



DOOR LOCK MONITORING

Content

Introduction

Elevator System Overview

What is “Door Lock Monitoring”?

What does the code say?

How is compliance accomplished?

Different solutions

Content

Installations

Considerations: Contractor's point of view

Revised Prints

Device Certification: A17.5

Challenges: Contractor's Point of View

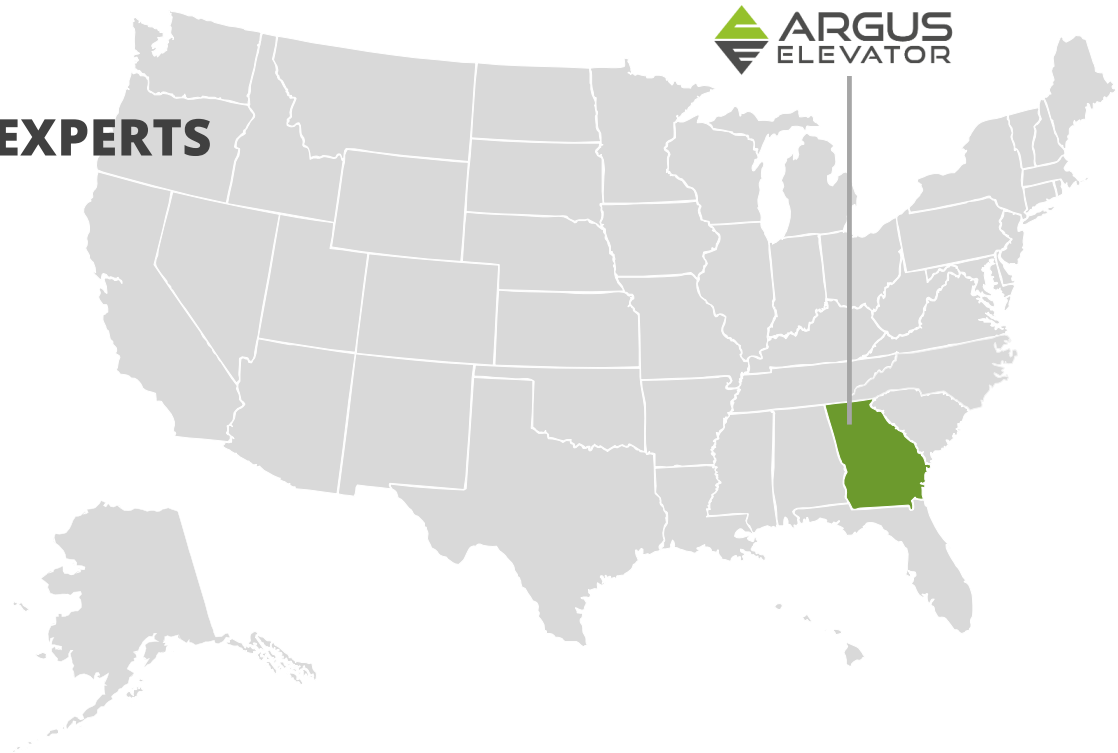
Q & A / Discussions



Elevator Safety Made Simple™

DOOR LOCK MONITORING EXPERTS

- **15,000+** Units Sold
- **9000+** Revised Prints
- **130+** Controller Variants
- **180+** Unique Customers



arguselevator.com





Elevator Safety Made Simple™

SAFETY SIMPLIFIED

Argus Elevator is simplifying the process of elevator code compliance. We provide our customers with safety solutions that are quick to ship, easy to install, and cost-effective.

We do this by constantly innovating – developing solutions that are universal to every controller, have bright, easy-to-read screens, and can fit in the palm of your hand. For door lock monitoring, pit flood detection, door restrictors, brake monitoring and more, Argus Elevator has your solution.

