Door Lock Monitoring Device

User manual Rev.5.14

1150 West McNab Road, Fort Lauderdale, FL 33309
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SEES DLM+

3 CODE SOLUTIONS IN 1 PRODUCT!

- DOOR LOCK MONITORING
- PIT FLOOD PROTECTION
- UNINTENDED CAR MOVEMENT

+ ALL-IN-ONE MULTI-FUNCTION SOLUTION

Combines 3 devices in a single compact unit: DLM, rope gripper, and pit flood protection. Saving space, simplifying wiring, and lowering installation cost.

+ USER-FRIENDLY HMI INTERFACE

A built-in touchscreen HMI makes configuration fast and intuitive, allowing technicians and operators to easily view system status, monitor inputs/outputs, and adjust settings without specialized training.

+ NON-PROPRIETARY, READILY AVAILABLE COMPONENTS

Designed with standard industrial parts that are easy to source worldwide, reducing downtime and avoiding the high cost of proprietary replacements.

+ RELIABLE REDUNDANT SPEED MONITORING

Equipped with an encoder for independent speed verification, the system can cross-check motor control signals, ensuring higher accuracy and safety.

+ FAST AND SIMPLE INSTALLATION

Engineered for straightforward setup, minimizing installation time and labor while ensuring consistent, reliable performance.

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The SEES-DLM+ is a PLC based door lock monitoring device that will prevent automatic car operation in the event of failure of the door circuit, car gate circuit, door lock/close signals, and other failures. Designed to work with almost any control using sample signals from the car gate switch, hoistway door locks, door open limit and close limit, inspection, door zone and fire service I and II. The input voltage only depends on the coils used for input relays.

Versions:

SEES-DLM+ version

The SEES-DLM+ version has the door fault monitor and a rope gripper monitor to sense overspeed and unintended movement.

Inputs and Outputs

Table 1. Inputs

PLC Input	Relay Number	Terminal Connector	Abbreviations	Name	Description
13	R0	**TC-01**	GS	Car close front	Front gate switch
01	R1	**TC-02**	RGS	Car Close Rear	Rear gate switch. Gate switch for the second cabin door.
02	R2	**TC-03**	DCLF	Car close limit front	Door close limit for the main door.
03	R3	**TC-04**	DOLF	Car open limit front	Door open limit for the main door.
04	R4	**TC-05**	DCLR	Car close limit rear	Door close limit for the second door.
05	R5	**TC-06**	**DOLR**/MC**	Car open limit rear	Door open limit for the second door.
06	R6	**TC-07**	FS2	Fire service 2	The car is in fire service 2
07	R7	**TC-08**	MT	Maintenance	Car is on inspection/maintenance
08	R8	**TC-09**	FS1	Fire service 1	The car is in fire service 1
09	R9	**TC-10**	HC1	Hall close 1	First hoistway door close switch.
10	R10	**TC-11**	**HC2**/MC**	Hall Close 2	Second hoistway door close switch.
11	R11	**TC-12**	**HC3**/DLC**/MC**	Hall Close 3	Third hoistway door close switch.
12	R12	**TC-13**	DZ	Door Zone	Door zone
N/A	**ALL**	**TC-14**	C	COMMON INPUT	COMMON VOLTAGE FOR INPUT SIGNALS
N/A	N/A	**TC-15**	**ENC**	+24 VDC	Encoder Power (red cable)
N/A	N/A	**TC-16**	ENC	0 VDC	Encoder 0VDC (Black cable)
00	N/A	**TC-17**	**ENC***	Encoder Input	Encoder Input channel if ENCODER MODE function is selected.

*the encoder needs to be an open collector type encoder, either channel A or B can be used.

** Active on some modes please refer to **Table 3 for MC** and **Table 4 for DLC** below.

Table 2. Outputs

PLC Output	Relay Connector	Abbreviations	Name	Description **Contact 11 and 21 common.**
00	R-13 24-**21** NO 14-**11** NO	FL	Fail Limits	If the output is right then the elevator can't move, preventing the elevator from moving.
01	R-14 24-**21** NO 14-**11** NO	FD	Fail Doors	If the output is right, prevent the elevator from closing doors.
02	PLC O-02	RFL	Redundancy Fail Limits	If the output is right then the elevator can't move, preventing the elevator from moving. Same function as output FL.
03	PLC O-03	RFD	Redundancy Fail Doors	If the output is right, prevent the elevator from closing doors. Same function as FD.
O4	R-15 24-**21** NO 14-**11** NO	BRAKE	Rope gripper control	If the output is right, then the rope gripper is tripped due to overspeed or unintended movement.
05	PLC O-05	RBRAKE	Redundancy Rope gripper control	Same function as output BRAKE.

Table 3. MC Input by Configuration (Only used when Rope Gripper Mode active)

The **MC/GOV input** changes its function depending on the configuration selected in the rope gripper:

- **Encoder Mode:** the **MC input** is used. *(Brake Switch may be used as an alternative for the Motor Contact)*

- **Governor Overspeed Mode:** the **GOV input** is used.

PLC Input	Terminal Connector	Abbreviations	Mode	Description
05	TC-06	MC/GOV	Config 1, 5 & 8	Motor contact
10	TC-11	MC/GOV	Config 7	Motor contact
11	TC-12	MC/GOV	Config 2 & 4	Motor contact

* For Config # Refer to the Mode Menu page for configuration details, *Applicable modes number are* marked in **RED**

Table 4. DLC Input by configuration

The DLC input changes between terminals depending on the configuration that is being used in the DLM.

PLC Input	Terminal Connector	Abbreviations	Mode	Description
11	TC-12	DLC	Config 3, 5, 7 & 8	Door lock chain

* For Config # Refer to the Mode Menu page for configuration details, *Applicable modes number are* marked in **RED**

Table 5. Extra 4 relay for Rope Gripper

The Four PLC output terminals are available for use with the rope gripper external circuit, if external relays are required.

PLC Output	Terminal Connector	Abbreviations	Mode	Description
06	PLC O-06	DZ1	Config 1, 2,5, 7 & 8	Door Zone signal — used for safety interlocks.
07	PLC O-07	DZ2	Config 1, 2,5, 7 & 8	Door Zone signalRedundancy — used for safety interlocks.
08	PLC O-08	GR1	Config 1, 2,5, 7 & 8	Gripper Logic — used for safety interlocks.
09	PLC O-09	GR2	Config 1, 2,5, 7 & 8	Gripper Logic Redundancy — used for safety interlocks.

* For Config # Refer to the Mode Menu page for configuration details, *Applicable modes number are* marked in **RED**

