Elevator Systems Inc.

VVVF TRACTION ELEVATOR CONTROLLER

MODEL NYCHAPLC

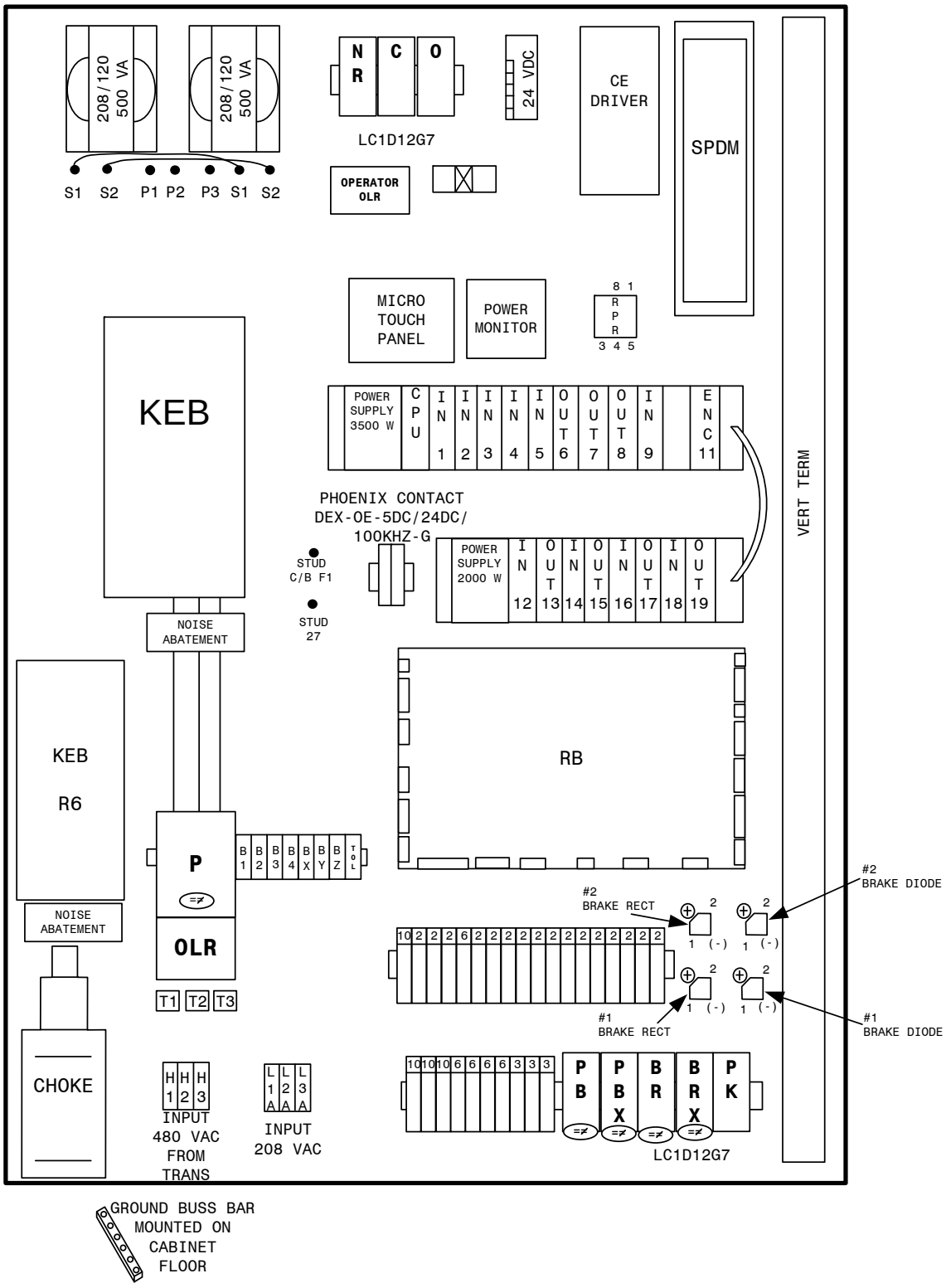
OPERATION MANUAL

MANUAL #D21.3201.A01 7-20-13

207 LAWRENCE AVE., INWOOD, NEW YORK 11096 • TEL: (516) 239-4044 • FAX: (516) 239-5793

Table of Contents

STANDARD VFPLCHA CONTROLLER LAYOUT



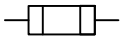
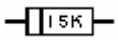
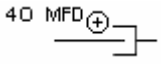
CONVENTIONS

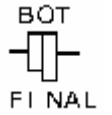
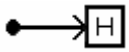
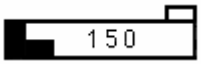
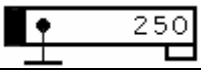
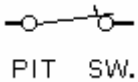
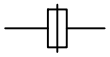
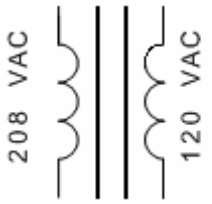
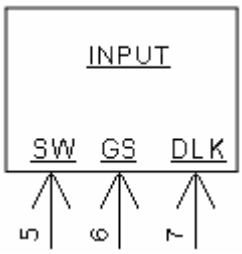
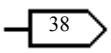
This manual uses the following terms and conventions to indicate parts of the controller and operation:

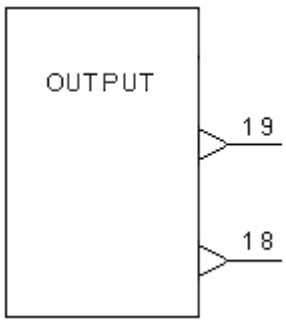
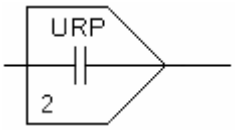
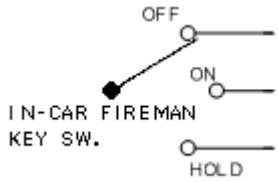
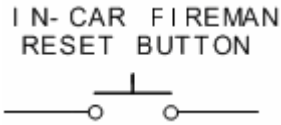
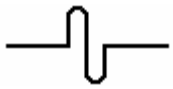
- CPU – The electronic controller board and all of it's associated expansion modules.
- Energized – Power is applied to the relay coil, and the relay has operated.
- De-energized – Power is not applied to the relay coil, and the relay is at rest.
- Activated – A signal is applied to the input terminal 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: 1C{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

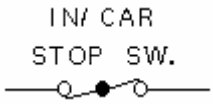
LEGEND

Table 1 outlines the symbols used in the ESI Drawings. Please refer to this table whenever you have any questions regarding symbols on the ESI Drawings.

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**	

	**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)
	**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 pictured.*
	**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**	
	**Board Connector**	The Lettering represents the connector name (i.e. J1). The number represents the Pin (i.e. 5).

	**Variable Timer Delay**	
	**Switch**	The Lettering represents the name of the switch (i.e. IN CAR STOP SWITCH). NOTE: *Switch shown in Closed Position.*

CONTROLLER COMPONENT OVERVIEW

The controller is designed for maximum reliability with minimum maintenance. A Schneider M340 PLC, coupled with a series of forced guided relays provides all the functionality to run the elevator. The PLC unit provides the control logic. The safety circuits are controlled by both the PLC and relay structure for maximum reliability and redundancy in all modes of operation. A KEB Drive Unit controls the motor and provides motor overload and fault protection. 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. A non-adjustable reverse phase relay on the board provides reverse phase protection to the controller.

Every controller has three toggle switches. These are: test mode, hall button disconnect and automatic/inspection. There are also four push button inputs on every controller: controller inspection down, enable and up, R/GRIP/SPDM RESET. There are also two slide switches: Car Door Bypass and Hatch Door Bypass. Every controller also has a relay tester. A vertical terminal strip provides all interconnecting to the elevator's equipment.