A100-DLM

DOOR LOCK MONITOR



DOOR LOCK MONITORING, MADE EASY

The A100-DLM Elevator Door Lock Monitor is the quickest and most cost-effective solution to bring any elevator system into compliance with ASME 17.3 Section 3.10.12

Each input of the A100-DLM is software configurable and can handle up to 300V AC/DC. This makes it compatible with any controller - without the hardware configurations required by other devices. As a result, the A100-DLM is the go-to solution for large OEMs and independent contractors who want a universal solution compatible with their varied customer install base.

A100-DLM DOOR LOCK MONITOR



arguselevator.com



Compact

Measuring 4.1" x 3.3" x 2.1", the A100-DLM mounts directly inside the controller cabinet. This eliminates the need for routing electrical conduit or sourcing additional enclosures.



Reliable

All inputs can take up to 300V AC or DC, continuously. No wiring mistake can damage the inputs.



Easy Wiring Verification

The beautiful graphical user interface provides visual indication of each signal coming into the A100-DLM. This allows for easy identification and correction of any wiring or configuration problem.

A100-DLM

DOOR LOCK MONITOR



arguselevator.com



Universal

Compatible with all controllers including Dover, EC, Fujitec, KONE, MCE, OTIS, Schindler, ThyssenKrupp (TK), Virginia Controls and Westinghouse—just a few of the many it has been installed on.



Versatile

The same unit handles single and dual opening cars. This prevents the need to buy or stock separate units.



Interchangeable

All units are identical, which means they are interchangeable. The customization is done via parameters.

A100-DLM

DOOR LOCK MONITOR



arguselevator.com



Future Proofed

Unlike competing devices that rely on hardware logic, the A100-DLM is firmware-based. This means that in the case of future regulations changes, the device will be brought up to compliance.



Certified

Device is certified to ASME A17.5 Elevator and Escalator Electrical Equipment, which requires strict design and manufacturing processes. Also, CSA B44.1



Non-invasive

The only solution that does not require the door locks and gate switches to be unwired from the controller. The result is faster installations with elevator wiring as close to the original as possible.

We Prioritize our Partners' Success



Elevator Safety Made Simple™



Units In Stock & Ready to Ship

- Products in stock at both Argus & channel partners
- Universal product that works for every installation



Shortest Install Times

- No need for additional enclosures
- Easily fits into existing system
- Bright, easy-to-read GUI
- Do not need to unwire existing circuits
- Fast troubleshooting



Longest Warranty

- 3 Year Warranty (vs. 1 year)

We Prioritize our Partners' Success



Elevator Safety Made Simple™



#1 in Customer Support

- Available over phone (not just email or chat)
- Helps prevent multiple trips to site
- Bilingual (English & Spanish)
- On-site support for sample unit



Revised Prints

- Show exactly how unit is wired into existing system
- Goes beyond general guidance of how unit is installed provided by other companies
- Saved in portal for future reference
- Can be prioritized for jobs needing quick turnaround