Main Screen

SEES-DLM+ version

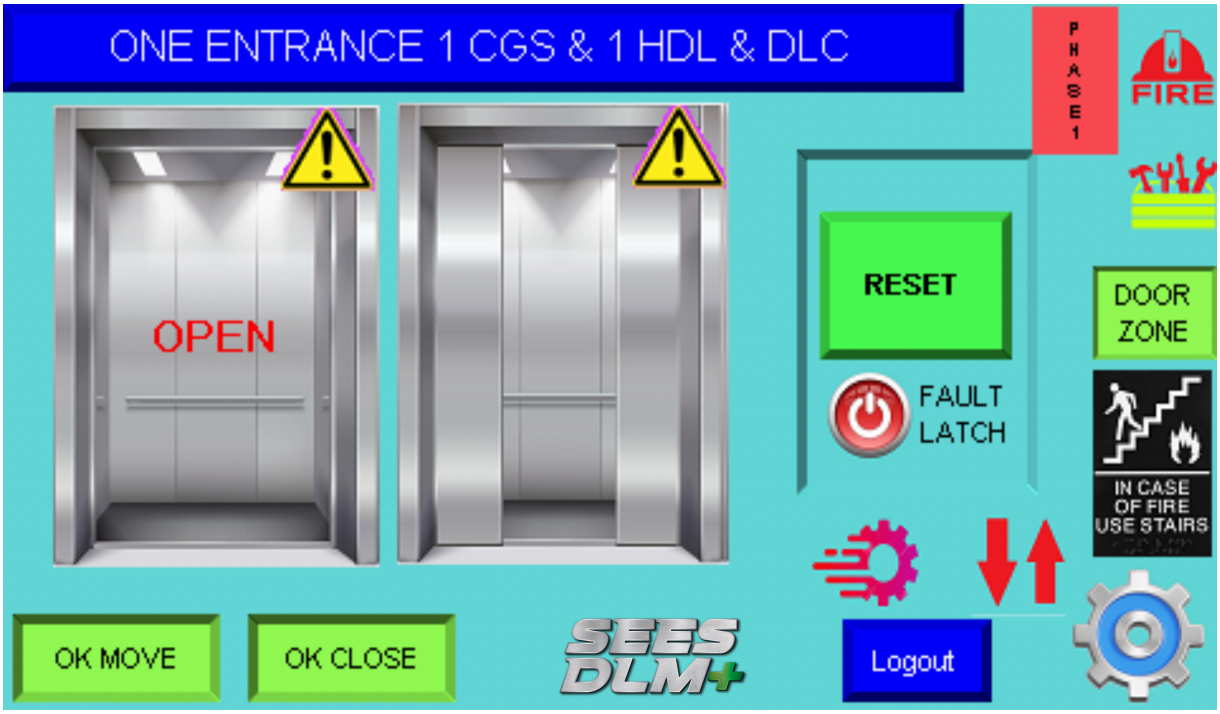
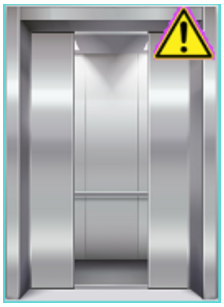


Table 6. Symbols

Symbol	Name	Comments
	Fire service 1 and 2	Elevator is in fire service 1 or 2
	Maintenance/Inspection	Elevator is on Inspection/Maintenance
	Door Zone	RED: Elevator out of door zone. GREEN: Elevator in door zone
	Settings	Access to the settings menus
	CLOSE	The elevator door can/can't close.
	MOVE	Elevator can/can't move
	HOME	Back to main screen

	FAULT	There is a fault in the doors.
	UNINTENDED MOVEMENT INDICATION	The control senses an unintended movement, this will trip the rope gripper.
	OVERSPEED INDICATION	The control detects an overspeed condition, which triggers the rope gripper. This signal can be activated either by the encoder or by the governor overspeed input.
 	BUTTON TO RESET FAULT	GREEN BUTTON: fault is not latched RED BUTTON: fault is latched
	Manual Reset	All rope gripper–related faults require a manual reset. Press RESET to clear a fault when Manual Reset is selected on the Settings screen for DLM mode.

Door status

Door fully Close	Door Opening/Closing	Door fully Open
		

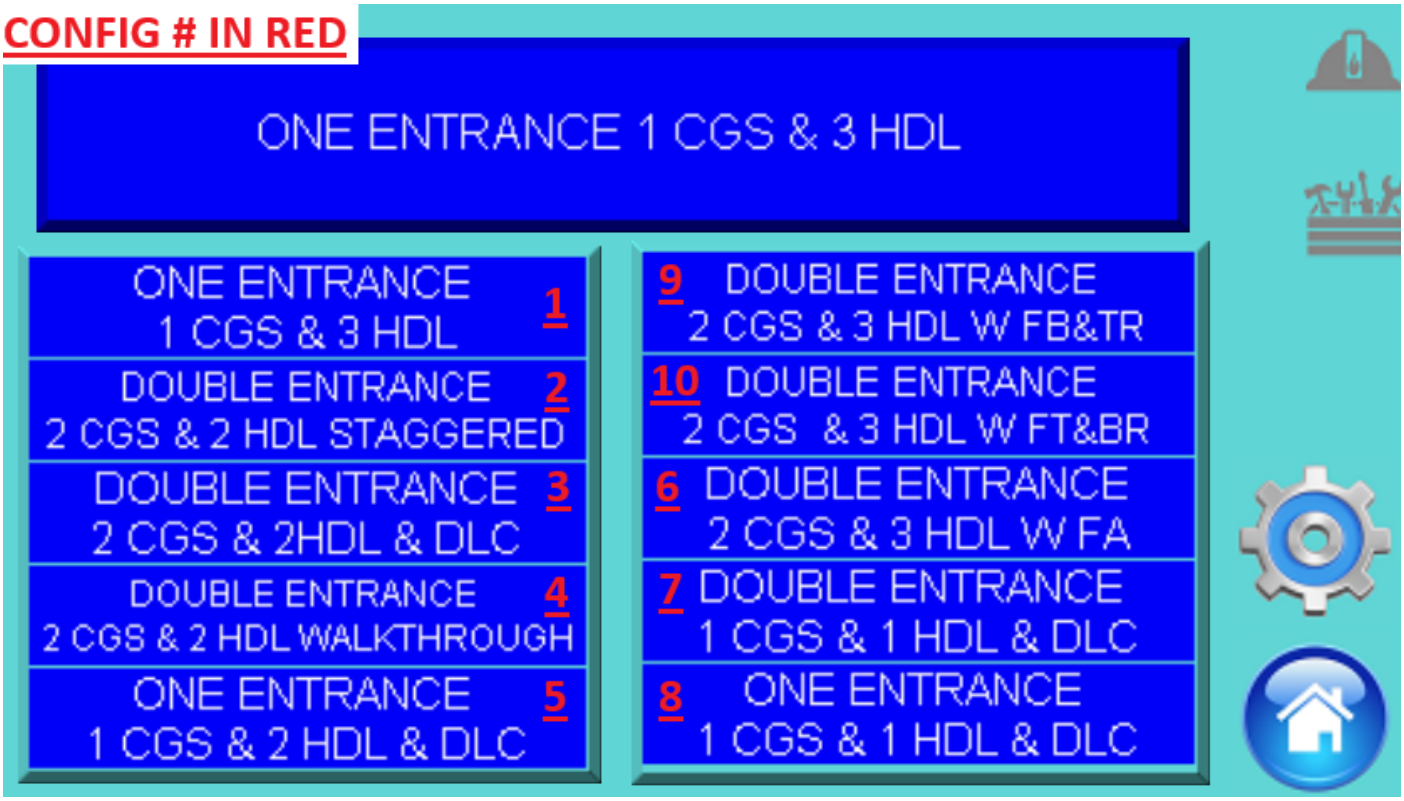
Menus

MODE	Menu for elevator operation mode, how many doors and hoistway door locks.
TIMERS	Menu for different timers.
ROPE GRIPPER	Menu to activate Rope Gripper Functionality.
IO	Menu to see the status of the different inputs and outputs.
ABOUT	Company and Software information.
ALARMS	Show saved past alarms

Mode menu:

