistor value (i.e. 250Ω)

Symbol	Symbol Name	Notes
	**Switch**	The Lettering represents the name of the switch (i.e. PIT SWITCH). NOTE: *Switch shown in Closed Position.*
	**Switch**	The Lettering represents the name of the switch (i.e. GOVERNOR SWITCH). NOTE: *Switch shown in Closed Position.*
	**Transformer**	The Lettering on the Left Side represents the Primary Voltage (i.e. 208VAC) and the Lettering on the Right Side represents the Secondary Voltage (i.e. 120VAC).
	**Switch**	The Lettering represents the name of the switch (i.e. FX). NOTE: *Switch shown in Open Position.*
	**CPU Inputs**	The Lettering represents the Input name (i.e. SW, GS, and DLK). The Numbers represent the Input location. (i.e. SW = IN 5, GS = IN 6, DLK = IN 7).
	**CPU Inputs**	The Lettering represents the Input name (i.e. 38
	**CPU Outputs**	The Numbers represent the Output Number on the CPU (i.e. Drawing is showing Outputs 18 and 19).
	**Dry Contact Outputs**	The Lettering represents the Dry Contact Output name. The Number represents the Output Number (i.e. Dry Contact Output URP, Output number 2).
	**Key Switch**	The Lettering represent the Switch Name (i.e. IN CAR FIREMAN KEY SW) and the Pole Names (i.e. OFF, ON and HOLD). *Three position key switch shown.*
	**Push Button**	The Lettering represents the Button Name (i.e. IN CAR FIREMAN RESET BUTTON).
	**Overload**	Current Sensing Portion of the Overload Protection.
	**Light**	The Lettering represents the name of the Light (i.e. UP).
	**Buzzer**	The Lettering represents the name of the Buzzer (i.e. Door Delay Buzzer).
	**Hall Lantern**	Represents a directional lantern. Up lantern shown

Symbol	Symbol Name	Notes
	**Board Connector**	The Lettering represents the connector name (i.e. J1). The number represents the Pin (i.e. 5).
	**Variable Timer Delay**	Represents a delay-on circuit timer
	**Switch**	The Lettering represents the name of the switch (i.e. IN CAR STOP SWITCH). NOTE: *Switch shown in Closed Position.*

1.11. Relay Type and Locations

ES2 has Relay based redundancy to achieve optimal and safe elevator operations. Following list provides a ready reference for all the Mechanical?? relays on ES2

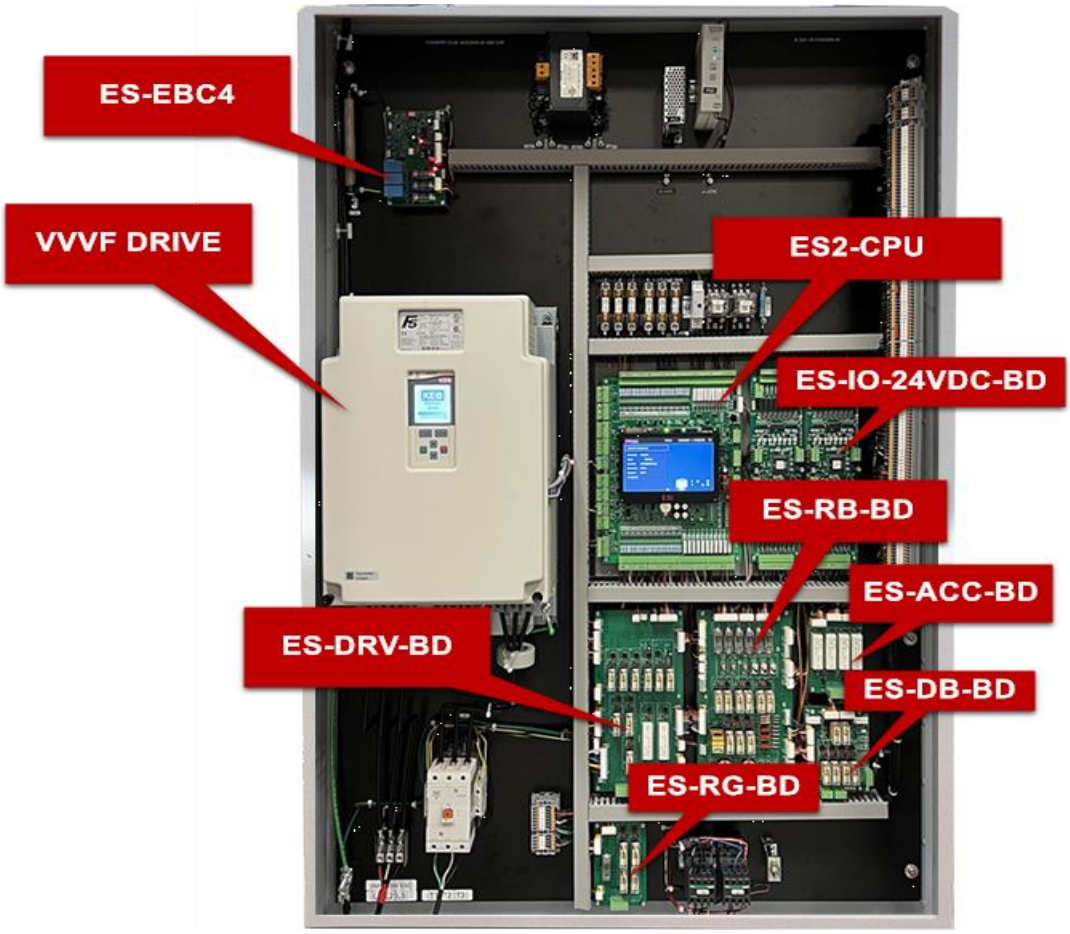
RELAY NAME	FUNCTION	TYPE	LOCATION
B	Delay Pilot	2 Pole Safety	ES-DRV-BD
D	Run Down	6 Pole Safety	ES-DRV-BD
DEN	Drive Brake Enable	2 Pole Safety	ES-DRV-BD
DU	Down or Up Run	2 Pole Safety	ES-DRV-BD
HM	HSM High Speed	2 Pole Safety	ES-DRV-BD
HMX	HSM High Speed Pilot	2 Pole Safety	ES-DRV-BD
HS	High Speed	2 Pole Safety	ES-DRV-BD
PX	Run	2 Pole Safety	ES-DRV-BD
U	Run Up	6 Pole Safety	ES-DRV-BD
I / IX	Inspection – Energized on automatic operation	2 Pole Safety	ES-RB-BD
IC1 / IC2	In Car Inspection – Energized on in car-insp.	2 Pole Safety	ES-RB-BD
ID	Inspection Down	2 Pole Safety	ES-RB-BD
IU	Inspection Up	2 Pole Safety	ES-RB-BD
LFI	Lobby Fire Light	2 Pole Safety	ES-RB-BD
CT	Cycle Test	4 Pole KUH	ES-RB-BD
SWB	Stop Switch Bypass	2 Pole Safety	ES-RB-BD
SWB2	Stop Switch Bypass Redundant	2 Pole Safety	ES-RB-BD
DL	Door Locks	2 Pole Safety	ES-DB-BD
GS	Gate Switch	2 Pole Safety	ES-DB-BD
VC	Leveling	2 Pole Safety	ES-DB-BD
Z	Door Zone	2 Pole Safety	ES-DB-BD
ACC	Access	6 Pole Safety	ES-ACC-BD
ACX	Access Aux. Relay	6 Pole Safety	ES-ACC-BD
BAC	Access Bottom Control	6 Pole Safety	ES-ACC-BD
TAC	Access Top Control	6 Pole Safety	ES-ACC-BD

2. Traction Controller : What's in the Package

2.1. ES2 Traction Controller

ES2 Traction Controller comes with the following boards pre-installed on all controllers

- CPU with 8" Touch Screen **ES2-CPU**: Main Process Controller
- Drive Board **ES-DRV-BD**: Board to communicate with the drive and enable safe operation of the elevator
- Relay Board **ES-RB**: Central Relay Board to ensure smooth communication between different controller components and has essential switches to setup different options
- Access Board **ES-ACC**: To ensure safe operations for different access operations
- Door Board **ES-DB**: Central Board to ensure smooth operation with door operators
- Brake Board **ES-EBC4**: Board to dive Primary Brakes



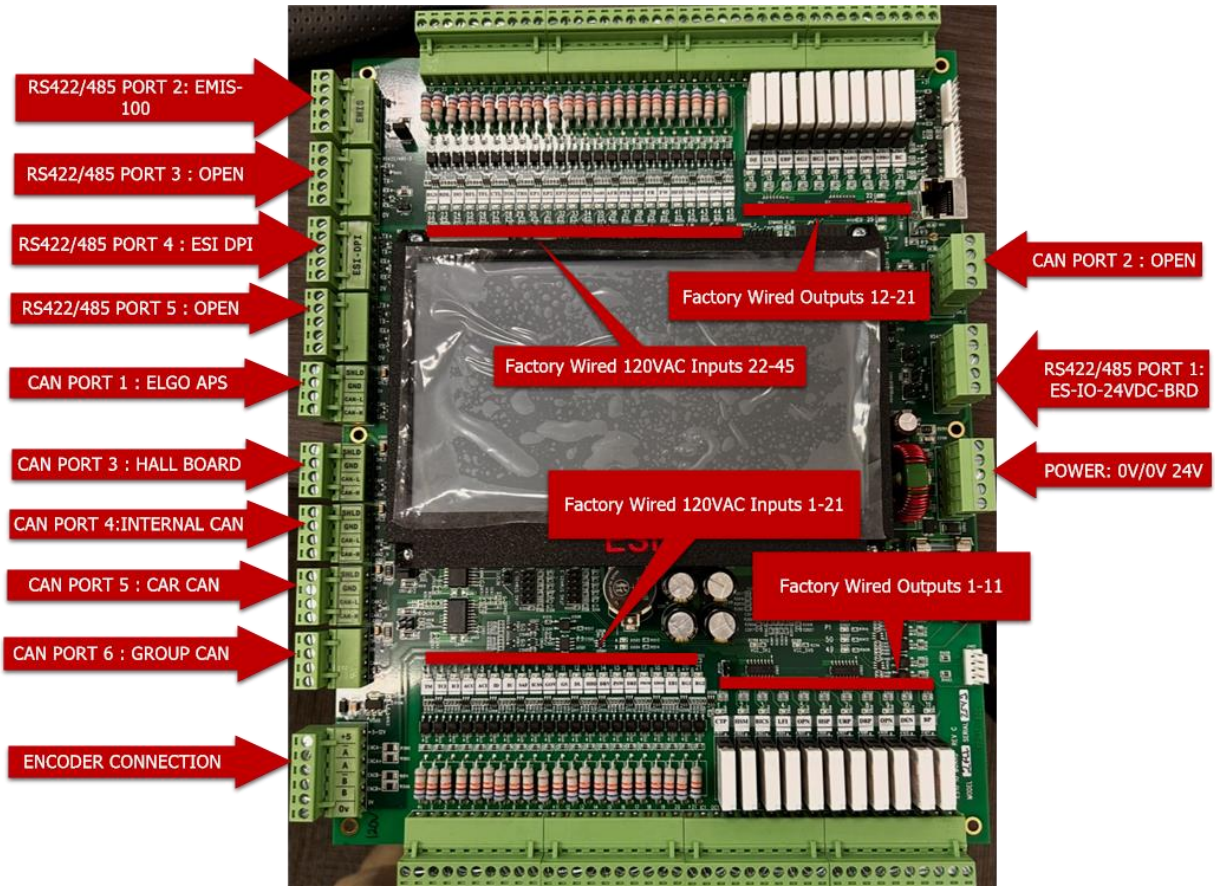
2.1.1. Boards on the Controller

2.1.1.1. CPU Board-(ES2-CPU)

CPU with 8" Touch Screen ES2-CPU

Main Process Controller is the "brains" of the controller and ensures safe operation of the elevator. **NO WIRING IS REQUIRED DIRECTLY INTO THE ES2 CPU. FOLLOWING INFORMATION ABOUT INPUTS/COMMUNICATION PORTS IS TO ASSIST IN TROUBLESHOOTING, IF NECESSARY.**

Key Components of ES2



With the ES2 architecture, Customers will always wire into the Terminals provided in the controller. This provides ES2 customers minimally invasive wiring.

THE TOUCH SCREEN SHOULD NEVER BE REMOVED BY ANYONE.

In case of damage or failure to the touch screen, the whole CPU Board should be returned to ESI for further disposition including repair.

2.1.1.1.1. CPU Inputs 1-22

***The input/output listing is standard version and may change for certain controllers based on customer requirements. Always refer to the final print to ensure everything is wired as per the print.**

* If the input has a legacy name different than the ES2 Input name, both are being displayed for ease of transition from ES1 to ES2

Input#	CPU Legacy Name	CPU Input Name	Abb# - Terminal Strip*	Default Condition	Function
1	N/A	TM	TM	On	Landing System Tape Tension Monitor
2	TC	TCI	TCI	On	Top of Car Inspection
3	IC	ICI	ICI	On	In Car Inspection
4	ACC	ACC	ACC	Off	Access Mode
5	I	ACI	ACI	On	Automatic or Controller Inspection Mode
6	ID	ID	ID	Off	Inspection Car Down Run
7	IU	IU	IU	Off	Inspection Car Up Run
8	SAF	SAF	CSC2	On	Safety Chain Monitoring for Car Safeties:-Fireman Safety Switch, Escape Hatch, Car Safety Switch, Top of Car Safety Switch, Slack Cable Switch
9	SW	ICSS	ICGS	On	In Car Stop Switch
10	GOV	GOV	GOV2	On	Governor Switch
11	GS	GS	GS	N/A	Gate Switch
12	DL	DL	DLB	N/A	Slide doors: Input for Car Door Interlocks Manual/Swing Door: Input for Car Door Contacts
13	HBD	HCE	NOT AVAILABLE	On	Hall Call Enable: Internal ES2 Input to disconnect Hall Calls
14	DRV	DRV	NOT AVAILABLE	On	ES2 Safety Input : Means SAF input is high, GS/DL is High, DRV will be high OR SAF High, TOC/In Car Insp High and Bypass from RB is On, then DRV
15	N/A	PSW	PSW2	On	Pit Switch
16	!ER	DRE	NOT AVAILABLE	On	Drive OK Input (always on, Deactivates on Error Condition)
17	N/A	BFL	BFL2	On	Bottom Final Limit
18	N/A	TFL	TFL2	On	Top Final Limit
19	DFI	GFI	NOT AVAILABLE	Off	120V Group Feed Input Check
20	RDO	RHDC	RDCT	Off	Manual/Swing Doors Input for rear hatch door locks
21	N/A	OPEN			OPEN FOR FUTURE USE
22	RGS	RGS	RGS	N/A	Rear Door Gate Switch (if job has walk through doors)

2.1.1.1.2. CPU Inputs 23-45

***The input/output listing is standard version and may change for certain controllers based on customer requirements. Always refer to the final print to ensure everything is wired as per the print.**

* If the input has a legacy name different than the ES2 Input name, both are being displayed for ease of transition from ES1 to ES2

Input#	CPU Legacy Name	CPU Input Name	Abb# - Terminal Strip*	Default Condition	Function
23	RDL	RDL	RDLB	N/A	Slide doors: Input for Rear Car Door Interlocks Manual/Swing Door: Input for Rear Car Door Contacts (if job has walk through doors)
24	DO	HDC	DCT	N/A	Manual/Swing Doors Input for hatch door locks
25	!RG1	!RG1	NOT AVAILABLE	Off	Internal Rope Gripper Relay Contact check
26	!RG2	!RG2	NOT AVAILABLE	Off	Internal Rope Gripper Relay Contact check
27	N/A	RGC	RGC2	Off	Rope Gripper Contact
28	69	CTL	CTL	On	Car To Lobby Input
29	BPX	TRS	TRS2	Off	ES2 Traction Elevator Emergency Rescue System Input
30	EA	EPMS	EPMS	Off	Emergency Power Manual Select
31	EM3	EPPT	EPPT	Off	Emergency Power Pre-transfer
32	EM2	EPCB	EPCB	Off	Emergency Power Contact
33	68	OOS	OOS	Off	Out of Service Input
34	HW	PFS	PFS	Off	Pit Flood Switch Input
35	SAB	SABI	SABI	Off	Sabbath Input
36	90	AFR	AFR	Off	Alternate Fire Recall Floor
37	92	PFR	PFR	Off	Primary Fire Recall Floor
38	92B	MFD	MFD	Off	Machine Room Sensors / Heat Detectors (Prime Return)
39	93	FR	FR	Off	Fire Control Lobby Switch (RESET)
40	94	FLS	FLS	Off	Fire Control Lobby Switch (ON)
41	90B	HFD	HFD	Off	Hatch Smoke / Heat Detectors (Alternate Return)
42	EBI	EBI	NOT AVAILABLE	N/A	ES2 Safety Input
43	BY	PBS	PBS	On	Primary Brake Switch Monitor
44	BZ	EBS	EBS	On	E-Brake Switch Monitor
45	TOL	TOL	TOL	On	Machine Thermal Overload Input

2.1.1.1.3. CPU Outputs

*The input/output listing is standard version and may change for certain controllers based on customer requirements. Always refer to the final print to ensure everything is wired as per the print.

Output#	Legacy Output Name	Name	Abb# - Terminal Strip*	Description
1	CT	CTP	Not Available	Cycle Test Output
2	HSM	HSM	Not Available	2nd High Speed Pilot (Controls Speed for 201FPM+)
3	SWB	BICS	Not Available	Bypass In-Car Stop Switch
4	RC	RC	Not Available	Retiring CAM (if Required)
5	DF	GFO	Not Available	Group Feed 120V Output
6	HSP	HSP	Not Available	High Speed Pilot (Controls Speed for 51-200FPM)
7	74	OOSL	OOSL	Out Of Service Light
8	97L	LFI	LFI	Lobby Fire Light Indicator
9	SAL	SABO	SABO	Sabbath Output
10	URP	URP	Not Available	Up Run Pilot
11	DRP	DRP	Not Available	Down Run Pilot
12	84	DZ	Not Available	Door Zone
13	VC	LVL	Not Available	Re-Level in the door zone
14	EBP	EBP	Not Available	Emergency Brake Pilot
15	RG1	RG1	Not Available	Rope Gripper Board Relays 1/2 Pilot
16	RG2	RG2	Not Available	Rope Gripper Board Relays 3/4 Pilot
17	EXP	BPX	Not Available	Brake Pick Pilot for Sheave Brakes
18	N/A	HSL	Not Available	High Speed Slowdown Limit
19	N/A	HML	Not Available	Very High Speed Slowdown Limit
20	BP	BP	Not Available	Brake Pilot
21	DEN	DEN	Not Available	Drive Enable

2.1.1.1.4. Communication Ports

ES2 CPU provides following Communication Ports for connectivity to ES2 and external components like Position Indicators, External Monitoring, Encoder etc:-

6 CAN Communication Ports

CAN-1	ELGO Absolute Position System
CAN-2	OPEN FOR FUTURE USE
CAN-3	Serial Hall
CAN-4	Internal CAN
CAN-5	Car CAN
CAN-6	Group Communication CAN

4 RS422/485 Communication Ports

RS422/485-1	Communication for I/O Expansion Board (ES-IO-24VDC-BD)
RS422/485-2	External Communication Gateway if required/ESI Setup
RS422/485-3	OPEN FOR FUTURE USE
RS422/485-4	ESI DPI's (DPI-XX)

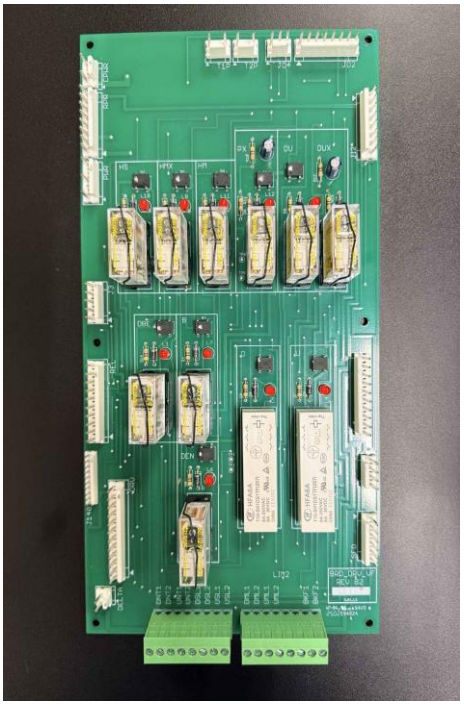
1 Encoder Communication Port

2.1.1.2. Drive Board-(ES-DRV-BD)

This board ensures backup redundancy for various drive operations. **NO CUSTOMER WIRING IS REQUIRED TO THIS BOARD.**

The board has following relays:-

1. 8A, 110 VDC replaceable Relays with Sockets marked HS, HMX, HM, PX, DU, DUX, DBE, B and DEN : TOTAL 9
2. 8A, 110 VDC non replaceable Relays marked as D and U : TOTAL 2

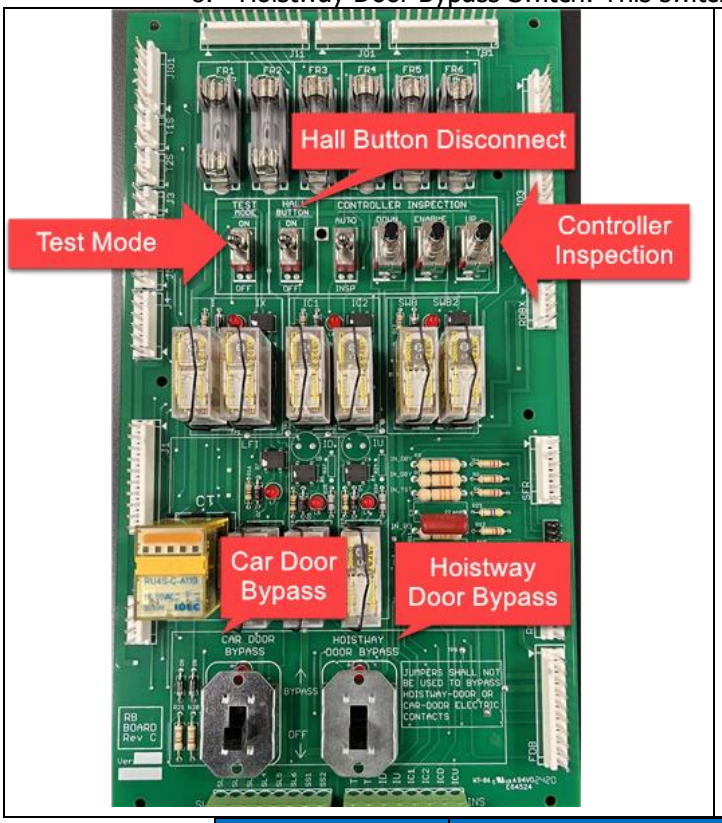


RELAY NAME	FUNCTION	TYPE
B	Brake Pilot	2 Pole Safety
D	Run Down	6 Pole Safety
DEN	Drive Brake Enable	2 Pole Safety
DU	Down or Up run	2 Pole Safety
HM	2nd High speed (Controls speed for 201 FPM+)	2 Pole Safety
HMX	2nd High speed pilot (Controls Speed for 201FPM+)	2 Pole Safety
HS	High speed (Controls Speed for 51-200FPM)	2 Pole Safety
PX	Run	2 Pole Safety
U	Run Up	6 Pole Safety

2.1.1.3. Relay Board-(ES-RB-BD)

The Relay Board to ensure smooth communication between different controller components and has essential switches to setup different options. Key Components on the Relay Board

1. 2AMP GLASS FUSE marked as FR1, FR2, FR3, FR4, FR5, FR6: TOTAL 6
2. Test Mode ON/OFF Toggle Switch : Puts the elevator in Test Mode, when toggled to ON position. Elevator doors will not open automatically and Hall calls will be disabled when set to ON
3. Hall Button ON/OFF Toggle Switch: Disconnect all hall call buttons when toggled to OFF position. No Hall calls will be accepted when set to OFF. Setting the switch back to ON will enable all hall calls.
4. Controller Inspection Mode:
   Auto/INSP Toggle Switch: Toggle Switch on AUTO will put the Controller in Automatic Mode. Toggle Switch on INSP will put the controller in Controller Inspection Mode
   ENABLE/DOWN push buttons: To run the elevator DOWN while on Controller Inspection mode, Press ENABLE AND DOWN Button Together
   ENABLE/UP push buttons: To run the elevator UP while on Controller Inspection mode, Press ENABLE AND UP Button Together
5. 8A, 110 VDC replaceable Relays with Sockets marked I,IX, IC1, IC2, SWB, SWB2, LFI, ID and IU : TOTAL 9
6. 6A, 110 VAC Replaceable Relay with Socket Marked CT
7. Car Door Bypass Switch : The switch enables Car door to be bypassed when on inspection.
8. Hoistway Door Bypass Switch: This switch enables Hoistway Door to be Bypassed when on inspection



RELAY NAME	FUNCTION	TYPE
I / IX	Controller Inspection – energized on automatic operation	2 Pole Safety
IC1 / IC2	In car inspection – energized on in car insp.	2 Pole Safety
ID	Inspection Down Run	2 Pole Safety
IU	Inspection Up Run	2 Pole Safety
LFI	Lobby Fire Light	2 Pole Safety
CT	Cycle Test	4 Pole KUH
SWB	Stop switch bypass	2 Pole Safety
SWB2	Stop switch bypass Redundant	2 Pole Safety

2.1.1.4. Access Board-(ES-ACC-BD)

To ensure safe operations for different access operations. **NO CUSTOMER WIRING IS REQUIRED TO THIS BOARD.**

The board has following relays:-

1. 8A, 110 VDC non replaceable Relays marked as ACC, ACX, BAC and TAC : TOTAL 4

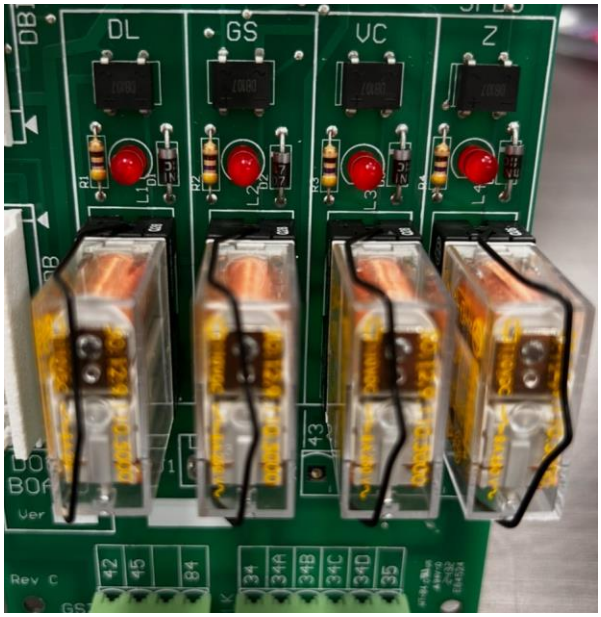
RELAY NAME	FUNCTION	TYPE
ACC	Access	6 Pole Safety
ACX	Access Aux. Relay	6 Pole Safety
BAC	Access Bottom Control	6 Pole Safety
TAC	Access Top Control	6 Pole Safety

2.1.1.5. Door Board-(ES-DB-BD)

Central Board to ensure smooth operation with door equipment. **NO CUSTOMER WIRING IS REQUIRED TO THIS BOARD.**

The board has following relays:-

1. 8A, 110 VDC replaceable Relays with Sockets marked DL, GS, VC and Z : TOTAL 4



RELAY NAME	FUNCTION	TYPE
DL	Door Locks	2 Pole Safety
GS	Gate Switch	2 Pole Safety
VC	Re-Leveling	2 Pole Safety
Z	Door Zone	2 Pole Safety
RDL*	Rear Door Locks	2 Pole Safety
RGS*	Rear Gate Switch	2 Pole Safety

* Only on the Walk Through Door Board

2.1.1.6. Brake Board-(ES-EBC3)

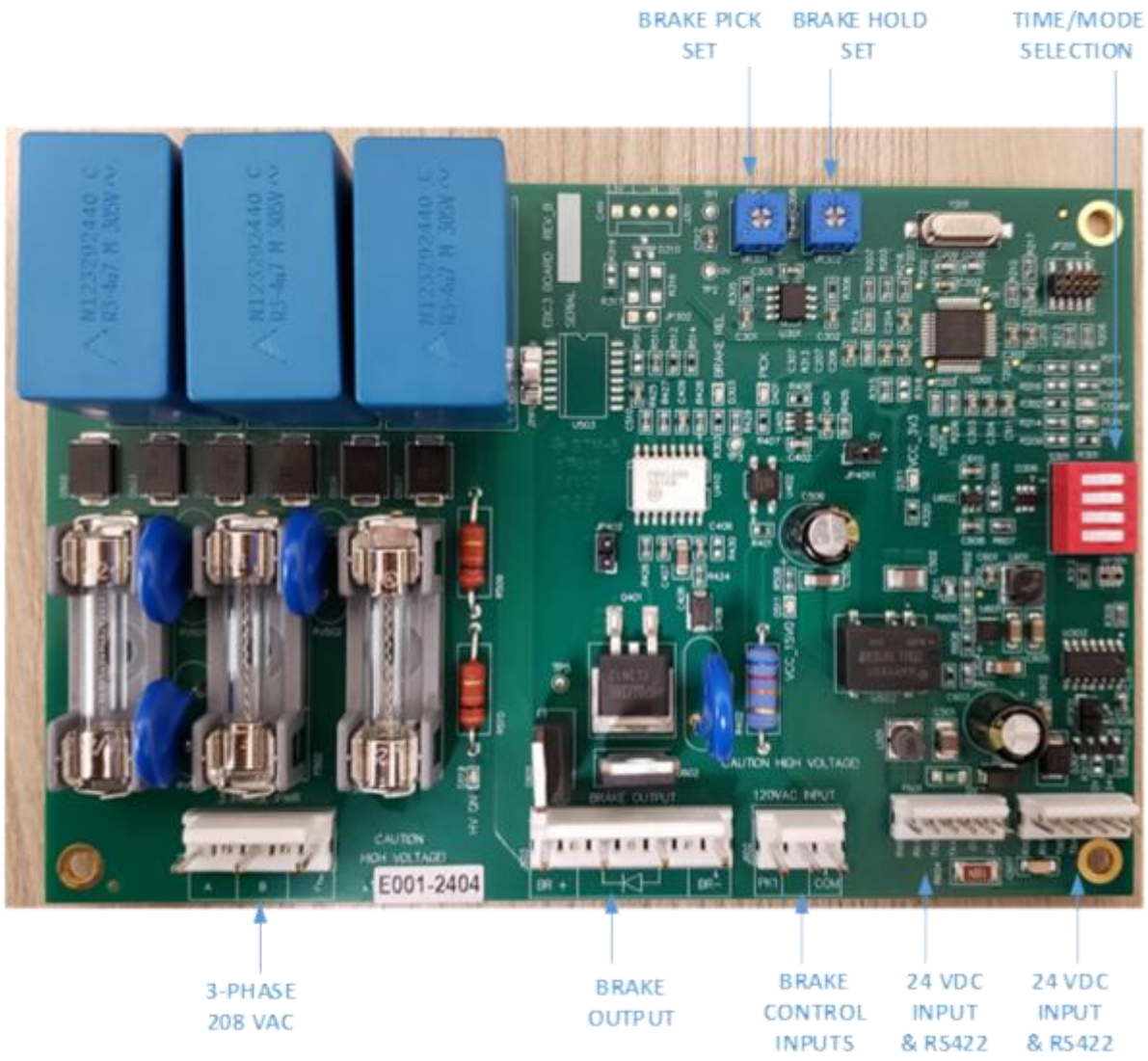
Every Traction Controller comes with **ZERO, ONE or TWO ES-EBC3.** Following are the details for different EBC3 configurations:-

1. **ZERO** : For certain brake Configurations, ES2, may come with Brake Control circuits which use power resistors and contactors to set 'Pick' and 'Hold' brake voltages.
2. **ONE :** Mostly applicable to Geared Applications where the secondary brake is a ROPE GRIPPER and comes with an ES-RG-BD
3. **TWO:** Mostly applicable to Gearless Applications, where the secondary brake is a Emergency Brake or a Sheave Brake.

EBC3

- Discrete Brake Board
- Brake Values are setup on the Brake Board

The second-generation ESI **Brake Control Board (EBC3)** uses an NXP microcontroller for PWM control of the brake 'pick' and 'hold' voltages (preset via adjustable set-points), with the source being 3-Phase 208 VAC.