The relays, Inputs and Outputs names and functions are described in the following tables:

Relay Names:

RELAY NAME	FUNCTION	TYPE	LOCATION
B	Brake Pilot	2 Pole Safety	RB Board
D/DX/DY/DZ	Run Down	2 Pole Safety	RB Board
DBE	Drive Brake Enable	2 Pole Safety	RB Board
DEN	Drive Enable	2 Pole Safety	RB Board
DU/DUX	Down or Up run	2 Pole Safety	RB Board
HS	High speed	2 Pole Safety	RB Board
HSP	High speed pilot	2 Pole Safety	RB Board
HSM	HSM High speed	2 Pole Safety	RB Board
HMP	HSM High speed pilot	2 Pole Safety	RB Board
PX	Run	2 Pole Safety	RB Board
U/UX/UY/UZ	Run Up	2 Pole Safety	RB Board
I / IX	Inspection – energized on automatic	2 Pole Safety	RB Board
IC1 / IC2	In car inspection – energized on in/car insp.	2 Pole Safety	RB Board
ID	Inspection Down	2 Pole Safety	RB Board
IU	Inspection Up	2 Pole Safety	RB Board
GSF	Gov Safety	2 Pole Safety	RB Board
FLS	Final Safety	2 Pole Safety	RB Board
CSF	Car Safety	2 Pole Safety	RB Board
SWB/SWB2	Stop switch bypass	2 Pole Safety	RB Board
DL	Door Locks	2 Pole Safety	RB Board
GS	Gate Switch	2 Pole Safety	RB Board
BNL	Bottom Normal Limit	2 Pole Safety	RB Board
TNL	Top Normal Limit	2 Pole Safety	RB Board

SPDM	Speed Monitor	2 Pole Safety	RB Board
LFI	Lobby Fire Light	2 Pole Safety	RB Board
RG1/2	Rope Gripper	2 Pole Safety	RB Board
RG3/4	Rope Gripper	2 Pole Safety	RB Board
VC	Leveling Pilot	2 Pole Safety	RB Board
Z	Door Zone	2 Pole Safety	RB Board

SYSTEM INPUTS

CPU Inputs:

INPUT	Symbol	FUNCTION
1-0	ON	120 VAC power on
1-1	TC	Top Car Inspection (when de-activated)
1-2	IC	In Car Inspection (when de-activated)
1-3	ACC	Access
1-4	I	Controller Inspection (when de-activated)
1-5	ID	Inspection Down
1-6	IU	Inspection Up
1-7	CTI	Critical Circuits
1-8	GOV	Governor Switch
1-9	RG	Rope Gripper
1-10	BUF	Buffer Switch
1-11	COMP	Compensator Switch
1-12	PIT	Pit Switch
1-13	PIT DR	Pit Door Switch
1-14	TFL	Top Final
1-15	BFL	Bottom Final
2-0	EEX	Emergency Exit Switch
2-1	CF	Car Safety Switch
2-2	TOC	Top Of Car Stop Switch
2-3	SW	In Car Stop Switch
2-4	GS1	Gate Switch 1
2-5	GS2	Gate Switch 2
2-6	DL	Door Lock
2-7	BNL	Bottom Normal
2-8	TNL	Top Normal
2-9	RPR	Reverse Phase Relay
2-10	OLR	Motor Overload
2-11	SAF	Safety String
2-12	DRV	Doors/Gate/Inspection
2-13	TOL	Motor Thermal Overload
2-14	BY	Brake Switch #1
2-15	BZ	Brake Switch #2
3-0	P1	Proving Input 1

3-1	P2	Proving Input 2
3-2	P3	Proving Input 3
3-3	P4	Proving Input 4
3-4	P5	Proving Input 5
3-5	24	Door Close Button
3-6	28	Door Open Button
3-7	28E	Door Electric Eye
3-8	47	Door Close Limit
3-9	48	Door Open Limit
3-10	52	Bottom Slowdown Limit
3-11	52A	Bottom Slowdown Limit
3-12	52B	Bottom Slowdown Limit
3-13	53	Top Slowdown Limit
3-14	53A	Top Slowdown Limit
3-15	53B	Top Slowdown Limit
4-0	81	Down Level
4-1	82	Up Level
4-2	84	Door Zone
4-3	85	Binary Input
4-4	86	Binary Input
4-5	87	Binary Input
4-6	88	Binary Input
4-7	89	Binary Input
4-8	90	Smoke / Heat Detectors (Alternate Return)
4-9	90B	Smoke / Heat Detectors (Prime Return)
4-10	92	Machine Room Sensors / Heat Detectors (Prime Return)
4-11	92B	Machine Room Smoke / Heat Detectors (Alternate Return)
4-12	93	Fire Control Lobby Switch (RESET)
4-13	94	Fire Control Lobby Switch (ON)
4-14	95	Fire Control Car Switch (ON)
4-15	96	Fire Control Car Switch (CANCEL)
5-0	100	Fire Control Car Switch (OFF)
5-1	!DF	Not DF Input
5-2	HBD	Hall Button Switch
5-3	TST	Test Switch
5-4	!GBY	Not Gate Bypass
5-5	!DBY	Not Door Bypass
5-6	DFLT	Drive Fault
5-7	R6FLT	Regen Drive Fault
5-8	29	Door Quick Close Input, car button 2nd poles wired in parallel
5-9	50	Independent
5-10	!RG	RG 1/2/3/4 Proving
5-11	DBE	Drive Brake Enable
5-12	SPDM	Speed Board Monitor
5-13	RGRST	Rope Gripper / Speed Board Reset
5-14	DOL	Door Overload
5-15	CB18	Circuit Breaker CB18
9-0	CB2	Circuit Breaker CB2

9-1	CB3	Circuit Breaker CB3
9-2	CB4	Circuit Breaker CB4
9-3	CB5	Circuit Breaker CB5
9-4	CB6	Circuit Breaker CB6
9-5	CB7	Circuit Breaker CB7
9-6	CB8	Circuit Breaker CB8
9-7	CB9	Circuit Breaker CB9
9-8	CB10	Circuit Breaker CB10
9-9	CB11	Circuit Breaker CB11
9-10	CB12	Circuit Breaker CB12
9-11	CB13	Circuit Breaker CB13
9-12	CB14	Circuit Breaker CB14
9-13	CB15	Circuit Breaker CB15
9-14	CB16	Circuit Breaker CB16
9-15	CB17	Circuit Breaker CB17
12-0	1C	Input 1C
12-1	2C	Input 2C
12-2	3C	Input 3C
12-3	4C	Input 4C
12-4	5C	Input 5C
12-5	6C	Input 6C
12-6	7C	Input 7C
12-7	8C	Input 8C
12-8	9C	Input 9C
12-9	10C	Input 10C
12-10	11C	Input 11C
12-11	12C	Input 12C
12-12	13C	Input 13C
12-13	14C	Input 14C
12-14	15C	Input 15C
12-15	16C	Input 16C
14-0	17C	Input 17C
14-1	18C	Input 18C
14-2	19C	Input 19C
14-3	20C	Input 20C
14-4	21C	Input 21C
14-5	22C	Input 22C
14-6	23C	Input 23C
14-7	24C	Input 24C
14-8	25C	Input 25C
14-9	26C	Input 26C
14-10	27C	Input 27C
14-11	28C	Input 28C
14-12	29C	Input 29C
14-13	30C	Input 30C
14-14	31C	Input 31C
14-15	32C	Input 32C

16-0	1H	Input 1H
16-1	2H	Input 2H
16-2	3H	Input 3H
16-3	4H	Input 4H
16-4	5H	Input 5H
16-5	6H	Input 6H
16-6	7H	Input 7H
16-7	8H	Input 8H
16-8	9H	Input 9H
16-9	10H	Input 10H
16-10	11H	Input 11H
16-11	12H	Input 12H
16-12	13H	Input 13H
16-13	14H	Input 14H
16-14	15H	Input 15H
16-15	16H	Input 16H
18-0	17H	Input 17H
18-1	18H	Input 18H
18-2	19H	Input 19H
18-3	20H	Input 20H
18-4	21H	Input 21H
18-5	22H	Input 22H
18-6	23H	Input 23H
18-7	24H	Input 24H
18-8	25H	Input 25H
18-9	26H	Input 26H
18-10	27H	Input 27H
18-11	28H	Input 28H
18-12	29H	Input 29H
18-13	30H	Input 30H
18-14	31H	Input 31H
18-15	32H	Input 32H