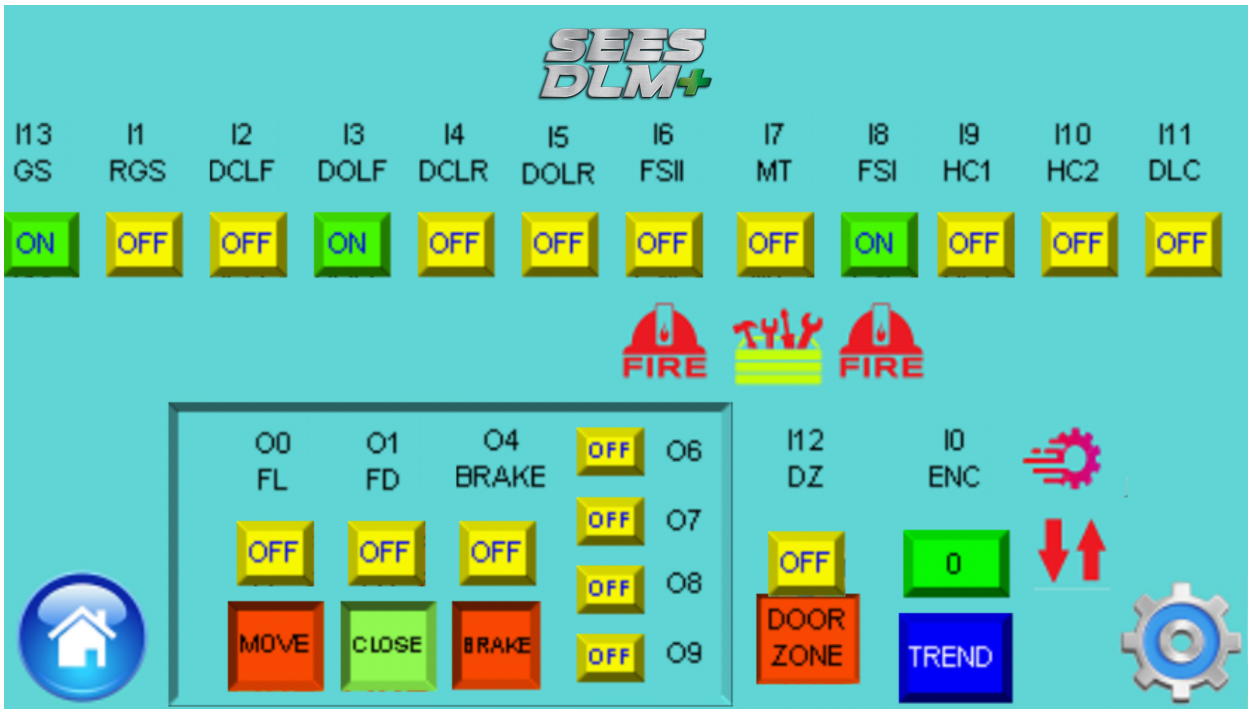
If you purchase the DLM, you need a **PASSWORD** to access this menu, but won't allow you to the Rope Gripper menu. However, if you purchase the Rope Gripper Monitor, your **PASSWORD** allows access to both, this and the Rope Gripper menu. The Rope Gripper already includes the DLM functionality.

This menu allows you to choose types of entrances.



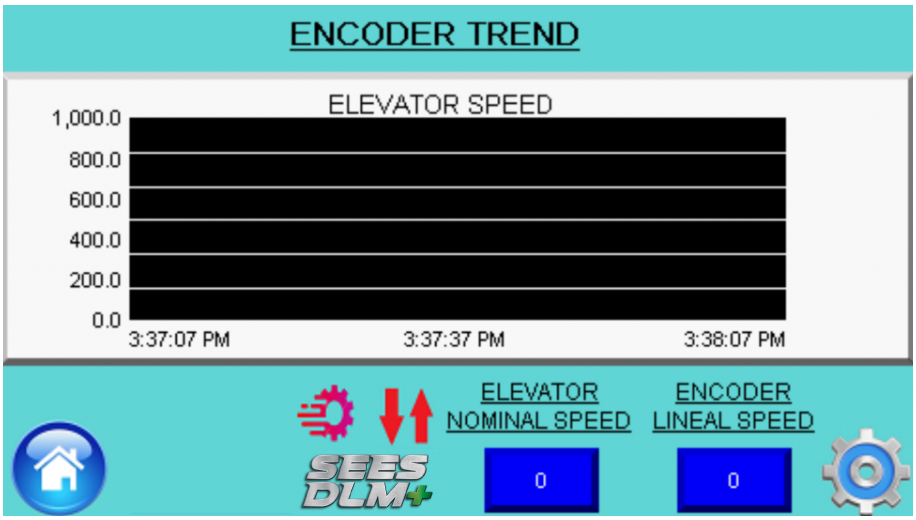
IO Menu

Example of the SEES-DLM+ version



Encoder trend

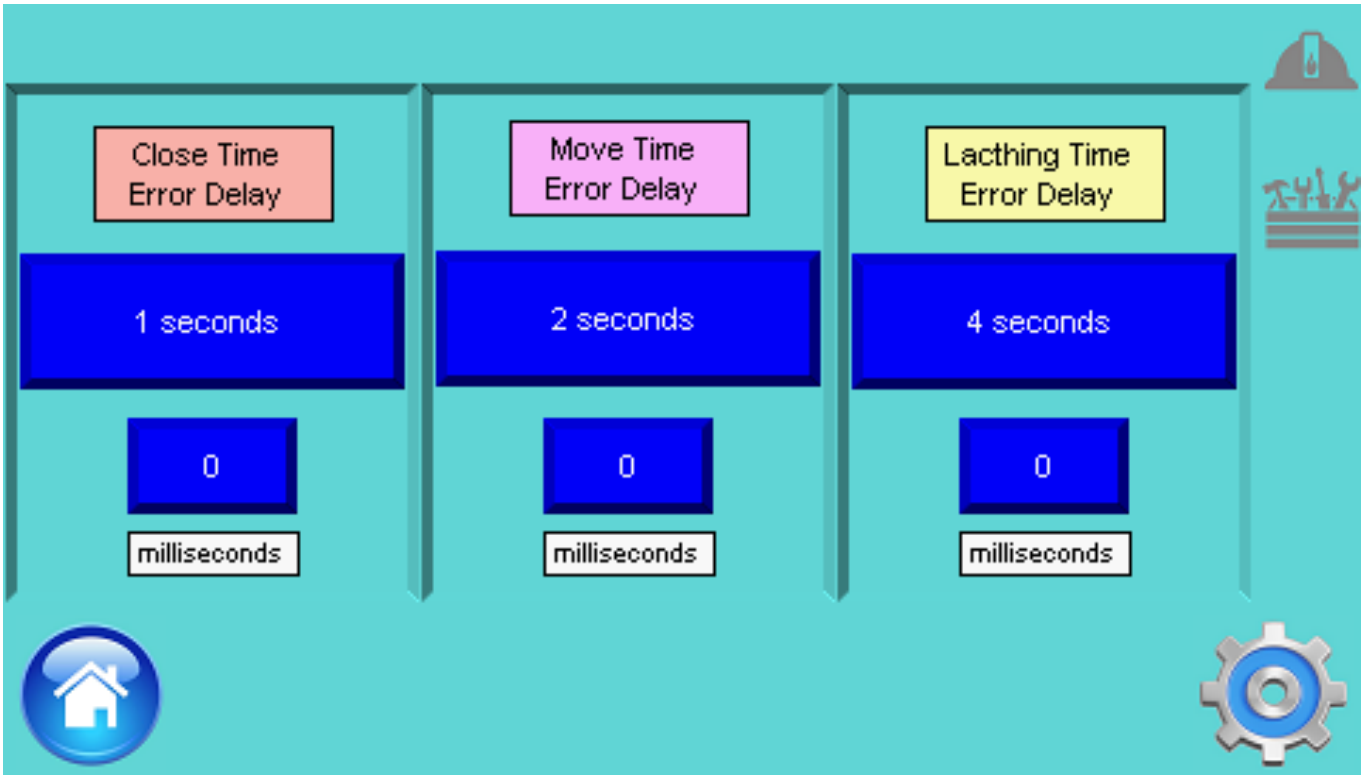
To get into this screen press TREND on the io screen.



ELEVATOR NOMINAL SPEED: This is the elevator nominal speeds; the user needs to input the nominal speed in the ROPE GRIPPER screen as a reference for the system.

ENCODER LINEAL SPEED: This is the current elevator speed that the encoder is reading from the elevator.