BRAKE CONTROL BOARD (EBC3) OVERVIEW

Following Figure shows an operational overview of EBC3. The following gives a brief description of the major circuit blocks:

3-Phase 208VAC Input: The board can accept 208/240VAC 3-Phase line voltage or 120VAC 1-Phase. This will depend on the brake data and will be configured by ESI.

PWM/Brake Output: In this section, an advanced IGBT optocoupler uses PWM signals (based on the preset pick and hold voltages) to drive the Brake Output Power Transistor which is capable of a continuous drain current of 27A/600V.

Brake Control Input: 120VAC command signal from the controller telling the Brake Control Board to pick the Brake.

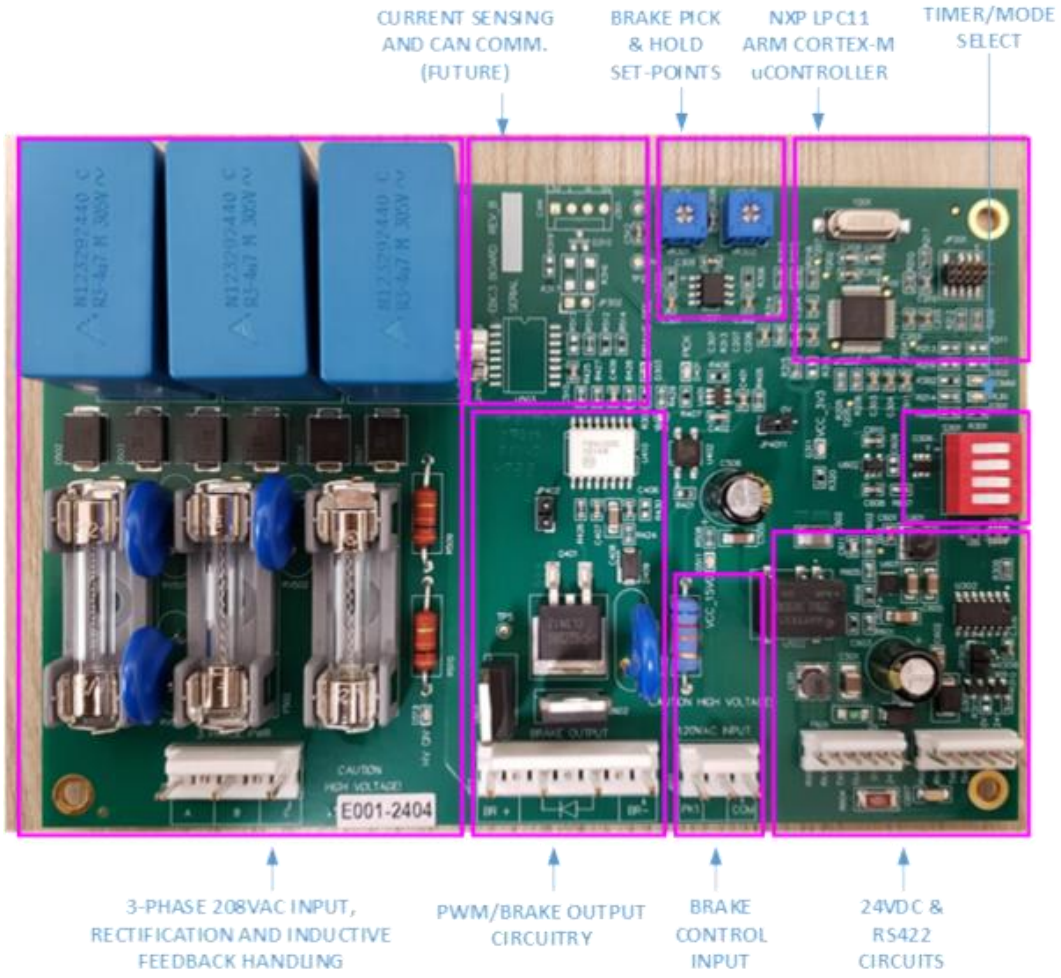
24VDC & RS422: This section uses a 24VDC Isolated DC-DC converter module as supply for the Controller and other logic circuits. There is also an RS422 interface for future use.

Timer/Mode Select: DIP Switch positions **1** and **4** are used to set the brake pick time. For 2 seconds, both 1 and 4 must be set. For a pick time of 4 seconds, only switch position **4** must be set.

NXP microcontroller: This is a low power 32-bit ARM Cortex-M0 microcontroller that offers among other peripherals, a 10-bit ADC, RS485 and CAN.

Brake PICK/HOLD Set-Points: These pick and hold potentiometers are preset by ESI (**Pick Max is 3AMP for this board**). They may be adjusted in the field as required. Clockwise increases the voltage. B1 and B2 test points on the controller can be used to with a multimeter to measure once adjusted.

Current Sensing & CAN: There are provisions on the board for current sensing feedback that would allow for remote control of pick and hold voltages via a CAN port.



2.1.2. Optional Boards on the Controller

2.1.2.1. Rope Gripper Board-(ES-RG-BD)

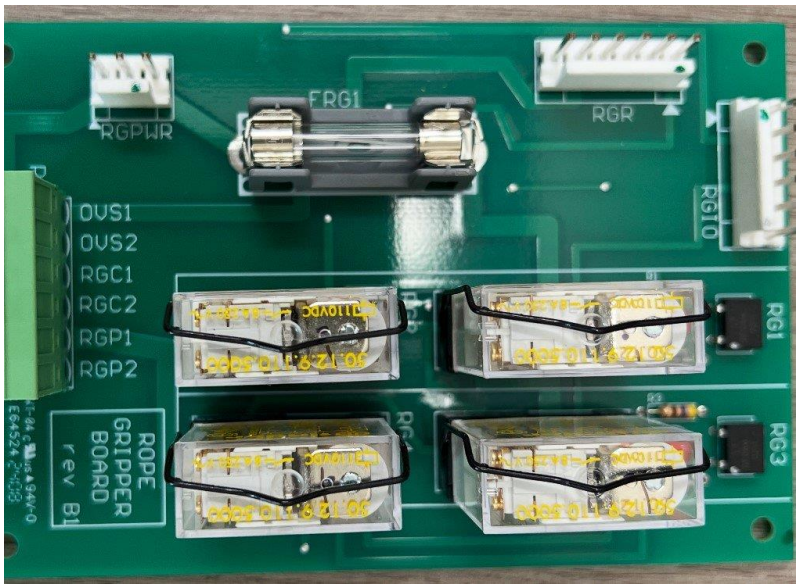
There are three events that will trip the rope gripper.

1) Governor Over Speed tripped.
2) Brake Switch Error on Stop.
3) Unattended Motion.

The board has following relays:-

1. 8A, 110 VDC replaceable Relays with Sockets marked RG1, RG2, RG3 and RG4: TOTAL 4
2. 6 AMP Glass Fuse Marked FRG1

Field Wiring to be provided as follows:
Governor Switch is to be wired between #OVS1 and #OVS2
Contacts from the Rope Gripper are to be wired between #RGC1 and #RGC2
Rope Gripper input power is to be wired between #RGP1 and #RGP2



2.1.2.2. I/O Expansion Board-(ES-IO-24VDC-BD)

Expansion board used for Discrete Hall Calls, Additional Inputs (not accommodated on ES2-CPU, TOC, COP), Lockouts, Power Doors etc.
No Direct Wiring is required for this board. ES-IO-24VDC-BD could be used for the following:-

1. Discrete Hall Cars
2. Special Door Operators (Power Doors etc.)
3. Hall lanterns
4. Lockouts for Machine Room

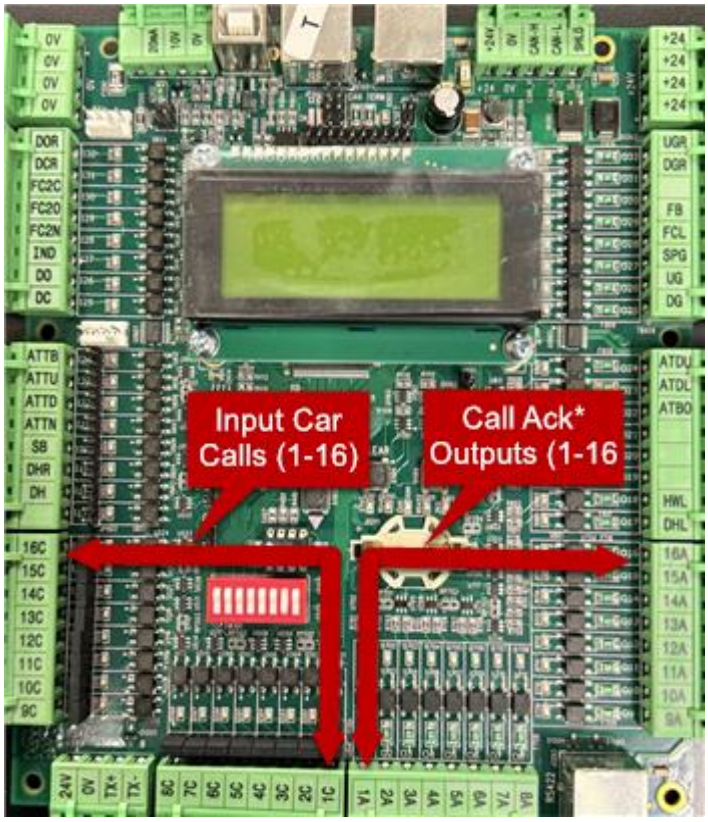
ES2 Print will clearly specify the purpose of the board and it's wiring.

2.1.2.3. CE Driver Board-(ES-CE-BD)

Special Interface Board to interact with CE Position Indicators. ESI provides this factory programmed for a seamless integration with CE Position Indicators.
No direct Customer wiring is required for this board

2.2. Car Operating Panel Board-(ES-CT-COP)

Standard ES2 controller architecture includes a ES-ECT-COP board. It can be shipped to the customer or our customer's COP manufacturer. This COP ECT will be wired to the car components/inputs/outputs. ES-ECT-COP connects to the ES-CPU via a CAN connection back to the controller. Standard ES-ECT-COP is setup for 16 floors. For additional floors, ES-ECT-COP's are provided in increments of 32 floors.

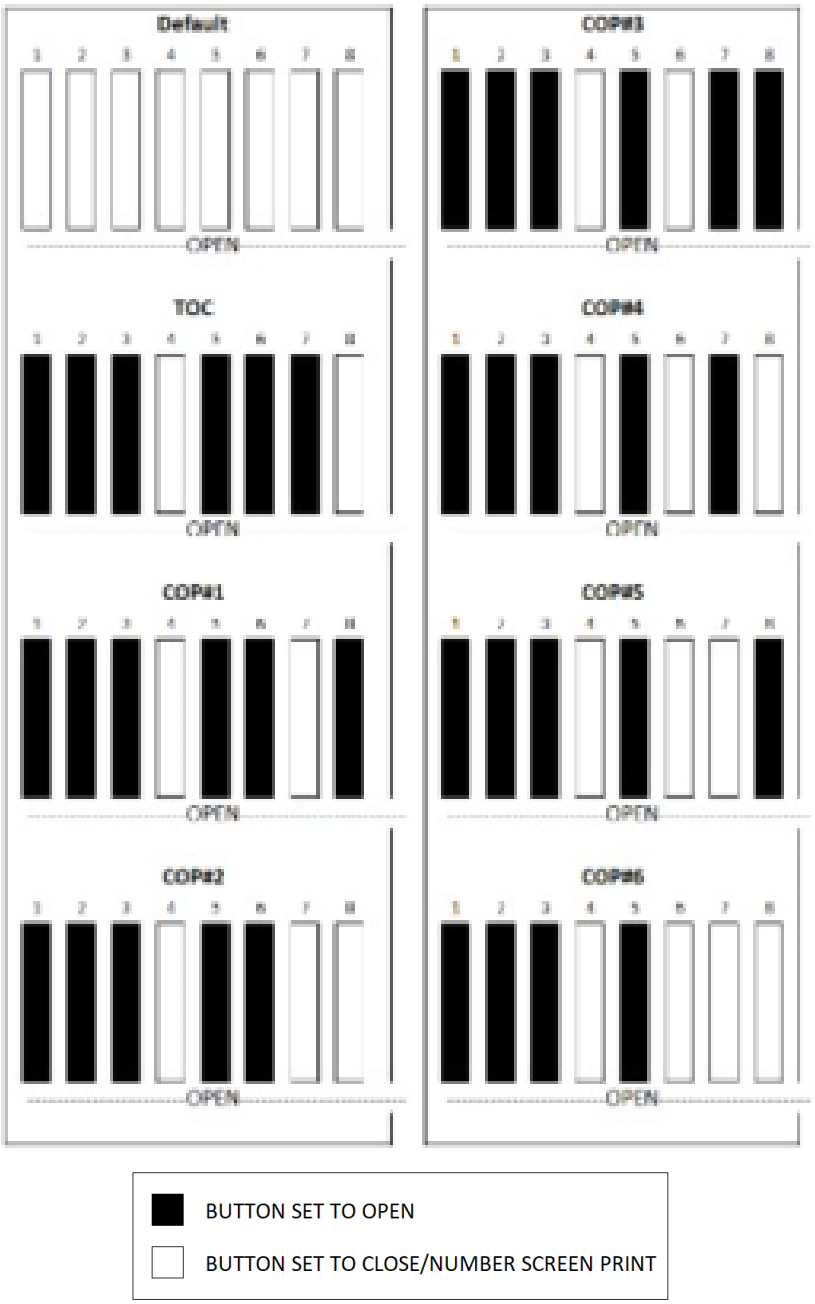


2.2.1. COP-Inputs & Outputs

*The input/output listing is standard version and may change for certain controllers based on customer requirements. Always refer to the final print to ensure everything is wired as per the print.

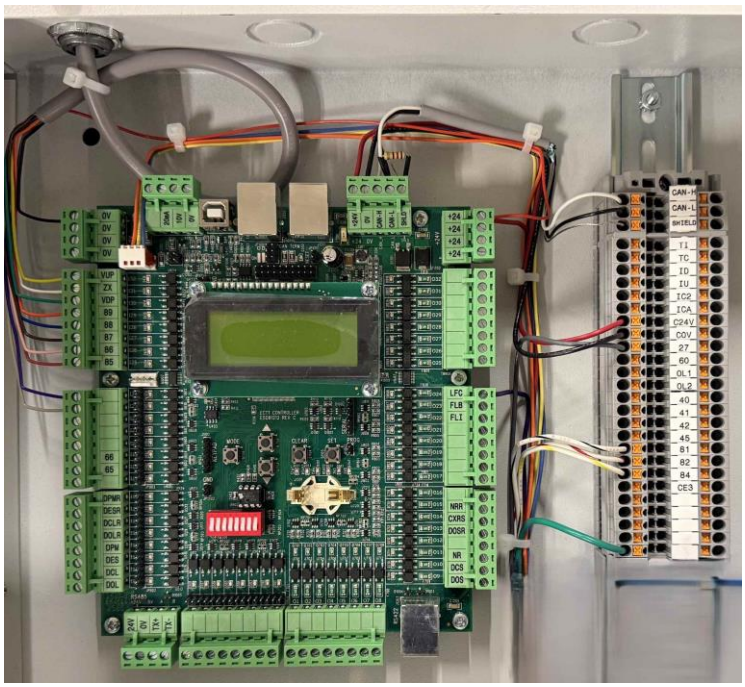
Input#	Legacy Label/Label	Function	Output#	Label	Function
1	1C	Car Call Floor 1	1	1A	Car Call Acknowledgment Light Floor 1
2	2C	Car Call Floor 2	2	2A	Car Call Acknowledgment Light Floor 2
3	3C	Car Call Floor 3	3	3A	Car Call Acknowledgment Light Floor 3
4	4C	Car Call Floor 4	4	4A	Car Call Acknowledgment Light Floor 4
5	5C	Car Call Floor 5	5	5A	Car Call Acknowledgment Light Floor 5
6	6C	Car Call Floor 6	6	6A	Car Call Acknowledgment Light Floor 6
7	7C	Car Call Floor 7	7	7A	Car Call Acknowledgment Light Floor 7
8	8C	Car Call Floor 8	8	8A	Car Call Acknowledgment Light Floor 8
9	9C	Car Call Floor 9	9	9A	Car Call Acknowledgment Light Floor 9
10	10C	Car Call Floor 10	10	10A	Car Call Acknowledgment Light Floor 10
11	11C	Car Call Floor 11	11	11A	Car Call Acknowledgment Light Floor 11
12	12C	Car Call Floor 12	12	12A	Car Call Acknowledgment Light Floor 12
13	13C	Car Call Floor 13	13	13A	Car Call Acknowledgment Light Floor 13
14	14C	Car Call Floor 14	14	14A	Car Call Acknowledgment Light Floor 14
15	15C	Car Call Floor 15	15	15A	Car Call Acknowledgment Light Floor 15
16	16C	Car Call Floor 16	16	16A	Car Call Acknowledgment Light Floor 16
17	OPN	OPEN FOR FUTURE USE	17	DHL	Door Hold Light
18	28H/DH	Door Hold Button	18	HWL	High Water Light
19	28HR/DHR	Door Hold Button Rear	19	DHLR	Door Hold Light Rear
20	62/SB	S Button	20	OPN	OPEN FOR FUTURE USE
21	70/ATTN	Attendant Service On	21	OPN	OPEN FOR FUTURE USE
22	71/ATTD	Car Down Run on Attendant	22	5/ATBO	Attendant: Buzzer Output to tell the attendant that a hall call was pressed
23	72/ATTU	Car Up Run on Attendant	23	6/ATDL	Attendant Car Down Light Indicator
24	73/ATTB	Car Bypass/Non Stop on Attendant	24	7/ATUL	Attendant Car Up Light Indicator
25	24/DC	Door Open Button - Front	25	DG	Down Car Travel Lanterns - Front Doors
26	28/DO	Door Close Button - Front	26	UG	Up Car Travel Lanterns - Front Doors
27	50/IND	Independent Service	27	61/SPG	Stop/Pass Gong
28	95/FC2N	Fire Phase 2 - Fire Control Car Switch On	28	97/FCL	Fire Control Light
29	100/FC2O	Fire Phase 2 - Fire Control Car Switch Off	29	97B/FB	Fire Buzzer
30	96/FC2C	Fire Phase 2 - Fire Control Car Switch Cancel	30	67/LWLB	Load Weighing Light & Buzzer
31	24R/DCR	Door Close Button - Rear	31	DGR	Down Car Travel Lanterns, Rear Doors
32	28R/DOR	Door Open Button - Rear	32	UGR	Up Car Travel Lanterns, Rear Doors

2.2.2. COP DIP SWITCH SETTINGS



2.3. Top of Car Box-(ES-TOC-BOX)

ES2 Top of Car Box (TOC) : ES2 TOC Box includes interface to the ES2 Controller/COP and APS system. The Elevator Systems Serial TOC box will be the interface of the car and the controller. Top of car components will typically be wired into this box. The connection will be made on the terminal strip located on the right side of the TOC box as well as on the green connectors on the TOC ECT Board (see Figure 2). As shown, the serial link controller will require less than 25 traveler cables.



2.3.1. ES-TOC-BOX-Inputs & Outputs

Input #	Legacy Label/Label	Function	Output#	Label	Function
1-8		OPEN FOR FUTURE USE	1-8		OPEN FOR FUTURE USE
9	OL/DOL	Open Limit Input	9	OX/DOS	Output to open the door
10	DCL	Door Close Limit Input	10	CX/DCS	Output to Close the Door
11	28E/DES	Door Edge Sensor : Input for any kind of door interruption sensor	11	NR	Closing the door slowly if 28E/DES triggers a reopen
12		OPEN FOR FUTURE USE	12		OPEN FOR FUTURE USE
13	ROL/DOLR	Open Limit Input, Rear Doors	13	OXR/DOSR	Output to open the door Master and Car Doors, Rear Doors
14	DLR/DCLR	Door Close Limit Input, Rear Doors	14	CXR/DCSR	Output to Close the Door. Master and Car Doors, Rear Doors
15	28ER/DESR	Door Edge Sensor, Rear Doors	15	NRR	Closing the door slowly if 28E/DES triggers a reopen, Rear Doors
16		OPEN FOR FUTURE USE	16		OPEN FOR FUTURE USE
17		OPEN FOR FUTURE USE	17		OPEN FOR FUTURE USE
18	65/LW	Load Weighing Input, 80%	18		OPEN FOR FUTURE USE
19	66/OLD	Load Weighing Input, 100%	19		OPEN FOR FUTURE USE
20		OPEN FOR FUTURE USE	20		OPEN FOR FUTURE USE
21		OPEN FOR FUTURE USE	21		OPEN FOR FUTURE USE
22		OPEN FOR FUTURE USE	22	97I/FLI	Fire Light Indicator
23		OPEN FOR FUTURE USE	23	97BI/FLB	Fire Light Buzzer
24		OPEN FOR FUTURE USE	24	LCP/LFC	Light and Fan Control
25		OPEN FOR FUTURE USE	25	52	Bottom Slow Down Limit
26		OPEN FOR FUTURE USE	26	52A	Bottom Slowdown Limit for 201FPM+
27		OPEN FOR FUTURE USE	27	52B	Bottom Slowdown Limit for 400FPM+
28		OPEN FOR FUTURE USE	28	52C	Bottom Slowdown Limit for 700FPM+
29		OPEN FOR FUTURE USE	29	53C	Top Slowdown Limit for 700FPM+
30		OPEN FOR FUTURE USE	30	53B	Top Slowdown Limit for 400FPM+
31		OPEN FOR FUTURE USE	31	53A	Top Slowdown Limit for 201FPM+
32		OPEN FOR FUTURE USE	32	53	Top Slowdown Limit

2.4. ELGO Absolute Position System-(ES-APS-KIT)

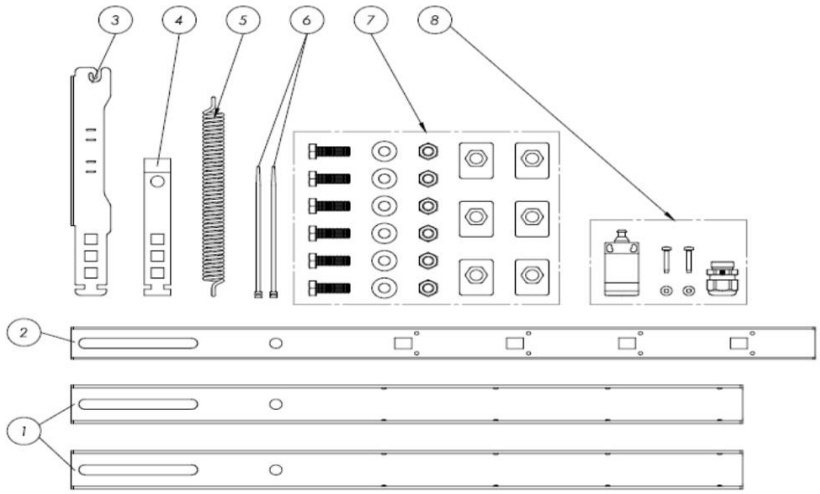
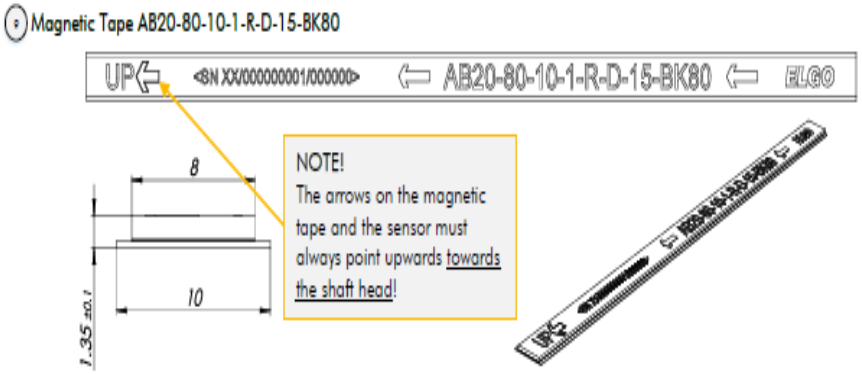
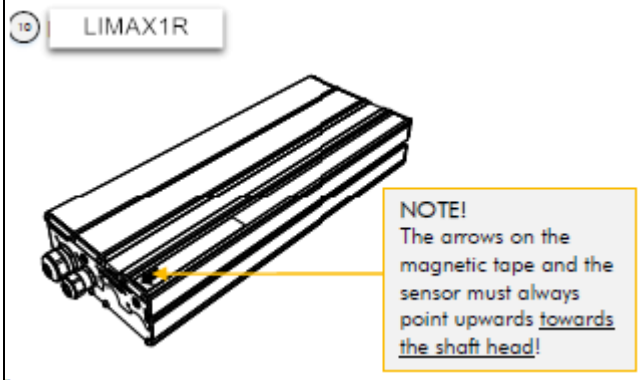
ES-APS-KIT

ELGO LIMAX Absolute Positioning System is installed in the hoistway to monitor elevator/car speed and position. The kit comprises of the following:-

1. Bracket Installation Hardware KIT
2. Sensor Installation Hardware KIT
3. Instructions for installation

2.4.1. ELGO Hardware Kit Components

ES-APS-KIT Bracket Mounting Kit

Bracket Installation Hardware	Bracket Installation Hardware List
	① Crossbeam (2x) ② Crossbeam for safety position switch (1x) ③ Tape fixture for position switch (1x) ④ Tape fixture (1x) ⑤ Spring (1x) ⑥ Cable ties (2x) ⑦ Rail clips including screws and nuts (6x) ⑧ Position switch including screws and cable gland (1x) Original description of position switch
	
	

2.4.2. ES-APS Installation Instructions

ES-APS Installation Safety Check

- **Function:** These mounting instructions provide all the information you need for mounting, commissioning, the safe operation and disassembly of the LIMAX S-RMS3. The mounting instructions must be available in a legible condition and complete version in the vicinity of the device.
- **Authorized Qualified Personnel:-** All operations described in these mounting instructions must be carried out only by trained specialist personnel, authorized by the elevator installation company.
- Please make sure that you have read and understood these mounting instructions and that you know all applicable prescriptions regarding occupational safety and accident prevention prior to installation and commissioning.

- **Explanation of the Symbols used**

	**Caution:** **Failure to comply with this warning notice could lead to interferences or malfunctions.** **Warning:** **Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.**

- **General Safety Instructions:** The user must observe the safety instructions in these mounting instructions, the local installation standards as well as all applicable safety regulations and accident prevention rules.The information contained in these mounting instructions manual is provided without liability. The installation instructions are subject to technical modifications.

- **Exclusion of Liability:** ESI shall accept no liability for damage and malfunctions resulting from incorrect mounting or failure to comply with these mounting instructions. ESI shall accept no liability for damage resulting from the use of unauthorized spare parts or accessories.
- For safety reasons, invasive work on the device as well as arbitrary repairs, conversions and modifications to the device are strictly forbidden; ESI shall accept no liability for damage resulting from such invasive work, arbitrary repairs, conversions and/or modifications to the device.

2.4.2.1. Bracket Installation Instructions

ES-APS Bracket Installation Instructions from Steps 1-15

2.4.2.1.1. Steps 1-4

Bracket Installation Steps 1-4

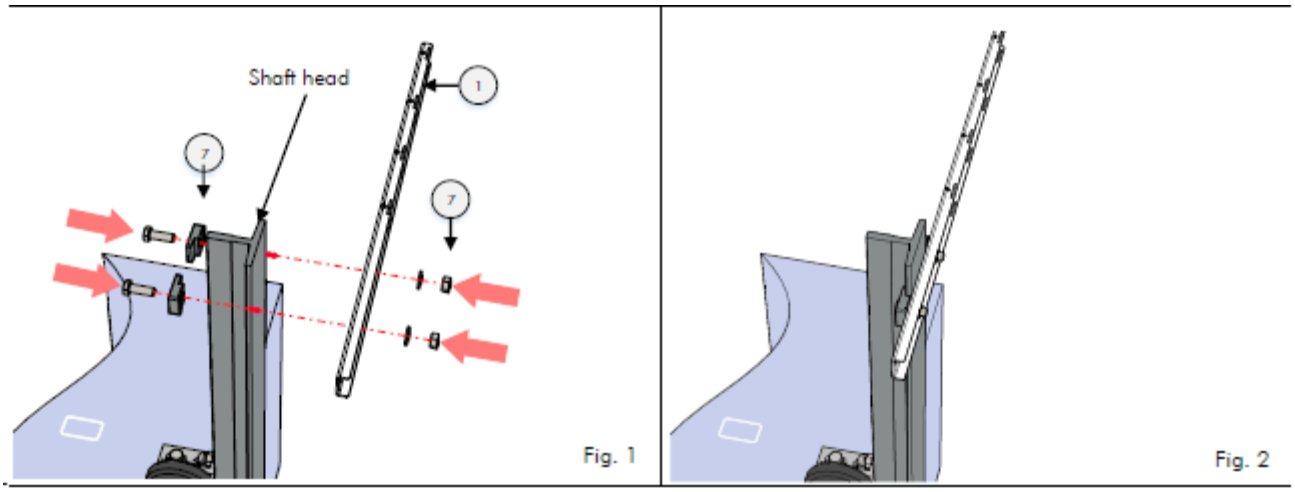


Fig. 1 & 2:

Install one crossbeam (1) in the shaft head by using the rail clips (7).
Make sure that the clips screws are well tightened (min. 45 Nm), so that the crossbeam does not move.

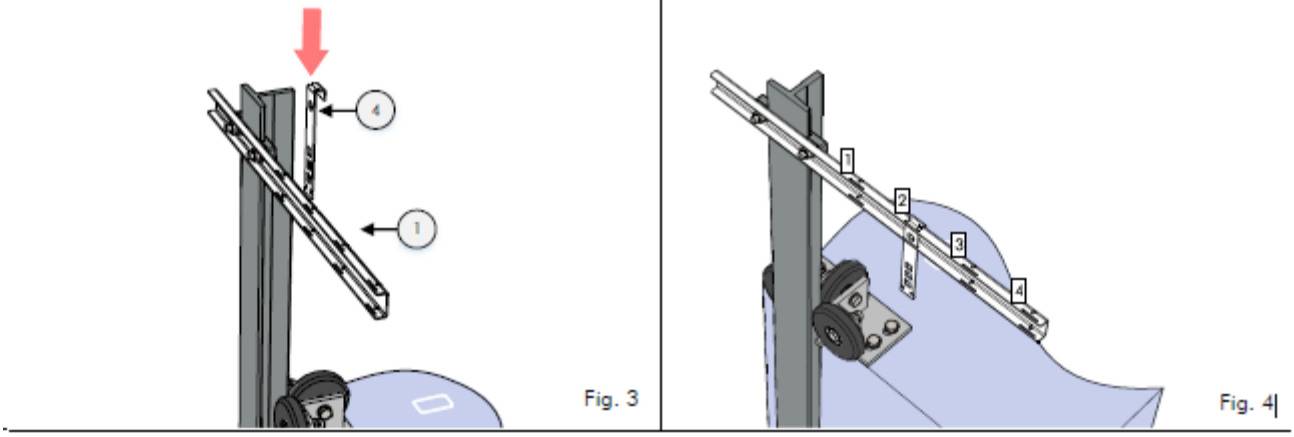


Fig. 3 & 4:

Slide the tape fixation (4) into the crossbeam as shown. Use any of the slots provided depending on your specific space situation in the installation. A position as close to the guide rail as possible is advantageous. Memorize the used slot.

2.4.2.1.2. Steps 5-8

Bracket Installation Steps 5-8

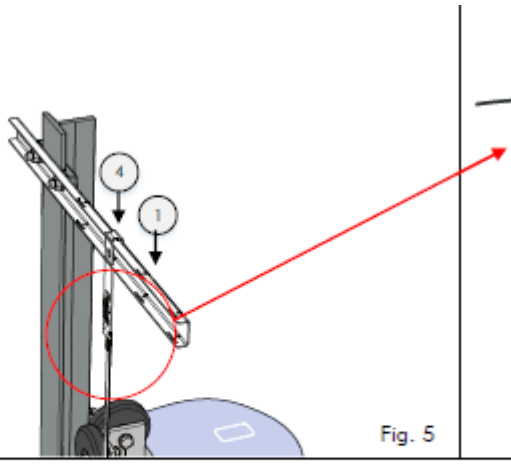


Fig. 5

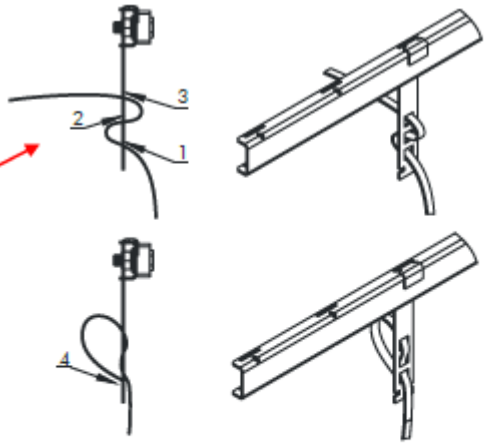


Fig. 6

Fig. 5 & 6:

This step must be done with the tape fixture (4) inside the crossbeam (1). Thread the tape through the tape fixture (4) and back down, as shown (FIG 6). Mind the orientation of the tape (FIG 7) – the magnet side must face the sensor body later on. Basically, the fixture works like a self-locking belt. Leave at least 20 cm tape at the spare end. Press the loops flat in the clamp. There should be a break in the upper loop. In the end, secure the tape with a cable tie (6) at the bottom of the tape fixation (4).