SYSTEM OUTPUTS

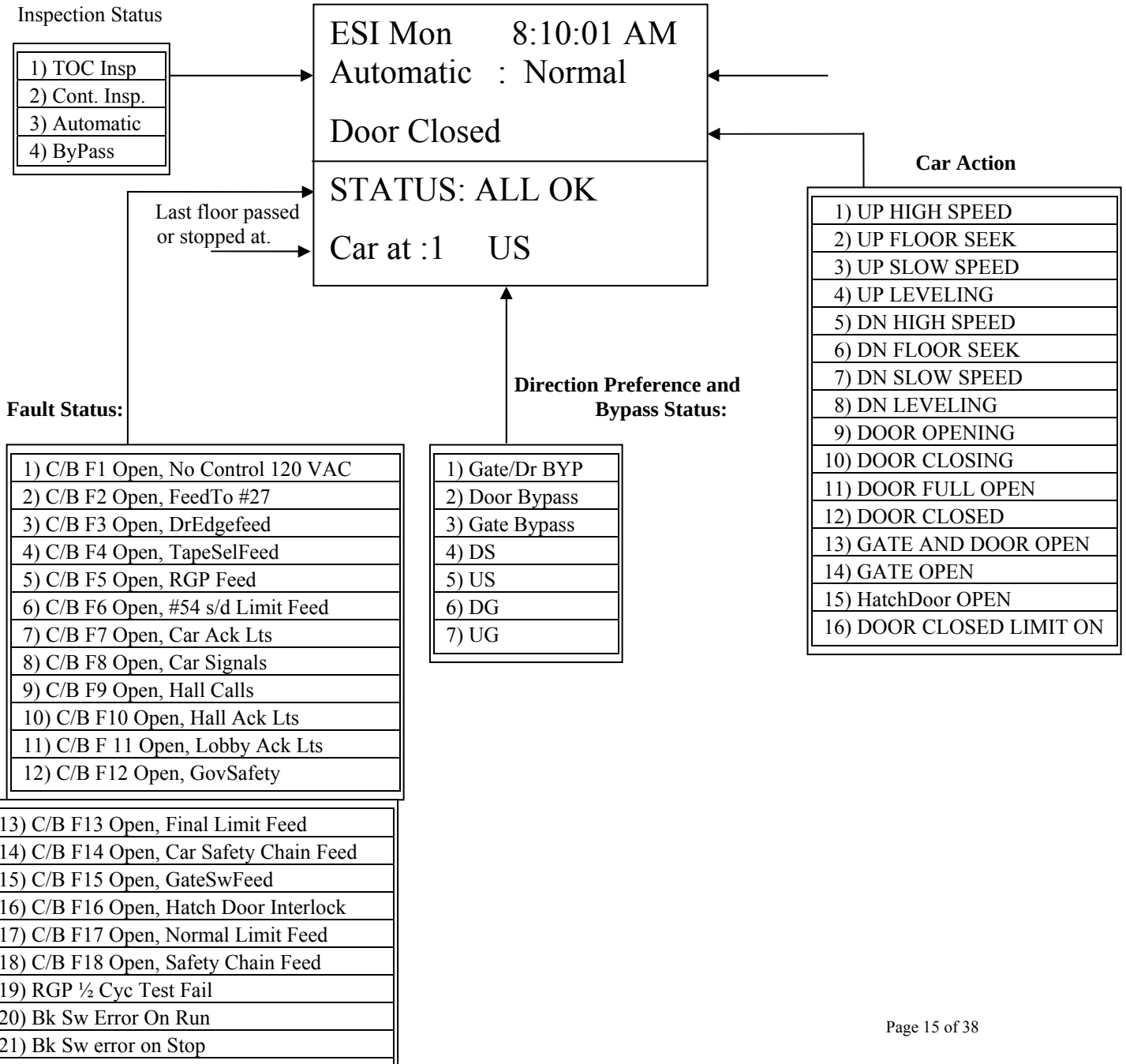
Output	Symbol	FUNCTION
6-0	BP	Brake Pilot
6-1	DRP	Down Run Pilot
6-2	URP	Up Run Pilot
6-3	DEN	Drive Enable
6-4	SP1	Leveling Speed Input
6-5	SP2	Inspection Speed Input
6-6	RES	Drive Reset
6-7	VCP	Leveling Pilot
13-0	1A	Car Call Ack For 1C
13-1	2A	Car Call Ack For 2C
13-2	3A	Car Call Ack For 3C
13-3	4A	Car Call Ack For 4C
13-4	5A	Car Call Ack For 5C
13-5	6A	Car Call Ack For 6C
13-6	7A	Car Call Ack For 7C
13-7	8A	Car Call Ack For 8C
13-8	9A	Car Call Ack For 9C
13-9	10A	Car Call Ack For 10C
13-10	11A	Car Call Ack For 11C
13-11	12A	Car Call Ack For 12C
13-12	13A	Car Call Ack For 13C
13-13	14A	Car Call Ack For 14C
13-14	15A	Car Call Ack For 15C
13-15	16A	Car Call Ack For 16C
15-0	17A	Car Call Ack For 17C
15-1	18A	Car Call Ack For 18C
15-2	19A	Car Call Ack For 19C
15-3	20A	Car Call Ack For 20C
15-4	21A	Car Call Ack For 21C
15-5	22A	Car Call Ack For 22C
15-6	23A	Car Call Ack For 23C
15-7	24A	Car Call Ack For 24C
15-8	25A	Car Call Ack For 25C
15-9	26A	Car Call Ack For 26C
15-10	27A	Car Call Ack For 27C
15-11	28A	Car Call Ack For 28C
15-12	29A	Car Call Ack For 29C
15-13	30A	Car Call Ack For 30C
15-14	31A	Car Call Ack For 31C
15-15	32A	Car Call Ack For 32C
17-0	1HA	Car Call Ack For 1H
17-1	2HA	Car Call Ack For 2H
17-2	3HA	Car Call Ack For 3H
17-3	4HA	Car Call Ack For 4H
17-4	5HA	Car Call Ack For 5H
17-5	6HA	Car Call Ack For 6H

17-6	7HA	Car Call Ack For 7H
17-7	8HA	Car Call Ack For 8H
17-8	9HA	Car Call Ack For 9H
17-9	10HA	Car Call Ack For 10H
17-10	11HA	Car Call Ack For 11H
17-11	12HA	Car Call Ack For 12H
17-12	13HA	Car Call Ack For 13H
17-13	14HA	Car Call Ack For 14H
17-14	15HA	Car Call Ack For 15H
17-15	16HA	Car Call Ack For 16H
19-0	17HA	Car Call Ack For 17H
19-1	18HA	Car Call Ack For 18H
19-2	19HA	Car Call Ack For 19H
19-3	20HA	Car Call Ack For 20H
19-4	21HA	Car Call Ack For 21H
19-5	22HA	Car Call Ack For 22H
19-6	23HA	Car Call Ack For 23H
19-7	24HA	Car Call Ack For 24H
19-8	25HA	Car Call Ack For 25H
19-9	26HA	Car Call Ack For 26H
19-10	27HA	Car Call Ack For 27H
19-11	28HA	Car Call Ack For 28H
19-12	29HA	Car Call Ack For 29H
19-13	30HA	Car Call Ack For 30H
19-14	31HA	Car Call Ack For 31H
19-15	32HA	Car Call Ack For 32H

MAIN CPU MONITOR LCD SCREEN

Operation Status

Inspection Status



Inspection Status:

1) TOC Insp	: On Top of Car Inspection
2) Cont Insp	: On controller inspection
3)Automatic	: On Automatic Operation
4)ByPass	: Illegal Condition Car Door and/or Hoistway Door Bypass switch is up when not on TOC/InCar Isnp

Operation Status:

1) OutOfServ	: Car is Out Of Service
2) Normal	: Controller is operating Normally
3) Ind Serv	: On Independent Service, Input "#50" is high
4) FCF Prime	: Fire Control Phase I Prime Return
5) FCF PII	: Fire Control Phase II Prime Return
6) FCF Alt	: Fire Control Phase I Alt Return

Direction Preference and Bypass Status:

1) US	: Up Direction
2) UG	: Up Preference
3) DS	: Down Direction
4) DG	: Down Preference
5) Dby	: Hatch Door Bypassed via slide switch on RB board
6) Gby	: Gate Switch Bypassed via slide switch on RB board
7) DGB	: Both the Hatch Door and Gate Switch are Bypassed by slide switches on the RB board

MODE : Used to change Touch Screen Display Mode.