Timers Menu



Timer	Range	Comments
Close Time Error Delay	0-1-2-4-6 seconds	Time that the control will wait to declare an error in the closing sequence.
Move Time Error Delay	0-1-2-4-6 seconds	Time that the control is going to wait to declare an error to restrict movement of the elevator.
Latching Time Error Delay	0-1-2-4-6 seconds	Time that the control is going to wait before declaring and latching an error.

Reset Mode

To choose between manual or automatic reset when a door fault happens. If the system requires a manual reset after the door fault happens, then it can be selected in this screen.

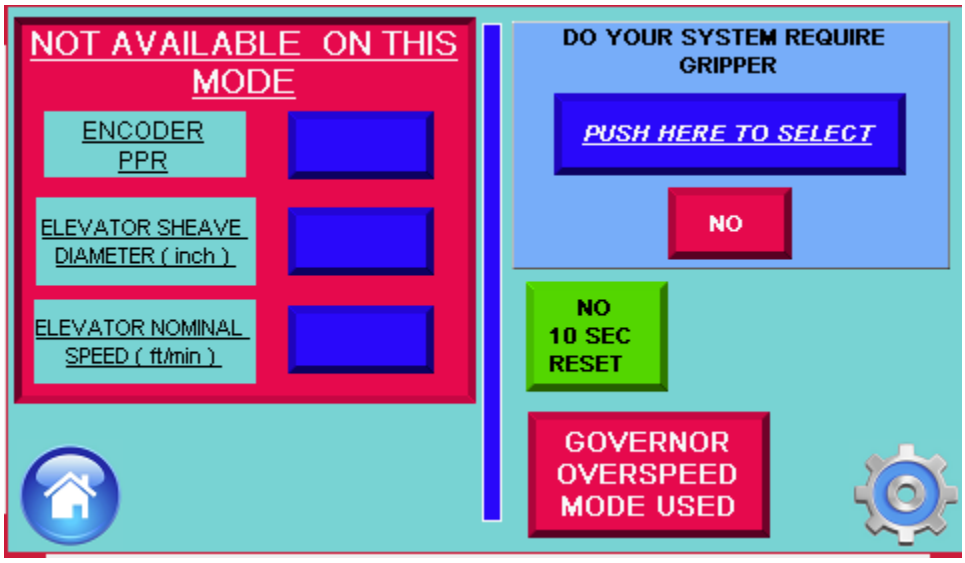
Miami Code

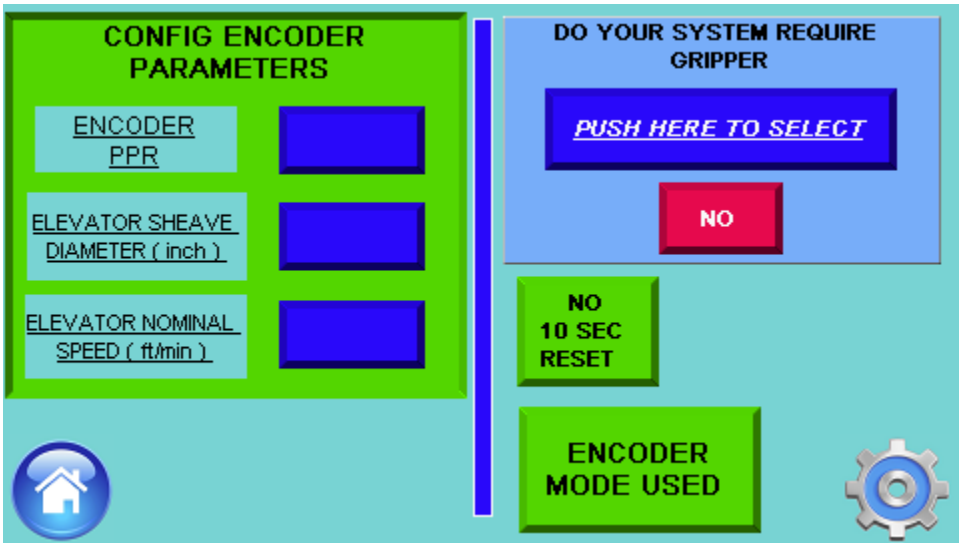
In this same screen, if you are in Miami, you can choose the Miami code behavior.

MANUAL RESET NO / MANUAL RESET YES	Press the button to enable or disable the MANUAL RESET for DLM related faults only.
MIAMI DADE NO / MIAMI DADE YES	Press the button to enable or disable MIAMI CODE

Rope gripper settings

To activate the rope gripper monitor functionality. If you only buy the DLM function you need a PASSWORD to enable the Rope Gripper Monitor Function.





Touch PUSH HERE TO SELECT to activate the Rope Gripper Functionality.

The following parameters need to be entered if you are using the ROPE GRIPPER ENCODER MODE functionality only:

- **Encoder PPR** (this are the PPR from the encoder that is being used)
- Elevator Sheave Diameter (this is the diameter of the traction sheave of the elevator)
- Elevator nominal speed (this is the nominal speed of the elevator)

GOVERNOR OVERSPEED MODE USED / ENCODER MODE USED	Touch this button to select between ***Encoder*** *Mode* and *Elevator* ***Governor overspeed*** ** Signal*. Only one mode can be active at a time.
YES 10 SEC RESET / NO 10 SEC RESET	Touch this button to enable or disable the Rope Gripper Reset Holding Timer (10 s). When enabled, the reset button must be held for at least 10 seconds to ensure safe manual reset.

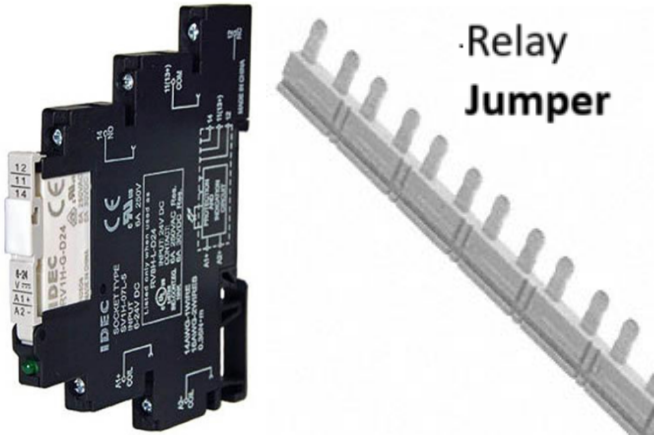
How to change the INPUT relay:

Input Relays need to be replaced as a whole base and socket *since the base also have different voltage configurations.*

Safety Precautions

1. **Disconnect power** to the equipment before starting.
    - Lock out and tag out (LOTO) the power source per facility procedures.
2. **Confirm zero voltage** at the relay terminals using a multimeter.
3. Use insulated tools
4. Keep your work area clean and free of conductive objects
5. Mark and Document Wiring
6. Identify all wires connected to the relay base.
7. Use labeling tape or wire markers to tag each wire with its terminal number.
8. (Optional) Take a photo of the wiring for reference.

Parts



Purpose

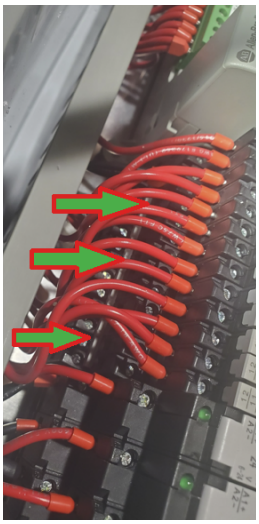
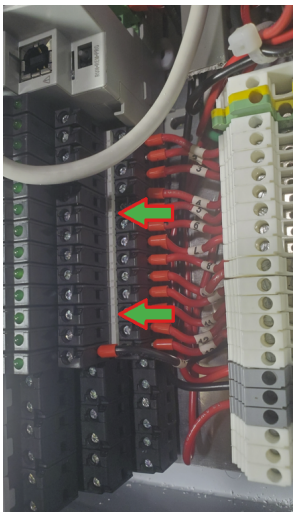
These are the input relays, the default voltage is 120VAC/VDC, in case you need a different voltage in the input, they need to be changed to the correct voltage. This procedure describes the safe removal and replacement of an IDEC RV8H relay and its corresponding socket/base, ensuring reliable operation after maintenance.