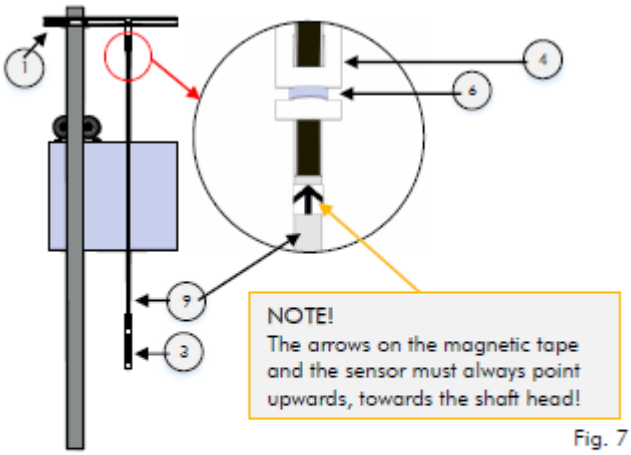


Fig. 7

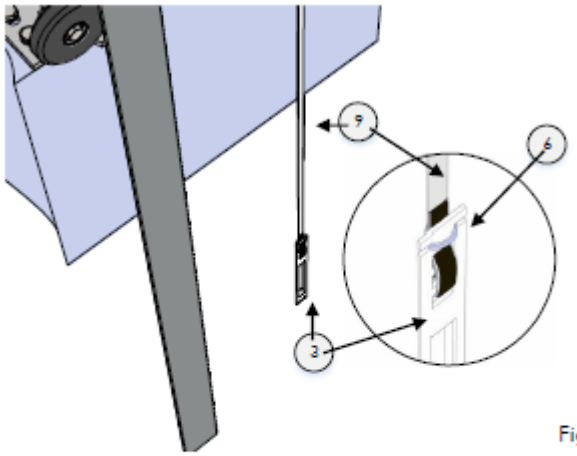


Fig. 8

FIG 7 & 8

After the tape (9) has been installed in the shaft, fix the tape fixture (3) for the presence detector to the lower end of the tape. Leave at least 20 cm at the spare end and press the loop flat in the clamp. There should be a break in the lower loop. The end, secure the tape with a cable tie (6) at the top of the tape fixture (3).

2.4.2.1.3. Steps 9-11

Bracket Installation Steps 9-11

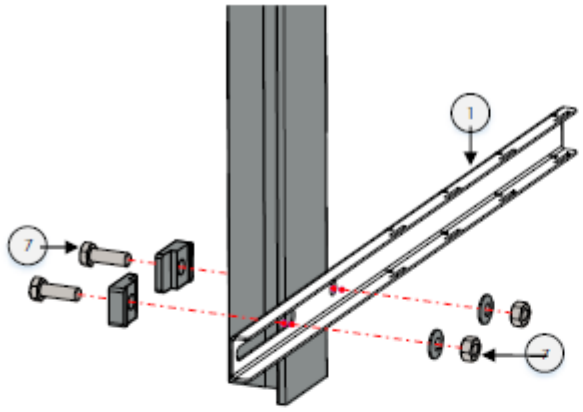


Fig. 9

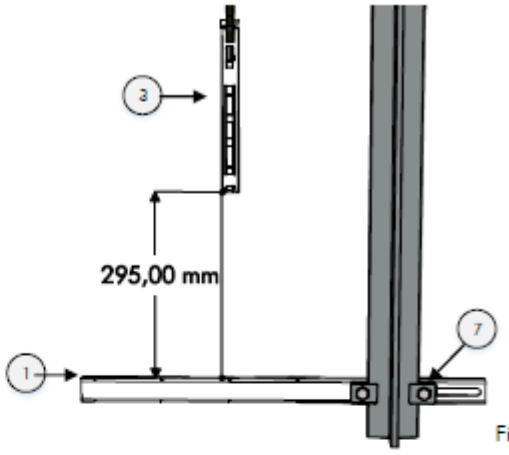


Fig. 10

Fig. 9 & 10:
Now install the second crossbeam (1) into the shaft bottom with a distance of 295 mm to the tape fixture for presence detector (3). Make sure that the screws (7) are well tightened with min. 20 Nm, so that the crossbeam (1) does not move.

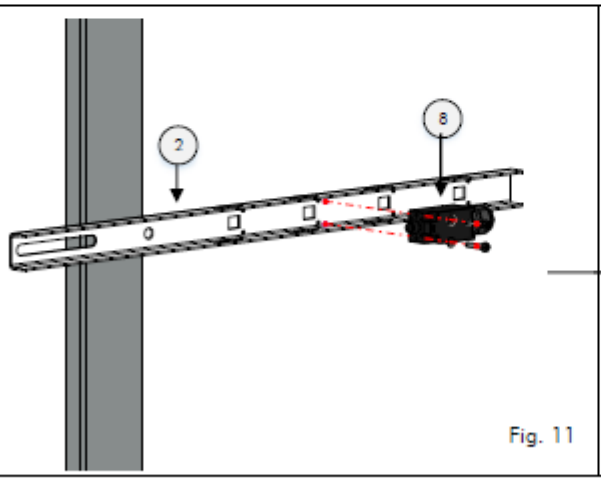


Fig. 11

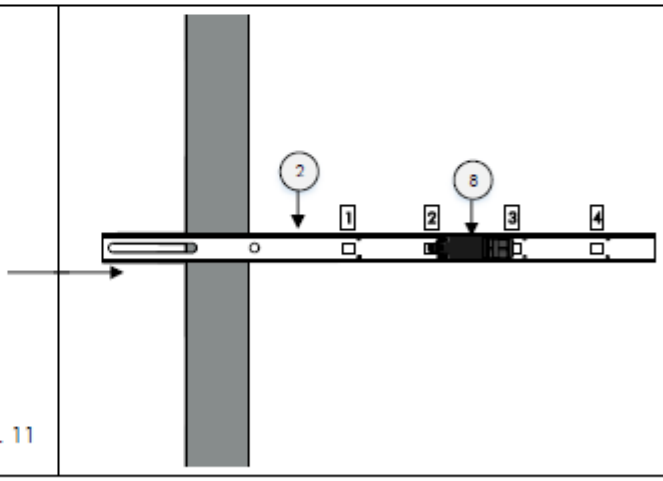


Fig. 11:
The crossbeam for the safety presence detector (2) should be pre-mounted for the installation later. Mount the cable screw connections (1 piece) to the presence detector. Align the presence detector (8) with the edge of the crossbeam (2). Then fasten the screws with 3 Nm. The presence detector should be positioned on the same slot, as you used during the assembly of the tape fixation (4) in the upper crossbeam (1) (see Fig. 3 & 4).

2.4.2.1.4. Steps 12-15

Bracket Installation Steps 12-15

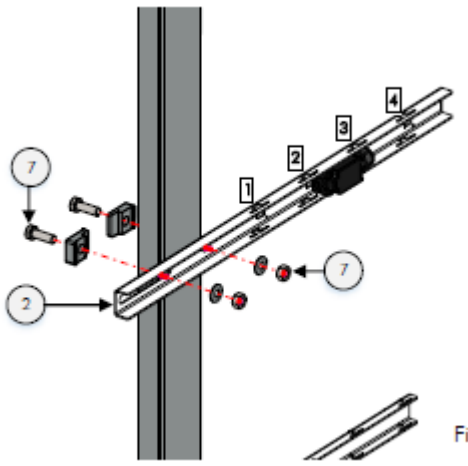


Fig. 12

Fig. 12:
Mount pre-installed crossbeam fort the presence detector (2) to the elevator rail. Fasten the screws (7) only so tight that the crossbeam (2) can still be moved.

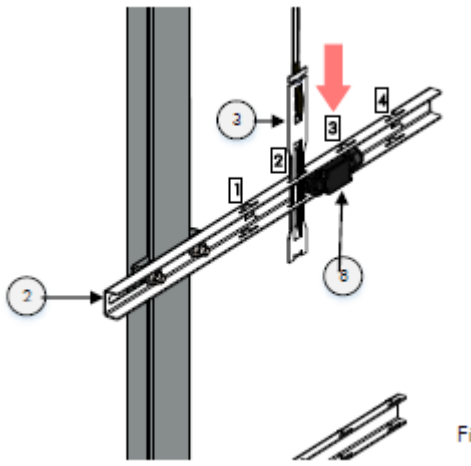


Fig. 13

Fig. 13:
Insert the tape fixture (3) into the crossbeam for the presence detector (2). Use the same slot, where the position detector (8) is positioned.

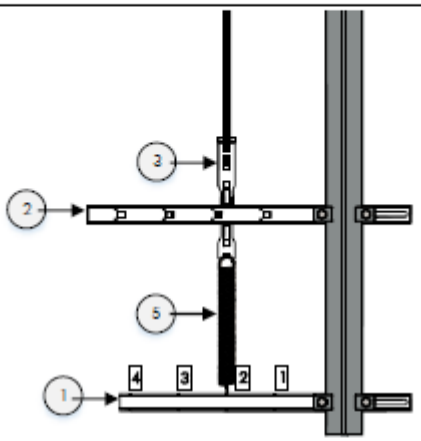


Fig. 14

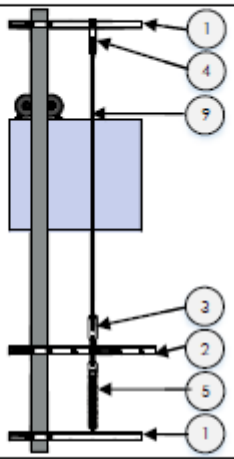


Fig. 15

Fig. 14 & 15:

Hook the tape fixture (3) into the spring (5). Make sure that the spring (5) is correctly placed in the drill hole of the lower cross-beam (1). The crossbeam for the presence detector (2) is positioned in such a way that only one marking on the tape fixture (3) can be seen towards both the top and the bottom. The crossbeam (2) must be mounted in a 90° angle to the elevator rail.

When the crossbeam (2) has been correctly positioned, the screws (7) are fastened with 20 Nm while making sure that the cross-beam (2) is not moved by accident.

ATTENTION!

Always use the same slot in all crossbars! The magnetic tape must hang vertically and parallel to the guide rail!
We recommend noting down the number of the slot you used first.

2.4.2.2. Sensor Installation Instructions

ES-APS Sensor Installation Instructions from Steps 16-30

2.4.2.2.1. Steps 16-21

ES-APS Sensor Installation Instructions : STEPS 16 - 21

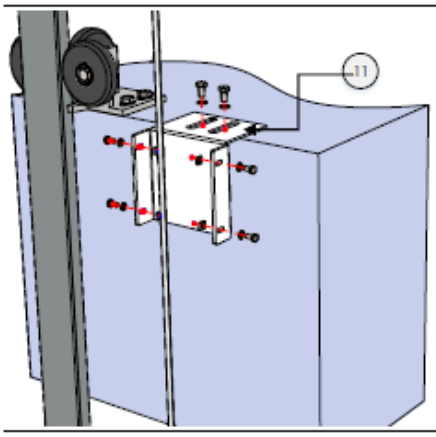


Fig. 16

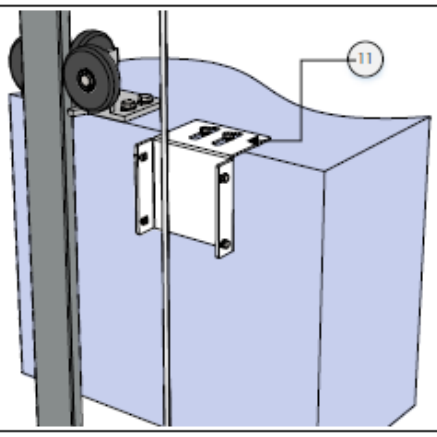


Fig. 17

Fig. 16 & 17: Installation of the mounting angle for LIMAX33 CP

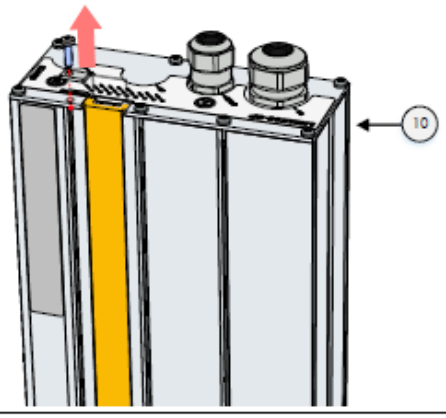


Fig. 18

Fig. 18: Remove the guide rail holding plate.

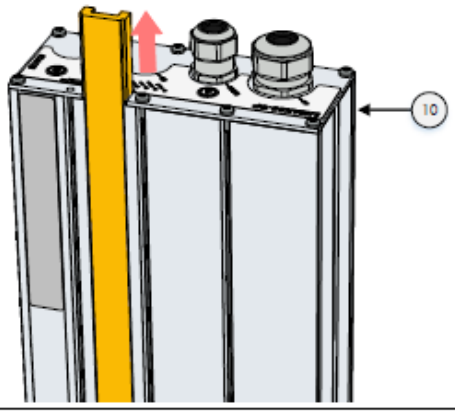


Fig. 19

Fig. 19: Remove the guide rail.

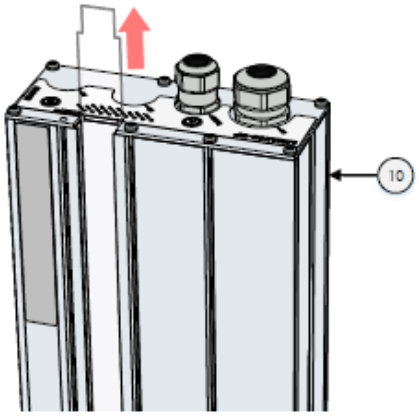


Fig. 20

Fig. 20: Remove the underlay.

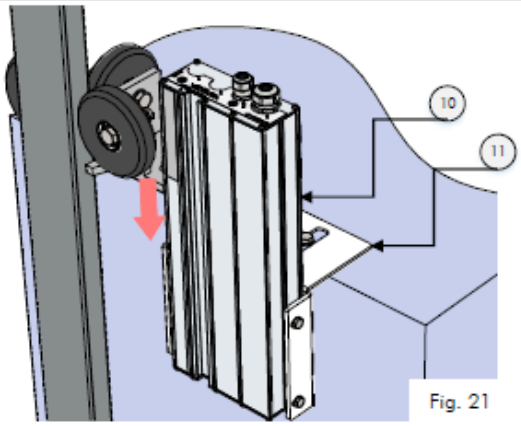


Fig. 21

Fig. 21: Move the LIMAX33 CP (10) to the center of the mounting angle (11) and fix it with the screws.

2.4.2.2.2. Steps 22-27

ES-APS Sensor Installation Instructions : STEPS 22 - 27

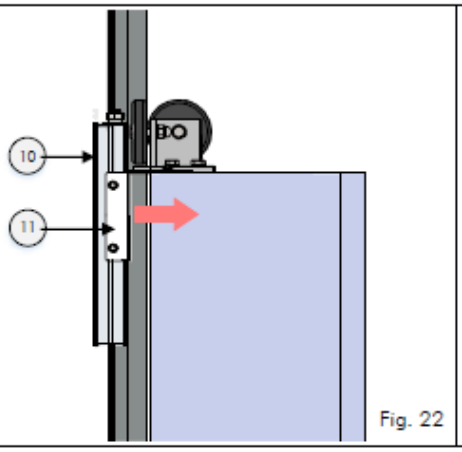


Fig. 22

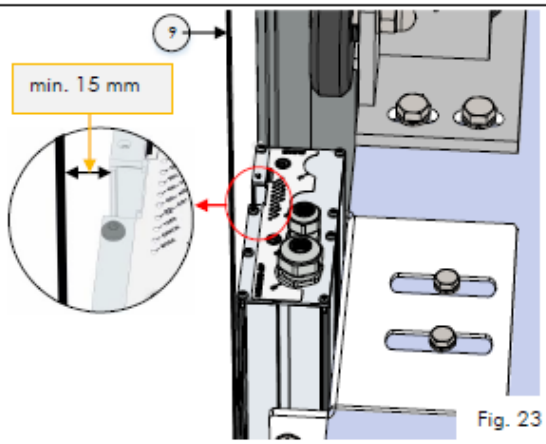


Fig. 23

Fig. 22 & 23:
Move the MW (11) to the cabin till you reach a gap of minimum 15 mm between magnetic tape (9) and sensor (10)

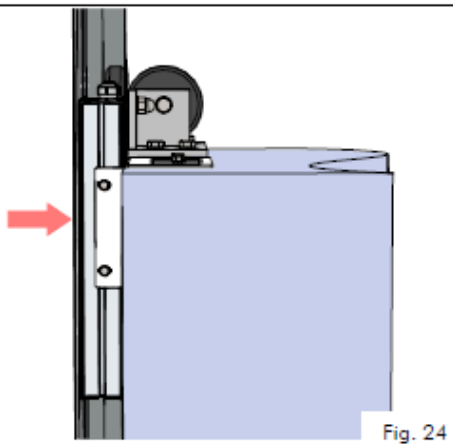


Fig. 24

Fig. 24:
Insert the magnetic tape (9) in the guide rail of the sensor (10)

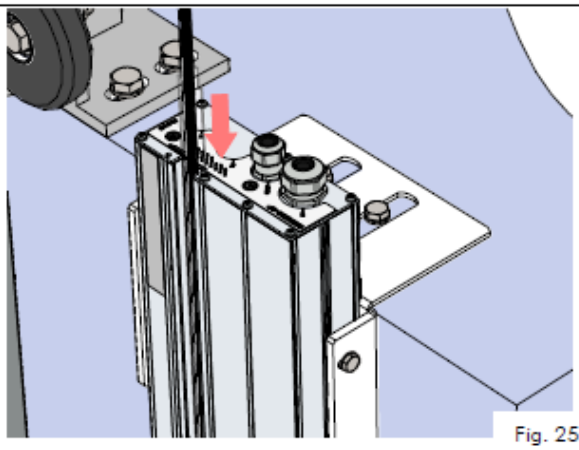


Fig. 25

Fig. 25: Insert the underlay.

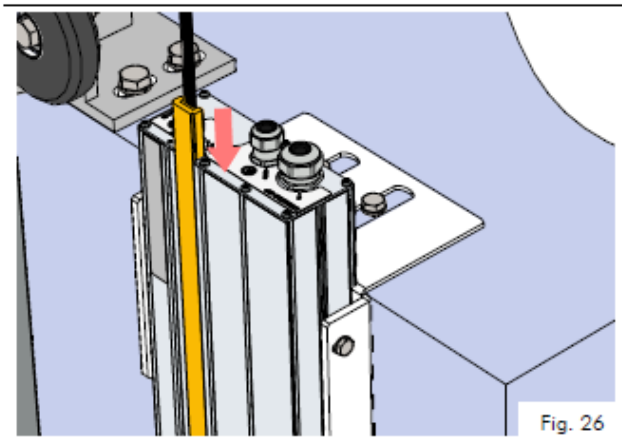


Fig. 26

Fig. 26: Insert the guide rail.

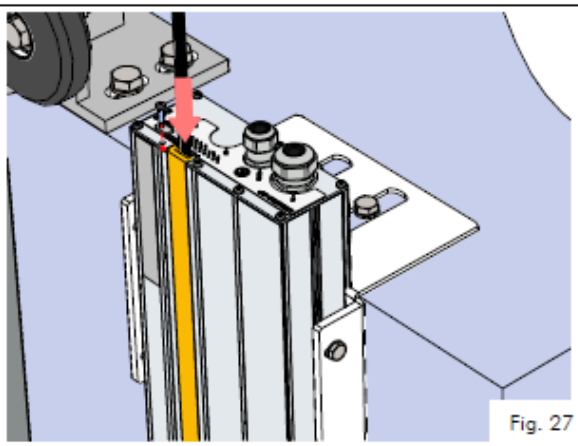


Fig. 27

Fig. 27: Fix the holding plate for the guide rail.

2.4.2.2.3. Steps 28-30

ES-APS Sensor Installation Instructions : STEPS 28 - 30

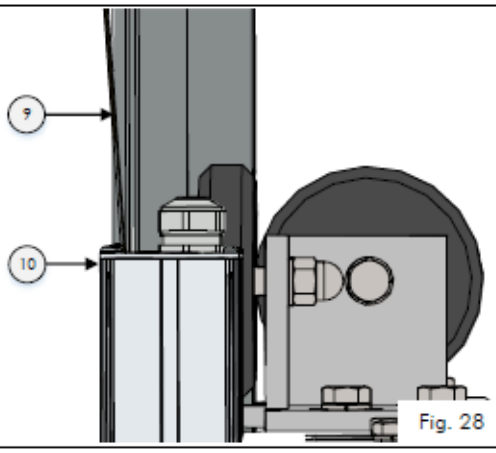


Fig. 28

Fig. 28:
Enforced contact between steel tape and polymer guide.

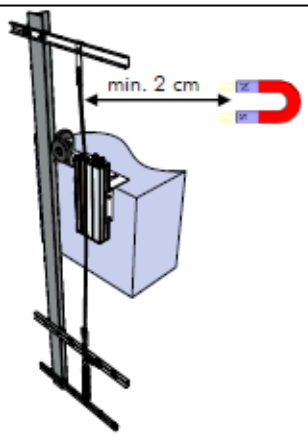


Fig. 29

Fig. 29:
External magnetic fields shall not exceed 64 mT (640 Oe; 52 kA/m), otherwise the magnetic coding will be damaged or destroyed.

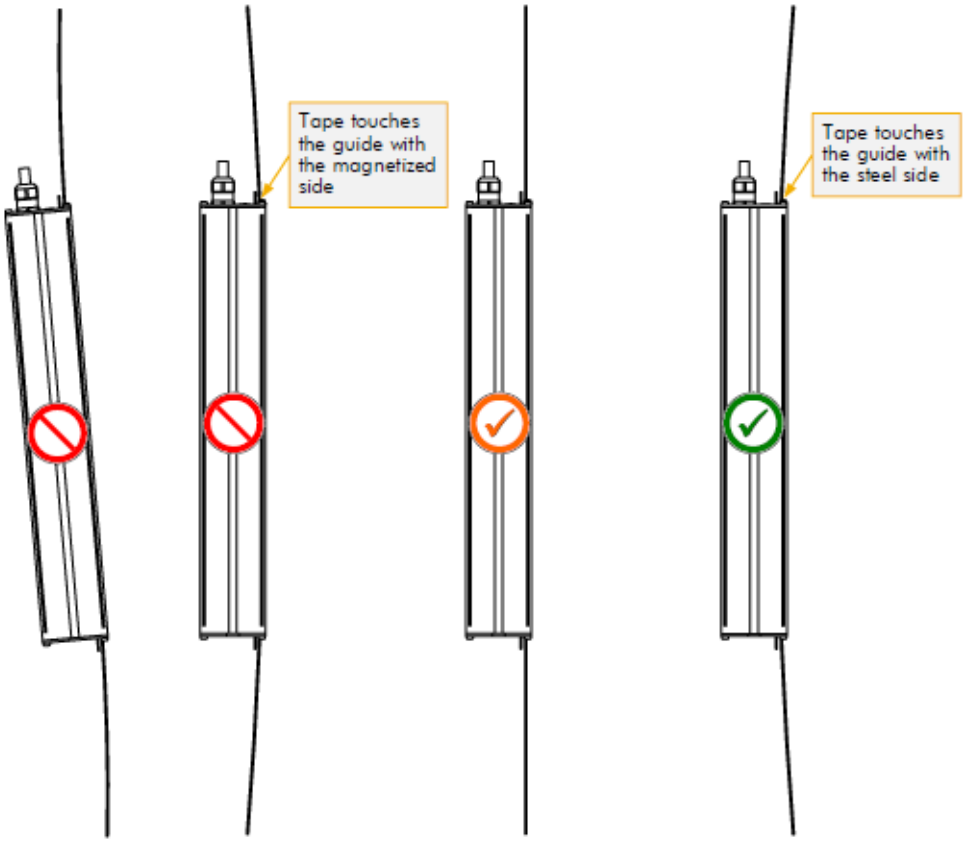
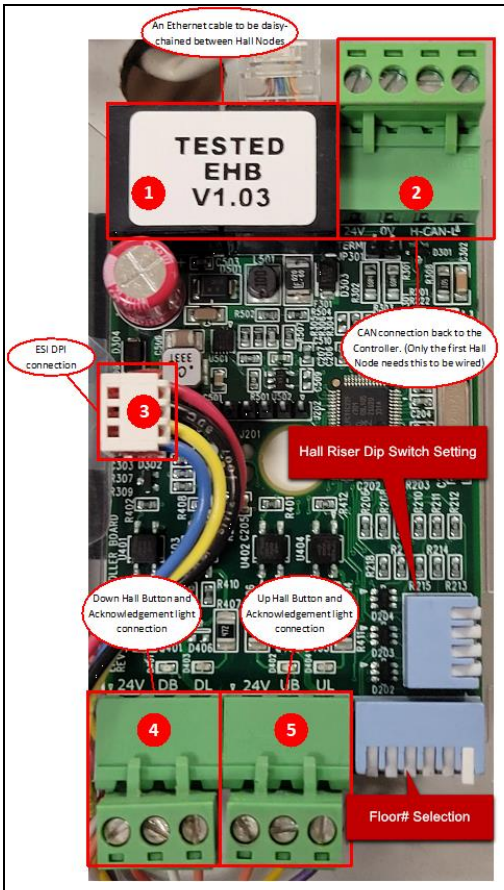


Fig. 30: Assessment of the magnetic tape offset (pretension)

2.5. Optional Add Ons

2.5.1. Hall Node Board (If Ordered)-(ES-EHB1)

Serial Hall Calls is an optional addition to the serial controller. Serial Hall Calls will reduce the number of hoistway wires. Typical discrete wiring would be two hoistway wire per hall button. Using Serial Halls Calls, the hall stations are daisy-chained to one another via Ethernet cables on the Hall Nodes, terminating with a CAN connection back to the controller. The Hall Board also has connections for ESI DPIs.



5. Ethernet connector used to daisy-chain each hall node to each other.

2. CAN connection from the first hall node to the controller, wired as followed:

Hall node	Controller
24V	#H24V
0V	#H0V
CAN_H	#HN_H
CAN_L	#HN_L

3. ESI DPI connection from the first hall node to the controller, wired as follower(if appliable):

Hall node	ESI DPI
24V (Red)	1L
0V (Black)	2L
A (Yellow)	3L
B (Blue)	4L

4. Down Hall Call Button connection, wired as followed:

Hall node	Hall Button
24V	Down Hall Call Button and Light Common
DB	Down Hall Call Button
DL	Down Hall Call Light

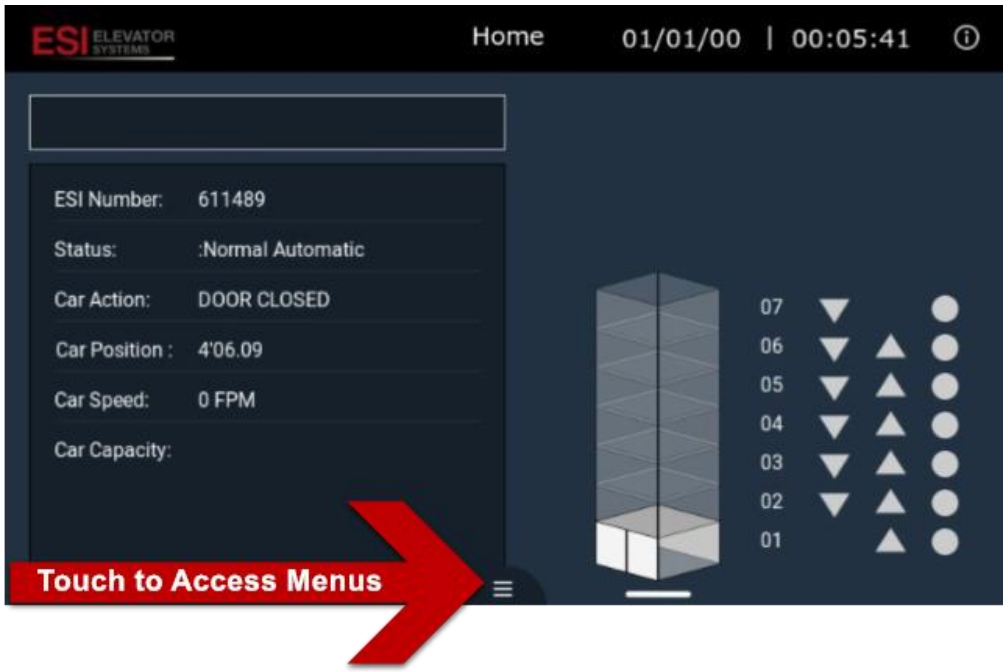
5. Up Hall Call Button connection, wired as followed:

Hall node	Hall Button
24V	Up Hall Call Button and Light Common
DB	Up Hall Call Button
DL	Up Hall Call Light

3. ES2 Touch Screen Menu Structure

ES2-CPU provides Full Setup and Troubleshooting of the Traction Controller with a Resistive Touch Enabled Screen.

ES2-CPU provides access to the following Menus on click of the Menu Button at the bottom Center of the screen.