We Prioritize our Partners' Success



Elevator Safety Made Simple™



Free Sample

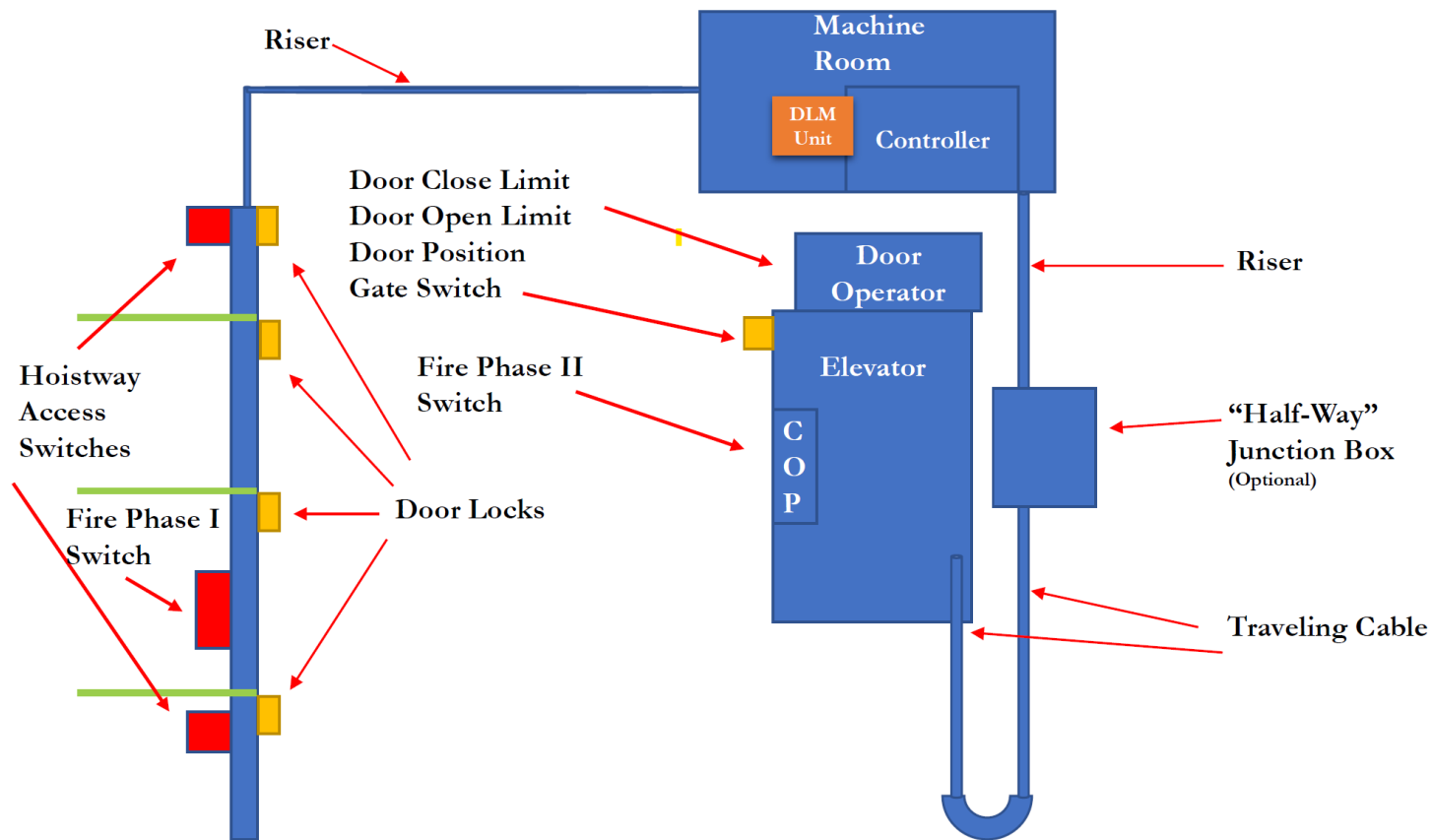
- Free sample to get started
- Gives technicians a chance to try it out
- Choose customer location for install
- Argus will show up on site of customer to assist in installation of sample unit



Unit #1 Pricing

- Work with Argus to determine estimated volume
- Get discounted pricing starting at unit #2 (Unit #1 is free sample)
- No need for contract or mater purchase orders
- Simple, fixed pricing from start

Simplified Elevator System Diagram



What is “Door Lock Monitoring”?

- Door Lock Monitoring, abbreviated as **DLM**, is the nickname given to the functionality described in:
 - ASME A17.1 Section 2.26.5
 - ASME A17.3 Section 3.10.12
- **DLM is a “System to Monitor and Prevent Automatic Operation of the Elevator with Faulty Door Circuits.”**

Which Elevators are Required to have DLM?

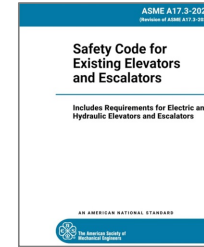
A17.1 Section 2.26.5

- All elevators with power-operated car doors that are mechanically coupled with the landing doors.
- All elevators with power-operated car doors with manually operated swing hoistway doors.

A17.3 Section 3.10.12

- All elevators with power operated car doors that are mechanically coupled with the landing doors

What does the code say?