Tools and Materials Required

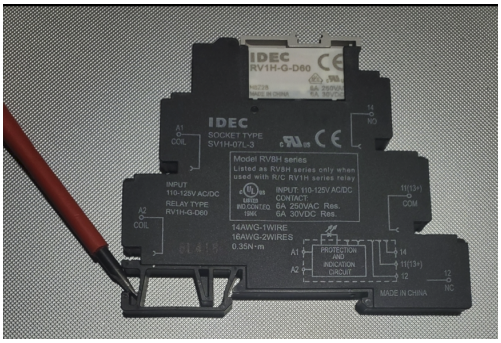
- New relay: IDEC RV8H (matching voltage and contact configuration)
- New relay base/socket: Compatible model **RV8H-L-AD24 or RV8H-L-AD110**
- Flat-head screwdriver (small to medium)
- Phillips screwdriver (if enclosure requires opening)
- Needle-nose pliers
- Multimeter (for verification)
- Personal protective equipment (PPE): insulated gloves, safety glasses

Removal Procedure

PLEASE MARK OR NOTE the **original location of the jumper**.

To change to a different voltage the whole relay and base need to be changed. Using a flat screw driver remove Rear Relay Jumper (Contacts side)  and Front Relay Jumper (Coils side)  .

Loose the wiring connection screws and remove the wires (front and back) from the relay base that needs to be replaced.

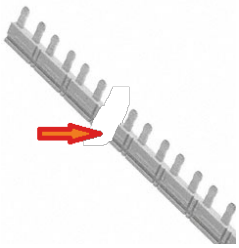
Using a screwdriver, gently pry the relay base on the front (coil side) 

to unclip it from the DIN rail and Position the new relay base in the same position as the old one. Ensure it is level and secure. Install back any labels from the old one.

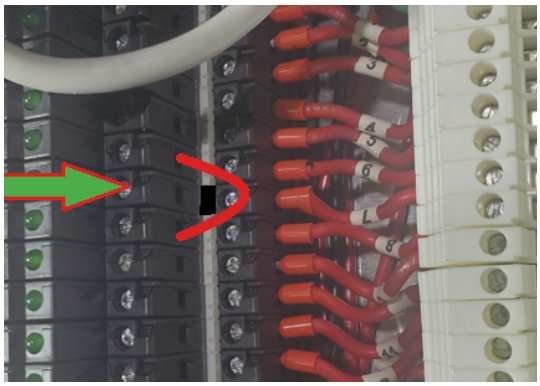
If **all input** relays had been replaced, reinstall the relay jumper on **both the front and rear**. **It is very important to note** the original location of the jumper. On both the front and rear, the jumper can be connected in two positions—top or bottom. Make sure it is reinstalled in the same position from which it was removed.

If **only one input** relay had been replaced, reinstall the relay jumper **on the rear**. **It is very important to note** the original location of the jumper. On both the front and rear, the jumper can be connected in two positions—top or bottom. Make sure it is reinstalled in the same position from which it was removed.

To reinstall the relay jumper **on the Front. Split the jumper** to avoid different voltages getting shorted, unless different voltages have the same common. In case of different common, remove the teeth of the one that won't be connected after install the jumpers back of each section on the front on the correct position make a jumper for the relay to make sure the jumper stays connected between the 2 section disconnected



To reinstall the relay jumper **on the front, split the jumper** to prevent different voltages from shorting—unless the different voltages share the same common. If they have different commons, remove the teeth of the one that will not be connected. Afterward, install the jumpers of each section in the correct positions. **It is very important to note** the original location of the jumper. Create a wire jumper for the relays to ensure the connection is maintained between the two disconnected sections.



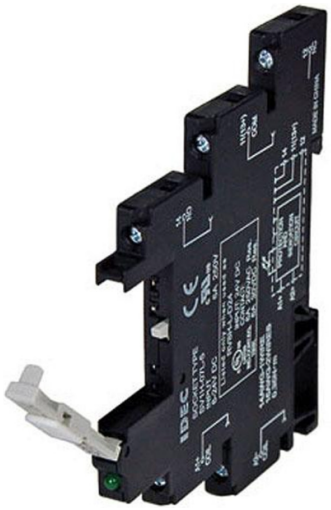
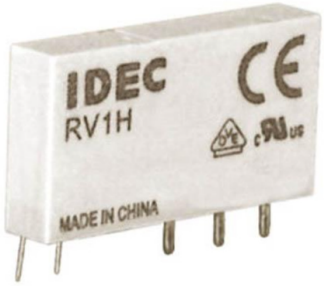
Since the new relay does not have a common wire connected to the terminal board, please ensure that a new wire is connected from the corresponding source to the common terminal on the replaced relay so that the coil can operate properly.

Insert each wire into the correct terminal according to their original position. Tighten terminal screws securely, but do not over-tighten.

Testing and Verification

Restore power to the equipment.
Operate the circuit that controls the relay.
Listen for the click of the relay coil engaging and disengaging.
Check the PLC input number indication light is changing in correspondence with the **Table 1 Input Section** to confirm proper Relay output switching.

How to change the OUTPUT relay:

Since the output relay uses a standard PLC control voltage, there is no need to replace the entire assembly. Grip the sides of the relay firmly and Simply OPEN the relay protection cover  and pull the relay straight upward out of the base, rocking gently if necessary. replace the relay 

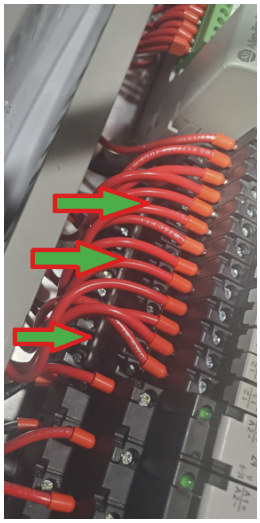
—there is no need to replace the base. Make sure the relay is replaced with the same part number (correct voltage) as the one removed.

To insert the new relay, align the relay pins with the base's socket holes, make sure the orientation is correct. Press the relay straight down until fully seated. Confirm the relay is not tilted and is firmly in place. Close the cover to set the relay.

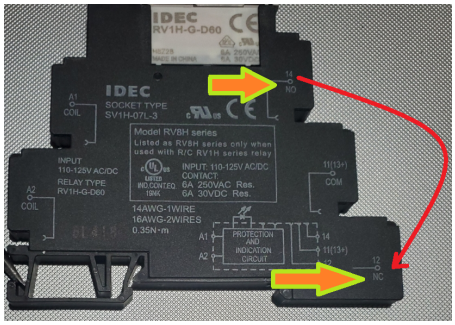
How to change Input logic on the relay:

In certain scenarios, the elevator control logic operates using **negative logic** rather than standard **positive logic**. For example, **maintenance mode may be activated when a signal is lost**, meaning the system interprets a LOW signal as TRUE.

To accommodate these cases, please follow the instructions below:



Locate the specific relay associated with the affected function. On the **relay contact side (rear)**,
move the wire connection from the Normally Open (NO) terminal to the Normally Closed (NC) terminal.



This change ensures the signal behaves correctly under negative logic conditions.

Connections

Replace relays and change connections.