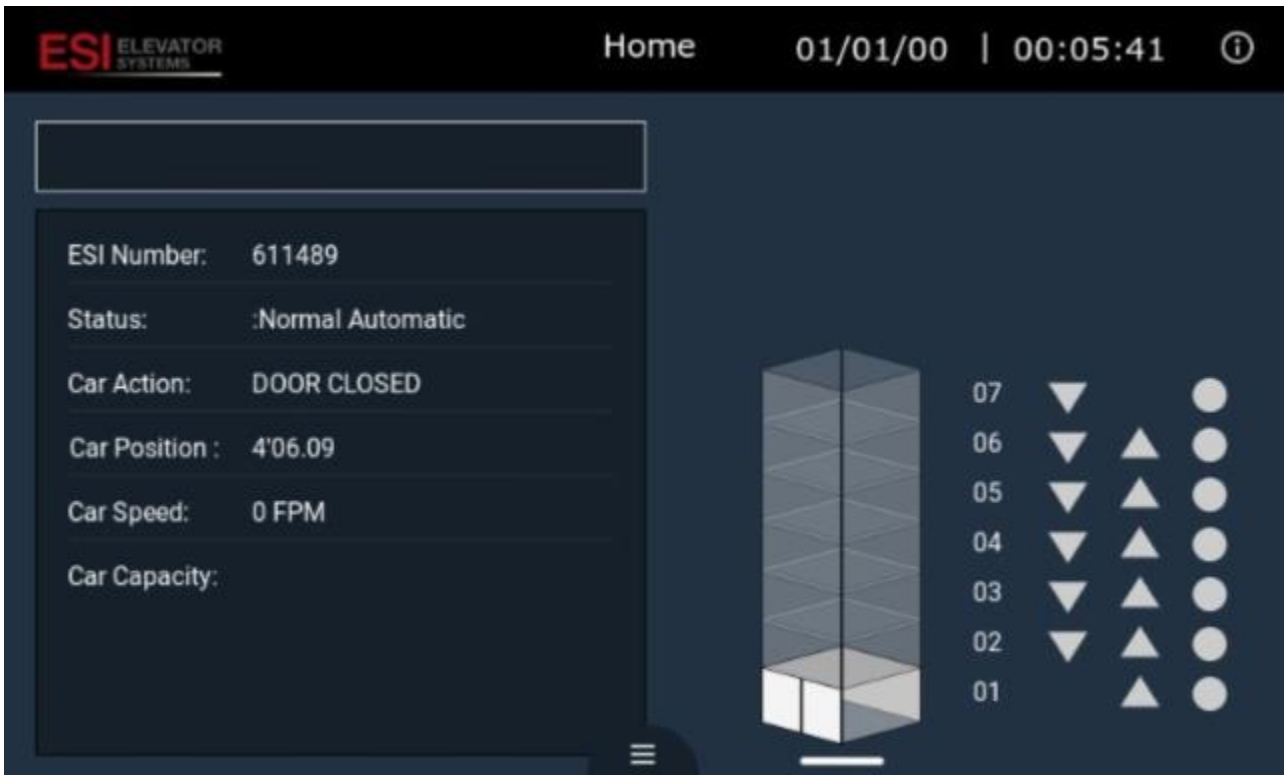


3.1. Home Screen

The **Home/Default** CPU screen shows the following information for the controller

- **Job Address/Name**
- **Date and Time**
- **ESI Number** : Unique number assigned to each controller
- Car Status **:** Combination of Inspection Status and Operation Status
- Car Actions and Faults **:** Shows the Current Car Action and Faults, if any
- **Car Position**
- **Car Speed**
- **Car Capacity**
- **Car Hoistway Rendering including ability to Place Car and Hall Calls**

- **Clicking on ⓘ at the top right will provide additional information like Software version.**



3.1.1. Car Status

Car Status : Combination of

- **Operations Status** AND
- **Inspection Status**

Inspection Status	Description
Access	Elevator is On TOP or BOTTOM ACCESS
Automatic	Elevator is in Automatic Operation
ByPass	Gate or Door Bypass Switch is in the Bypass position.
Controller Insp	Controller has been put in inspection mode from the Controller from ESI-RB-BD
In Car Insp	Controller has been put in the inspection mode from the COP
TOC Insp	Controller has been put in the Inspection mode from ES2 Top of Car Inspection Box or Similar Top of Car Inspection Box

Operation Status	Description
Attn Serv	On attendant Service, ES-CT-COP input location 21, [70]/[ATTN] is high
BackUpPWR	Car is on Backup Power (On UPS Backup Power, relay PF de-energized)
EMT Serv	On Emergency Medical Team Service
EMT InCar	On Emergency Medical Team Service in Car
EQ-Sem	Earth Quake-Seismic Trip only
EQ-Sem& CW	Earth Quake-Seismic & Counter Weight Trip
EQ-Cwt	Earth Quake Counter Weight Trip only
Emg Power	Car is on Emergency/Backup Power
Emg PR PK	On Back-up Power and Auto returning
FCF Prime	Car is on Fire Phase: Prime Floor/Return
FCF PII	Car is on Fire Phase 2 : Prime Floor/Return
FCF Alt	Car is on Fire Phase 1: Alternate Floor/Return
FCF AII	Car is on Fire Phase 2: Alternate Floor/Return
Ind Serv	Car is on Independent Service,ES-CT-COP input location 27, [50]/[IND] is high
Normal	Car is on Normal Service
OutOfServ	Car is out of Service, ES2-CPU input location 33, [68]/[OOS] is high

3.1.2. Car Actions and Fault Status

3.1.2.1. Codes 0-53

Home Screen additionally shows the Current Car Action and Faults, if any

Fault/Status Code	Fault	Type
7	DRIVE ERROR	Error/Fault
14	Emerg Power	Status
15	BackUP Power	Status
16	Attendant Service	Status
17	MotorTherm OVLD Trip	Error/Fault
18	SAF Opened	Error/Fault
19	GOV OVS Opened	Error/Fault
20	OVERspeed Trip	Error/Fault
23	TRACTION LOSS Trip	Error/Fault
24	CAR OverLoaded	Error/Fault
25	Ropegrp/EmBrktrp OVS	Error/Fault
26	Ropegrp/EmBrktrp GOV	Error/Fault
27	Ropegrp/EmBrktrp UAM	Error/Fault
28	Ropegrp/EmBrktr bksw	Error/Fault
29	Ropegrp/EmBrktr EBsw	Error/Fault
30	HS Stop DL	Error/Fault
31	HS Stop GS	Error/Fault
32	HS Stop RDL	Error/Fault
33	HS Stop RGS	Error/Fault
34	HS Stop DCL	Error/Fault
35	HS Stop RDCL	Error/Fault
36	HS Stop HDOOR	Error/Fault
37	HS Stop RHDOOR	Error/Fault
38	SD LIMIT Failure	Error/Fault
41	ESL TRIP TYPE:1	Error/Fault
42	ESL TRIP TYPE:2	Error/Fault
43	ESL TRIP TYPE:3	Error/Fault
44	ESL TRIP TYPE:4	Error/Fault
45	ESL TRIP TYPE:5	Error/Fault
46	ESL TRIP TYPE:6	Error/Fault
47	ESL TRIP TYPE:7	Error/Fault
48	ESL TRIP TYPE:8	Error/Fault
49	ESL TRIP TYPE:9	Error/Fault
50	ESL TRIP TYPE:10	Error/Fault
51	CYCLE TEST Fail P1	Error/Fault
52	CYCLE TEST Fail P2	Error/Fault
53	CYCLE TEST Fail P3	Error/Fault

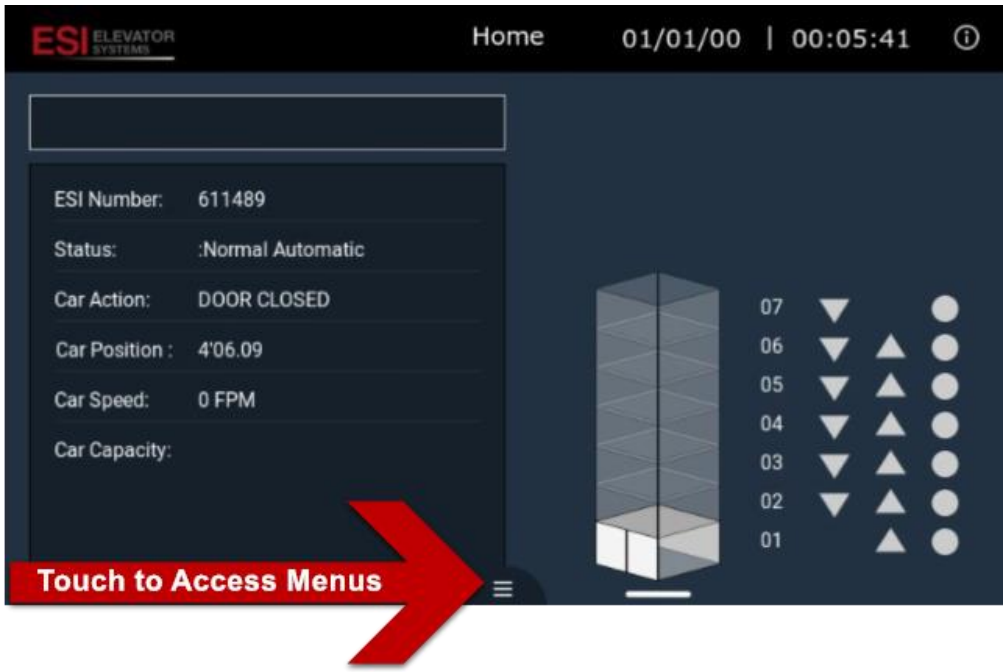
3.1.2.2. Codes 57-200

Home Screen additionally shows the Current Car Action and Faults, if any

Fault/Status Code	Fault	Type
57	E-Brk CYC FAIL I-ON	Error/Fault
58	E-Brk CYC FAIL I-OFF	Error/Fault
60	DOOR OPEN TimeOUT	Error/Fault
61	DOOR OPEN TOS FAULT	Error/Fault
62	DOOR CLOSE TimeOUT	Error/Fault
63	DOOR CLOSE TOS FAULT	Error/Fault
64	REAR OPEN TimeOUT	Error/Fault
65	REAR OPEN TOS FAULT	Error/Fault
66	REAR CLOSE TimeOUT	Error/Fault
67	REAR CLOSE TOS FAULT	Error/Fault
69	GATE SW ON FAULT	Error/Fault
70	DOOR LOCK ON FAULT	Error/Fault
71	REAR GATE ON FAULT	Error/Fault
72	REAR LOCK ON FAULT	Error/Fault
74	CAR HELD TOS	Error/Fault
75	CAR HELD TOS-REAR	Error/Fault
77	RUN DELAY - GS	Error/Fault
78	RUN DELAY - DL	Error/Fault
79	RUN DELAY - RGS	Error/Fault
80	RUN DELAY - RDL	Error/Fault
81	RUN DELAY - DRV	Error/Fault
82	RUN DELAY-OLR/RPR/DC	Error/Fault
83	RUN DELAY - FAULT	Error/Fault
84	EQ - CWT Trip	Error/Fault
85	EQ - SEM	Error/Fault
92	Brake DROP Fault	Error/Fault
93	Brake PICK Error	Error/Fault
94	Brake PICK Fault	Error/Fault
95	E-Brake DROP Fault	Error/Fault
96	E-Brake PICK Error	Error/Fault
97	E-Brake PICK Fault	Error/Fault
98	RopeGP CYC FAIL RG1	Error/Fault
99	RopeGP CYC FAIL RG2	Error/Fault
100	APS Invalid data	Error/Fault
101	APS No Comm	Error/Fault
102	APS Error	Error/Fault
103	APS Valid	Error/Fault
104	Safety Proc No Com	Error/Fault
105	Safety Proc CRC	Error/Fault
106	Safety Proc Good	Error/Fault
122	Tape Monitor Open	Error/Fault

3.2. Menu Screen

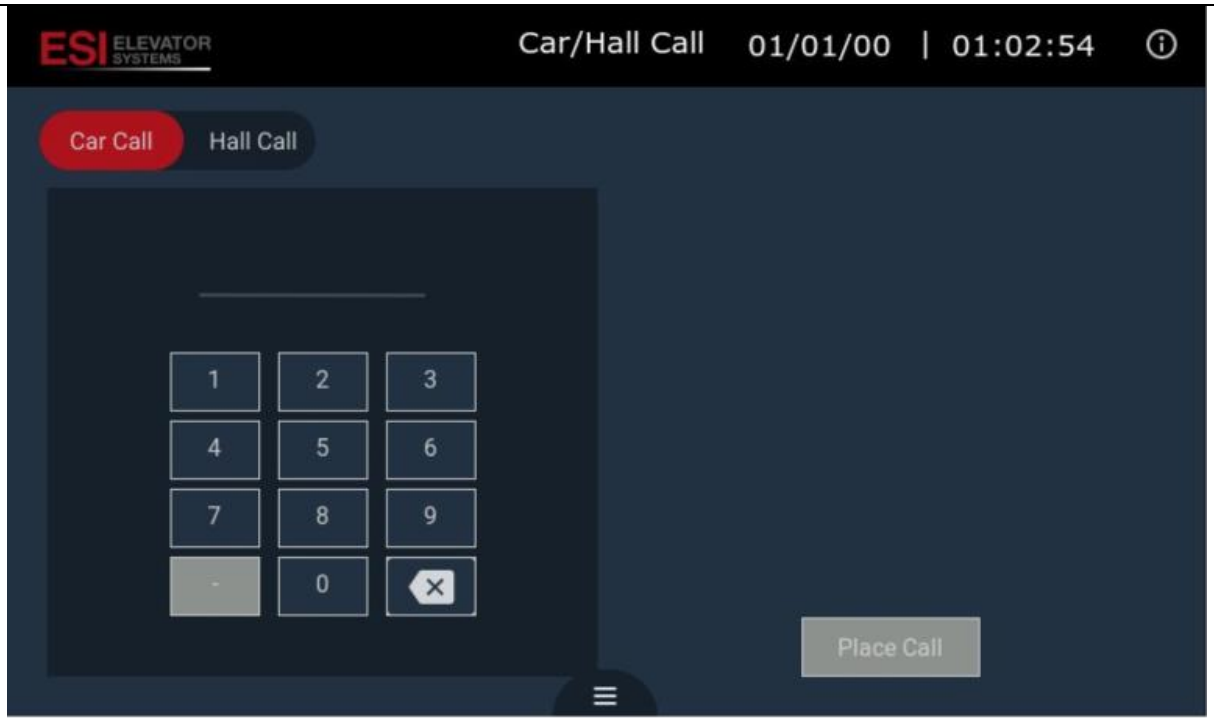
ES2-CPU menu screen can be accessed by touching the Menu Button (3 Stacked Lines) at the bottom of the screen.

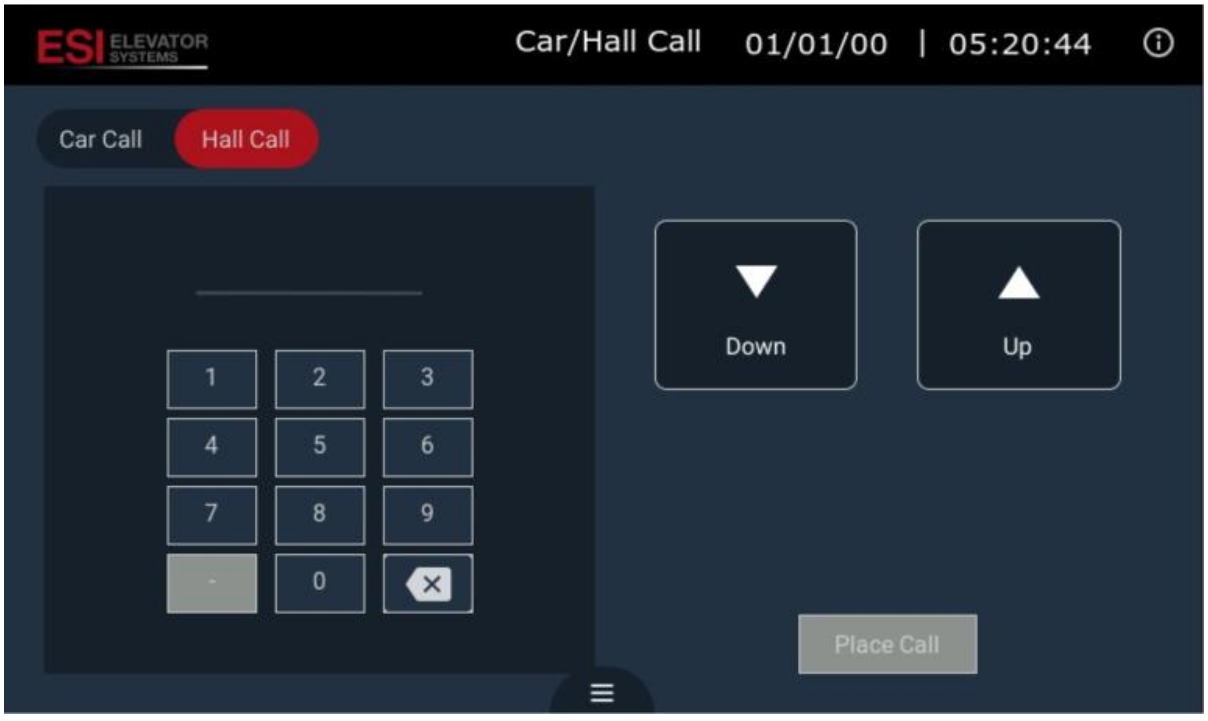


This will bring up the menu screen

3.2.1. Calls Screen

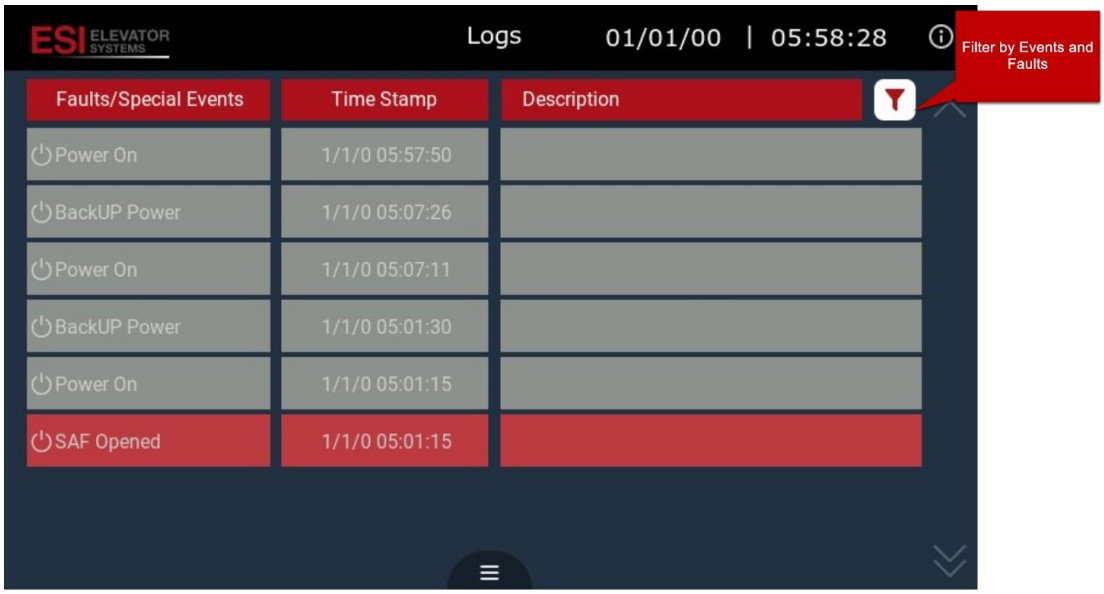
Calls Screen lets Controller Users place car calls and hall calls





3.2.2. Logs Screen

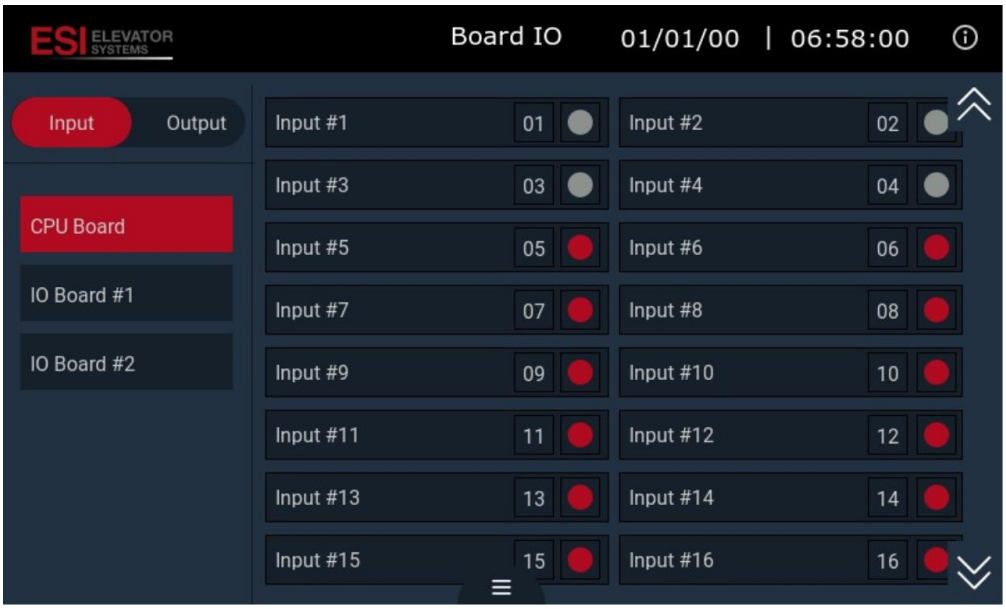
Logs Screen lets user see last 100 events/Faults that have occurred on the controller to troubleshoot the elevator controller. Shows Faults/Events/TimeStamp and ability to Filter by Faults/Events

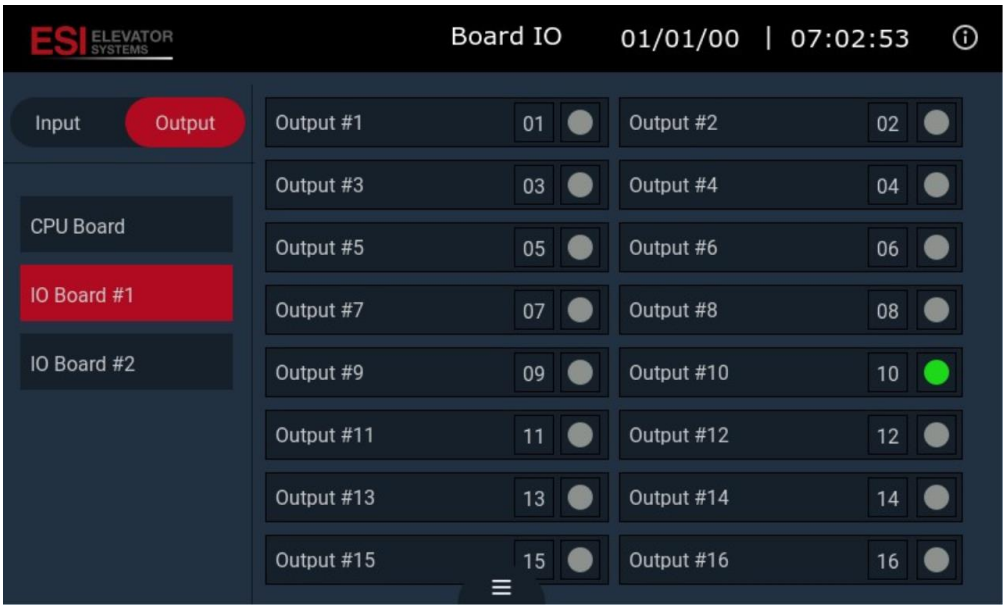


3.2.3. I/O Screen

I/O Screen indicates the status of every input/output for the following boards

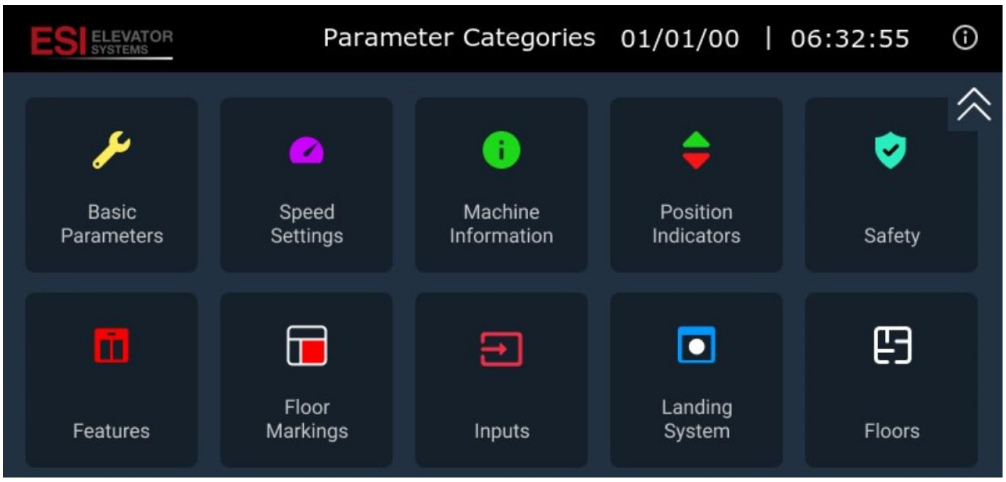
- ES2-CPU
- ES-CT-COP
- ES-TOC-BOX
- ES-IO-24VDC-BD (IF REQUIRED)

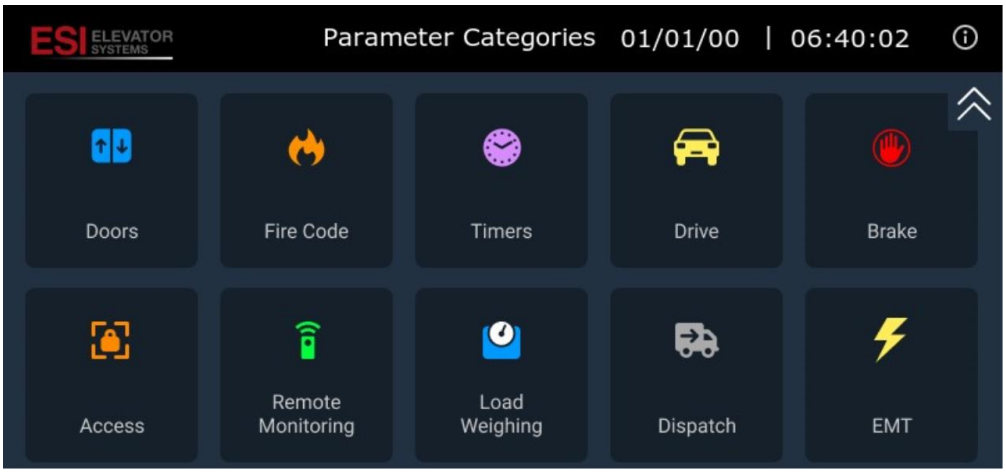




3.2.4. Parameters Screen

Parameter Screens various sub screens to setup Parameters for the the controller. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements





3.2.4.1. Basic Parameters

Basic Parameters to setup following parameters for the the controller. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Basic Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Value**
Top Floor	Define/Identify the Top Floor Number for the Job	Job Based Value	2
Bottom Floor	Define/Identify the Bottom Floor Number for the Job	Job Based Value	1
Selector Type	Selector Type to be used for the job	1: APS 2: APS-ESI-TEST	APS
Controller Type	Select Controller Type	1: Hydraulic 2: Traction	Job BASED
Door Type	Door Type to be used on the Job	1: Master Doors 2: Car Doors 3: Manual Doors and Gates 4: Power Doors and Gates	1
Is Group	If the Car is Part of Duplex/Group Setup or Not	Yes or No	0
Car#	If Multiple Cars, enter the Car#	Job Based Value	1
# of IO Cards	Number of ES-IO-24VDC-BD	Job Based Value	2
I/O Type	Configure if the Car is Full Serial (Car and Hall), Car Serial Only and Hall Wiring is Discrete or Fully Discrete	Discrete Serial Car Serial Car+Hall	Serial Car
Operation	Elevator Operation Type	Selective Collective Down Collective Collective Single Auto Push Button	Selective Collective
BOT Access LimDist	Set the Bottom Distance for Access	(Value Between 24-360)	150
TOP Access LimDist	Set the Top Distance for Access	(Value Between 24-360)	120

3.2.4.2. Speed Parameters

Speed Parameters to setup following parameters for the controller. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Speed Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Value**
S/D #1 Distance OFR	Slow Down Distance One Floor Run (Values between 4-140 (inches))	If speed is less than 150, then S/D #1 Distance OFR = (Speed X 0.24) +4 • Else if speed is greater than 150 and less than 250 then S/D #1 Distance OFR = 42 • Else if speed is greater than 250 then S/D #1 Distance OFR = 46	42
S/D #2 Distance HSM	SlowDown Distance High speed Run (Values between 12–250 inches)	If speed is less than or equal to 200, then S/D #2 Distance HSM = (Speed X 0.24) +4 • else if speed equals 250, then S/D #2 Distance HSM = 74, • else if speed equals 300, then S/D #2 Distance HSM = 88, • else if speed equals 350, then S/D #2 Distance HSM = 100, • else if speed is greater than or equal to 400, then S/D #2 Distance HSM = 88.	150
S/D 2/3 Floor Run	Slowdown distance on a two or three floor run. Only used if contract speed is greater than 450.	Value between (12–220 inches)	70
Contract Speed	Contract Speed of the Car/Job	Job Based Value	200
ETS CHK Engage	Enable/Disable ETS Testing	Speed Greater than 250 FPM, set to 1 Else Set to 0	0

Speed Parameters to setup following parameters for the controller. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Speed Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Value**
ETS1 FPM Speed	Set the max speed at which car can run after tripping the final speed slow down limit without triggering ETS fault	0-2400	5
ETS2 FPM Speed	For jobs more than 200 FPM set the max speed at which car can run after tripping the intermediate speed slow down limit without triggering ETS fault	0-2400	1
ETS 3 FPM Speed	For jobs more than 400 FPM, set the max speed at which car can run after tripping high speed slow down limit without trigerring ETS fault after the timer expires in ETS3 Chk TIME Parameter	0-2400	1
Highspeed ETSPercent	For jobs more than 400 FPM, sets an ETS check point as a percentage of S/D #2 Distance HSM.	0-100	70
Maxspeed at Outerlimit	Set the max speed at which car can run after tripping first slow down limit without trigerring ETS fault	50-999	999

3.2.4.3. Machine Information Parameters

Machine Information Parameters to setup following parameters for the controller. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

<table>
<tr><th colspan="4">Machine Information Parameters</th></tr>
<tr><th>Parameter Name</th><th>Function</th><th>Values/Options</th><th>Default Value</th></tr>
<tr><td>Contract Motor RPM</td><td>Enter the Motor RPM for the job</td><td>Based on Job</td><td>1200</td></tr>
<tr><td>Cnt Reset Range</td><td>When a car lands and the encoder count is different than the saved encoder position by more than this threshold, the encoder count will be reset to the saved encoder count (0-50 tenths of an inch)</td><td>(0-50 tenths of an inch), Default:0</td><td>0</td></tr>
<tr><td>Cnts Per INCH</td><td>Scale factor from encoder counts to inches.</td><td>0 - 9000, Default Value : 350</td><td>0</td></tr>
<tr><td>Motor Encoder PPR</td><td>Motor encoder pulses per revolution (1-4)</td><td>
<table>
<tr><td>Parameter value</td><td>Motor Encoder PPR</td></tr>
<tr><td>1</td><td>1024</td></tr>
<tr><td>2</td><td>2048</td></tr>
<tr><td>3</td><td>4096</td></tr>
<tr><td>4</td><td>10000</td></tr>
</table>
</td><td>1</td></tr>
</table>

3.2.4.4. Position Indicators

Position Indicator Parameters to setup following parameters for the controller. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Position Indicator Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Value**
Position Indicator Choice	Choose which Position Indicators will be used	NONE: No Position Indicators ESI: Using ESI DPI-XXX CE: CE position Indicators when controller is built with ES-CE-BD	None
Double Gong on Down Call	Enables the down gong double option.	Disable - 0 Enable - 1	Disable
Down Gong/Up Gong Options	Parameter to setup trigger for Down Gong/Up Gong (0: Down Gong/Up Gong to trigger when Door Open Limits are reached 1: When Car Arrives in Door Zone, 2: When Car is in slow down zone)	0-2	0
Position Indicater Messages and Buzzer Setup Option	Only to be used with ESI PI. Activates various Buzzers/Messages on ESI PI's. Buzzers on CAR PI only and Messages on both Car/Hall PI's: (0: No Buzzer, 1: Whenever the car passes Door Zone , 2: Door Delay: When Door is held for long time, 3: Option 1 and 2 are activated, 4: Activate Various Car Status Messages for 2 Digit PI, 5: Door Zone Plus Messaging on 2 Digit PI, 6: Option 4 + Option 2, 7: Option 1, 2, 4, 12: Messaging on Single Digit PI, 13: Option 12 + 1, 14: Option 12 + 2, 15: Option 12 + 3	0-15	3
Car Buzzer Setup Options	Parameter to Setup External Car Buzzer from Output Terminal #61(1: Whenever the car passes Door Zone , 2: Door Delay: When Door is held for long time, 3: Option 1 and 2 are activated)	1-3	3
PI or Car Buzzer Dwell Time	Parameter to Setup PI Buzzer or External Buzzer Dwell Time (Duration: Max 1 Second)	1-10 tenth of Seconds	5
Binary Position Indicator Outputs	Parameter to be activated only if CE or ESI Digitals Not Chosen. Need an IO	0-1	0

3.2.4.5. Safety Parameters

Various Safety Parameters for safety elements for the elevator and the controller. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Safety Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Value**
Motor Thermal Overload	Enable the Motor Thermal Overload input	Enabled/Disabled	Disabled
Auxiliary Brake Type	Choose Secondary Brake Mechanism	None Legacy Rope Gripper Legacy Emergency Brake Rope Gripper Emergency Brake Sheave Brake	None
Traction Loss Per Floor	The traction loss event will be logged if the car does not reach the next landing before the timer expires.	3 – 99 seconds	99
Enable/Disable Door Lock Monitoring	Enables door lock monitoring	0-Disable 1-Enable DOL, GS, DLK Sequence Check	Enable DOL, GS, DLK Sequence Check
DL/GS/DLK Fail Count	Sets the door close/gate switch/door lock fail count before controller generates an error	3 –99	4
Door Open Fail Count	Sets the door open fail count	3-99	99
OVFR Speed Trip Speed	Maximum Car Speed	50-999	999

3.2.4.6. Security Parameters

Various Security Parameters to be setup

Security Parameters			
Parameter Name	**Function**	**Values and Options**	**Default Value**
Key Switch In Hall	Key Switches in Car and which floors they cover. Preconfigured options provided by ES2. **If key switches are on custom floors not indicated in the list, ES2 will be shipped with a SPECIAL SOFTWARE**	None Lobby Floor Only Basement Only	None
Key Switch in Car	Key Switches in Car and which floors they cover. Preconfigured options provided by ES2. **If key switches are on custom floors not indicated in the list, ES2 will be shipped with a SPECIAL SOFTWARE**	None Basement All Except Lobby All Floors Second Landing Only Top and Bottom 1 and 2 Only Top Only 1,2 and 3 Only Top 3 Only	None
Card Reader Bypass Enable	Enable card reader bypass input	Enabled/Disabled	Disabled
Card Reader Bypass Input#	Assign Input for Card Reader Bypass Enable Input	0-99	0
Car to Lobby Key Enable	Enable a Key/Button to get the car to lobby	Enabled/Disabled	Disabled
Car to Lobby Key Input#	Assign input to Car to Lobby Key Enable Feature	0-99	0

3.2.4.7. Features Parameters

Various Feature Parameters to turn on Default Features provided by ES2. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Controller Features Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Value**
Attendant Enable	Enable the Attendant Feature	Enable/Disable	Disable
Anti-Nuisance Settings	Number of Trips/Floors traveled without somebody leaving or entering the elevators will trigger Anti-nuisance Feature. This feature will cancel all car calls after the number that has been setup on the controller. 0 Means feature is disabled	0-10	0
S-Button Enable	S-Button Enable. What do different values from 0-196 do	0-1	0
Sabbath Enable	Enable the Sabbath Input	Enable/Disable	Disabled
Sabbath Input#	Assign Input for Sabbath Service	0-99	0
Sabbath Output#	Assign Output for Sabbath Service	0-99	0
Quick Close Input#	Input to assign for Quick Close of Doors	0-99	0
Pit Flood Park Floor#	Floor where the car will be parked in case of flooding in pit	2-120 (job based)	2
Pit Flood Enable	Enable/Disable Pit Flood feature	Enabled/Disabled	Disabled
Pit Flood Input#	Assign input for Pit Flood Feature	0-99	0
Out of Service Enable	Enable/Disable Out of Service Input via key/button	Enabled/Disabled	Disabled
Out of Service Input#	Input for Out of Service Feature	0-99	0
Out of Service Light Output Enable	Enable/Disable Out of Service Output for a light/fixture	Enabled/Disabled	Disabled
Out of Service Light Output#	Assign Output for Out of Service Light Output	0-99	0
Car Light Fan Enable	Car Light Fan to be turned off based on no activity Feature	Enable/Disable	Disabled
Car Light Fan Output#	Car Light Fan Feature Output	0-99	0

3.2.4.7.1. Attedant Feature Setup

Various Attendant Parameters to turn on and setup Attendant Service. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Attendant Features			
Parameter Name	**Function**	**Values/Options**	**Default Values**
Attendant Enable	Enable the Attendant Feature	Enable/Disable	Disabled
Attendant Buzzer Output#	Output for Attendant Buzzer to let the attendant know about service being required	0-99	0
Attendant Up Light Output#	Output for UP direction light when car is on attendant service	0-99	0
Attendant Down Light Output#	Output for UP direction light when car is on attendant service	0-99	0
Attendant Key Switch Input#	Input for Attendant Key Switch to turn on Attendant Service	0-99	0
Attendant Down Button Input#	Input for Running the car DOWN when on Attendant Service	0-99	0
Attendant Up Button Input#	Input for Running the car UP when on Attendant Service	0-99	0
Attendant Hall ByPass Key Switch Input#	Input for Hall ByPass Key Switch	0-99	0

3.2.4.7.2. Emergency Power Feature

Various Feature Parameters to turn on Default Features provided by ES2. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Emergency Power Features			
Parameter Name	**Function**	**Values/Options**	**Default Value**
Emergency Power Enable	Enable Emergency Power Operations to run the elevator	Enabled/Disabled	Disabled
Emergency Power Input#	Assign Input for Car for Emergency Power	0-99	0
Emergency Power Car Select Input#	Assign Input for assigning a particular car to operate on Emergency Power in duplex/Group	0-99	0
Emergency Power Transfer Switch Input#	Pre-Transfer Switch Input#. : Emergency Power to Grid Power	0-99	0
Emergency Power Parking Floor	Setup Parking Floor where elevator will park when on emergency power	1-48	1
TEERS Enable	Enable Traction Emergency Rescue System for ES2	Enabled/Disabled	Disabled
TEERS Input#	Assign Input for TEERS	0-99	0

3.2.4.8. Floor Markings Parameters

Floor Markings Parameter Screen will let you put a Text/Numeric Value for Each of the Floors

ES2 controller supports up to 120 floors and each floor can be individually marked/named.