↓ : To Scroll Down through various display screens and to adjust parameter settings.

↑ : To Scroll Up through various display screens and to adjust parameter settings.

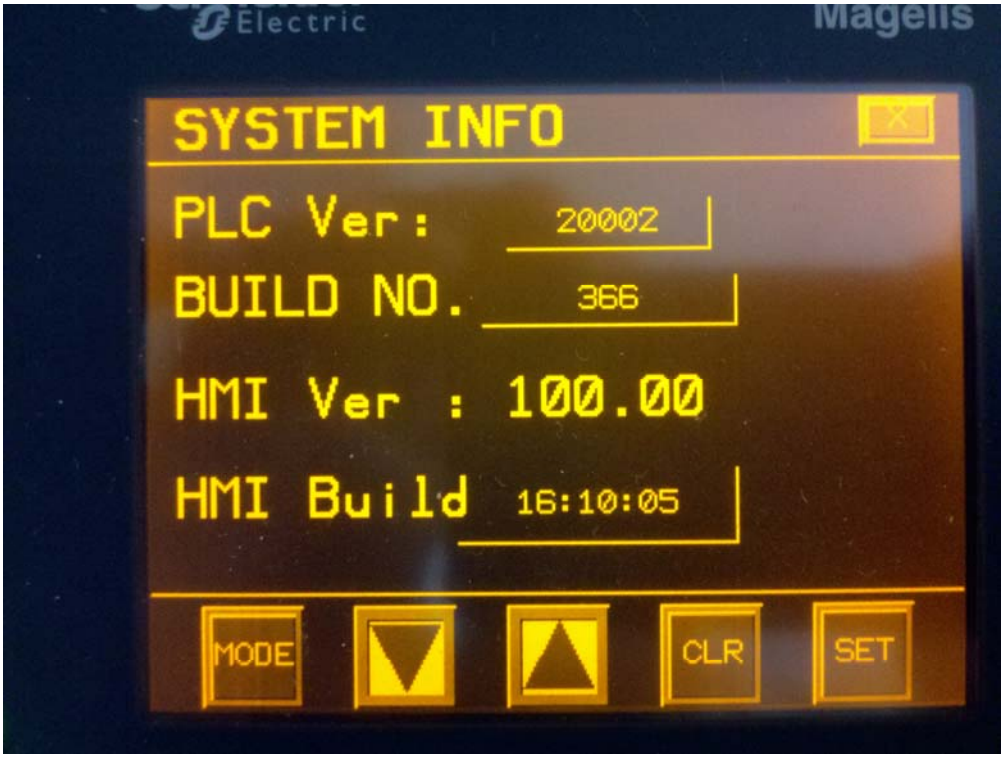
CLR : To Clear current parameter editing and to force a drive reset without time delay

SET : Used to enter parameter settings and adjust operational information.

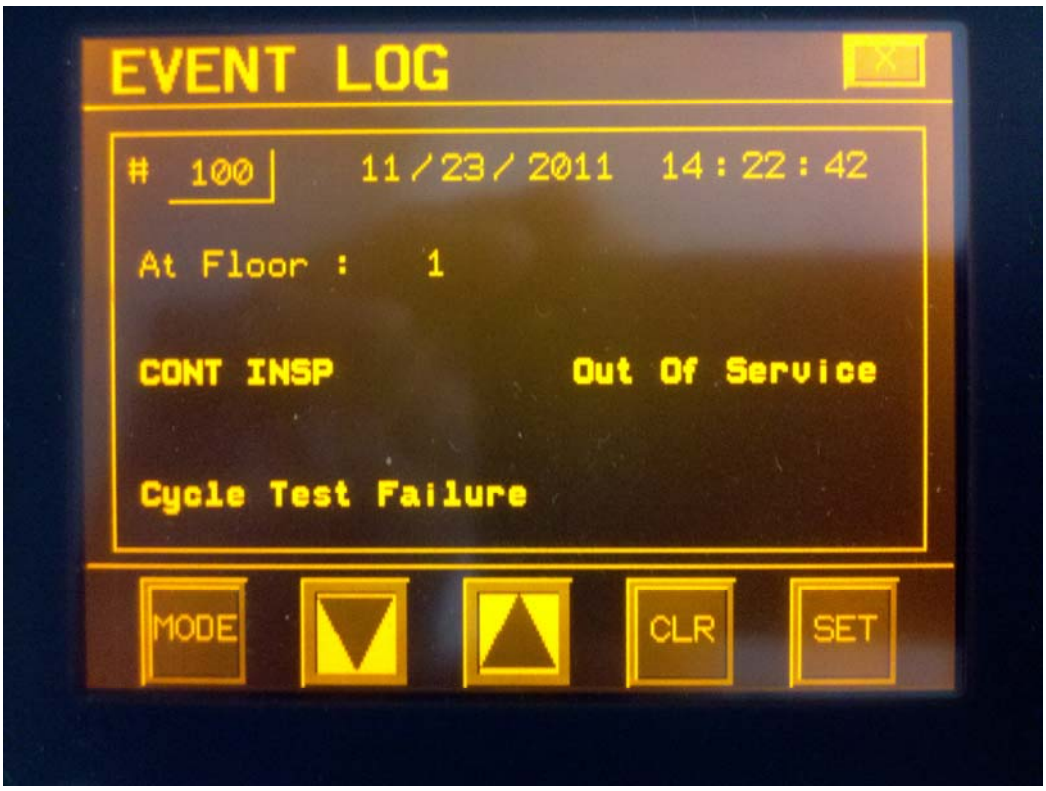
Display Modes:

1. ESI Mon : Main Screen for monitoring current status of elevator
2. System Info : Software version information
3. Internal Flags : View Internal flags status
4. Event Log : Scroll through events with time/date stamp
5. Place Car Call : To place car calls into system
6. Place Hall Call : To place hall calls into system
7. Parameters : Scroll through to edit desired parameter
8. Setup : Scroll through various setup options
9. Mem View : View ROM,RAM & EE2 memory

ESI MONITOR – 2
This screen shows the last floor passed, or present if stopped.
The Floor Count of that floor.
The present encoder count if moving.
The speed of the motor in RPM.
The speed of the car in FPM.