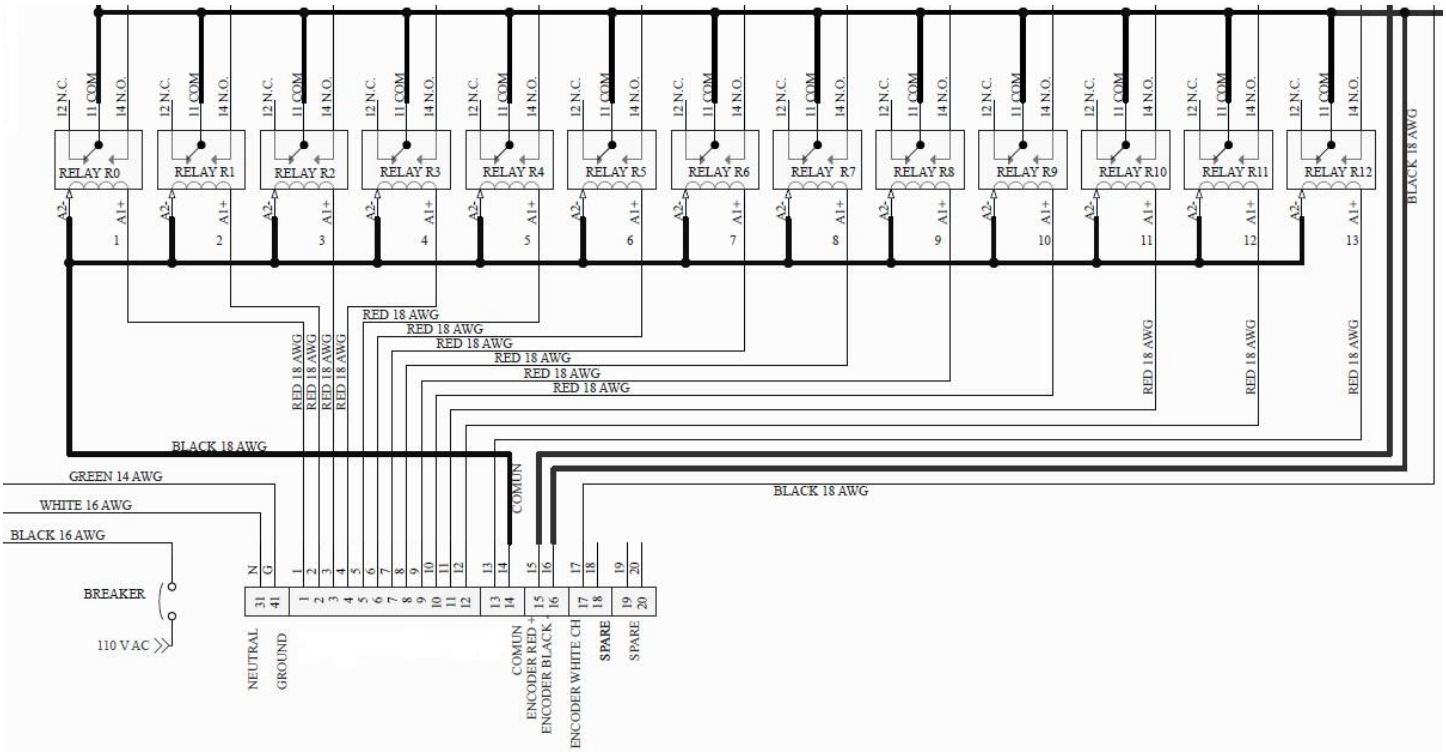
The COMMON of all the relays are interconnected from the factory, in case a relay needs to be changed for a different voltage and the COMMON is NOT the same, follow the below example.

Example:

Relay R4 needs to be changed from 120VAC to 24VDC, and the COMMON is not the same

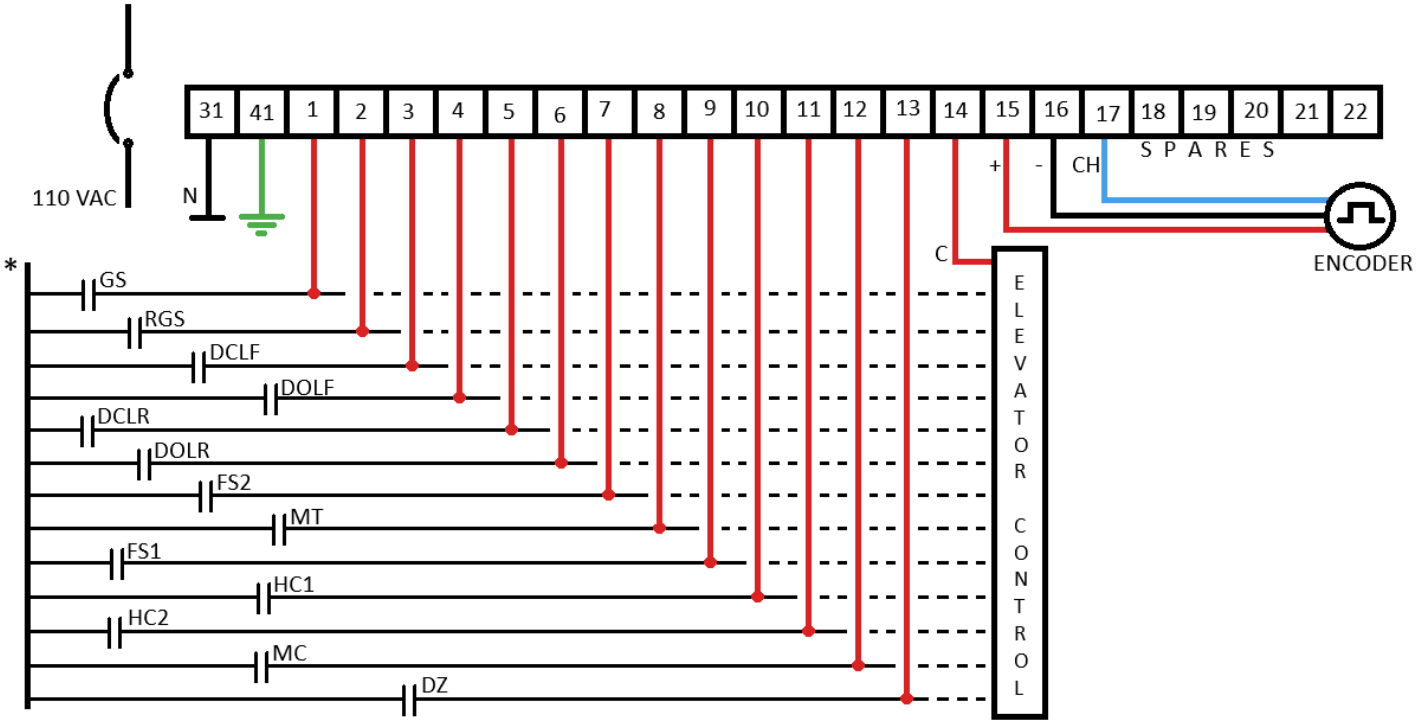
- Remove and change Relay R4 using the method from the previous page
- Remove the hard jumper that connects the COMMON of all the relays on the coil side and cut the connection to R4.
- Install a wire jumper between R3 and R5.
- install a wire jumper from the coil side of R4 to one of the spare terminals and use this for the common of the new 24VDC relays.

Replace relays and change connections.