From ASME A17.3 Section 3.10.12

3.10.12 System to Monitor and Prevent Automatic Operation of the Elevator With Faulty Door Contact Circuits

Means shall be provided to **monitor the position of power operated car doors** that are mechanically coupled with the landing doors while the car is in the landing zone, in order

(a) to prevent automatic operation of the car if the car door is not closed [see 3.4.2(c)], regardless of whether the portion of the circuits incorporating the car door contact or the interlock contact of the landing door coupled with the car door, or both, are closed or open, except as permitted in 3.10.7

(b) to prevent the power closing of the doors during automatic operation if the car door is fully open and any of the following conditions exist:

- (1) The car door contact is closed, or the portion of the circuit incorporating this contact is bypassed.
- (2) The interlock contact of the landing door that is coupled to the opened car door is closed, or the portion of the circuit incorporating this contact is bypassed.
- (3) The car door contact and the interlock contact of the door that is coupled to the opened car door are closed, or the portions of the circuits incorporating these contacts are bypassed.

arguselevator.com



Car Motion Restriction (CMR)

The elevator must not leave the floor if the car doors are not physically closed regardless of the status of the door locks and the gate switch. This implies that something additional must be monitored to get the door closed information, usually the door closed limit

Door Closing Restriction (DCR)

The elevator must stay with the door fully open indefinitely if while the car doors are fully opened the gate switch (car door contact) or the door locks circuitry, or both, are shorted or bypassed.

What does the code say?

From ASME A17.1 Section
2.26.5

2.26.5 System to Monitor and Prevent Automatic Operation of the Elevator With Faulty Door Circuits ⁽²²⁾

2.26.5.1 Power-Operated Mechanically Coupled Doors. Means shall be provided to monitor the position of power-operated car doors that are mechanically coupled with the landing doors while the car is in the unlocking zone, in order to

(a) prevent automatic operation of the car if the car door is not closed (see 2.14.4.11), regardless of whether the portion of the circuits incorporating the car door closed detection means, car door interlock, or the door locked detection means of the landing door coupled with the car door, or any combination thereof, is closed or open, except as permitted in 2.26.1.6

(b) prevent the power closing of the doors during automatic operation if the car door is fully open and any combination of the following conditions exist:

(1) the car door closed detection means has detected the closed position or the car door interlock detection means has detected the closed and locked position

(2) the door locked detection means of the landing door that is coupled to the opened car door has detected the closed and locked position, except as required in 2.27.3.3.9

(3) the portions of the circuits incorporating the closed detection means or door locked detection means of the car door or landing door that is coupled to the opened car door are bypassed

Functions



Car Motion Restriction (CMR)

EXCEPTION 2.26.1.6 Operation in Leveling or Truck Zone.



Door Closing Restriction (DCR)



(22) **2.27.3.3.9** Requirement 2.26.5.1(b)(2) shall not apply when the elevator is on Phase II Emergency In-Car Operation.

What does the code say?

From ASME A17.1 Section
2.26.5

Functions

2.26.5.2 Power-Operated Car Doors with Manually Operated Swing Hoistway Doors Means shall be provided to monitor the position of the car doors while the car is in the unlocking zone in order to

(a) prevent automatic operation of the car if the car door is not closed (see 2.14.4.11), regardless of whether the portion of the circuits incorporating the car door closed detection means, car door interlock, or door locked detection means of the landing door, or any combination thereof, is closed or open, except as permitted in 2.26.1.6

(b) prevent the power closing of the car door during automatic operation if the car door is fully open and any combination of the following conditions exists:

(1) the car door closed detection means has detected the closed position or the car door interlock detection means has detected the closed and locked position

(2) the door locked detection means of the landing door associated with the opened car door has detected the closed and locked position, except as required in 2.27.3.3.9

(3) the portions of the circuits incorporating any combination of the following are bypassed:

(-a) closed detection means of the car door

(-b) door locked detection means of the car door

(-c) door locked detection means of the landing door associated with the opened car door



Car Motion Restriction (CMR)

EXCEPTION 2.26.1.6 Operation in Leveling or Truck Zone.