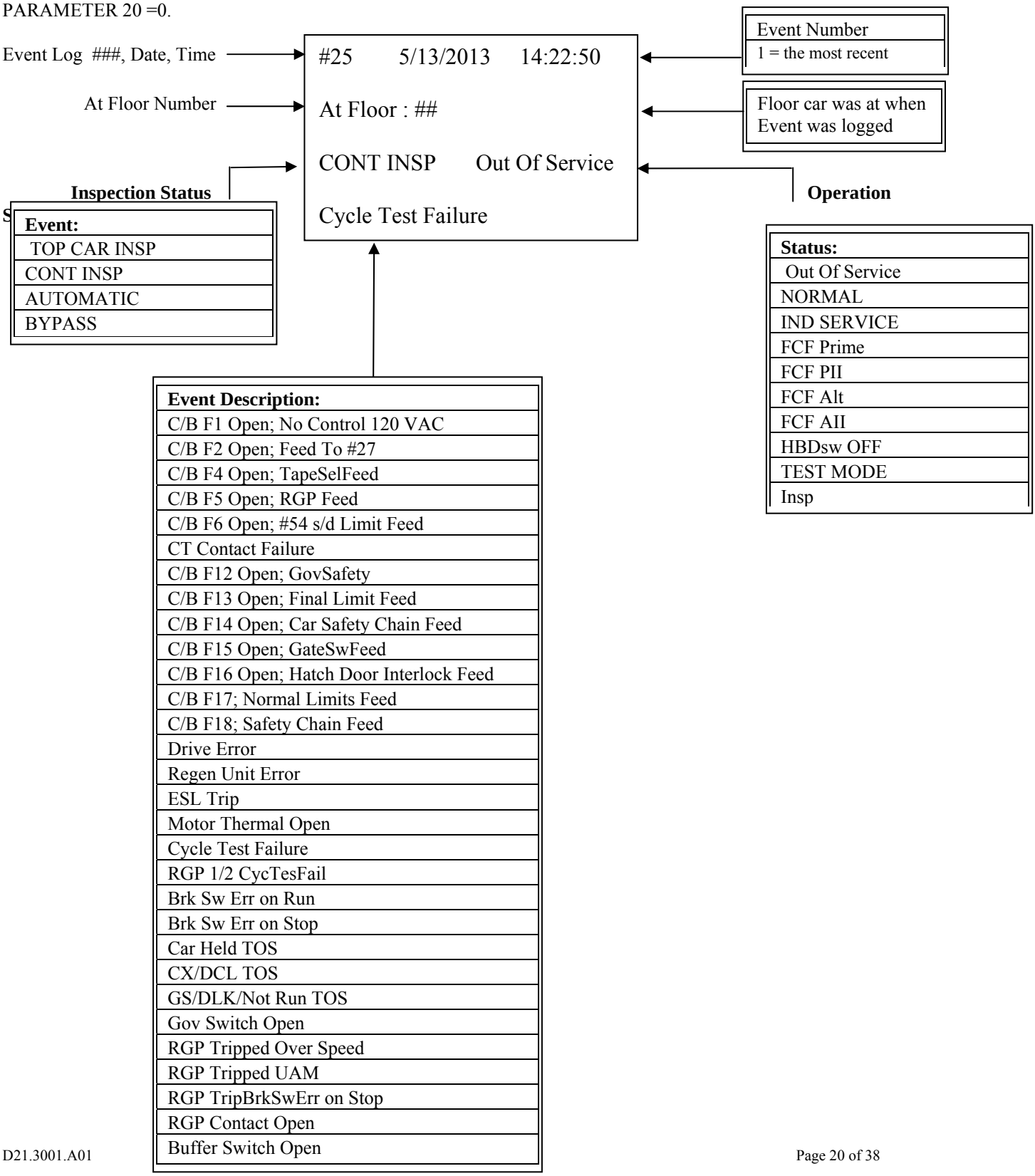
SYSTEM INFORMATION
This screen shows the PLC Software version and build number.
The touch screen software version and build number.



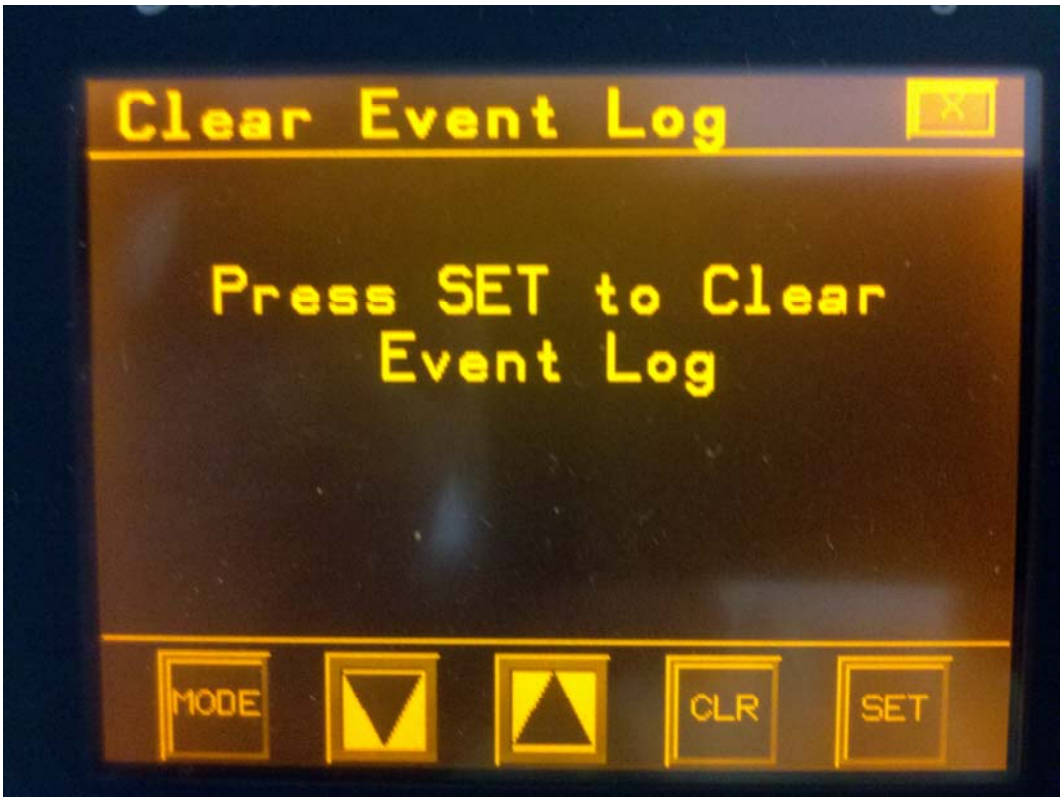
EVENT LOG

To view Event Log, press MODE until EVENT LOG screen comes up. Use up and down arrows to scroll through the events.

To reset the event log, set PARAMETER 20=3,then press mode until the SETUP/UTILITIES screen comes up. Press up and down arrows to scroll to the CLEAR EVENT LOG screen. Press SET. Press SET again to reset EVENT LOG. Set PARAMETER 20 =0.



Comp Switch Open
Pit Switch Open
Pit Door Open
Top Final Open
Bottom Final Open
Emergency Exit Open
Car Safety Switch Open
Top Of Car Stop Switch Open
Top Switch Open
RPR Open
OLR Open
Speed Board Tripped
SAF Input Low
DRV Input Failure
Door Overload Open
Normal Limits Failure
Top Normal Open
Bottom Normal Open
Slow Down Limit Failure
C/B F3 Open; DrEdgeFeed
C/B F7 Open; Car Ack Lts
C/B F8 Open; CarSignals
C/B F9 Open; Hall Calls
C/B F10 Open; HallAckLts
C/B F11 Open; LobbyAckLts
Floor Seek Timeout
CHECK SUM Error
Status: ALL OK



Follow on screen instructions to clear Event Log, all previous records will be lost.

View and Edit Parameters

To View and edit parameters:

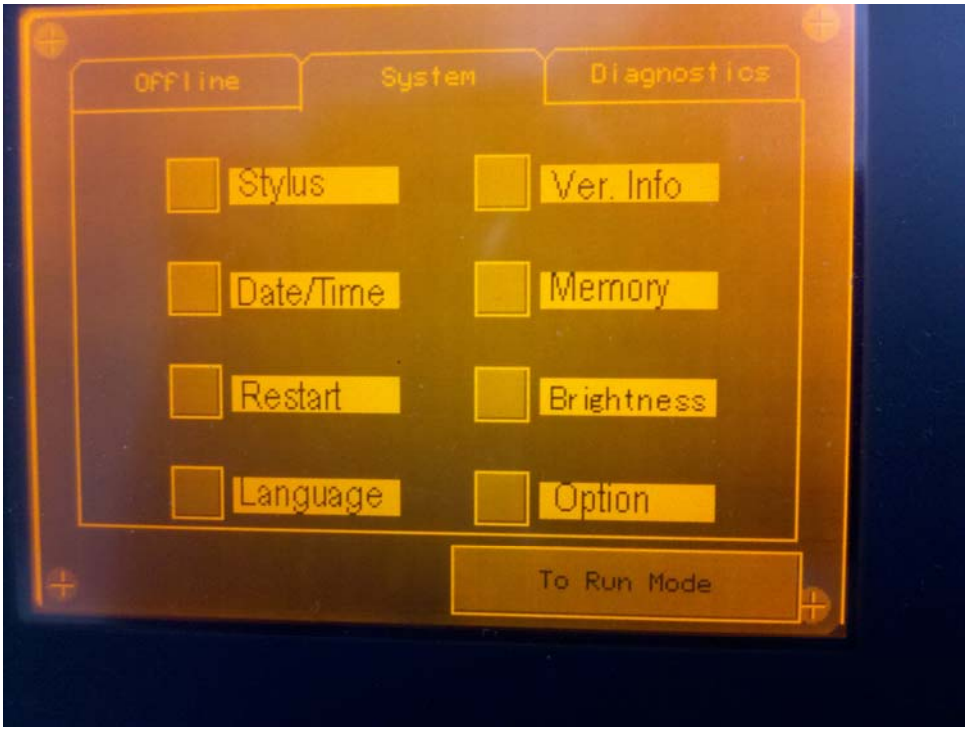
1. Use ↓/↑ keys to scroll to desired parameter.
2. Press **SET** to place into edit mode. The parameter value will invert color.
3. Use ↓/↑ keys to change parameter setting.
2. Press **SET** to save changes. The parameter value will revert back to the original color.
3. If **CLR** is pressed prior to saving changes the previous value will be restored.
5. **NOTE:** Parameter #20 must be set to 3 to enable edit mode.