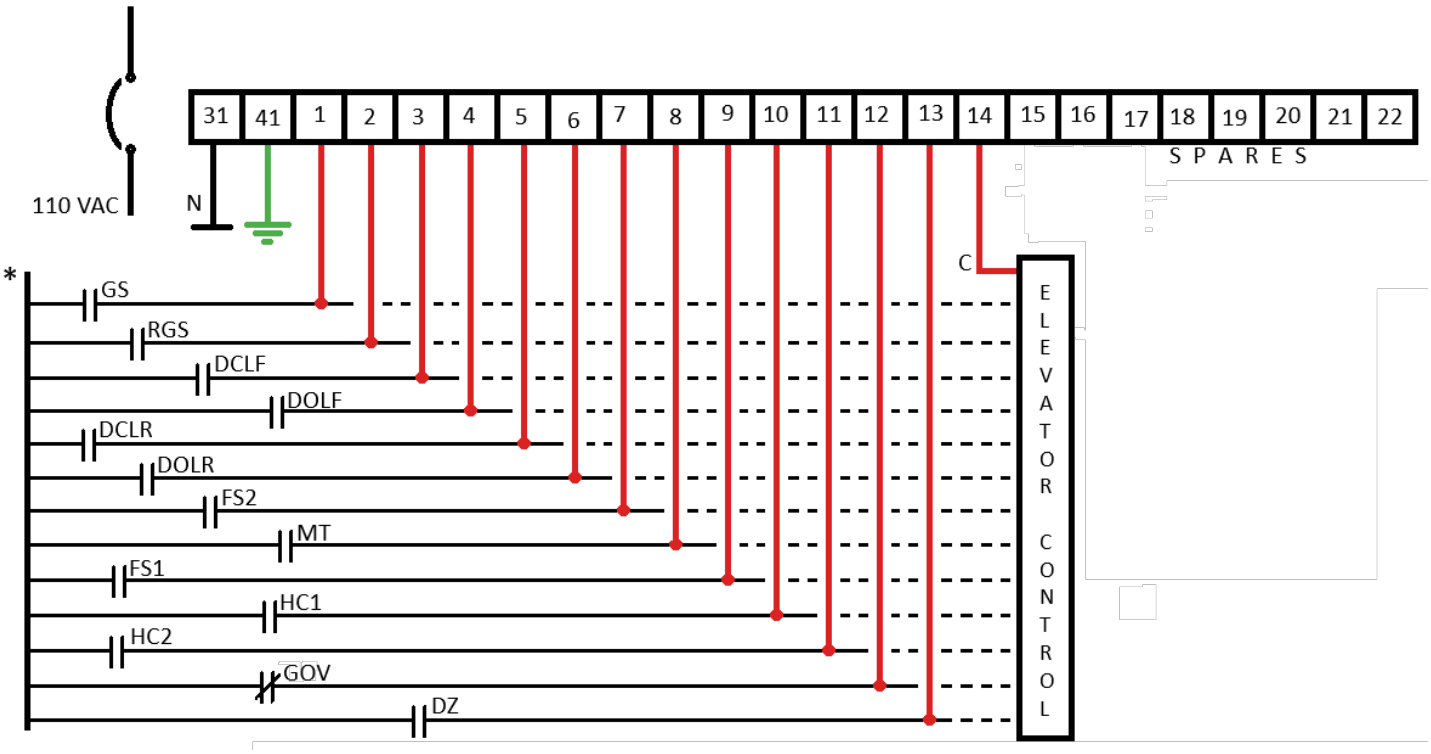
Example for front and rear door connection DLM

Example using configuration 2 for DLM and adding Rope gripper. Encoder Mode



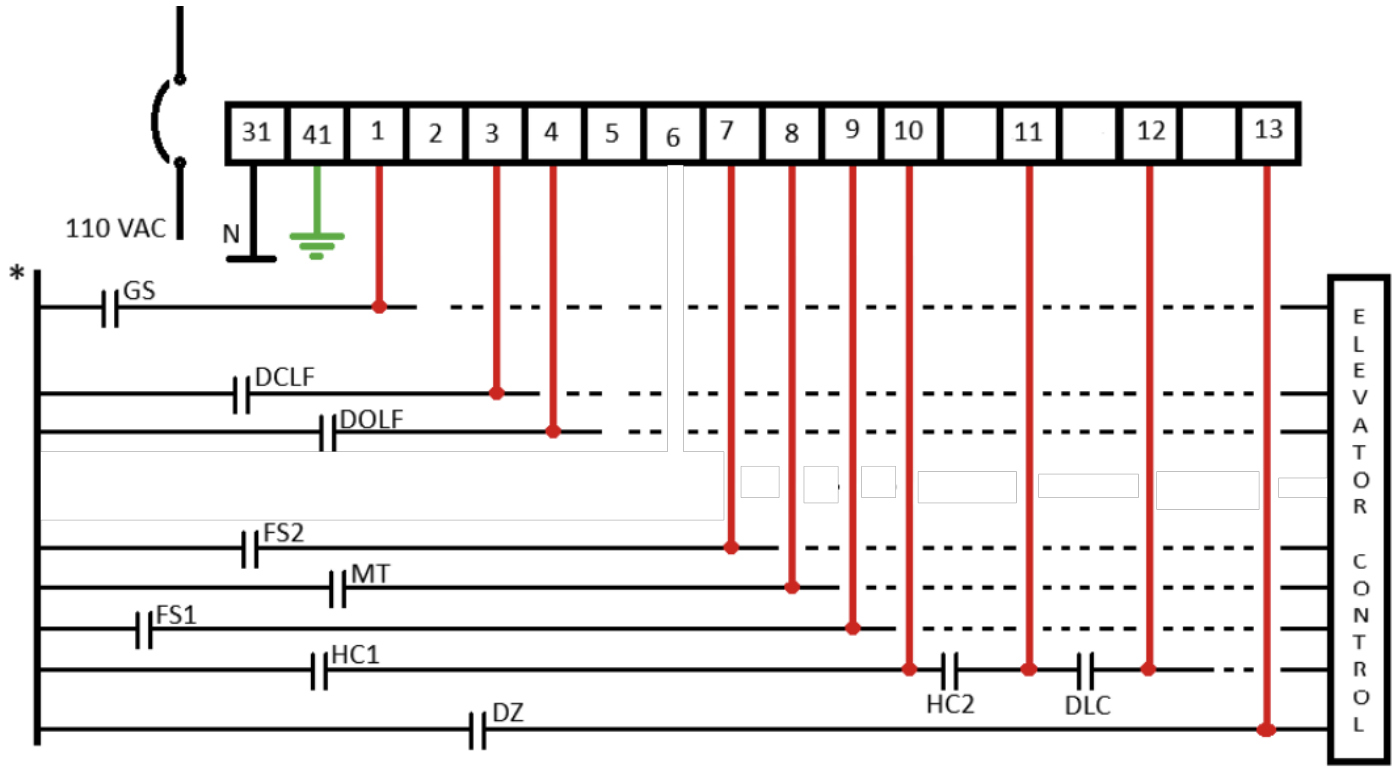
Example using configuration 2 and Rope Gripper. Governor Overspeed Mode

If you choose not to use an encoder to sense the actual speed of the elevator, then you can use the governor switch.



* Elevator Control Voltage (Depend on specific elevator Controller)