3.2.4.9. Landing System Parameters

Landing System Parameters lets user define parameters for the ELGO APS. These parameters should not be changed without consulting with ESI engineering support.

Landing System Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Value**
High Level Speed Enable	Car Landing Behavior based on speed profiles: ESI Safety Parameter	0-7	0
Level Magnet Length	Legacy TS89 Parameters	4-12	6
Learn Floor Heights	Legacy TS89 Parameters	0-2	0
Re leveling Threshold	Distance defined in MM at which car will start to relevel when in stationary position (if car moves more than 5mm while stationary, it will attempt to relevel)	0-50	5
Low Speed Leveling threshold	Distance defined in MM at which car will send a zero speed command when car is approaching a floor at a slow speed (normally below 5 FPM)	0-50	5
High Speed Leveling threshold	Distance defined in MM at which car will send a zero speed command when car is approaching a floor at a high speed (normally above 5 FPM)	0-50	5
Leveling Hystersis	Distance defined in mm at which the car is determined to be leveled at a landing. 3mm +/- which is default is about 8th of an inch from position defined in Floor Table	0-15	3

3.2.4.10. Floors Parameters

Floor Parameters lets user define parameters for the floor options in the ES2 controller.

Floor Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Value**
Lobby Floor	Setup which floor will be the lobby floor	1-120	1
Parking Floor # 1	Parking Zone #1 should be same for all cars in the group	0-120	0
Parking Floor # 2	Parking Zone #2 should be same for all cars in the group	0-120	0
Parking Floor # 3	Parking Zone #3 should be same for all cars in the group	0-120	0
Parking Floor # 4	Parking Zone #4 should be same for all cars in the group	0-120	0
Parking Floor # 5	Parking Zone #5 should be same for all cars in the group	0-120	0
Parking Floor # 6	Parking Zone #6 should be same for all cars in the group	0-120	0
Parking Floor # 7	Parking Zone #7 should be same for all cars in the group	0-120	0
Parking Floor # 8	Parking Zone #8 should be same for all cars in the group	0-120	0

3.2.4.11. Door Parameters

Various Door Parameters to integrated Door Equipment correctly and safely with ES2. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Door Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Values**
Door Nudging Option	Enables the Door Nudging Option (1-3).	1 : will let the doors stay open as long as input 28E is ON and not sound the buzzer. 2 : will let the doors stay open as long as input 28E is ON and sound the buzzer. 3 : will let the doors nudge close , and sound the buzzer. After the time set in Timer Parameters screen (EDGE TIME OUT): Parameter #7 expires the buzzer will sound. Then the door close timer will expire and the door will nudge close with both CX and NR energized.	3
OX ONafter OL:N/C NR (AT-400 Door Operation)	For AT-400 door operator. Open output will stay on after open limit falls out. NR, door nudging output, drops to put door into nudging mode	0-3	0
Power Doors Close when out of Door Zone	Power door close signal when out of the door zone. Required for some operators so the doors don't start to open.	Enabled/Disabled	Disabled
Door Options When Car Parked	Door Behavior when Car is Parked on the Parking Floor	0: Car Park with Door Closed, 1: Car Park with Door Open at Lobby Floor 2: Car Park with Door Open at Any Floor	0
Door Hold	Door Hold Enable or Disable	Enabled/Disabled	Disabled
Door Hold Input Front	Input Assigned for Door Hold Button Input Front Opening	0-99	0
Door Hold Input Rear	Input Assigned for Door Hold Button Input Rear Opening	0-99	0

Enable Door Open and Close while on Inspection	Enable or Disable Door Open and Close while on Inspection	Enabled/Disabled	0
F/R Opening 1-16	Setup Default	1-1	Front
F/R Opening 17-32			Front
F/R Opening 33-48			Front
F/R Opening 49-64			Front
F/R Opening 65-80			Front
F/R Opening 81-96			Front
F/R Opening 97-112			Front
F/R Opening 113-120			Front

3.2.4.11.1. Edit Door Openings

Touching/Clicking on the Edit Door Openings Menu (top right corner for Door Parameters) will let the user enable Front/Rear Openings for a job

3.2.4.12. Fire Code

Fire Code Menu is used to define various parameters based on Fire Code applicable to the region where the controller is being installed.

Fire Code Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Values**
Fire Code Jurisdiction	Chose the jurisdiction for the FCF code	ANSI, NYC, Chicago, ANSI2000, MASS 2000	BASED ON JOB
Prime FCF Floor#	Setup which floor will act as Prime Floor In case of Fire	1-120	1
Alternate FCF Floor#	Setup which floor will act as Alternate Floor In case of Fire	1-120	2
Nudging on FCF 1	Allow Nudging on Prime Floor	Enabled/Disabled	Enabled
Prime FCF Door	Specify the Door opening for Prime FCF Floor	None, Front, Rear	Front
Alt FCF Door	Specify the Door opening for Alternate FCF Floor	None, Front, Rear	Front
Fire Buzzer Options	Parameter to setup Fire Buzzer	0:Only Fire Buzzer 1: Fire Buzzer and Door Delay Buzzer	0

3.2.4.13. Timers

Timer Menu is used to define various timer based parameters in ES2. All values are based on seconds, Except the parameters marked in blue cells

Timer Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Values**
Max Time for Door Open/Close	Amount of time the controller will wait for the door to make a full open or close	15-90	15
Car Call Door Time	Time for doors to close after car call has been input	2-30	6
Hall Call Door Time	Time for doors to close after hall call has been input	2-30	10
Lobby Door Time	Time for doors to close while on the lobby Floor	2-30	10
Re-Open Door Time	Amount of Time in seconds that door will remain open if it is forced to reopen due to door edge being broken (if someone enters or leaves the elevator while doors are closing)	2-30	3
Edge Time Out	Sets the Door Edge Time out after which doors will close	10-900	25
Posiiton Indicator Shut Down Time	The amount of time that position indicators will on after after the car is idle. If position indicators are desired to be on all of the time, set this parameter to 0	0-900	180
Timer for car to switch from Attendant/Independent to Fire Phase	Amount of time in seconds after which the car will go into Fire Phase 1 if it is running in Independent/Attendant Mode.	1-60	15
Stuck Hall Button Time	Sets a timer used to determine if a Hall button is stuck	10-600	30
Parking Delay Time	Sets the delay before going to park.	2-900	30
Primary Parking Floor Refill Time	Another car will be called to park in the Emergency parking location when the Park Floor 1 refill time expires.	2-900	300
Alternate Parking Floor Refill Time	Another car will be called to park in the secondary parking location when the Park Floor 2 refill time expires.	2-900	300

Motor Thermal Overload Fault Clear Timer	Sets the time to clear the Motor TOL(Thermal Overload) fault after the TOL input falls.	10-1800	10
Door Hold Door Time	Sets the time the door remains open after door hold has been pressed. Also used for how long the door remains open while operating in Sabbath mode	2-600	45
Timer for Down/Up Output Delay on CPU	Time Measured in Tenth of Seconds to delay dropping the Up and Down Outputs on the CPU	3-20	3
Light and Fan Delay Timer	Sets the cab light delay on time	10-900	60
Emergency Brake Delay Drop Timer	Setup time for Ebrake To Drop after Primary Brake Drops once the car is stopped	0-900	240
ETS 3 Max Speed Timer	For jobs more than 400 FPM, set the timer for max speed at which the car can run after tripping the high speed slow down limit without trigerring ETS fault	0-50	50
Car Call Button Timer	Time measured in tenth of a second for the duration for which the car Car Call Button has to be held to register a car call.	0-6	0
Maximum Time after which Car will Timeout for Running	Maximum Time after which Car will Timeout for Running	30-9999	60

3.2.4.14. Drive Parameters

Drive Menu is used to define various parameters to fine tune the drive on ES2 to the ES2 Controller

Drive Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Value**
Delay High Speed Run in tenth of Seconds	Time Measured in Tenth of Seconds to delay the High Speed Run	0-20 tenths of a second	0
Delay Dropping the Drive Enable Output on the CPU	Time Measured in Tenth of Seconds to delay dropping the Drive Enable Output on the CPU	0-20 tenths of a second	3
Delay turning on the Drive Enable Output on the CPU	Time Measured in Tenth of Seconds to delay turning on the Drive Enable Output on the CPU	0 – 30 tenths of a second	2

3.2.4.15. Brake Parameters

Brakes Menu is used to define various parameters to fine tune the brakes on the Machine with ES2 Brake Interface

Brake Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Values**
VVVF BR Drop Delay	Timer used to engage the brake after a run has stopped (tenth of Seconds)	0-20	5
Brake SW Enable	Enables the brake switch input	Enabled/Disabled	Disabled
Brake Pick Time	Set the Brake Pick Time (in tenth of Seconds)	1-60	20
Primary Brake Pick Current	Primary Brake Pick Current defined 100th of an Amp. E.g. for 2 AMP Brake Pick Should be set to 200	0-6000	0
Primary Brake Hold Current	Primary Brake Hold Current defined 100th of an Amp. E.g. for 2 AMP Brake Hold Should be set to 200	0-3000	0
Primary Brake Coil Ohm	Primary Brake Coil Resistance defined in 1/10th of OHMS. E.g. for 45 OHM Brake, should be set to 450	0-20000	0
Primary Brake Pick to Hold Time	Time in tenth of a second, to go from Brake Pick to Brake Hold on the Primary Brake	0-100	20
Primary Brake Volt Setpoint	ESI Safety Parameter (DO NOT CHANGE WITHOUT Consulting with ESI Engineering Team)	0-5	0
Emergency Brake Pick Current	Emergency Brake Pick Current defined 100th of an Amp. E.g. for 2 AMP Brake Pick Should be set to 200	0-6000	0
Emergency Brake Hold Current	Emergency Brake Hold Current defined 100th of an Amp. E.g. for 2 AMP Brake Hold Should be set to 200	0-3000	0
Emergency Brake Pick to Hold Time	Emergency Brake Coil Resistance defined in 1/10th of OHMS. E.g. for 45 OHM Brake, should be set to 450	0-20000	0
Emergency Brake Pick to Hold Time	Time in tenth of a second, to go from Brake Pick to Brake Hold on the Emergency Brake	0-100	20
Emergency Brake Volt Setpoint	*ESI Safety Parameter (DO NOT CHANGE WITHOUT Consulting with ESI Engineering Team*	0-5	0

3.2.4.16. Remote Monitoring Parameters

If In building Remote Monitoring (EMIS-100) is purchased as an option for the controller, this menu would be used for setting/configuring the EMIS-100 features.

Remote Monitoring (EMIS-100) Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Values**
EMIS REM Control Enable	Enable EMIS to do Hall Calls, Car Calls, Update Parameters, Remote Independent Service, Remote Car to Lobby	Enabled/Disabled	Disabled
Enable EMIS to lock Floors for Hall and Car Calls	Enable EMIS to lock Floors for Hall and Car Calls	Enabled/Disabled	Disabled
EMIS SEC Deny Enable	Enable EMIS to Disable certain Floors	Enabled/Disabled	Disabled
EMIS Car To Lobby Time Off	Setup time for how long the car will stay in Car To Lobby Mode, once parked at the lobby floor	10-999	30

3.2.4.17. Load Weighing

Load Weighing Menu is used to define various parameters to configure ES2 controller setting for the Load Weighing Device provided with the controller.

Load Weighing Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Values**
Input# For Load Weighing	Configure Load Weighing Input on the controller	0-99	0

3.2.4.18. Group/Duplex Dispatching Parameters

Parameter for Group/Duplex jobs

Dispatch Parameters			
Parameter Name	**Function**	**Values/Options**	**Default Values**
Car Reassignment Penalty	Group Job Dispatching Parameter : To be used only with consultation with ESI	0-120	10
Pref Lobby DN call Car	Preferred car to assign down calls from the lobby.	0-8	0
Pref Lobby UP call Car	Preferred car to assign UP calls from the lobby.	0-8	0
Lobby Car Up Penalty	Group Dispatch Parameters for Calculating ETA for a car. This Parameter is used to calculate total ETA. This setting not recommended to be changed	0-120	10
Lobby Car Down Penalty	Group Dispatch Parameters for Calculating ETA for a car. This Parameter is used to calculate total ETA. This setting not recommended to be changed	0-120	0
Brake to Brake Time (tsec)	Group Dispatch Parameters for Calculating ETA for a car. This Parameter uses time between Brake Opening and Closing and adds to total ETA. This setting not recommended to be changed	1-250	80
High Speed Floor to Floor Time (tsec)	Group Dispatch Parameters for Calculating ETA for a car. This Parameter uses time required for High Speed Floor to Floor Runs and adds to total ETA. This setting not recommended to be changed	1-250	30
Door Open Close Time (tsec)	Group Dispatch Parameters for Calculating ETA for a car. This Parameter uses time required for doors opening and closing and adds to total ETA. This setting not recommended to be changed	1-250	30
Average Door Dwell Time (tsec)	Group Dispatch Parameters for Calculating ETA for a car. This Parameter uses time required for doors dwell time and adds to total ETA. This setting not recommended to be changed	1-250	340

3.2.4.19. EMT Parameters

Parameters to setup EMT/Code Blue Features provided by ES2

EMT/Code Blue Features			
Parameter Name	**Function**	**Values/Options**	**Default Value**
EMT Enable	Enables EMT Function for MA only	Enable/Disable	Disabled
EMT Floor	Setup EMT Floor for MA Only	1-120	1
EMT Door (FUTURE)	Setup EMT Door (for future: DO NOT USE)	0-50	0
EMT Hall Key Switch Input	Assign Input for the EMT or CODE BLUE Hall Key Switch	0-99	0
EMT Car Key Switch Input	Assign Input for the EMT or CODE BLUE Car Key Switch	0-99	0
EMT Buzzer Output	Assign Output for the EMTor CODE BLUE Buzzer	0-99	0
EMT Light Output	Assign EMT Light Output	0-99	0
EMT Delay OUT Time	Time for EMT mode to clear if the car has not moved while in EMT mode.	10-300	30
Code Blue Enable	Disable/Enable Code Blue	Enable/Disable	Disabled
Code Blue Call 1-32 Input	Assign Code Blue Calls for Floors 1-32, one for each floor	0-99	0

4. Brakes

ES2 controller is shipped with the various brake parameters pre-set into the controller, specific for the job information provided by the customer.

Every Traction Controller comes with **ZERO, ONE or TWO ES-EBC3.** Following are the details for different EBC3 configurations:-

1. **ZERO** : For certain brake Configurations, ES2, may come with Brake Control circuits which use power resistors and contactors to set 'Pick' and 'Hold' brake voltages.
2. **ONE :** Mostly applicable to Geared Applications where the secondary brake is a ROPE GRIPPER and comes with a ES-RG-BD
3. **TWO:** Mostly applicable to Gearless Applications, where the secondary brake is a Emergency Brake or a Sheave Brake.

5. Elevator Modes

5.1. Construction Mode

Construction Mode

Assuming all the necessary steps have been taken as defined in Initial Power Turn On/ES2 Ground Safety, ES2 can now be put to construction mode:-

1. **Following Terminals need to be Jumped for car to run in Construction Mode:-**

Terminal #'s	Function
#DCB(#34) - #DCT(#35)	Door Contacts (Manual/Swing Doors only), Input [HDC]
#DLT(#44) - #DLB(#43)	Door Locks, Input [DL] and Relay "DL"
#37 to #39	Bottom Normal Limit
#38 to #39	Top Normal Limit
#TFL1- #TFL2	Top Final Limit
#BFL1 - #BFL2	Bottom Final Limit
#PSW1 - #PSW2	Pit Safety Switch
#CSC1(#40) - #CSC2(#41)	Car Safety Circuit - Escape Hatch, Safety Sw, TOC Stop Sw (input [SAF] ON)
#CSC2(#41) - #ICGS(#42)	InCar Stop Switch (input [ICSS] ON)
#ICGS(#42) - #GS(#45)	Car Door Contact (input [GS] ON and relay "GS" ON)

2. **If job has walkthrough doors, jump the following terminals**

Terminal #'s	Function
#DCBR(#34R) - #DCTR(#35R)	Rear Door Contacts (Manual/Swing Doors Only), Input [RHDC]
#DLTR(#44R) - #DLBR(#43R)	Rear Door Locks, Input [RDL] and Relay "RDL"
#ICGS(#42) - #RGS(#45R)	Rear Car Door Contact (input [RGS] ON and relay "RGS" ON)

3. **In addition for controllers using Rope Gripper as a secondary brake , jump the following terminals on the** ES-RG-BD **(Rope Gripper Board):-**

Terminal #'s	Function
#OVS1 - #OVS2	Governor Overspeed Switch (input **"OVS"** ON)
#RGC1 - #RGC2	Rope Gripper Contact

4. **If the controller uses Emergency Brake as the secondary brake, jump the following terminals:-**

Terminal #'s	Function
#GOV1(#32) - #GOV2(#32A)	Governor Trip Switch

5. **If running construction mode with a Temporary Run Box, connect the Run Box to the following Terminals**

   #TI , #ID , #IU

6. **After adding the above jumpers, use the following documents to tune the drive to the machine/motor. On clicking the links below you :-**

- KEB F5 Drive: KEB Elevator Quick Start Guide (V 3.00), included with the controller documentation (Click to download)
- Magnetek M1000 Drive: M1000 Quick Start Guide V3-0, included with the controller documentation (Click to download)

5.2. Inspection Mode

Inspection Mode

Post Construction Mode, users are recommended to move to the next stage of Inspection Mode.

ESI Sets up the controller for Inspection at 50FPM.

Before going into Inspection Mode, all connections should be made between ES2-CPU and ES-CT-COP and ES-TOC-BOX. These wiring connections should be based on the Job Print that has been provided for that particular job.

Inspection has two standard modes:-

- **Controller Inspection**
- **Top of Car Inspection.**

5.2.1. Controller Inspection

Controller Inspection

Controller Inspection can be activated from ES-RB-BD

Turning the Toggle Switch to INSP mode on the ES-RB-BD will engage the Controller Inspection Mode.

With the Top of Car Inspection switch closed (Top of Car Inspection always has the highest priority) and the controller inspection switch in the INSP position, the controller can be run via the controller inspection buttons. You may run the car by pressing Enable and either Up or Down. The car will run on inspection speed up or down. The LCD will display "Up Slow Speed" or "Dn Slow Speed". The car will move up or down by energizing the IU or ID relay and it's corresponding input.

Relays that must be energized: RPR and CT.

Relays that must be de-energized: ACC, ACX, I, and IX.

Inputs [ACC] should be OFF

Inputs that must be activated: [TM], [GOV], [SAF], [ICSS], [TCI] & [ICI].

5.2.2. Top of Car Inspection

Top of Car Inspection

Top of Car Inspection gets the highest priority and overrides the Controller Inspection or Hoistway Access Inspection.

If running construction mode with an ES-TOC-INSPECTION-Box, connect the Inspection Box to the following Terminals

- #TI
- #ID
- #IU

Relays that must be energized: RPR and CT

Relays that must be de-energized: ACC, ACX, I, IX, IC1, and IC2.
Input [TCI] should be off.
Inputs that must be activated: [TM], [GOV], [SAF], and [ICSS].

In order to move the car on Top of Car Inspection, constant pressure must be applied to the buttons. The buttons will allow voltage to flow from terminals #TI to #IU or #TI to #ID. The car will move up and down by energizing the IU or ID relay and its corresponding input.

CAUTION: Ensure that all personnel working on the elevator understand that the car will be moving during this procedure in both Up run and the Down run modes

Top of Car Inspection UP RUN

Pressing the Top of Car UP RUN and Safety button (#TI to #IU) will send a signal to the controller (via ES2-CPU-input 7-[IU]) that up motion is requested. Relay IU will pick, feed voltage to ES2-CPU-input 14-[DRV] via a N/Open contact and through N/Open "RPR" contacts to run circuit.

The CPU will turn ON four outputs. ES2-CPU-Output 10 [URP] energizing relay U. ES2-CPU-Output 20 [BP] energizing relay B. ES2-CPU-Output 21 [DEN] energizing relay DEN. ES2-TOC-Output 10 [DCS] which will force the doors closed ("if applicable"). The motor and brake will engage and the car will run up at inspection speed. The CPU display will read 'Up Slow Speed'. Releasing the switch will stop the car immediately.

Top of Car Inspection DOWN RUN

Pressing the Top of Car DOWN RUN and Safety button (#TI to #ID) will send a signal to the controller (via ES2-CPU-input 6-[ID]) that down motion is requested. Relay ID will pick, feed voltage to ES2-CPU-input 14-[DRV] via a N/Open contact and through N/Open "RPR" contacts to run circuit.

The CPU will turn ON four outputs. ES2-CPU-Output 11 [DRP] energizing relay D. ES2-CPU-Output 20 [BP] energizing relay B. ES2-CPU-Output 21 [DEN] energizing relay DEN. ES2-TOC-Output 10 [DCS] which will force the doors closed ("if applicable"). The motor and brake will engage and the car will run down at inspection speed. The CPU display will read 'Down Slow Speed'. Releasing the switch will stop the car immediately.

5.3. Test Mode

Test Mode

Set controller inspection switch to “TEST” on the ES-RB-BD.

Place the “TEST MODE” switch into the “TEST” position in order to run the car without Hall Calls enabled and without automatic door opening. The screen will read “:TEST Mode”. Otherwise it should read “:Normal”

5.4. Hoistway Access Mode

Hoistway Access

The hoistway access mode is available only at the terminal floors (Top and Bottom) to moves the car to get access to the pit or the top of the hoistway. In order to activate Hoistway Access a key switch is used to enable Top or Bottom Access on the car. The car will only move if the doors are open.

In order to move the car on Access, constant pressure must be applied to the key switches. The key switches will allow voltage to flow from terminals #AC to either the ID relay or the IU relay via an ACC N/Open contact. Two other relays associated with Access are TAC and BAC. The TAC is energized by the Top Floor Access Key Switch, and the BAC is energized by the Bottom Floor Access Key Switch. The car will move up or down by energizing the IU or ID relay and it's corresponding input.

In addition, Bottom and Top Access Distance can be setup in basic parameters as listed here.

15	BOT Access LimDist	Set the Bottom Distance for Access	(Value Between 24-360)
16	TOP Access LimDist	Set the Top Distance for Access	(Value Between 24-360)

The GS N/Open contact is bypassed via "ACC" and either "BAC" or "TAC" N/Open contacts.
The Bottom Hatch Door is bypassed via "ACX" and "BAC" N/Open contacts. The Top Hatch Door is bypassed via "ACX" and "TAC" N/Open contacts.

Relays that must be energized: RPR, CT, ACC and ACX.

Relays that must be de-energized: I, IX, IC1, and IC2.
Input [ICI] should be OFF.
Inputs that must be activated: [TM], [GOV], [SAF], [ICSS], [TCI], and [ACC].

CAUTION: Ensure that all personnel working on the elevator understand that the car will be moving during this procedure in both Up run and Down run modes

5.5. Automatic Mode

Set controller inspection switch to "AUTO" on the ES-RB-BD.
In addition top-of-car inspection and in-car inspection switches should be closed.

When the controller is in automatic mode, the ES2 Screen will read "Automatic". If the word 'Automatic' is not displaying, the elevator is not in automatic mode. Automatic is the normal mode of operation for the elevator when it is in service.

AUTOMATIC UP RUN: Following is the sequence of Inputs/Outputs that trigger during an Automatic UP RUN

With the car level at the bottom terminal floor (First Floor), ES2-CPU-output 12 [DZ] should be ON. Pressing 2nd floor car button will activate ES2-COP-input [2C] and ES2-COP-output [2A] will acknowledge the call. If the doors are not closed, they will wait for the door close timer to expire. The hatch doors will close energizing relay DL and ES2-CPU-input 12 [DL]. The car door contacts will close energizing relay GS and ES2-CPU input 11 [GS]. The car will start and begin to accelerate to high speed. The CPU will slow the car down by de-energizing ES2-CPU-output 6 [HSP]. The point of slow down will be determined via the Absolute positioning system. The car will decelerate into the floor.

AUTOMATIC DOWN RUN

This is the same as above. However in the down direction, the CPU will slow the car down by de-energizing ES2-CPU-output 6 [HSP]. The point of slow down will be determined via the Absolute positioning system. The car will decelerate into the floor.

DETAILED RUNNING RELAY SEQUENCE

N/Open contacts from either D or U will energize following relays DU,DUX and PX. The main motor contactor P and contactor PB will been energized via PX and DUX. The DEN relay will give a run enable to the VVVF drive, which will turn on DBE output. The Brake contactor BR will then come in releasing the brake.
Depending on direction of travel and request speed, the drive will accelerate the elevator to it's proper speed.
When not on automatic, releasing the inspection buttons or access key switch will bring the car to an immediate stop. D or U, DEN and BR will drop right away. P and PB will fall out 250msec later.
On automatic after the car has decelerated and entered the leveling zone. The car will be brought to zero speed and then BR, DEN, D/U and P will sequentially fall out bringing the car to a controlled stop.

5.6. Independent Service

INDEPENDENT SERVICE

Independent service is initiated by the key switch wired to [50]/[IND] on the ECT-COP. While on Independent Service all hall calls are disabled and the car responds to only car calls. The doors remain open until a car call is registered. Continuous pressure of a car call button or the door close button will close the doors. If the doors reach full close, the car will run to the selected floor. Releasing the button prior to running causes the doors to reopen and remain open.

5.7. Sabbath Operation

Sabbath Operation

Sabbath can be turned on as a feature using a Key Switch that is using an Input designated by either ESI or the user.
In Sabbath operation, the car goes to each floor. The door will remain based on Door Hold Door Time Input that can be setup in the Door Menu Screen.
The car will exit Sabbath operation once the key switch is turned off.

Sabbath can be setup using the Feature Setup Menu Screen.

5.8. Attendant Operation

Various Attendant Parameters to turn on and setup Attendant Service. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Attendant Features			
Parameter Name	**Function**	**Values/Options**	**Default Values**
Attendant Enable	Enable the Attendant Feature	Enable/Disable	Disabled
Attendant Buzzer Output#	Output for Attendant Buzzer to let the attendant know about service being required	0-99	0
Attendant Up Light Output#	Output for UP direction light when car is on attendant service	0-99	0
Attendant Down Light Output#	Output for UP direction light when car is on attendant service	0-99	0
Attendant Key Switch Input#	Input for Attendant Key Switch to turn on Attendant Service	0-99	0
Attendant Down Button Input#	Input for Running the car DOWN when on Attendant Service	0-99	0
Attendant Up Button Input#	Input for Running the car UP when on Attendant Service	0-99	0
Attendant Hall ByPass Key Switch Input#	Input for Hall ByPass Key Switch	0-99	0

6. Emergency Modes

6.1. Earthquake Operation

EarthQuake Operation

When earthquake feature is enabled, the controller will land at the nearest floor and open the doors for passengers to exit. The doors will remain open until the earthquake status on the controller is reset.

Earthquake Reset Operation

After inputs [CWE] & [SEM] are off, put car on controller inspection.
On the Setup and Utilities screen, press the Earthquake Reset Button.

6.2. Fire Phase 1/2

Fire Emergency Setup and Operation

Fire Phase 1 and Phase 2 is used to setup the behavior of the Elevator/Elevators when a fire situation is detected.

1. **Fire Phase 1:** When a smoke/fire detector/sensor is detected an input into the controller turns on Fire Phase 1 automatically. Alternatively, it can be turned on manually using a key switch. ES2 will move the car(s) to the primary Fire Phase 1 Floor/Door as setup in the Fire Parameter Settings. In case, the fire is detected on the primary landing floor, ES2 will move car to the Alternate Fire Floor/Door, as defined in Fire Parameter Settings. In both cases, the doors will remain open on the landing floors.

2. **Fire Phase 2:** Car can be put on Fire Phase 2 ONLY manually with a key switch. In Fire Phase 2, Elevator is under full control of fire fighters and/or emergency crews to control the operations of the elevator from inside the car.