Change IP Address

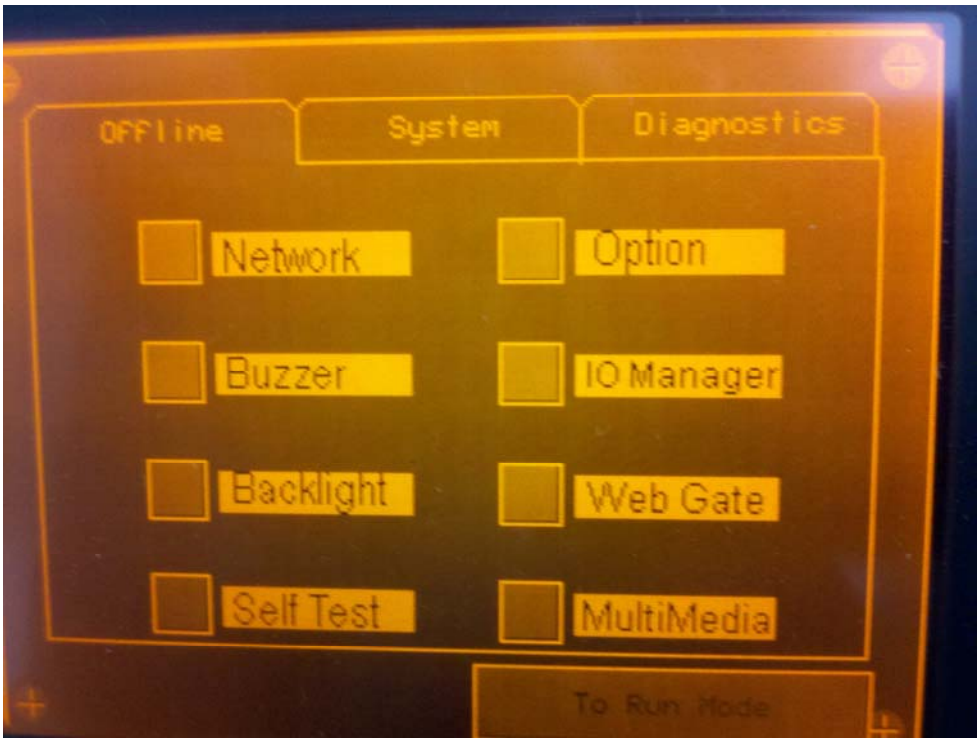
Before entering this screen change parameter 20 to 9. Then press mode once to the utility screen.

Follow on screen instructions to change setup.

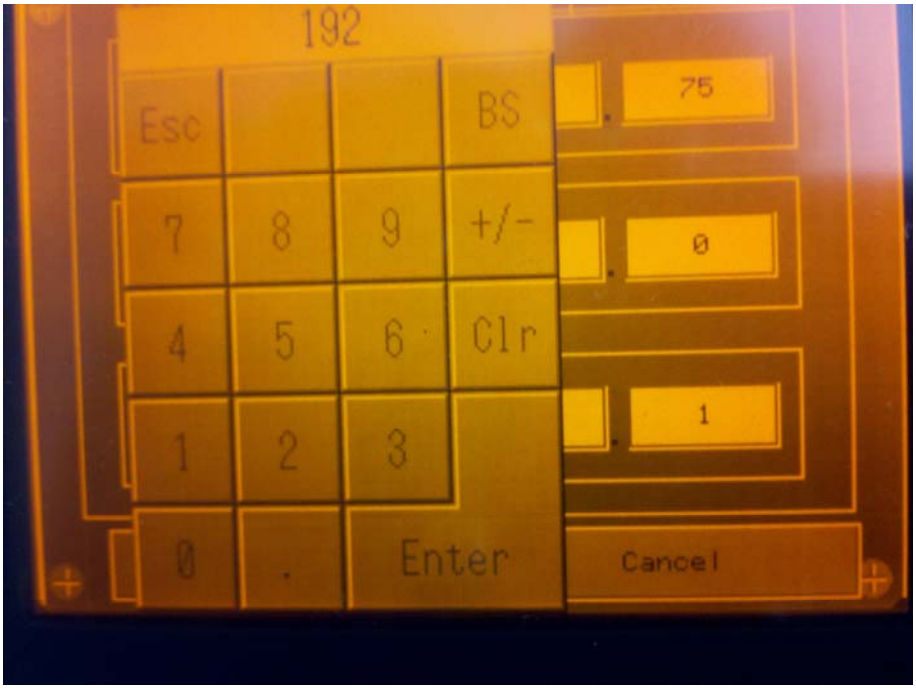
Press the down arrow 3 times to the above screen. Press set.



Press offline.



Press Network, then OK. The Touch Screen will reboot in Static IP mode.



Press the IP address digit one at a time, enter the number and press enter.
When finished entering all the information press OK. Then press “To Run Mode” then press OK.

The Touch Screen will reboot to normal operation.

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 bent 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 connections are tight.
- Make sure all toggle switches are in the down position.
- CONFIRM input power supply. The input power supply specifications are printed near the terminals.

INITIAL POWER TURN ON

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.

Check the voltage across terminals #L1, #L2 and #L3. Verify that the voltage reading is what the controller is built for. The RPR should be lit. If the RPR is not lit then reverse the #L1 and #L2 wires. 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. The Secondary side of the transformer ties into the circuit breakers where power is routed to different parts of the controller.

Verify the following terminal pairs should have 120VAC present:

- #27 - #60
- #32 - #60 (with CT Relay energized)
- #91 - #60

Verify the following terminal pairs have the proper voltage present:

- #31 - #60
- #30 - #60
- #30L - #60

SEQUENCE OF OPERATION

Before we can run the controller the safety mechanisms must all be in place. Verify that the following safety circuits are closed.

- #32 - #32A : Governor Trip Sw
- #32A - #32B : Rope Gripper Contact
- #32B - #33C : Buffer Sw
- #32C - #32D : Compensation Sw
- #32D - #32E : Pit Sw
- #32E - #32F : Pit Door Sw
- #33 - #33A : Top Final Limit
- #33A - #33B : Bottom Final Limit
- #34 - #35 : Hatch Door Interlocks
- #39 - #38 : Top Normal Limit
- #39 - #37 : Bottom Normal Limit
- #40 - #40A : Emergency Exit Sw
- #40A - #40B : Car Safety Sw
- #40B - #40C : Top or Car Stop Sw
- #40C - #40D : In/Car Stop Sw
- #45 - #45A : Car Door Contact
- #45A - #46 : Aux Door Contact

On power up, if the LCD screen shows "Rope Gripper Tripped", press the R/GRIP/SPDM RESET Switch. Follow the "S.LRN" (Auto Tune) instructions and then the SPI (Stationary Pole Identification) instructions in the KEB COMBIVERT F5 manual. These instructions must be followed before attempting to run the car.

TOP OF CAR INSPECTION

Relay that must be energized: RPR, CT, GSF, FLS, CSF, GS, DL, TNL and BNL.

Relays that must be de-energized: I and IX. Input "TC" should be off.

Inputs that must be activated: ON, CTI, all circuit breaker monitoring inputs, GOV, RG, BUF, COMP, PIT, PIT DR,TFL, BFL, EEX, CF, TOC, SW, BNL, TNL, DL, GS1, GS2, RPR, OLR, SAF, TOL, BY, BZ, P1, P3, P5, DOL.