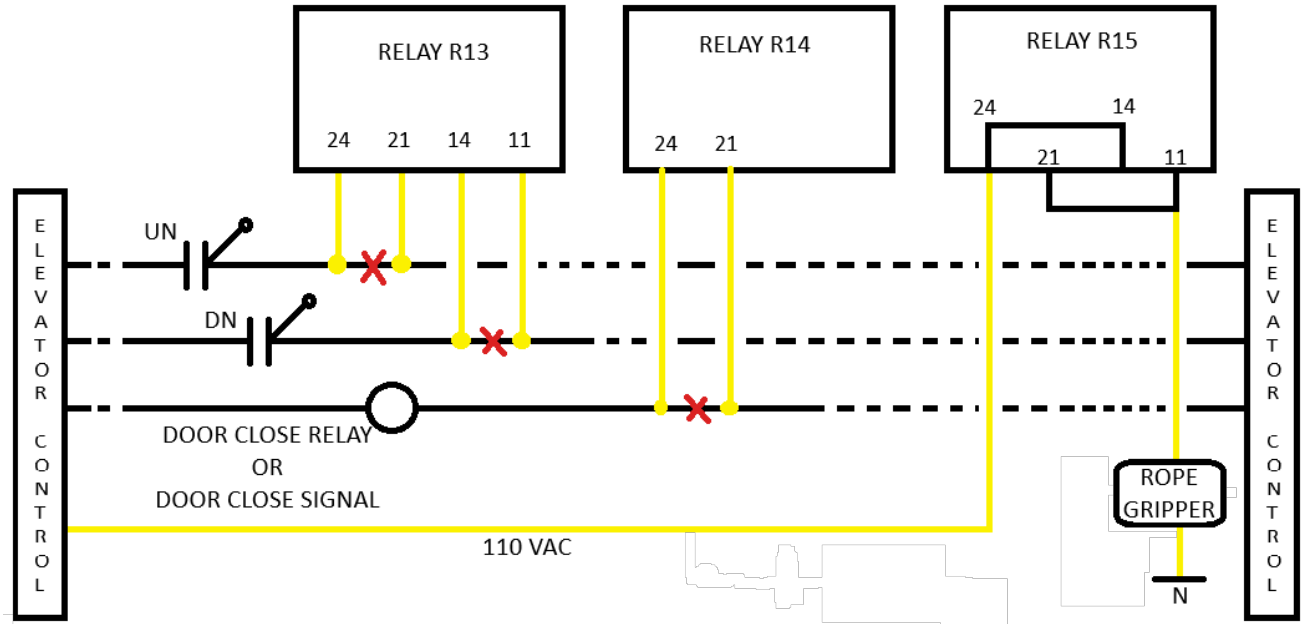
Example using configuration 5 for DLM



BLACK: Controller internal wiring

RED: Input wiring by the mechanic

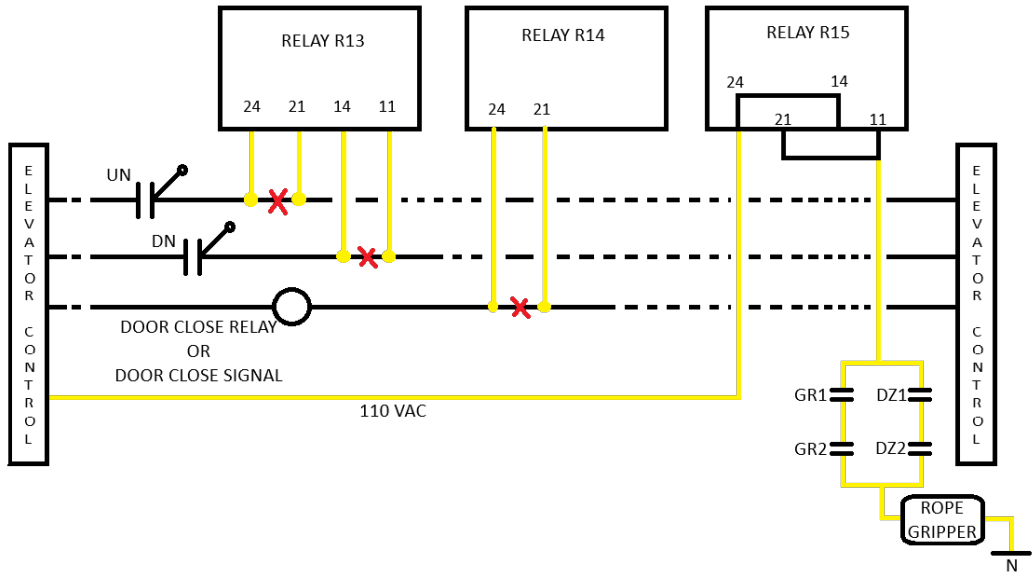
Output relays connection

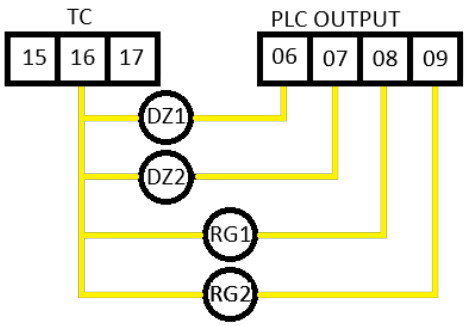


In the previous example, the Up Normal and Down Normal limit switches are interrupted to control elevator movement. The MC contactor coil can also be used as an interlock to prevent unintended motion.

Connect RG5 and RG7 from the rope gripper in series with the elevator safety string to ensure proper integration with the safety circuit. The R15 relay includes factory-installed jumpers between terminals 24–14 and 21–11; no additional wiring is required for these connections.

If you require external REDUNDANCY relays to control the rope gripper



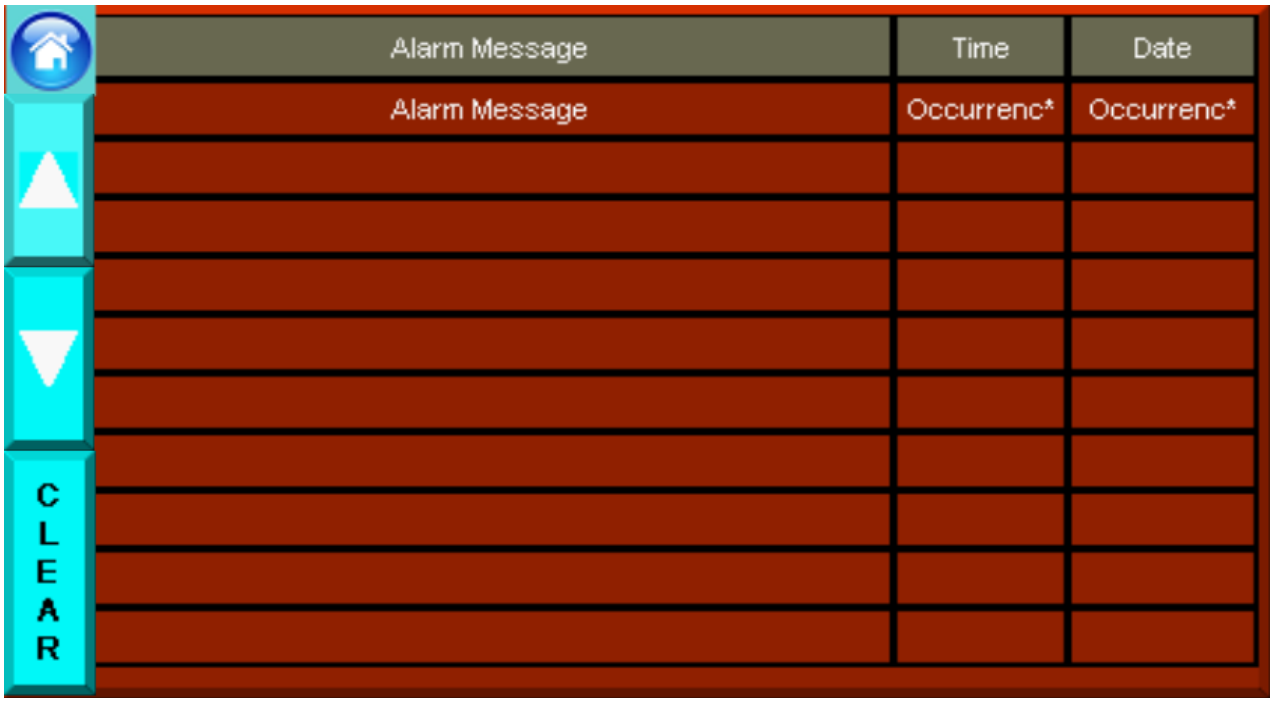


RELAY COILS MUST BE 24 VDC (DZ1, DZ2, RG1, RG2)

BLACK: Controller internal wiring

YELLOW: Output wiring by the mechanic

Alarms Menu



Alarms menu:

Blue Highlight -> old alarms

Green Highlight -> active alarm

About

The **About** screen shows the company information and the version of the door fault monitor.