6.3. Emergency Power

Various Feature Parameters to turn on Default Features provided by ES2. Each ESI Controller is factory programmed to meet the customer jobs but may require change from time to time based on changing job requirements

Emergency Power Features			
Parameter Name	**Function**	**Values/Options**	**Default Value**
Emergency Power Enable	Enable Emergency Power Operations to run the elevator	Enabled/Disabled	Disabled
Emergency Power Input#	Assign Input for Car for Emergency Power	0-99	0
Emergency Power Car Select Input#	Assign Input for assigning a particular car to operate on Emergency Power in duplex/Group	0-99	0
Emergency Power Transfer Switch Input#	Pre-Transfer Switch Input#. : Emergency Power to Grid Power	0-99	0
Emergency Power Parking Floor	Setup Parking Floor where elevator will park when on emergency power	1-48	1

7. Floor/Hoistway Learn

7.1. Floor Learn Trip

This procedure is specifically for APS applications performed from the COP (in the car) , or TOC (TOP OF CAR) while in Inspection Mode. .

1. Parameter [2], Top Floor, must be set before running this procedure
2. Terminals #37 and #38 must be jumped to #39. While these jumpers are in place, the car will not be stopped by the virtual normals.
3. Set Parameter [20] = 8 (this allows floor heights to be written to Memory)
4. Keep pressing MODE Button until the Setup/Utilities Menu is visible. Enter the Setup/Utilities Menu

5. Press UP ARROW until "LEARN FLOOR TABLE" is displayed

6. Press set, LEARN Floor Hgts will be displayed

7. RUN Car to Landing "1"
8. Press SET, repeat SET to confirm

9. Repeat the process for each Landing
10. Once each Landing position has been learned, the controller will ask for the CWT position.
11. Move the car to the desired position and press Set to Save and Set to Confirm.
12. Slow down distances and position of the virtual normal limits are then automatically calculated.
13. Remove Jumpers from Terminals #37 and #38 that were jumped to #39
14. At the end of this procedure, the controller will train the safety processor in the TOC

7.2. Floor Height Final Adjustments

After Initial Learn Trip, following process is used to do final adjustments to fine tune the floor height table.

1. Set Parameter [20] = 8
2. Keep Pressing MODE Button until the Setup/Utilities Menu is visible

3. Press UP ARROW until "View Flr Hgt Table" is displayed

4. Press Set to View the table

5. Press up and down arrows to cycle through the rows of the floor height table
6. Press Set to Edit the floor height

7. The cursor will show which number will be changed. Press Mode to move the cursor between the characters. Use up and down arrows to adjust the number. Press Set to save OR Press clear to cancel.

8. ES Testing Procedures

ES2 provides industry standard Testing Procedures to pass various elevator Safety Tests

1. NTS Testing
2. ETS Testing
3. Unintended Motion Acceptance Test
4. Ascending Overspeed Test
5. Descending Overspeed Test/Car Safety Test
6. Car Buffer Test
7. Counterweight Buffer Test
8. Traction Loss Test
9. Rope Gripper Test

8.1. NTS Testing

NTS Testing

NTS (Normal Terminal Slowdown) testing is a crucial procedure performed on elevators before they are put into service to ensure proper operation of the slowdown and stopping mechanisms at the top and bottom of the hoistway. This test verifies that the elevator will safely slow down and stop at the terminal landings using the designated normal virtual limit.

CAR SHOULD BE IN AUTOMATIC MODE FOR THIS TEST TO BE CONDUCTED.
Car will Enter SPECIAL TEST MODE and all calls and normal operations will be disabled. The NTS Test is to be performed after the initial Floor Learn Trip has been completed.

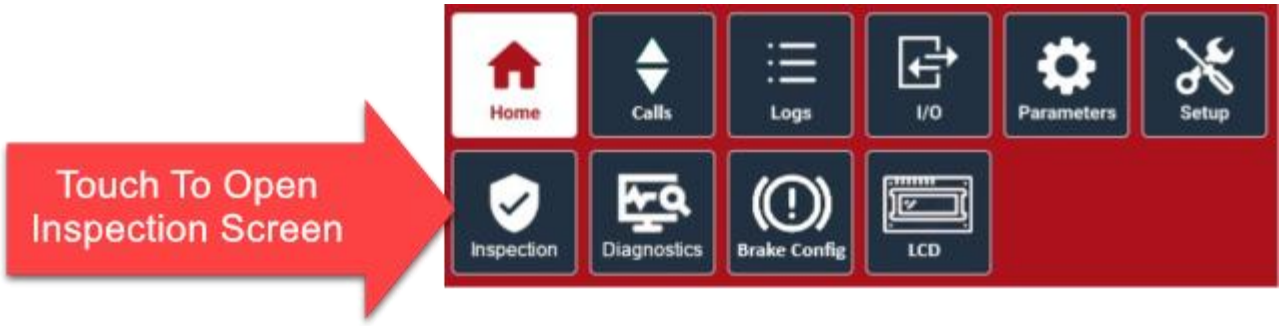
With ES2, NTS can be performed either with an Automated Test or a Manual Test.

1. Automated Test
2. Manual Test

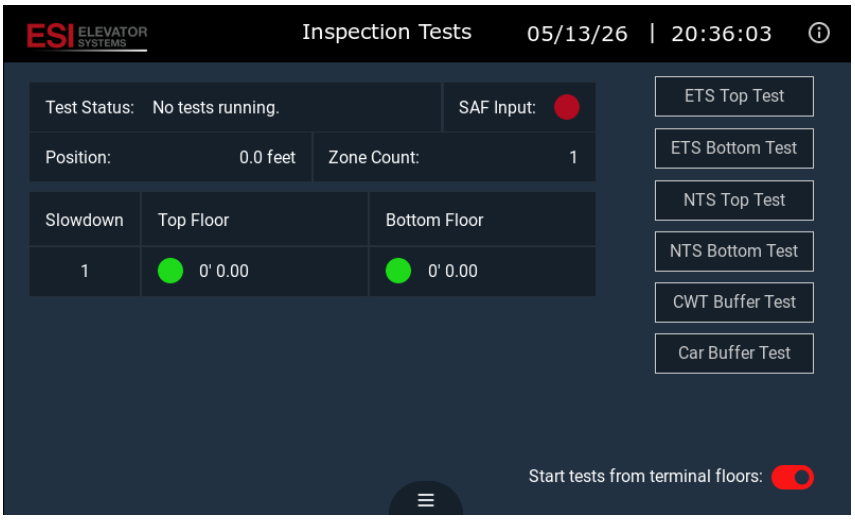
8.1.1. NTS Automated Testing Procedure

CAR SHOULD BE IN AUTOMATIC MODE FOR THIS TEST TO BE CONDUCTED.
Car will Enter SPECIAL TEST MODE and all calls and normal operations will be disabled. The NTS Test is to be performed after the initial Floor Learn Trip has been completed.

Automated NTS Testing Procedure



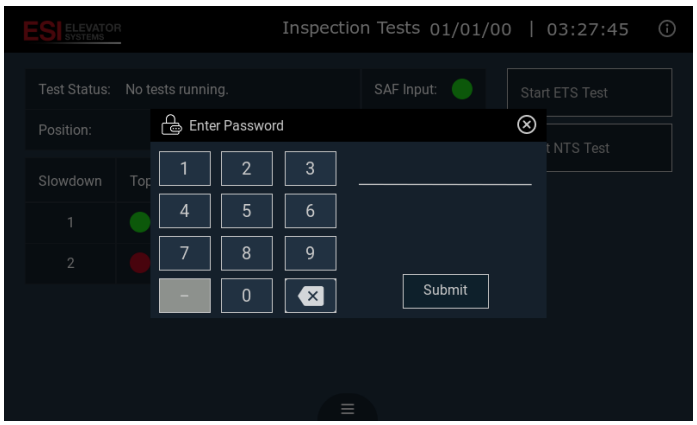
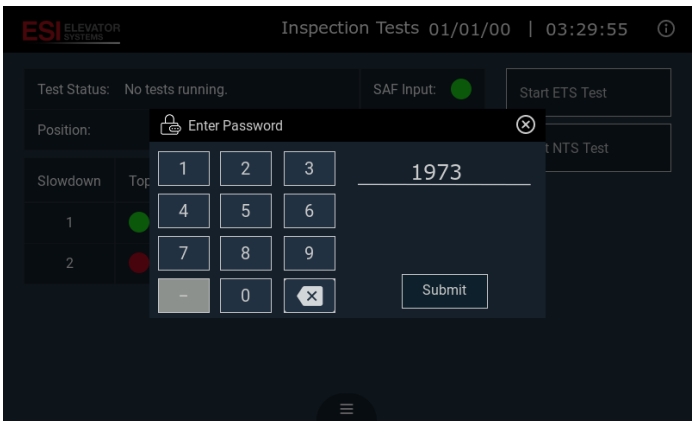
The following screen provides automated wizards to perform the inspection tests. Car will move during these tests.
1) Select the NTS Top Test button to start the test and follow the on screen prompts.
2) Once NTS Top Test is completed, Select the NTS Bottom Test button to start the test and follow the on screen prompts.



In case during inspection it is desired to run the NTS test starting from terminal floors, toggle the START TESTS FROM TERMINAL FLOORS to ON position. It will turn Green and will conduct automated testing from Terminal Floors.

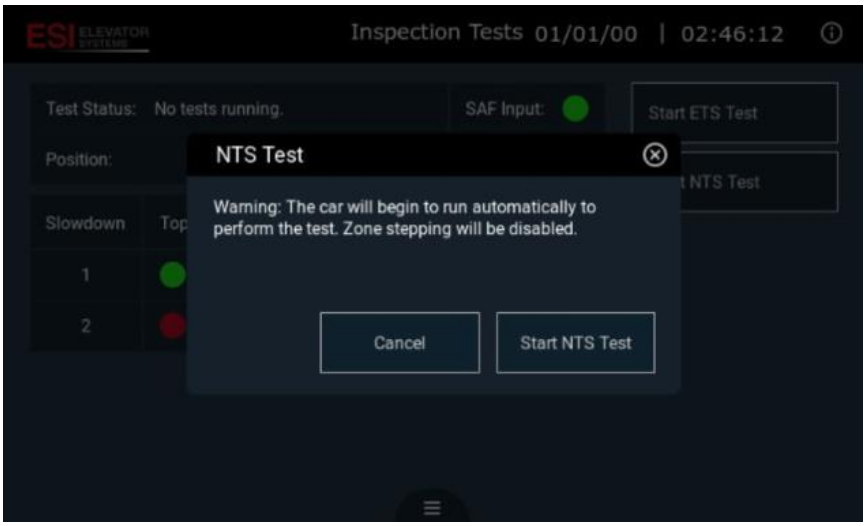
(NTS TEST STEP 1)

Press one of the NTS TEST buttons. Screen will prompt for a password. Default Password is 1973. Enter the Password.

Figure 2	Figure 3
	

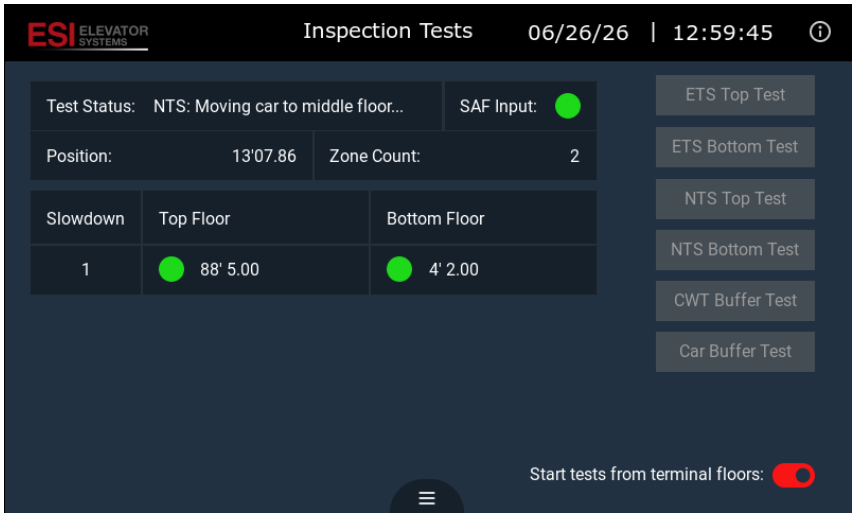
(NTS TEST STEP 2)

After Entering the password, Screen will display the following Prompt. Press the Start NTS Test button



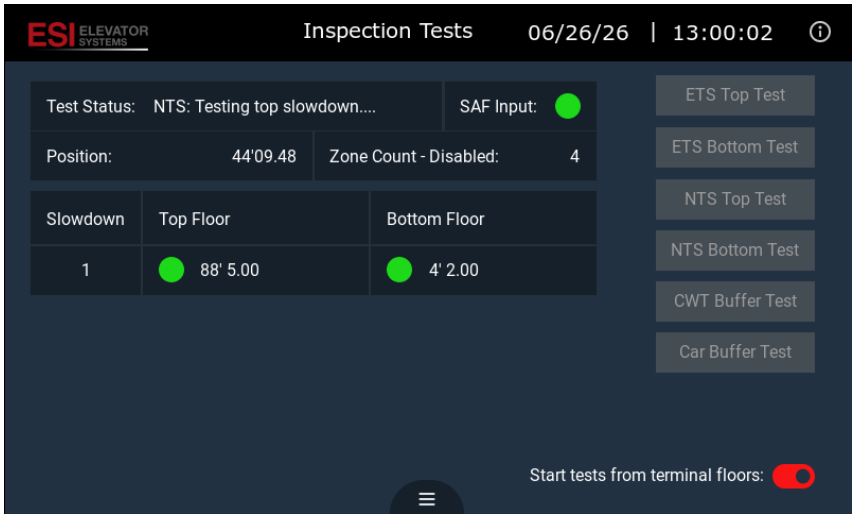
(NTS TEST STEP 3)

Car will Move to middle floor to start the Test Process. If the "Start tests from terminal floors" switch is enabled, the car will move to a terminal floor to start the test.

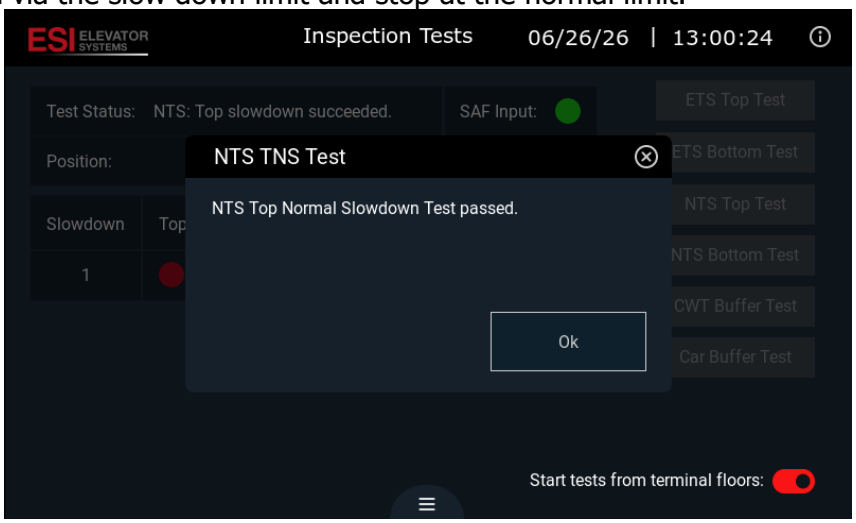


(NTS TEST STEP 4)

Car will then test the slowdown limit that was selected. (Automatically: No USER INPUT required). Zone Count is disabled which means that zone count will during the test procedure, only reflect the middle floor.



The car will slow down via the slow down limit and stop at the normal limit.



(NTS TEST STEP 5)

End of NTS Testing.
Cycle the Inspection Switch on the ES-RB (Relay Board) to return to Automatic Mode.

8.1.2. NTS Manual Testing Procedure

CAR SHOULD BE IN AUTOMATIC MODE FOR THIS TEST TO BE CONDUCTED.
Car will Enter SPECIAL TEST MODE and all calls and normal operations will be disabled. The NTS Test is to be performed after the initial Floor Learn Trip has been completed.

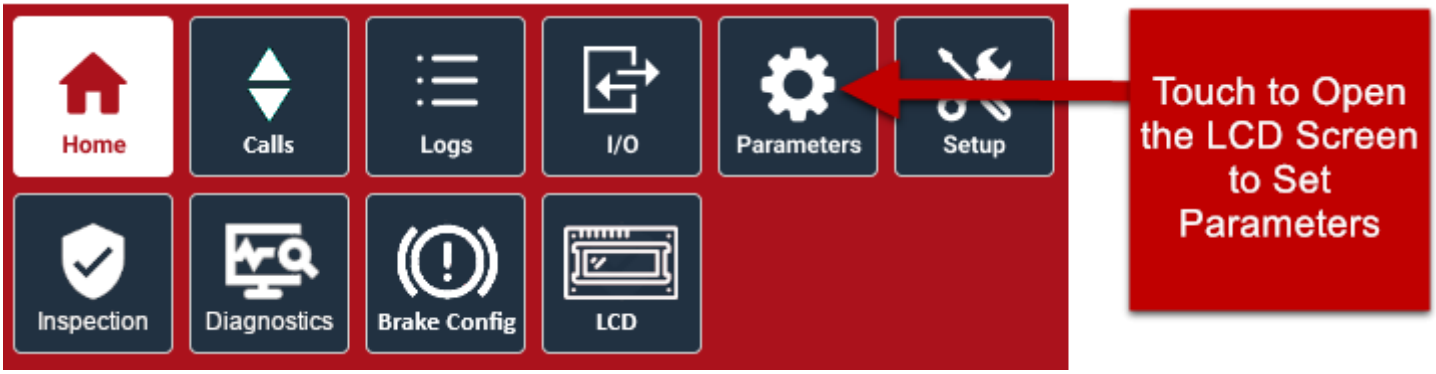
STEP 1

Place Car Level at a landing in the middle of the shaft.

STEP 2

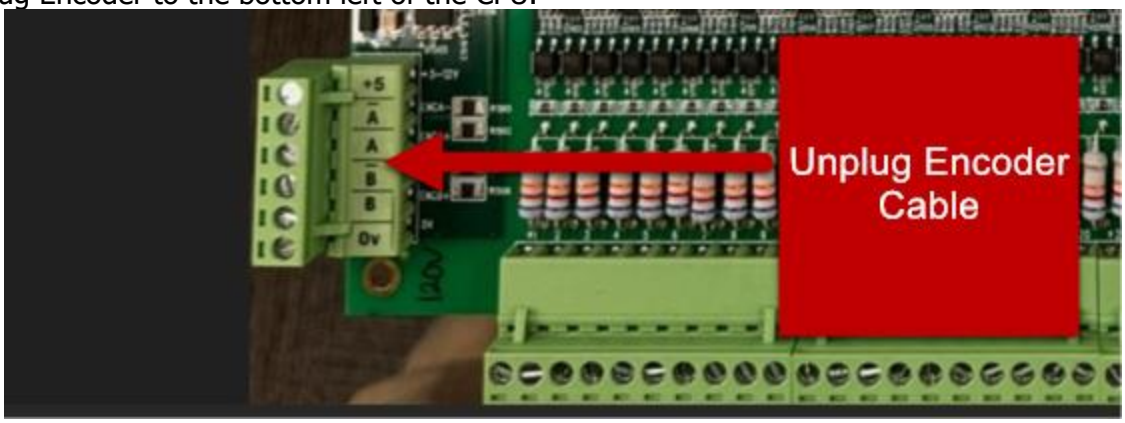
Use ESI LCD Screen Menu to Setup the following Parameter Values

- Set Parameter [20] to 8 and Parameter [30] to 1.



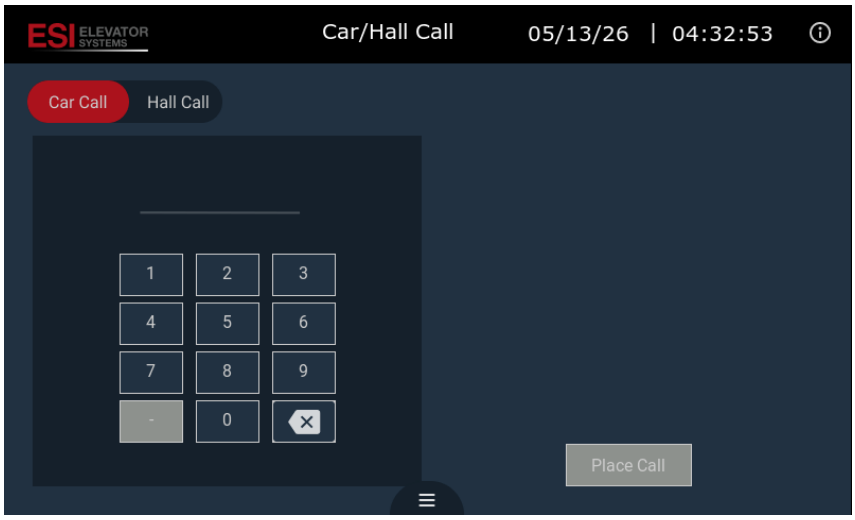
STEP 3

Unplug Encoder to the bottom left of the CPU.



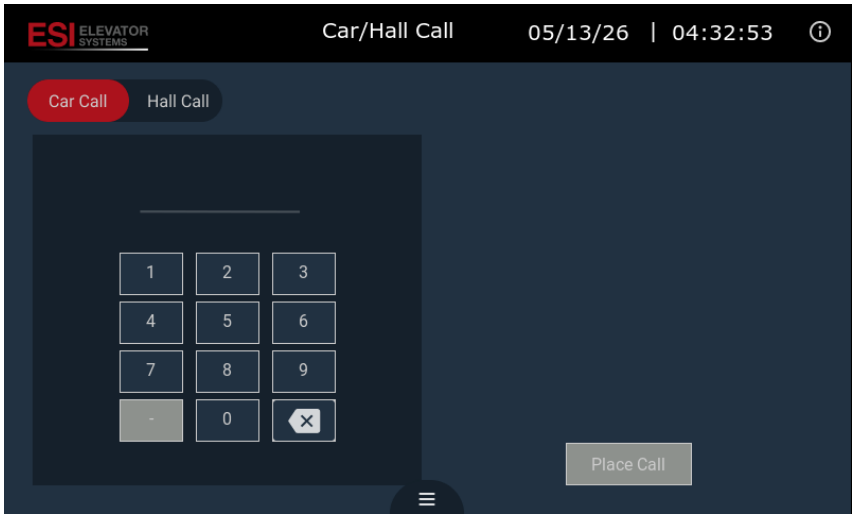
STEP 4

PLACE A CAR CALL from the Controller Screen for the BOTTOM LANDING. The car will slow down via the bottom slow down limit(s) then stop on the Bottom Normal Limit.



STEP 5

PLACE A CAR CALL from the Controller Screen for the TOP LANDING. The car will slow down via the top slow down limit(s) then stop on the Top Normal Limit.



STEP 6

Restore Encoder Plug.

STEP 7

Using ES2 LCD Screen, Set Parameter [20] to 8 and Parameter [30] to 0.

8.2. ETS Testing

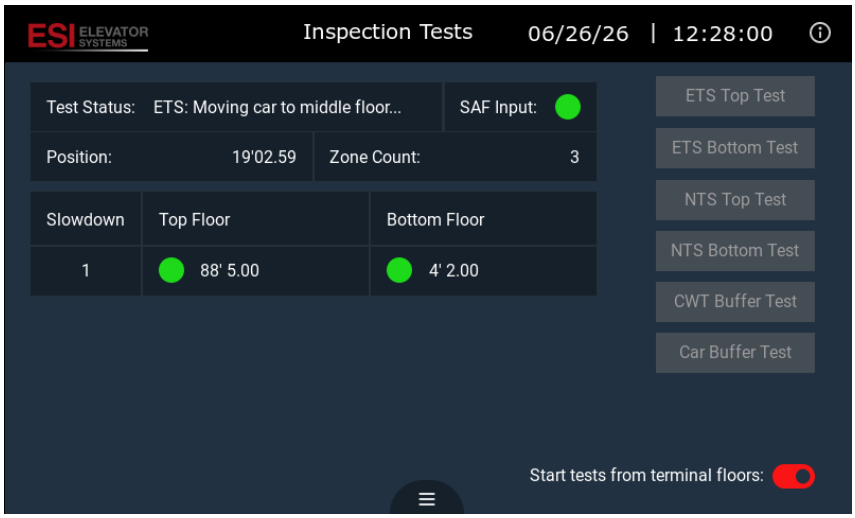
8.2.1. ETS Automated Testing Procedure

CAR SHOULD BE IN AUTOMATIC MODE FOR THIS TEST TO BE CONDUCTED.
Car will Enter SPECIAL TEST MODE and all calls and normal operations will be disabled. The ETS Test is to be performed after the initial Floor Learn Trip has been completed.

Automated ETS Testing Procedure- (ETS Testing only for jobs above 200 fpm)

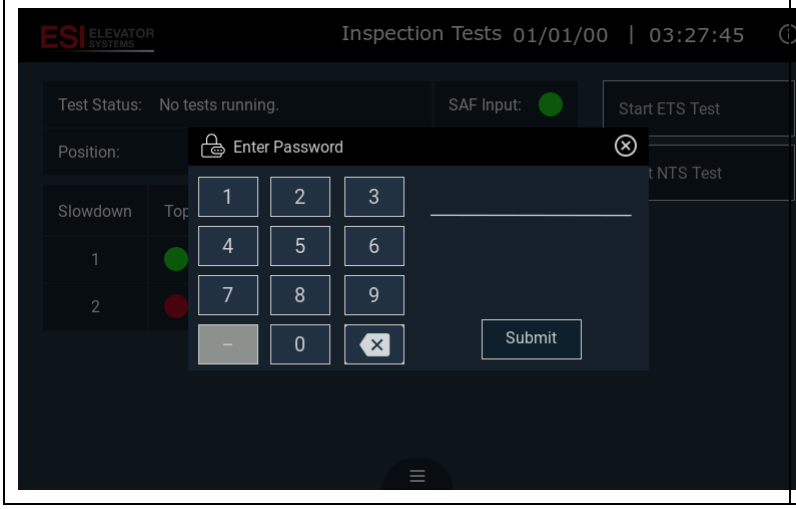
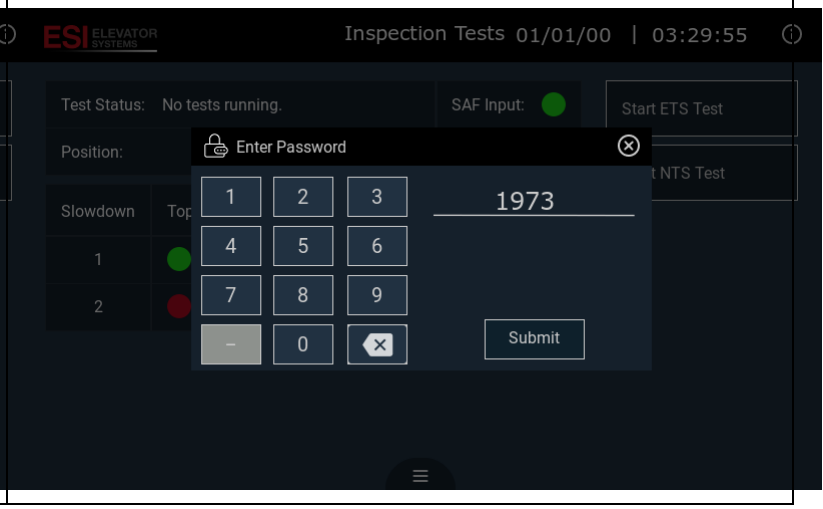
Press the Menu Button, Followed by INSPECTION Button to get to the ETS test screen.

ETS (Normal Terminal Slowdown) testing is a crucial procedure performed on elevators before they are put into service to ensure proper operation of the slowdown and stopping mechanisms at the top and bottom of the hoistway. This test verifies that the elevator will perform an emergency stop on the Terminal Floors on SECOND slow down virtual limit. Normally all tests will move to the middle landing to start the test. If desired, the tests can be started from the terminal floors. The toggle switch in the lower right corner can be flipped to green or left position to enable the tests to start from the terminal floors. **CAR SHOULD BE IN AUTOMATIC MODE FOR THIS TEST TO BE CONDUCTED. Car will Enter SPECIAL TEST MODE and all calls and normal operations will be disabled.**



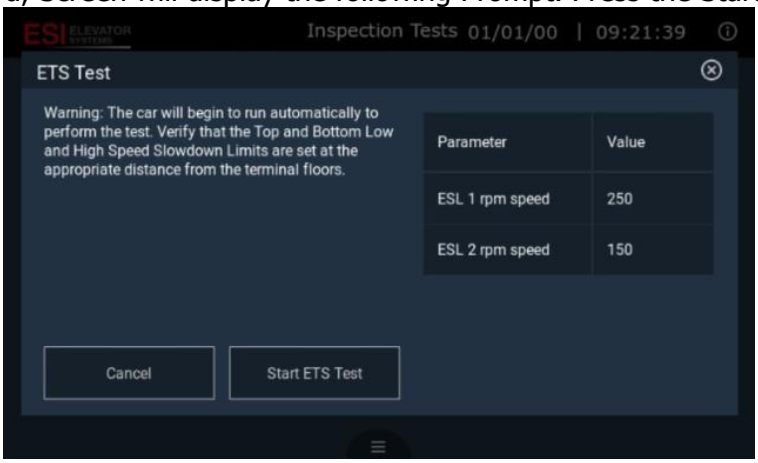
(ETS TEST STEP 1)

Press one of the ETS test buttons. Screen will prompt for a password. Default Password is 1973. Enter the Password.

Figure 2	Figure 3
	

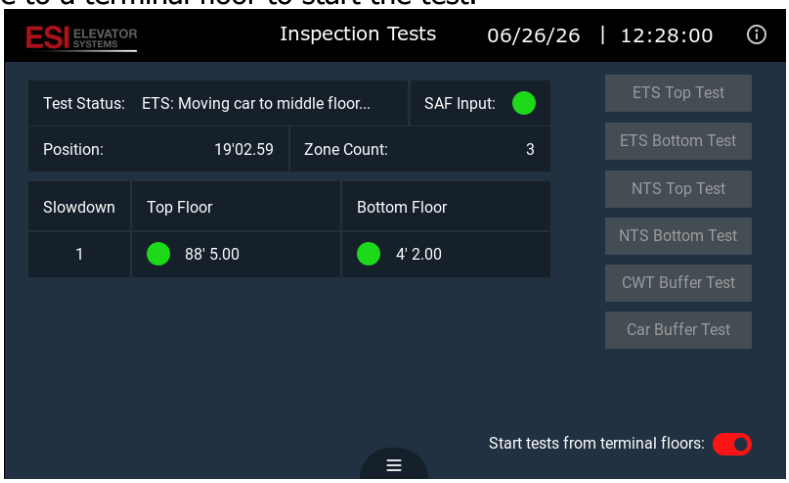
(ETS TEST STEP 2)

After Entering the password, Screen will display the following Prompt. Press the Start ETS Test button



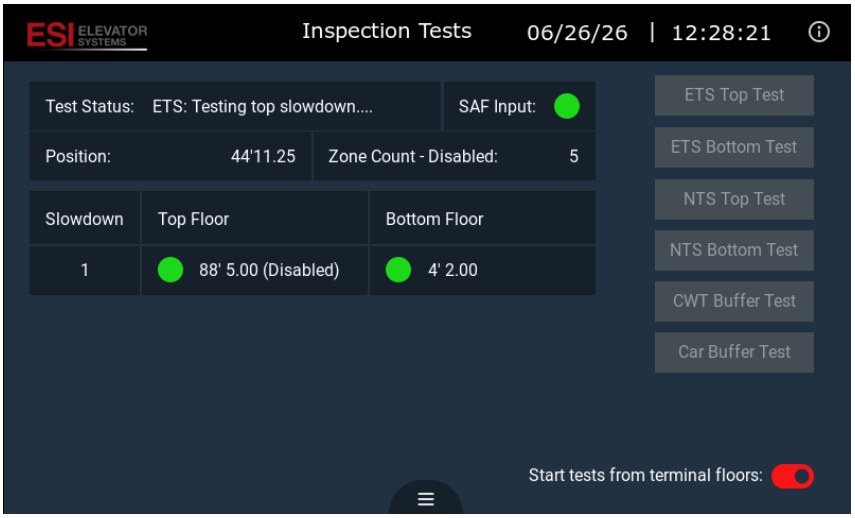
(ETS TEST STEP 3)

Car will Move to middle floor to start the Test Process. If the "Start tests from terminal floors" switch is enabled, the car will move to a terminal floor to start the test.