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 it's 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 that up motion is requested. Relay IU will pick, feed voltage to input "DRV".

The CPU will turn ON four outputs. Output 6-2 "URP" energizing relay U. Output 6-0 "BP" energizing relay B. Output 6-3 "DEN" energizing relay DEN. Output 7-5 "CX" which will force the doors closed *("if applicable"*). The motor and brake will engage and the car will run up at inspection speed. The Touch Screen 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 that down motion is requested. Relay ID will pick, feed voltage to input "DRV" .

The CPU will turn ON four outputs. Output 6-1 "DRP" energizing relay U. Output 6-0 "BP" energizing relay B. Output 6-3 "DEN" energizing relay DEN. Output 7-5 "CX" witch 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.

CONTROLLER INSPECTION

Relays that must be energized: RPR, CT, GSF, FLS, CSF, GS, DL, IC1, IC2, TNL and BNL.

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

Inputs that must be activated: ON, CTI, all circuit breaker monitoring inputs, TC, IC, GOV, RG, BUF, COMP, PIT, PIT DR,TFL, BFL, EEX, CF, TOC, SW, BNL, TNL, DL, GS1, GS2, RPR, OLR, SAF, TOL, BY, BZ, P1, P3, P5, DOL.

With the Top of Car and InCar Inspections switches closed 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 in run in inspection speed up or down. The Touch Screen 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.

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.

AUTOMATIC OPERATION

NOTE: A floor height learn trip must be done prior the running the car on automatic operation.

Relays that must be energized: RPR, CT, I, and IX.

Inputs that must be activated: ON, TC, IC, I, CTI, GOV, RG, BUF, COMP, PIT, PIT DR,TFL, BFL, EEX, CF, BNL, TNL, RPR, OLR, SAF, TOL, BY, BZ, P1, P3, P5, DOL.

Inputs that must NOT be activated: 28, 28E, 28S, 50, 90, 90B, 92, 92B, 95, 99

Set controller inspection switch to "Automatic", be sure top-of-car inspection switches are closed.

When the controller is in automatic mode, the display will read "Automatic". If you do not see the word 'Automatic' on the display, the elevator is not in automatic mode. Automatic is the normal mode of operation for the elevator when it is in service.

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"

AUTOMATIC UP RUN

With the car level at the first floor, inputs "84" (input 4-2), "53" (input 3-13) and "53A" (input 3-11) ON. Input "52" (input 3-10) and input "53A" (input 3-14) Bottom SlowDowns will be OFF. Pressing 2nd floor car button will activate input "2C"(12-1) and output "2A" (13-1) will acknowledge the call. If the doors are not closed, they will wait for the door close timer to expire. Pressing the Door Close Button (#27 to #24) will bypass the timer and close the doors. The hatch doors will close energizing relay DL and input "DL" (input 2-6). The car door contacts will close energizing relay GS and input" GS" (input 2-4 and 2-5). The car will start and begin to accelerate to high speed. The CPU will slow the car down by de-energizing output "HSP" (output 7-1). The point of slow down will be via the EncoderCnt positioning system. The car will decelerate into the floor. As the car enters the leveling zone, input "82"(4-1) will be activated by the up leveling unit (#27 to #82). Relay Z and input "84" (4-2) will energize via the door zone unit (#27 - #84). When the up leveling unit turns off, "82" will fall out bring the elevator to a stop.

AUTOMATIC DOWN RUN

This is the same as above. However in the down direction, the CPU will slow the car down by de-energizing output "HSP". The point of slow down will be via the EncoderCnt positioning system. The car will decelerate into the floor. As the car enters the leveling zone, input "81"(4-1) will be activated by the down leveling unit (#27 to #81). Relay Z and input "84"(4-2) will energize via the door zone unit (#27 - #84). When the up leveling unit turns off, "81" will fall out bring the elevator to a stop.

DETAILED RUNNING RELAY SEQUENCE

N/Open contacts from either D, DX, DY, DZ or U, UX, UY, UZ will energize DU,DUX and PX. The main motor contactor P and contactor PB, PBX 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.

CYCLE TEST

The Cycle Test is controlled by the cpu output "CTP"(output 7-0). 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 HS and HSM feed proving input "P1". Relays I, IX, IC1, IC2, SWB1, SWB2, ID, IU, GS, DL and VC feed input "P2". D, DY, DX, DZ, U, UX, UY, UZ, DU, DUX, PX, DEN, DBE AND B feed input "P3". GSF, FLS, CSF, BNL, TNL, AND SPDM feed input "P4". P, PB, PBX, BR AND BRX feed input "P5". With the elevator at rest in automatic operation, inputs "P1", "P3" and "P5" are lit. When the car stops, the CT relay is cycled. All five should flash ON. This verifies that all forced safety relays are working appropriately. Output "CTP" will then turn back on. "P1", "P3" and "P5" will stay lit. "P1", "P2" will light depending on the mode of operation. If the cycle test fails and all five proving input do not come ON in proper sequence the Touch screen will display "CYCLE Test Failure".

CT TROUBLE SHOOTING

If the cycles test fails. Proving inputs "P1","P2", "P3", "P4", and "P5" must be trouble shot. P1, P2, P3, P4 and P5 are feed through various relays and passes through circuit breaker C/B F2. See sheet #1 area K-30.

All voltages are measured from terminal #60, unless otherwise noted.

If "P1" is not on, check for 120 VAC at T22 on the relay board. If not present replace the HS relay, if present replace the HSM relay.

If "P2" does not come on and the CT relay is de-energized remove the CT relay. If "P2" comes on after removing CT replace the CT relay. Removing the CT relay will de-energize all relays in the "P2" string. Check for 120 VAC at T13 through T21. Replace the relay to the left of the missing voltage. See sheet #1 area C-22.

If "P3" is not on, removing the CT relay will de-energize all relays in the "P2" string. Check for 120 VAC at T13 through T21. Replace the relay to the left of the missing voltage. See sheet #1 area C-22.

If "P4" is not on, removing the CT relay will de-energize all relays in the "P4" string. Reset the SPDM board if it is tripped. Check for 120 VAC at T23 through T27. Replace the relay to the left of the missing voltage. See sheet #1 area C-22.

If "P5" is not on, Check for 120 VAC at the top of P 6, the bottom of PB 6, the top of PBX 6, the bottom of BR 6 and the top of BRX 6. If not present check for a broken wire or defective relay contact.

DIRECTIONAL PREFERENCE

Direction preference is indicated by the state of the DG and UG flags on the Touch Screen. The direction preference is maintained until the doors reach full close and the Door Close Limit input is OFF.

DOOR OPERATION

CPU outputs "CX", "OX", and "NR" control door operation. The door close button (#27 to #24) will close a fully open door immediately. The door open button (#27 to #28) will open the door. The DoorEgde/ElectricEye (#27 to #28E) will immediately open a closing door. The quick close button #27 to #29 is the second pole of each car button wired in parallel. When the car is not at the lobby, this input will cause the doors to close immediately. The computer is programmed to know which floor is the lobby, and will ignore the quick close feature whenever the elevator is on the lobby floor. If the lobby floor ever changes, the computer simply needs to be reprogrammed to the new lobby floor, and operation of the quick close feature will work on the new lobby floor.

Door Nudging

Parameter 24 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 "28E" ON, setting parameter 24 to:
"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 stay, and sound the buzzer. After the time set in parameter 45 expires the buzzer will sound. Then the door close timer will expire and the door will nudge close with both CX and NR energized.

INDEPENDENT SERVICE

Independent service is initiated by the key switch terminal #50. 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.

ROPE GRIPPER

Power is applied to the rope gripper from terminals #RGP1 and #RGP2 through relays RG1 – RG4. RG1 and RG2 N/Open contacts are in series, their coils are in parallel and energize from output 7-7. RG3 and RG4 N/Open contacts are in series, their coils are in parallel and energize from output 7-8. There are three things that will trip the rope gripper.