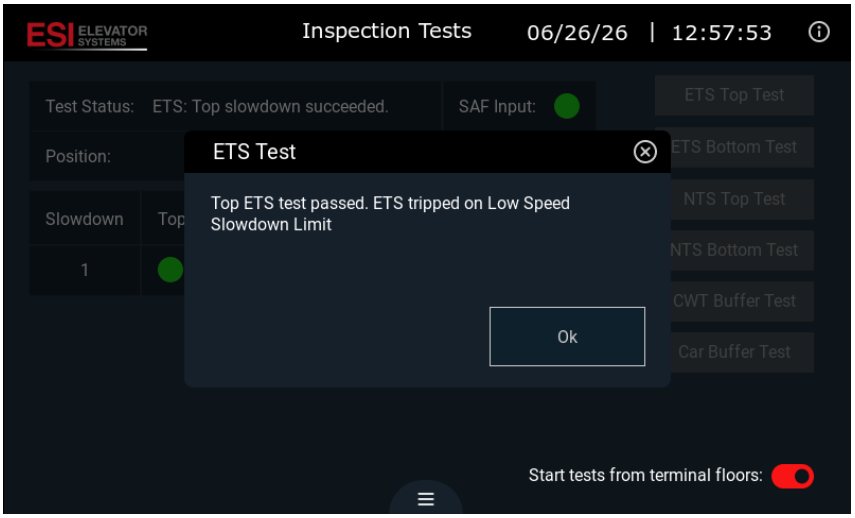


(ETS TEST STEP 4)

Car will first test the slowdown limit selected (Automatically: No USER INPUT required). First Slow Down is disabled which means that car will not begin to slow down on the first slow down.



The car will stop on the second bottom slow down limit.



(ETS TEST STEP 5)

End of ETS Testing.

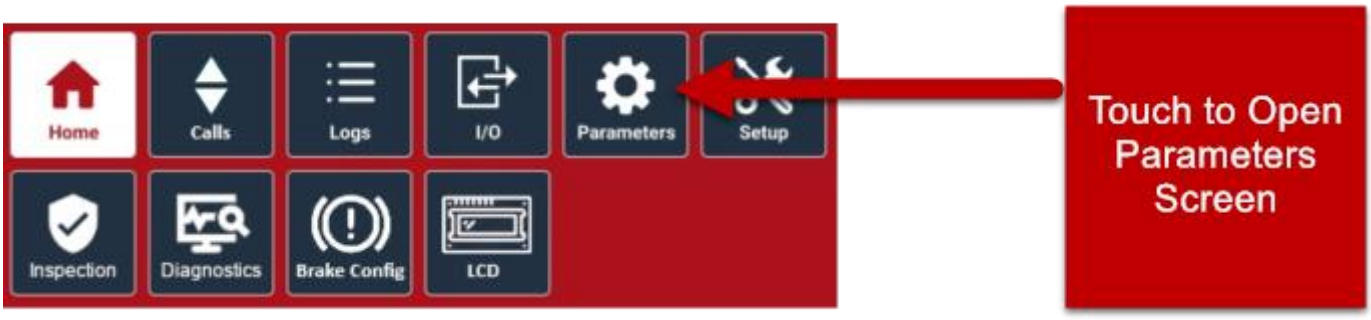
Cycle the Inspection Switch on the ES-RB (Relay Board) to return to Automatic Mode

8.2.2. ETS Testing > 200 FPM and < 400 FPM

The ETS Test is to be performed after the initial Floor Learn Trip has been completed.

Before the test begins ensure that the controller is in an intermediate landing (not a terminal landing).

Go To Parameters Screen ⟶ Speed Settings Menu



There are four (4) controller parameters in **Speed Setting Menu** that will be involved with the ETS system testing OR Change the Following Parameters on LCD Screen .

1. ETS CHECK ENGAGE / [180]
2. S/D DISTANCE HSM / [82]
3. ETS 1 FPM SPEED / [181]
4. ETS 3 FPM SPEED / [182]

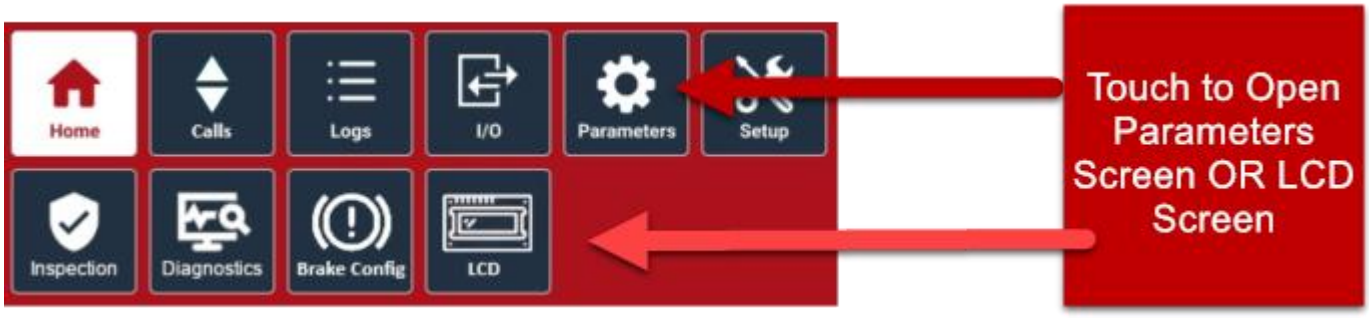
Test Procedure

1) RECORD value in the following parameter: S/D #2 Distance HSM / [82]
2) Change the following Parameters
   a) Set Parameter [20] = 8
   b) Set Parameter S/D #2 Distance HSM / [82] to 12 INCHES
3) Ensure Following Parameters are set as follows:-
   a) ESL CHECK ENGAGE / [180] IS SET TO 1
   b) ETS 1 FPM SPEED / [181] is equal to the Contract Car Speed Value.
   c) ETS 2 FPM SPEED / [182] = 150 FPM
4) Jump terminal #27 to #52A so that the car does not slow down on the first slowdown limit.
5) Run the car to the bottom landing.
6) Upon Reaching the second slow down limit the car will shut down, and the ESI LCD display will show the status of the car as ESL Error.
7) Toggle the Controller Inspection Switch to clear the error.
8) Remove the jumper from #52A.
9) Move the car to the center of the hoist way.
10) Jump terminal #27 to #53A so that the car does not slow down on the first slowdown limit.
11) Run the car to the top landing.
12) Upon Reaching the second slow down limit the car will shut down, and the ESI LCD display will show the status of the car as ESL Error.
13) Toggle the Controller Inspection Switch to clear the error.
14) Remove the jumper from #53A.
15) Reset Parameter S/D #2 Distance HSM / [82] BACK TO THE NUMBER THAT WAS RECORDED ON STEP 1.

8.2.3. ETS Testing >= 400 FPM

The ETS Test is to be performed after the initial Floor Learn Trip has been completed.

Before the test begins ensure that the controller is in an intermediate landing (not a terminal landing).
Go To Parameters Screen ➞ Speed Settings Menu



There are four (4) controller parameters in Speed Setting Menu that will be involved with the ETS system testing OR Change the Following Parameters on LCD Screen.

1. ETS CHECK ENGAGE / [180]
2. S/D DISTANCE HSM / [82]
3. ETS 1 FPM SPEED / [181]
4. ETS 2 FPM SPEED / [182]

Test Procedure

1) ENSURE ESL CHECK ENGAGE/ [180] IS SET TO 1.
2) RECORD value in the following Parameter: S/D #2 Distance HSM/[82].
3) Change the following Parameters
   a) Set Parameter [20] = 8
   b) Set Parameter S/D #2 Distance HSM / [82] to 12 INCHES
4) Ensure Following Parameters are set as follows:-
   a) ETS 1 FPM SPEED / [181] is equal to the Contract Car Speed Value
   b) ETS 2 FPM SPEED / [182] = 150 FPM
5) Jump terminal #27 to #52B so that the car does not slow down on the first slowdown limit.
6) Run the car to the bottom landing.
7) Upon Reaching the second slow down limit the car will shut down, and the ESI LCD display will show the status of the car as ESL Error.
8) Toggle the Controller Inspection Switch to clear the error.
9) Remove the jumper from #52B.
10) Move the car to the center of the hoist way.
11) Jump terminal #27 to #53B so that the car does not slow down on the first slowdown limit.
12) Run the car to the top landing.
13) Upon Reaching the second slow down limit the car will shut down, and the ESI LCD display will show the status of the car as ESL Error.
14) Toggle the Controller Inspection Switch to clear the error.
15) Remove the jumper from #53B.
16) Change the following Parameters Reset Parameter S/D #2 Distance HSM / [82] on SPEED SETTING SCREEN BACK TO THE NUMBER THAT WAS RECORDED ON STEP 1

8.3. Unintended Motion Acceptance Test

Unintended Motion Acceptance Test

Purpose of Unintended Motion Acceptance Test is to ensure that if the Elevator Moves out of the door zone and doors are still open, it triggers the secondary braking (Rope Gripper or Emergency Brake).

1) Take note of Parameter [74]
2) Set Parameter [20] to 8 on the LCD screen
3) Set Parameter [74] to 0 on the LCD screen
4) Place controller level at a floor on INDEPENDENT SERVICE, this will hold both the Hall and Car doors open.
5) Manually engage the PB, PBX and BR contactors
6) If the UAM push button exist:
   a) Manually engage the PB and PBX contactors and press the UAM push button
   b) Both brakes will release
7) The car should drift out of the door zone with the doors open, tripping the EBrake and causing a "ROPEGrp/EmBrkTrp_UAM" Error.
8) Set Parameter [74] to the value noted in step 1 on the LCD screen
9) To reset, toggle the controller from "Automatic" to Controller Inspection.

8.4. Ascending Overspeed Test

Ascending Overspeed Test: Purpose of the Ascending Overspeed Test is to ensure that if the car is running UP at a speed more than 10% than the contract speed, the Overspeed Governor Trips.

1. Place controller in test mode.
2. Move the car to the middle of the shaft way.
3. Set the drive speed to 25% more than the Contract Speed
4. Manually Engage the PB/BR contactors which control the Primary Brake.
5. Place a car call to the top floor from the controller.
6. The car will attempt to run up at a speed 25% higher than the contract speed and trip the governor.
7. When the governor trips, the EBRAKE drops and would stop the car.
8. The controller will show the following error RopeGrp/EmBrkTrp_OVS

8.5. Descending Overspeed Test/Car Safety Test

Descending Overspeed Test/Car Safety Test: Purpose of the Descending Overspeed Test/Car Safety is to ensure that if the car is running down at a speed more than 10% than the contract speed, the Overspeed Governor Trips.

1. Place controller in test mode.
2. Move the car to the middle of the shaft way.
3. Set the drive speed to 25% more than the Contract Speed
4. Manually Engage the PB/BR contactors which control the Primary Brake.
5. Place a car call to the bottom terminal floor from the controller.
6. The car will attempt to run down at a speed 25% higher than the contract speed and trip the governor.
7. When the governor trips, the EBRAKE drops and would stop the car.
8. The controller will show the following error RopeGrp/EmBrkTrp_OVS

8.6. Car Buffer Test

Car Buffer Test: Objective is to verify that the buffers at the bottom of the hoistway can safely stop and decelerate the elevator car if it over travels beyond its normal lowest landing

1) Place car level at a floor mid shaft
2) Place controller in test mode.
3) Jump out bottom slow down limits terminals #27 to #52, #52A (only available on jobs above 200FPM) and #52B (#52B only available for more than 400 FPM jobs)
4) USE ESI LCD Screen Menu to Setup the following Parameter Values
   a) Set Parameter [20] to 8
   b) Set Parameter [180] to 0 from LCD Screen. This will disable the ETS test.
   c) Set Parameter [30] (disabling zone count) in the LCD screen to 1
5) Record Parameter [81], [82], [83] before going to step 7
6) Set Parameter [81] (S/D #1 Distance OFR), [82] (S/D #2 Distance HSM), [83] (S/D 2/3 Floor Run) to 12 (inches). This will ensure that car bypasses all the slow downs.
7) Wait 1 Minute for changes to be recorded throughout the controller safety system
8) Place car call to bottom floor.
9) Car will stop at the buffers.
10) Once test is completed, restore the following:-
   a) Remove jumpers from bottom slow down limits terminals #27 to #52, #52A (only available on jobs above 200FPM) and #52B (#52B only available for more than 400 FPM jobs)
   b) Set Parameter [180] to 1 from LCD Screen
   c) Set Parameter [30] to 0 from LCD Screen
   d) Restore the values recorded in Step 6 for Parameter [81], [82], [83]

8.7. Counterweight Buffer Test

Counterweight Buffer Test: Objective is to verify that the buffers at the bottom of counterweight can safely stop and decelerate the elevator car if it over travels beyond its normal highest landing

1) Place car level at a floor mid shaft
2) Place controller in test mode.
3) Jump out bottom top down limits terminals #27 to #53, #53A (only available on jobs above 200FPM) and #53B (#53B only available for more than 400 FPM jobs)
4) USE ESI LCD Screen Menu to Setup the following Parameter Values
   a) Set Parameter [20] to 8
   b) Set Parameter [180] to 0 from LCD Screen. This will disable the ETS test.
   c) Set Parameter [30] (disabling zone count) in the LCD screen to 1
5) Record Parameter [81], [82], [83] before going to step 7
6) Set Parameter [81] (S/D #1 Distance OFR), [82] (S/D #2 Distance HSM), [83] (S/D 2/3 Floor Run) to 12 (inches). This will ensure that car bypasses all the slow downs.
7) Wait 1 Minute for changes to be recorded throughout the controller safety system
8) Place car call to top floor.
9) Counterweight will stop at the buffers.
10) Once test is completed, restore the following:-
   a) Remove jumpers from bottom slow down limits terminals #27 to #53, #53A (only available on jobs above 200FPM) and #53B (#53B only available for more than 400 FPM jobs)
   b) Set Parameter [180] to 1 from LCD Screen
   c) Set Parameter [30] to 0 from LCD Screen
   d) Restore the values recorded in Step 6 for Parameter [81], [82], [83]

8.8. Traction Loss Test

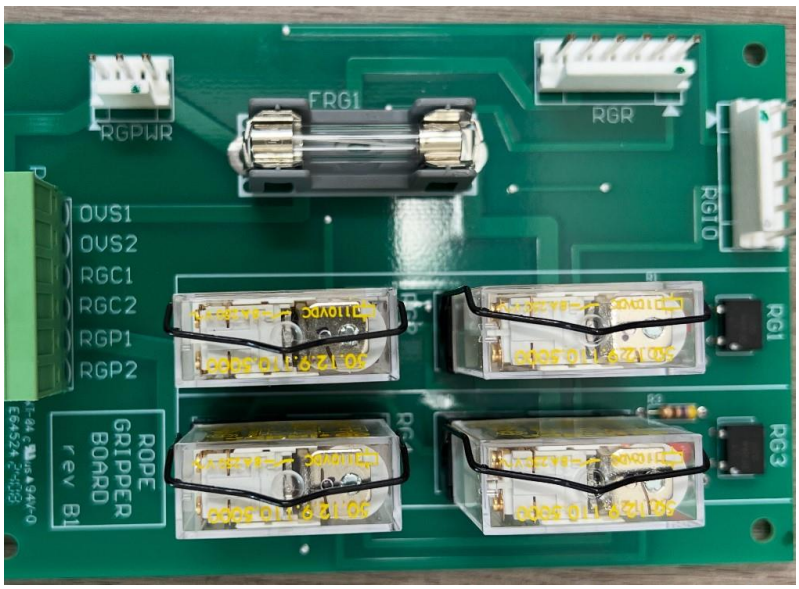
Traction Loss Test: Objective is to verify that in case of traction loss the controller detects and displays a fault.

1. Set Parameter [50] = 3
2. Place a call to next floor.
3. If car can't make it to next floor within 3 seconds (Parameter [50]), the controller should fault out with "Traction Loss".
4. Toggle Auto/Insp switch to reset the fault.
5. After the test, set Parameter [50] to 2 times of the floor to floor run time.

8.9. Rope Gripper Test

Rope Gripper Test

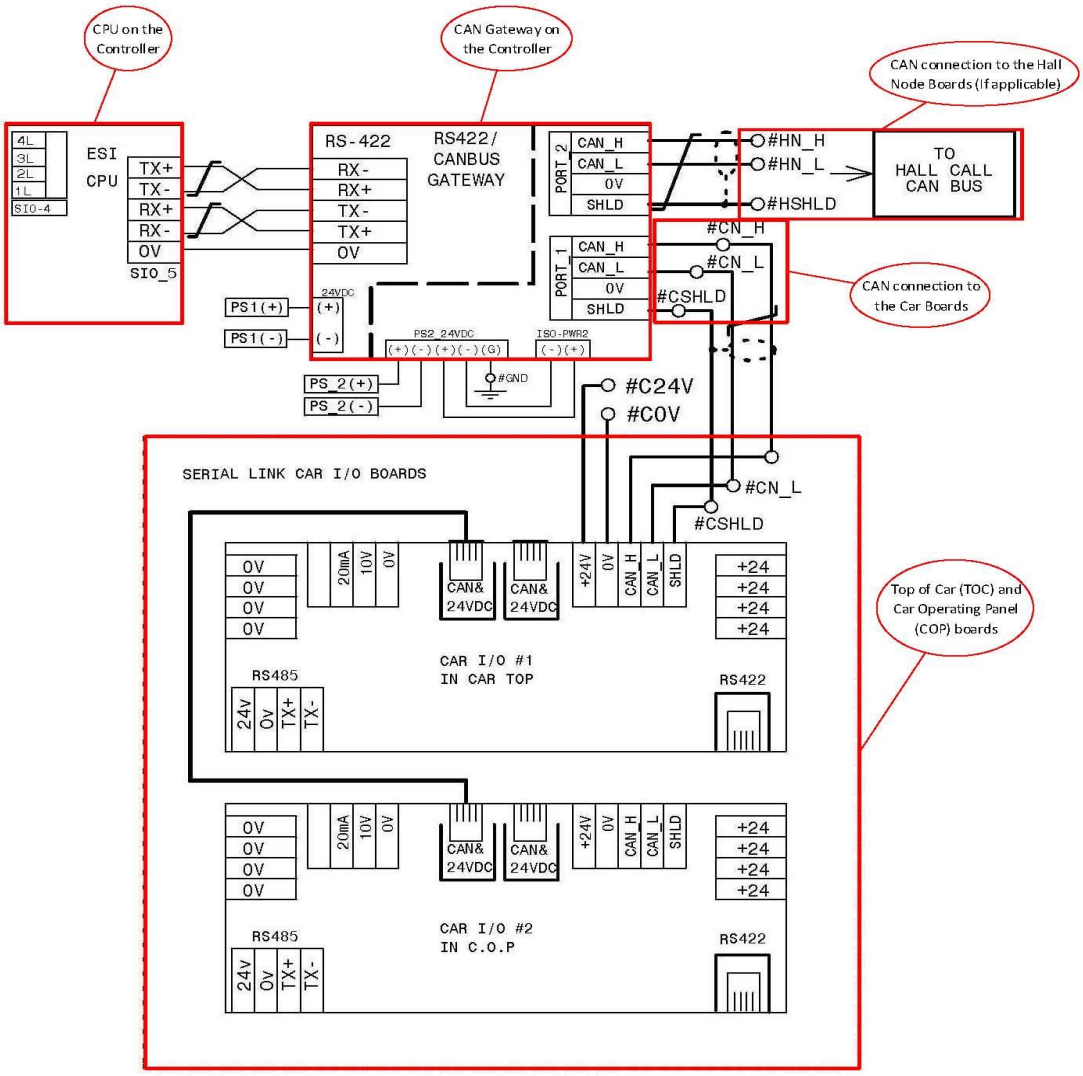
1. Trip the Governor connected to OVS1 and OVS2. Rope Gripper should trip(GOV overSp).
2. Remove wire from disc brake switch, if in use. Rope Gripper should trip(BrakeSW on Stop).
3. See Section 8.3 for testing Unintended Motion.



9. Hall Network

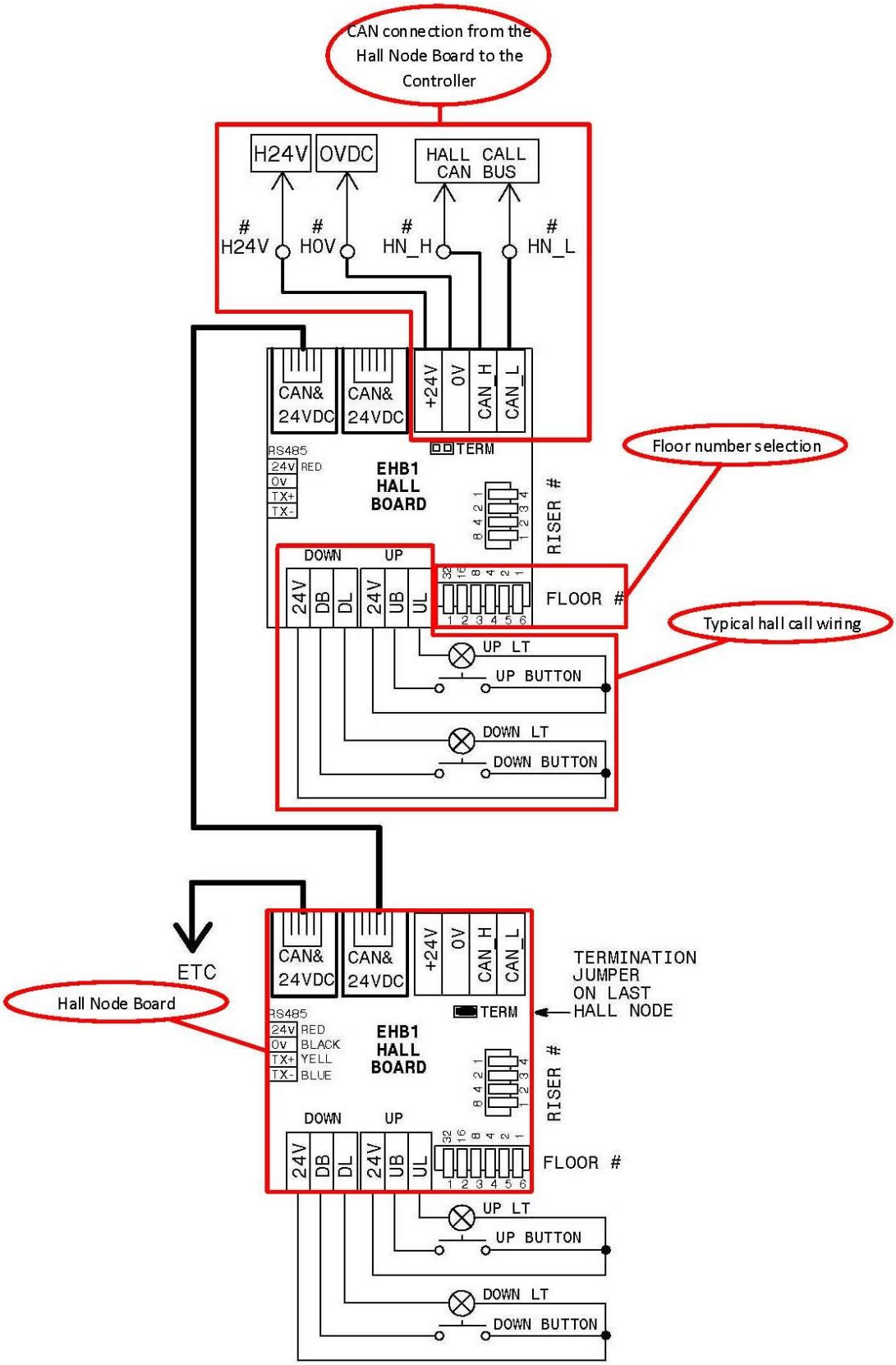
Serial/Hall Network

Elevator Systems Serial Controller does away with most discrete connections from the elevator car, and optionally hall stations (Hall Nodes), to the controller to the controller. This includes car calls and acknowledgments, car key switches, door operator signals, various in car buzzers and lights/lanterns, tape selector signals, and optionally hall calls and acknowledgments. The Serial Controller will require less than 25 traveler cables regardless of the number of landings. These signals are replaced with a single CAN connection back to the controller. If opting for the optional serial hall, hall calls and acknowledgments will be replaced with an additional CAN connection back to the controller.



9.1. Hall Board Wiring

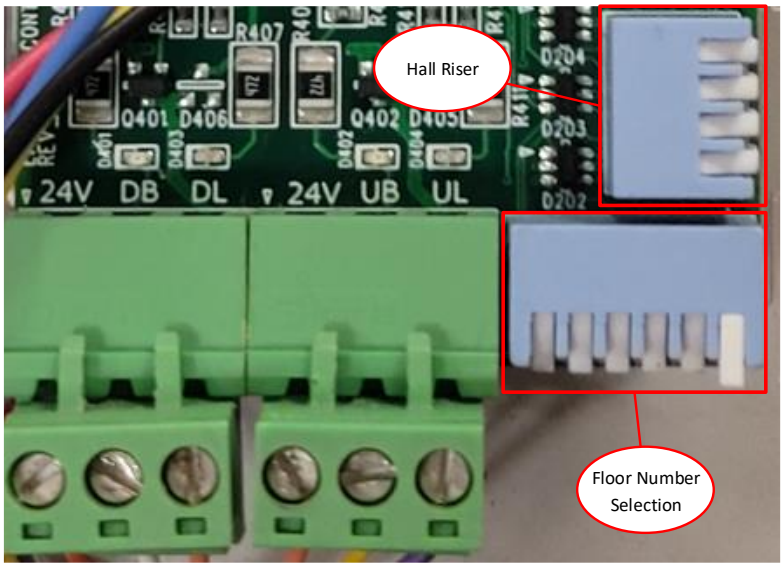
Hall Board Wiring



9.2. Hall Board Dip Setting-Front/Rear

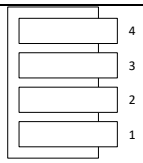
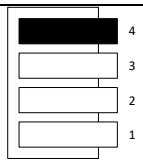
Setting Hall Node Floor and Riser?? SETTINGS FOR 128 FLOORS

Each Hall Node needs to be set based if it is front or rear and the floor number. The Hall Riser dip switches will set that floor's Hall Node for either the front or rear side of the car. The Floor Number Selection dip switches will set the floor where that Hall Node is located. Follow the charts below to set the Hall Riser and Floor Number Selection dip switches.



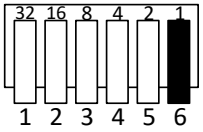
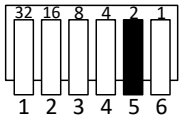
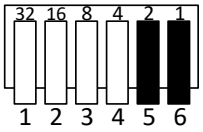
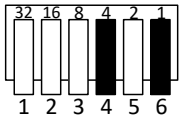
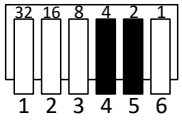
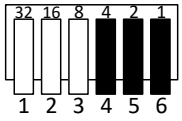
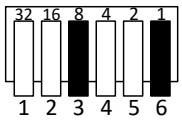
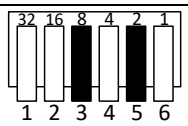
Dip Switch is in the Up Position

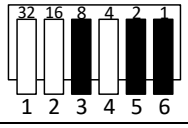
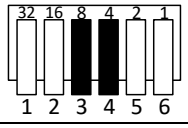
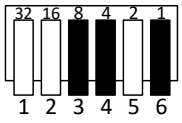
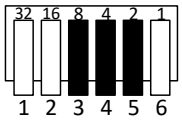
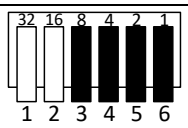
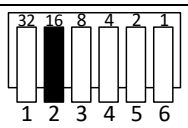
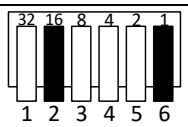
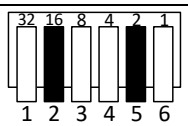
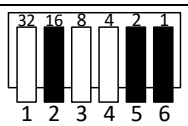
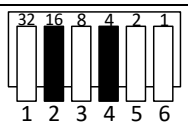
Dip Switch is in the Down Position

Hall Riser Dip Switch Setting	
Side	**Hall Riser Setting**
Front	
Rear	

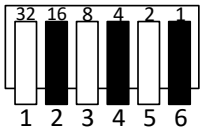
10. Hall Board DIP Setting Floors

10.1. Floors 1- 20

Floor Number Dip Switch Setting	
Floor Number	**Floor Number Setting**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Floor Number Dip Switch Setting	
Floor Number	**Floor Number Setting**
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

10.2. Floors 21-32

Floor Number Dip Switch Setting	
Floor Number	**Floor Number Setting**
21	
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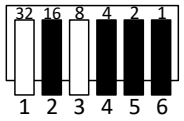
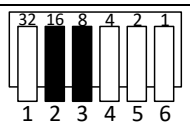
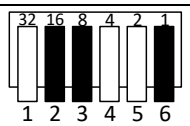
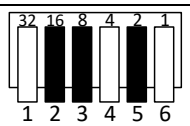
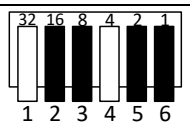
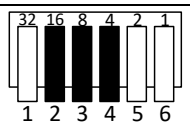
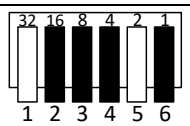
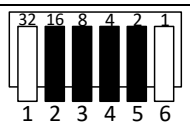
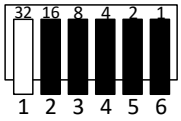
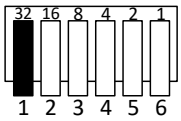
23	
24	
25	
26	
27	
28	
29	
30	

Floor Number Dip Switch Setting	
Floor Number	**Floor Number Setting**
31	
32	

* Please consult ESI for dip switch settings for more than 32 Floors

11. Debug & Troubleshooting

Following are some of the error codes that controller may experience and suggested troubleshooting guidelines:-

11.1. Fault Codes 0-34

Following are some of the error codes that controller may experience and suggested troubleshooting guidelines:-

Fault Code	Fault	Troubleshooting
7	VF Drive Error	• Check the ESI Event log to see if another fault occurred at the same time as the drive fault • This may be the actual fault and the drive fault was just a result of the emergency stop.
17	Thermal OVLD Trip	• The Motor Thermal OVLD Trip "TOL" opened • Check the status of TOL input on CPU board, verify the input TOL should be ON
18	SAF Opened	• SAF Input lost due to a break in the Safety String • Check voltage between #60 and each terminal in the string (OVS1, OVS2, RGC1, RGC2, 32, 32A, 33, 40, 41) • Usually a bad contact or switch.
19	Gov OVS Opened	• The Governor Sw input "OVS" opened • Check the status of OVS/GOV input on CPU board, verify the input OVS/GOV should be ON
20	OVERspeed Trip	• The Car exceeded the OverSpeed trip speed parameter set in Parameter 185 • This is an actual overpseed condition • Verify Car speed with a tachometer or on ES2 main screen if selector is APS.
23	TRACTION Loss Trip	• On a floor to floor run, car cannot make it to next floor within Parameter [50]: Traction Loss Duration Time, the controller will fault out with "Traction Loss" • Check encoder & Parameter[50] • Check if any rope slippage.
24	CAR OverLoaded	• Overload condition in Car as determined by the load-weigher module • If not an actual overload condition, check for faulty contact connected at 66.
27	RopeGrp/EmBrkTrp_OVS	• Rope Gripper/ Emergency Brake Trip due to the governor switch opening
28	RopeGrp/EmBrkTrp_UAM	• Rope Gripper/Emergency Brake tripped due to unintended motion • The Car drifted out of the door zone
29	RopeGrp/EmBrkTrp_BKSW	• Rope Gripper/ Emergency Brake Trip due to the brake switch not closing on a stop
30	HS Stop DL	• Front Door Lock opened in flight • Check Door lock mechanism (at the floor specified in fault) for any adjustments that may be needed.
32	HS Stop RDL	• Rear Door Lock opened in flight • Check Door lock mechanism (at the floor specified in fault) for any adjustments that may be needed.
33	HS Stop RGS	• Check Rear Gate Switch OPENED while car is in flight
34	HS Stop DCL	• Front Door Close Limit Closed in flight • Check limit switch.