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

When the car is stopped relays RG1/RG2 and RG3/RG4 are in. When the car stops, a rope gripper cycle test is preformed. RG1 will go out, input 5-10 will go high. RG3 will stay on so that power is maintained to the rope gripper. RG1 will go on and input 5-10 will go low. RG3 will go out, input 5-10 will go high. RG1 will maintain power to the rope gripper. RG3 will go on and input 5-10 will go low, completing the rope gripper cycle test.

To Reset the Rope Gripper

To reset a tripped rope gripper *circuit* , the controller should be set to "controller inspection". Jump terminals #TI to #TC and #TC to #IC2. The CPU LCD screen should say "Cont Insp". Press the R/GRIP/SPDM RESET button.

ESI Learn Floor Trip

Before performing the ESI Learn Floor Trip, there are several parameters that must be verified.

PAR[20] – Unlock Parameters – *unlock system parameters set to 3*
PAR[81] – Slowdown Distance #1 – *slowdown distance in inches (one floor run)*
PAR[82] – Slowdown Distance #2 – *slowdown distance in inches (multi-floor run)*
PAR[85] – Level Magnet Length – *in inches*
PAR[86] – Contract Speed (fpm) – *top speed of car*
PAR[87] – Contract Motor (rpm) – *adjust to get correct speed reading*
PAR[88] – Learn Floor Heights – *should be zero except when performing the test =1*
PAR[91] – Encoder PPR – *1=1024*

Prep Work

1) Bring car to lowest landing.
2) Verify that Z relay is on, #81 and #82 are off.
3) Leave car in Automatic
4) Insp Speed to 25 fpm.

Initialize Test

5) Set PAR[88] = 1

Begin Learn Floor Trip

6) Jump terminal #53A to #27
7) From the ESI MON screen use the up arrow to go to ESI MON-2 screen.
8) Place a car call to the top floor and allow the car to run to the top floor – Note that the car will run up and stop at the top floor. PAR[88] will reset to zero automatically upon stop.
9) Go to the Setup/Utilities Menu screen and use the up arrow to get to the View Floor Height Table. View the value of the floor counts and verify that all floors have a value that does not end in multiple zeros.

Use this screen to view Floor Height Table and Inch Count. These values are not editable.

Verify Results

10) Run the car down one floor at a time.
11) Run the car up one floor at a time.
12) Run the car several floors at a time in the down direction.
13) Run the car several floors at a time in the up direction.
14) Make one floor runs into the Terminal Landings.
15) Make multi-floor runs into the Terminal Landings.
16) Set inspection speeds back to original settings.

SPEED MONITOR BOARD

The Speed Monitor Board monitor the functions of the controller independent of the CPU.

Inputs to the speed board include:
- Encoder
- Slowdown limits 52, 52A,53, and 53A
- Gate switch and door locks
- Inspection signal
- Up direction and down direction
- Governor switch
- CT signal
- Reset signal

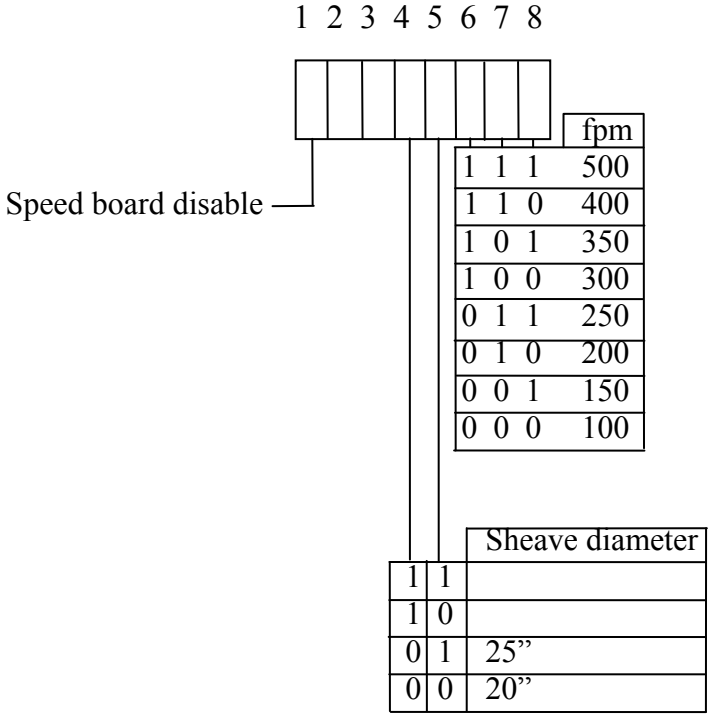
There is one output: SPDM

This output shuts down the operation of the controller.

If the Speed Monitor Board trips there are three binary indicators that show the trip event.

E3	E2	E1	
O	O	1	Encoder loss
O	1	O	Over Speed Governor Trip
O	1	1	Inspection speed greater than 150 fpm.
1	O	1	Leveling Speed greater than 150 fpm with open Doors and Gate
1	1	O	ESL Trip
1	1	1	UAM > 75 fpm

DIP Switch settings



ESL TEST

The ESL Test is to be performed before the car is placed in service.

Before the test begins ensure that the controller is in an intermediate floor (not a terminal landing). There are three (3) controller parameters involved with the ESL system. The parameters are:

- PAR[180] = ESL CHECK ENGAGE (0 = NO Check, 1 = Check)
- PAR[181] = ESL 1 RPM SPEED
- PAR[182] = ESL 2 RPM SPEED

NOTE: In order to enable the controller to allow you to change the values of these parameters, you must change the value of PAR [20] to 3.

Test Procedure

1. Verify that the Low Speed Slowdown Limits (52 and 53) are set at the appropriate distance from the terminal landings.
2. Verify that the High Speed Slowdown Limits (52A and 53A) are set at the appropriate distance from the terminal landings.
3. Set PAR [181] to the High Speed RPM value.
4. Set PAR [182] to the Low Speed RPM value.

NOTE: ESI uses a second set of safety parameters that could interfere with the ESL testing. Please ensure that steps 5 and 6 are taken so that the ESL test can be performed accurately.

5. Set PAR [81] to12. PAR [81] is the Slowdown Distance 1 Parameter.
6. Set PAR [82] to12. PAR [82] is the Slowdown Distance 2 Parameter.
7. Set PAR [83] to12. PAR [83] is the Slowdown Distance 3 Parameter if present.
8. Jump 52A so that it does not break when the car passes the switch.
9. Run the car into the bottom floor.
10. Upon reaching 52, the car will shut down and the Touch Screen display will show Speed Monitor Trip and the status of Speed Board Monitor as ESL Error.
11. Press the “R/GRIP/SPDM RESET” Switch to clear the error.
12. Remove the jumper from 52A.
13. Move the car to the center of the hoist way.
14. Jump 53A so that it does not break when the car passes the switch.
15. Run the car into the top floor.
16. Upon reaching 53, the car will shut down and the Touch Screen display will show Speed Monitor Trip and the status of Speed Board Monitor as ESL Error.
17. Press the “R/GRIP/SPDM RESET” Switch to clear the error.
18. Remove the jumper from 53A.
19. Reset PAR [82] and PAR [82] to the correct distance values.

NTS TEST

The NTS Test is to be performed before the car is placed in service.

1) Place car level at a floor in the middle of the shaft.
2) Unplug the top connector from input module 11.
3) Disconnect field wires to terminals #81 and #82 (leveling).
4) Place a car call for the lowest landing.
5) The car will slow down via the bottom slow down limit and stop on the bottom normal limits.
6) Place a car call for the top landing.
7) The car will slow down via the top slow down limit and stop on the normal limit.
8) Restore top connector in module 11.
9) Reconnect terminals #81, #82.

ROPE GRIPPER TEST

1) Trip the Governor connected to #32 and #32A. Rope Gripper should trip(GOV overSp).
2) Remove wire from a disc brake switch. Rope Gripper should trip(BrakeSW on Stop).
3) Repeating the test for the other Brake switch.

To test for Unattended Motion:
1) Jump out both brake switches. Place controller on INDEPENDENT SERVICE. Manually release both brakes. The car should drift out of the door zone with the door open tripping the Rope Gripper (Rope Gripper trip UAM). Remove jumpers on brake switches.