11.2. Fault Codes 35-54

Following are some of the error codes that controller may experience and suggested troubleshooting guidelines:-

Fault Code	Fault	Troubleshooting
35	HS Stop RDCL	• Check Rear Door Lock OPENED while car is in flight
38	SD Limit Failure	• Both Up and Down Slow-down limits are open • Check 52 and 53 limits switches.
39	FloorPosition Reset	• Check the Binary Zone Inputs (B1,B2,B4,B8) are updated properly or not when the car stops
41	ESL Trip Type-1	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-1 via #81 with Parameter 180 =1
42	ESL Trip Type-2	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-2 via #52A/52M with Parameter 180 = 1
43	ESL Trip Type-3	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-3 via #52A/52M with Parameter 180 = 1
44	ESL Trip Type-4	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-4 via #52B Time with Parameter 180 = 1
45	ESL Trip Type-5	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-5 via #52B Max Speed with Parameter 180 = 1
46	ESL Trip Type-6	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-6 via #82 with Parameter 180 =1
47	ESL Trip Type-7	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-7 via #53 with Parameter 180 = 1
48	ESL Trip Type-8	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-8 via #53A/53M with parameter 180 =1
49	ESL Trip Type-9	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-4 via #53B Time with Parameter 180 = 1
50	ESL Trip Type-10	• Emergency Slowdown Limit/Emergency Terminal Slowdown Trip Type-5 via #53B Max Speed with Parameter 180 =1
52	CYCLETEST Fail P1	• If "P1" is not on, remove connector cover ACC on the RB Board (the board with the switches on it).
53	CYCLETEST Fail P2	• If "P2" does not come on, check to see that inputs "SAF", "SW", "DLK" and "GS" are not lit
54	CYCLETEST Fail P3	• If P3 is not on, check to see if there is 120 VAC from #60 to the BR 6 or EB 6 (aux contact on the right side, top of relay BR/EB) • If not, check the N/Closed contacts on P, PB, and BR feed from VF Drive board connector REL pin[5] • If present, check for 120vac from #60 to pin J1[6] on the RB board • If not present, replace relays DU, DUX, DEN, PX, B and DBE one at a time until P3 comes on • Again, you may use the LFI relay, as it is not part of the cycle test • Be sure to replace LFI relay with a new one if needed • If 120vac is present at pin J1[6], contact ESI for further assistance.

11.3. Fault Codes 55-70

Following are some of the error codes that controller may experience and suggested troubleshooting guidelines:-

Fault Code	Fault	Troubleshooting
57	RGRP/EB CYCtest-RG/EB1	• Rope Gripper/E-Brake Cycle Test Failure input RG1/EB1 • Probably a bad relay • Check to see if RG1 or RG2 relay on Rope Gripper board are energized, if they are, verify RG1 input on CPU board if it is OFF • If it is not off, then replace RG1 and RG2 relay one at time
58	RGRP/EB CYCtest-RG/EB2	• Rope Gripper/E-Brake Cycle Test Failure Input RG2/EB2 • Check to see if RG3 or RG4 relay on Rope Gripper board are energized, if they are, verify RG2 input on CPU board if it is OFF • If it is not off, then replace RG3 and RG4 relay one at time•
60	DoorOpen TimeOut	• When Opening, Door Open Limit did not break within the time set in Parameter 40 • Adjust Parameter 40 • Check Door Open limit Switch • Check for mechanical friction.
61	DoorOpen FAULT	• Door Open TimeOut's Count exceeded parameter 141, without a successful Open • Check the doors why not opening.
62	DoorClose TimeOut	• When Closing, Door Close Limit did not break within the time set in Parameter 40 • Adjust Parameter 40 • Check Door Close limit Switch • Check for mechanical friction.
63	DoorClose FAULT	• Door Close TimeOut's Count exceeded parameter 140, without a successful Close • Check the doors why not closing.
64	RearDoorOpen TimeOut	• When Opening, Rear Door Open Limit did not break within the time set in Parameter 40 • Adjust Parameter 40 • Check Door Open limit Switch • Check for mechanical friction.
65	RearDoorOpen FAULT	• Rear Door Open TimeOut's Count exceeded parameter 141, without a successful Open • Check the rear doors why not opening.
66	RearDoorClose TimeOut	• When Closing, Rear Door Close Limit did not break within the time set in Parameter 40 • Adjust Parameter 40 • Check Door Close limit Switch • Check for mechanical friction.
67	RearDoorClose FAULT	• Rear Door Close TimeOut's Count exceeded parameter 140, without a successful Close • Check the rear doors why not closing.

69	GS ON Fault	• GS Input is ON while Doors are Open/Door Open Limit (48) is OUT • Isolate wires at Gate Switch (42, 45) and check for voltage - these should be 0V to GND • Also, check that the Door Open Limit is wired correctly.
70	DL ON Fault	• DL Input is ON while Doors are Open/Door Open Limit (48) is OUT • Isolate wires at Hatch Door Interlocks (34, 34A, 34D, 35) and check for voltage - these should be 0V to GND • Also, check that the Door Open Limit is wired correctly.

11.4. Fault Codes 71-85

Following are some of the error codes that controller may experience and suggested troubleshooting guidelines:-

Fault Code	Fault	Troubleshooting
71	RGS ON Fault	• RGS Input is ON while Doors are Open/Door Open Limit (48R) is OUT • Isolate wires at Gate Switch (42, 45R) and check for voltage - these should be 0V to GND • Also, check that the Door Open Limit is wired correctly.
72	RDL ON Fault	• RDL Input is ON while Doors are Open/Door Open Limit (48R) is OUT • Isolate wires at Hatch Door Interlocks (34R, 34AR, 34DR, 35R) and check for voltage - these should be 0V to GND • Also, check that the Door Open Limit is wired correctly.
74	TOS-CarHeld	• Car cannot run due to Front Door being held open • 28 (Door Open), 28S (Safety Edge) or 28E (Electric eye) is on • Check if any of these is bad.
75	TOS-CarHeld REAR	• Car cannot Run due to Rear Door being held opened • Check rear door open signal (28R) or rear door edge signal (28ER) or rear door hold button (28HR) are being stuck or being closed all the time.
77	RUN DELAY-GS	• Car cannot RUN • Doors Closed but Front Gate Switch input (GS) is not ON within 10 seconds • This is most likely a physical door contact issue • Check contact.
78	RUN DELAY-DL	• Car cannot RUN, Front Doors Closed, but Front Door Lock DL input is not ON within 10sec.
79	RUN DELAY-RGS	• Car cannot RUN • Doors Closed but Rear Gate Switch input (RGS) is not ON within 10 seconds • This is most likely a physical door contact issue • Check contact.
80	RUN DELAY-RDL	• Car cannot RUN, Rear Doors Closed, but Rear Door Lock RDL input is not ON within 10sec
81	RUN DELAY-DRV	• Car cannot RUN • Doors Closed but 'DRV' input is not ON within 10 seconds • Probably bad GS, DL or I relay
82	RUN DELAY-OLR/RPR	• Car cannot RUN, Doors Closed, but Input #15 (OV) is not ON within 10sec • Check RPR (Reverse Phase Relay) is tripped or not.
84	EQ-CWT	• Earthquake Service CWT trip • Vibration detected due to earthquake or bad CWE relay contact.
85	EQ-SEM	• Check EarthQuake Service Seismic Switch (input SEM) if it is activated

11.5. Fault Codes 86-150

Following are some of the error codes that controller may experience and suggested troubleshooting guidelines:-

Fault Code	Fault	Troubleshooting
89	PIT Flood SW ON	• PIT flood condition • If not true, then check PIT flood switch.
92	Brake Drop FAULT	• Main Brake did not drop within 3 seconds • Check for faulty Brake Switch .
93	Brack Pick Err	• Main Brake did not Pick within 3 sec • Check to see if PB & PR contactors picked • Mesaure if there is any voltages (VDC) on brake coil between #B1 & #B2.
94	Brake Pick FAULT	• Main Brake did not pick within 3 seconds • Check for faulty Brake Switch .
95	E-Brake Drop FAULT	• Emergency Brake did not Drop within 3sec • Check to see if PBX, BR, EB or PB contractors dropped out properly when the car stops.
96	E-Brack Pick Err	• Emergency Brake did not pick within 3 seconds • Check for faulty EBrake Switch.
97	E-Brake Pick FAULT	• Emergency Brake Pick Error Count exceeded 4 without a clean Pick • Check to see if PBX, BR, EB, or PB contactors picked • Measure if there is any voltages (VDC) on emergency brake coil between #B3 & #B4.

11.6. Cycle Test and Troubleshooting

CYCLE TEST

The Cycle Test is controlled by the CPU ES2-CPU-output 1 [CTP] The [CTP] output controls the CT relay, whose N/Open contacts control the voltage feed to the Critical Circuits. The Cycle Test is sequenced at the end of every run. N/Closed contacts from the forced guide safety relays I, IX, IC1, IC2, SWB1, SWB2, ID, IU, GS, DL and VC feed proving input [P2]. Relays BAC, TAC, ACC, ACX, HS and HMX feed input ES2-CPU input [P1]. P, PB, BR, U, D, DU, DUX, PX, B, DBE feed input ES2-CPU-input [P3]. With the elevator at rest in automatic operation, inputs [P1] and [P3] are lit. When the car stops, the CT relay is cycled. All three proving should flash ON. This verifies that all forced safety relays are working appropriately. Output [CTP] will then turn back on. [P3] will stay lit. [P1] and [P2] will light depending on the mode of operation. If the cycle test fails and all three proving input do not come ON, the CPU LCD screen will display "CYCLE Test Failure".

CT TROUBLE SHOOTING

If the cycles test fails. Proving inputs [P1], [P2] and [P3] must be trouble shot. [P1], [P2] and [P3] are feed through various relays and passes through fuse FR2. See sheet #1 area H-24 on the prints.

If [P1] is not ON, remove connector cover ACC on the ES-RB Board (the board with the switches on it). Check for 120vac from terminal #60 to pin ACC[5]. Note, the triangle symbol next to connector indicates pin[1]. If not replace relay HS and/or HM. If present, check for 120vac from #60 to ACC[6]. If not replace ACCESS Board. If present, contact ESI for further assistance.

If [P2] is not ON, check to see that inputs [SAF], [ICSS], [DL] and [GS] are not lit. If any are lit remove the CT relay. If [SAF] goes out replace the CT relay. If [SAF] does not go out when CT is removed look for 120vac entering the safety circuit from someplace other than the CT point at area A-1 on sheet #1. If all is ok, check to see if there is 120vac from #60 to connector FDB pin[6] on the RB board. If not try replacing relays I,IX,IC1,IC2,SWB,SWB2,ID and IU one at a time. You may use the LFI relay, as it is not part of the cycle test. When 120vac from #60 to connector FDB pin[6] on the RB board is present, check pin FDB[7] to #60 for 120vac. If not, try replacing relays DL,GS and VC one at a time. If present and [P2] is still out, contact ESI for further assistance.

If [P3] is not ON, check to see if there is 120 VAC from #60 to the BR 4 (aux contact on the right side, top of relay BR). If not, check the N/Closed contacts on P, PB, and BR feed from VF Drive board connector REL pin[5]. If present, check for 120vac from #60 to pin J1[6] on the RB board. If not present, substitute relays DU, DUX, DEN, PX, B and DBE one at a time until [P3] comes on. Again, you may use the LFI relay, as it is not part of the cycle test. Be sure to replace LFI relay with a new one if needed. If 120vac is present at pin J1[6], contact ESI for further assistance.

11.7. Door Operation

DOOR OPERATION

On master door jobs, ES2-CPU outputs [DCS], [DOS], and [NR] control door operation.
Door Close Button: The door close button will close a fully open door immediately.
Door Open Button: The door open button will open the door.
Door Safety Edge: The Safety edge as well as the DoorEdge / ElectricEye will immediately open a closing door.

Door Nudging

Door Nudging Parameter under the Door Parameter Screen control the various mode of nudging control available. Depending on this setting, the door can be made to nudge close, sound the in/car buzzer or simply stay open all day long.

With input [DES] ON, setting the above parameter to:
"1" : will let the doors stay open as long as input [DES]is ON and not sound the buzzer.
"2" : will let the doors stay open as long as input [DES]is ON and sound the buzzer.
"3" : will let the doors nudge close , and sound the buzzer. After the time set in Timer Parameters screen (EDGE TIME OUT): Parameter #7 expires the buzzer will sound. Then the door close timer will expire and the door will nudge close with both [DCS] and [NR] energized.

12. Utilities

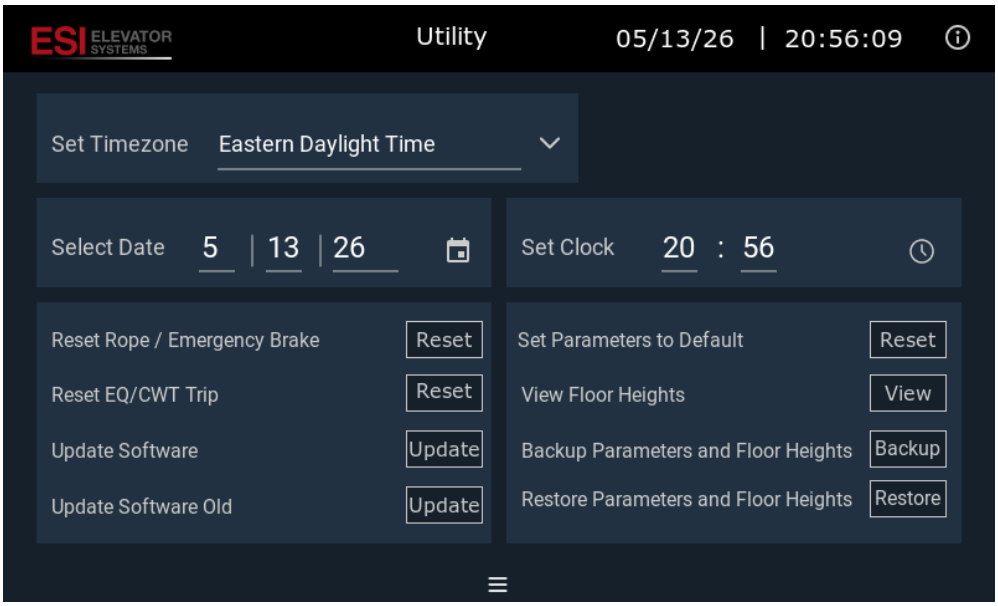
12.1. Backup and Restore Parameters

SD Card required. Saving and restoring parameters and floor height tables is only possible if there is an SD Card installed. If there is no SD Card installed, please install the SD card and reset the controller.

To Backup or Restore Parameters and Floor Height tables:

STEP 1

Go to Utilities Screen.



STEP 2

To create the Backup, select Backup. A backup will be created on the SD Card.

To restore a previously created Backup, select Restore. Parameters and Floor Height Tables will be restored into the controller. The controller must be reset after this process is finished to complete the restore.

12.2. Software Update

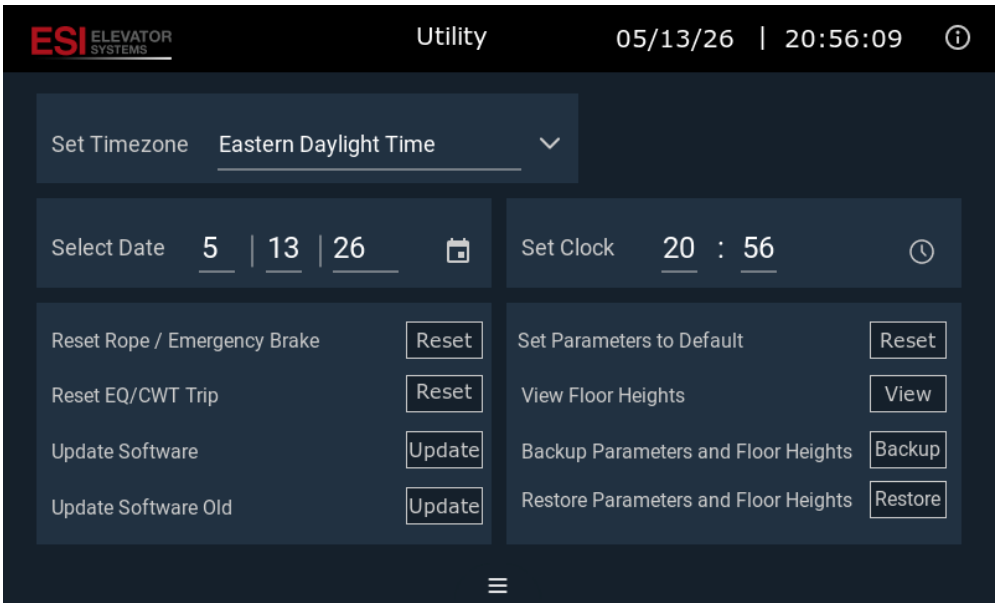
CAR SHOULD BE IN INSPECTION MODE TO SAFELY UPDATE SOFTWARE.
Software update could take up to 30 minutes to update all controllers in the system. Depending on the contents of the software update, it normally will take about 5 minutes. Please consult with ESI to determine the contents of the update.

STEP 1

Copy the new software file (xxx.zip) received from ESI to an SD Card. Insert the SD Card to the SD card slot.

STEP 2

Go to the Utilities Screen. Backup parameters and floor height tables.

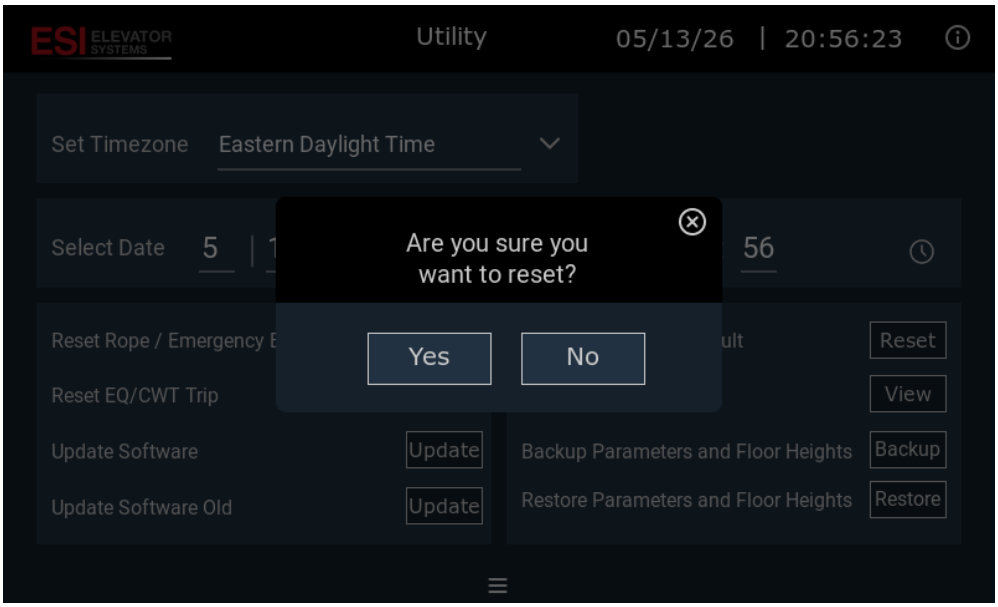


STEP 3

Select Update Software. Update Software Old can be used to revert software back to the previous version.

STEP 4

Confirm software update. Please be sure car is out of service and in a safe location.



STEP 5

Controller will automatically reboot into the boot loader. The screen will reflect the current status of the update. This may take up to 30 minutes to complete. Please be patient.

STEP 6

When update is complete, the controller will automatically reboot into the application.

13. TEERS-Traction Emergency Elevator Return System

13.1. TEERS SAFETY

	**CAUTION:** High Voltage can cause serious and fatal injury. Extreme caution should be exercised when working on this equipment.
	**CAUTION:** Only qualified personnel should attempt to start-up or troubleshoot it.
	**CAUTION:** UPS output still has power on it even if the ON/OFF switch is turned off. Unplug the UPS output or shutdown the UPS to completely shutoff the unit.

13.2. Introduction

Introduction

The TEERS Traction Elevator Emergency Return System monitors the incoming electrical power to the elevator control systems. In the event of a failure of the power, the Traction Elevator Emergency Return System will provide single phase power to the controller. The controller will then move the elevator to the nearest floor in the direction of least resistance. The controller will cycle the doors and then shutdown. This will eliminate the entrapment of any passengers during a power outage. When normal power is restored the Traction Elevator Emergency Return System will switch over and supply the elevator from incoming electrical power.

13.3. TEERS-Conventions

Conventions

This manual uses the following terms and conventions to indicate parts of the controller and operation:

- CPU – The main processing board, that houses the touch enabled screen. The 'Brains' to the controller.
- Energized – Power is applied to the relay coil, and the relay has operated.
- De-energized – Power is not applied to the relay coil, and the relay is at rest.
- Activated – A signal is applied to the input terminal on the CPU or CPU expansion board.
- De-activated – A signal is not applied to the input terminal on the CPU or CPU expansion board.
- Symbol – a letter or letter number code referring to a relay or terminal.
  Example: PX
- Symbol number/number – A contact pair on a relay
  Example: PX 1/7
- Symbol [number] – An input / output on the CPU board.
  Example: A [1]
- Symbol{number-number} – An input / output on an expansion board. The first number indicates which I/O board, the second indicates the terminal.
  Example: 1[1-13]
- #symbol - A terminal on the connection terminal strip.
  Example: #OF1
- #symbol to #symbol – Indicates an external electrical connection between two terminals.
  Example: #27 to #28

13.4. TEERS-Features

The TEERS Traction Elevator Emergency Return System includes:

a) On board controller

b) Diagnostic LCD screen and user interface.

c) Lockable shut-off switch.

d) Three phase input

e) UPS bypass control switch.

f) UPS status monitor dry contact output.

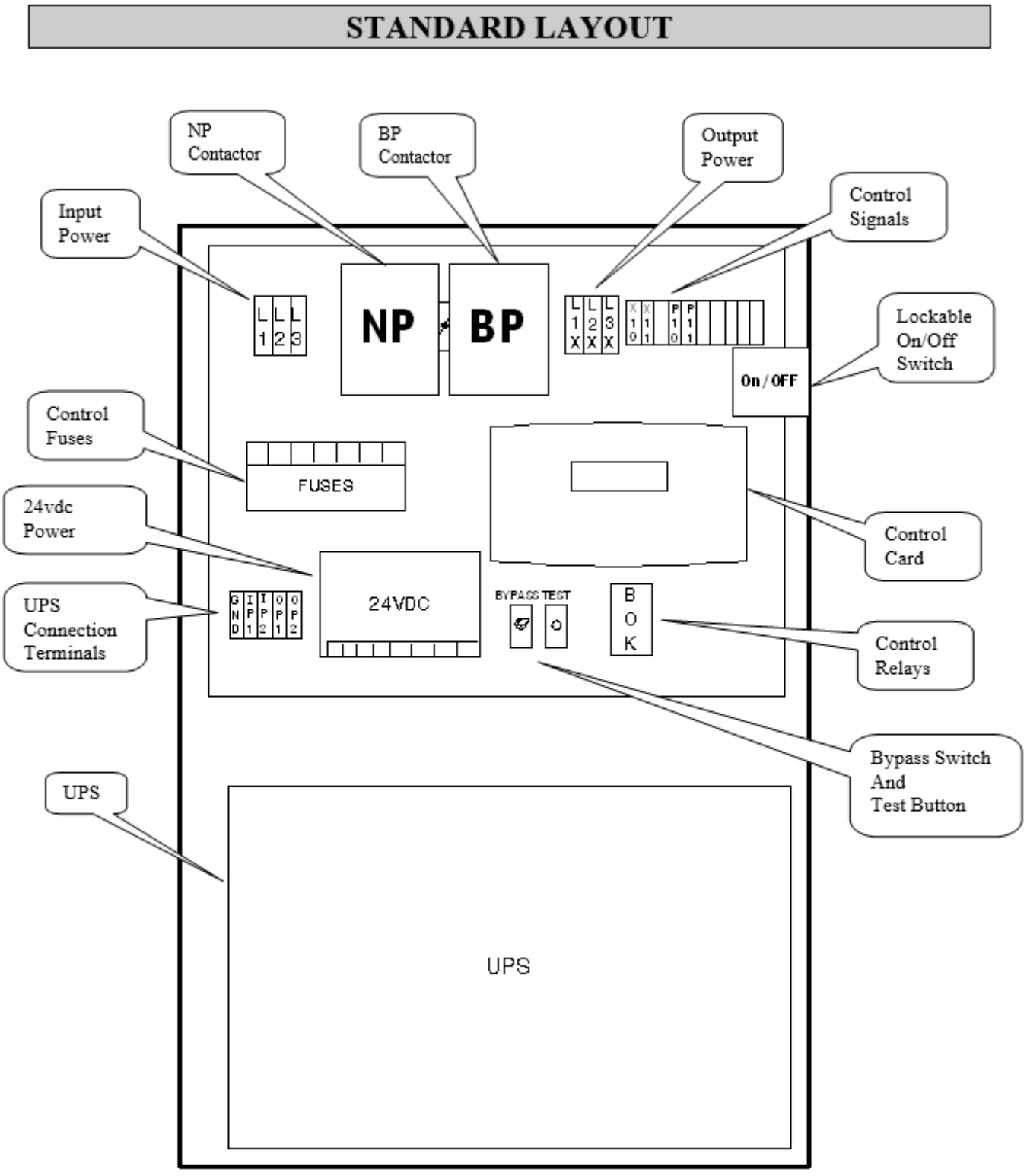
g) Test button to simulate power failure.

h) Optional remote test feature.

i) Disconnect switch monitor.

j) Fully automatic operation.

13.5. TEERS-Standard Layout-208V



13.6. Component Overview

COMPONENT OVERVIEW

The TEERS Traction Elevator Emergency Return System is designed for maximum reliability with minimum maintenance. A solid state control card monitors the in coming power, both voltage and frequency. Normal power is transfer to the control system via the NP contactor. In the event of an outage, the BP contactor will transfer the UPS power to the controller.

The components of the TEERS Traction Elevator Emergency Return System are:

a) Input Power Terminal Block : to connect to incoming power.

b) NP Contactor : Normal Power contactor

c) BP Contactor : Backup Power contactor.

d) Output Power Terminal Block : to connect to elevator controller.

e) Control Signals Terminal Block

f) Lockable ON/OFF Switch

g) Fuses : power and logic control fuses.

h) Control Card : Controller with LCD screen to monitor voltage.

i) UPS connection block : For UPS input and output power connections

j) 24vdc power supply : powered by either the Incoming power or UPS output

k) Bypass switch

l) Test button

m) Control relays.

n) UPS : single phase 208 vac output

13.7. TEERS-Sequence of Operation

SEQUENCE OF OPERATION

Under normal power conditions, the control card will detect power to source one "S1" and energize the NP contactor. This contactor will connect the input power directly to the output power terminals. The control card will also detect ups output power on source two "S2". In the event of a incoming power failure, the control card will drop output the "NP" contactor. A drop in voltage, fluctuation in frequency or the loss of a phase will be detected by the control card. After a 5second delay, it will energize the "BP". This contactor will transfer the UPS single phase output to the output terminals. A normally open contact on "BP" provide a dry contact signal to the elevator controller to indicate it is UPS power. Upon the resumption of normal power the control card will wait 10sec, release "BP", wait another 2sec and then energize the "NP" contactor.

13.8. TEERS SAFETY IMPORTANT

	**CAUTION:** High Voltage can cause serious and fatal injury. Extreme caution should be exercised when working on this equipment.
	**CAUTION:** Only qualified personnel should attempt to start-up or troubleshoot it.
	**CAUTION:** UPS output still has power on it even if the ON/OFF switch is turned off. Unplug the UPS output or shutdown the UPS to completely shutoff the unit.

13.9. TEERS - Initial Power Turn On

INTIAL POWER TURN ON

1) Ensure the TEERS ON/OFF switch is in the OFF position.
2) Check that all connections are correct.
3) Place elevator on inspection mode.
4) Make sure the TEERS Bypass switch is in the BYPASS position.
5) Turn on the main line disconnect.
6) Turn the TEERS ON/OFF switch to the ON position.
7) Turn the UPS on by holding the ON button for a few seconds.
8) The TEERS control card screen should be lit.
9) The "S1" and "S2" indicator lights will be on.
10) "NP" will energize.
11) Confirm three phase power is being provided to the controller
12) Switch the Bypass switch to the NORMAL position.

IMPORTANT:

Confirm the fourth pole of the disconnect is connected to #P10 & #P11

Turn TEERS ON/OFF switch to the ON position.

Shut Off the mainline

13.10. TEERS-Functional Test

Functional Test

1) Place the main line disconnect in the ON position.

2) Confirm the TEERS ON/OFF Switch is ON, and the BYPASS switch is NORMAL

3) The "NP" contactor will be energized providing power to the controller.

4) Place the car onto inspection and move the car between floors.

5) Push and hold the TEST button until backup transfer begins.

6) Place the car back onto automatic operation.

7) The "BP" contactor will energize provide single phase to the controller.

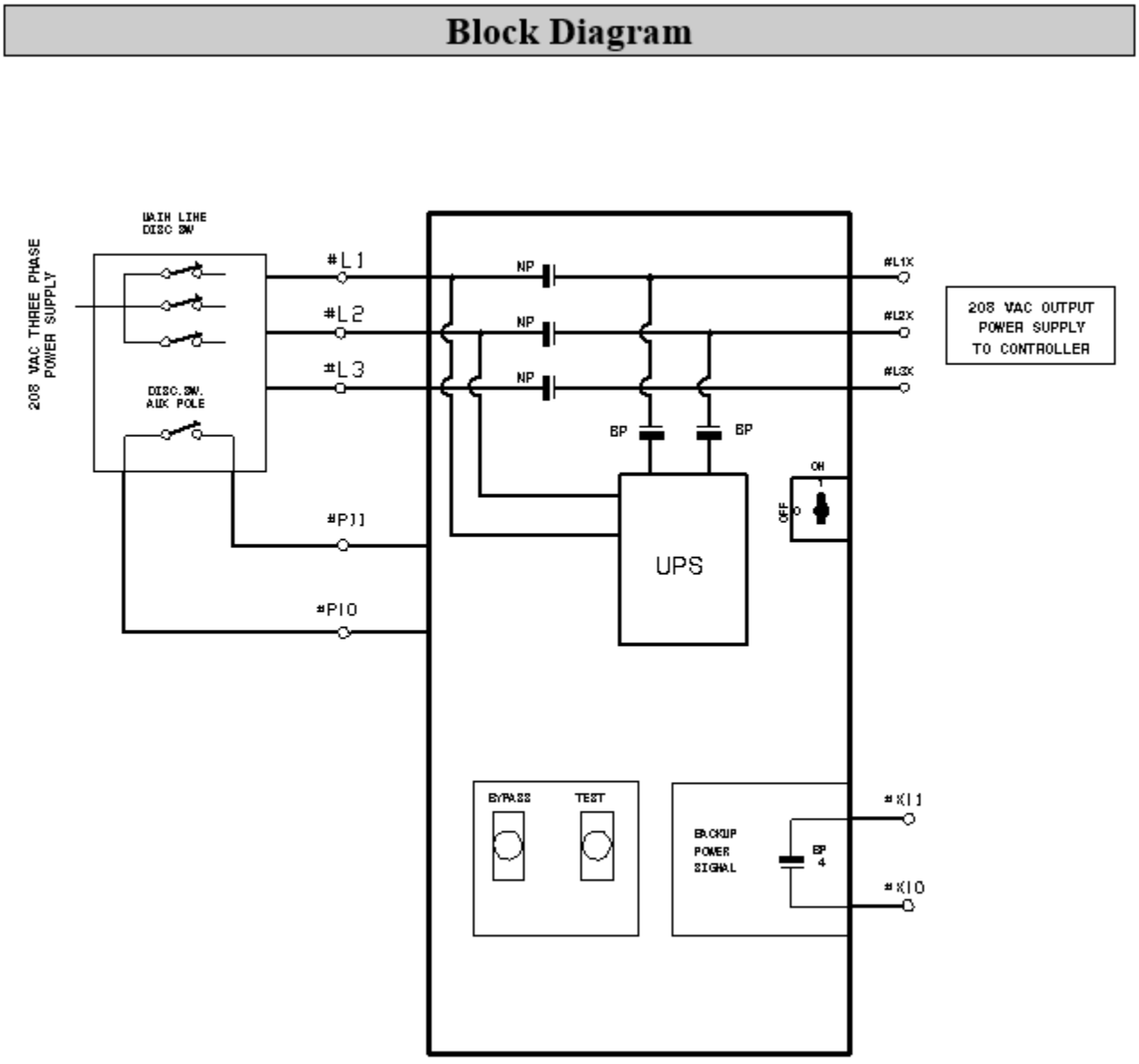
8) Terminals #TRS1 and #TRS2 will provide a signal to the controller to notify that is on backup power and to go into Backup Power Return Mode.

9) Depending on the controller, It will use either the drive or a load weighting sensor to determine the best direction of travel.

10) The elevator will begin to move at leveling or seek speed until it reaches a floor. It will cycle the doors and shutdown.

11) When normal power is restored and after a 10sec delay TEERS will transfer the elevator back to normal power.

13.11. TEERS - Block Diagram



14. Legal Disclaimers

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