Door Closing Restriction (DCR)



(22) **2.27.3.3.9** Requirement 2.26.5.1(b)(2) shall not apply when the elevator is on Phase II Emergency In-Car Operation.

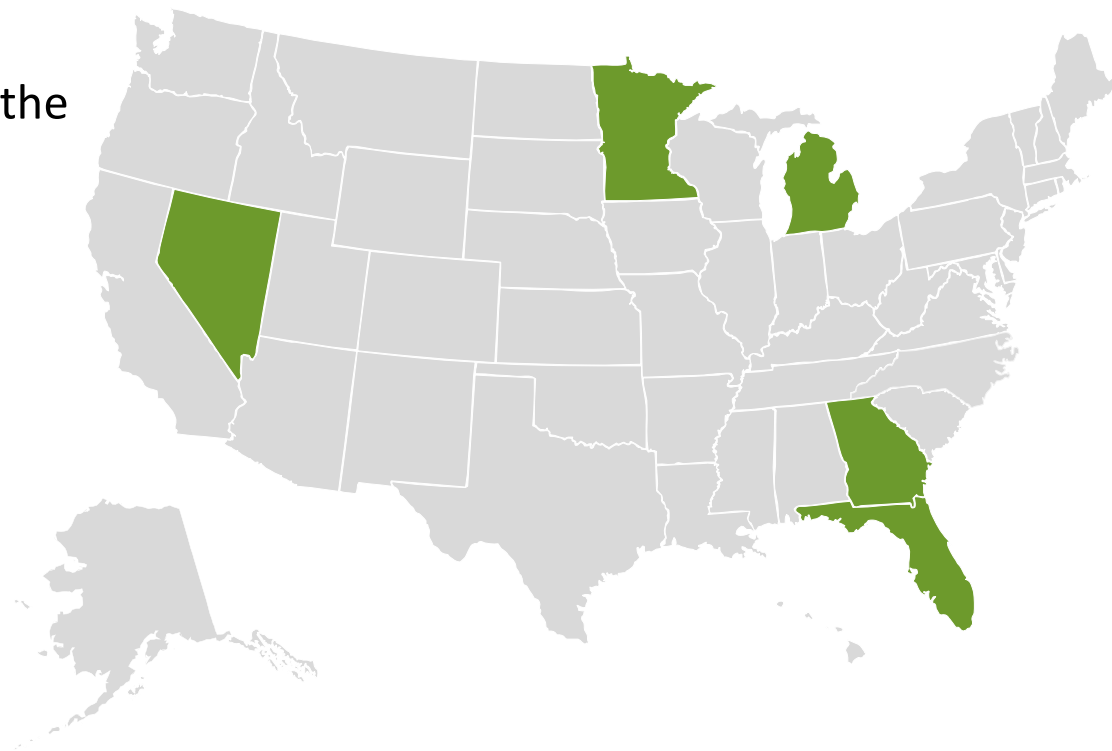
Why is Door Lock Monitoring Important?

- DLM is a redundant safety layer
- DLM prevents the elevator from moving when the doors are open
- DLM prevents passengers from falling into the hoistway, tripping or other injuries due to unsafe operation
- DLM ensures safe and controlled elevator operation as intended by the controller (redundant safety layer)
- DLM helps reduce accidents for passengers and liability exposure for building owners



Where is DLM Currently Required?

- Michigan, Minnesota, New York City, Florida, Georgia, and Nevada all require DLM by code
- Other jurisdictions are in the process of adopting DLM as a safety requirement



How is compliance accomplished?

- Parameter activation (if already supported by the current)
- Firmware upgrade (if the hardware supports it and it is available)
- Door lock monitor device installation
- Controller upgrade
- Elevator Modernization

DLM Devices - Different Technologies

All units shown to scale



PLC +
input/output
relays



Electronic Boards +
Interface Modules +
output relays



PLC +
input/output
relays



Relay logic +
input/output
relays



Electronic
boards +
output relays

DLM Devices – Selection Considerations

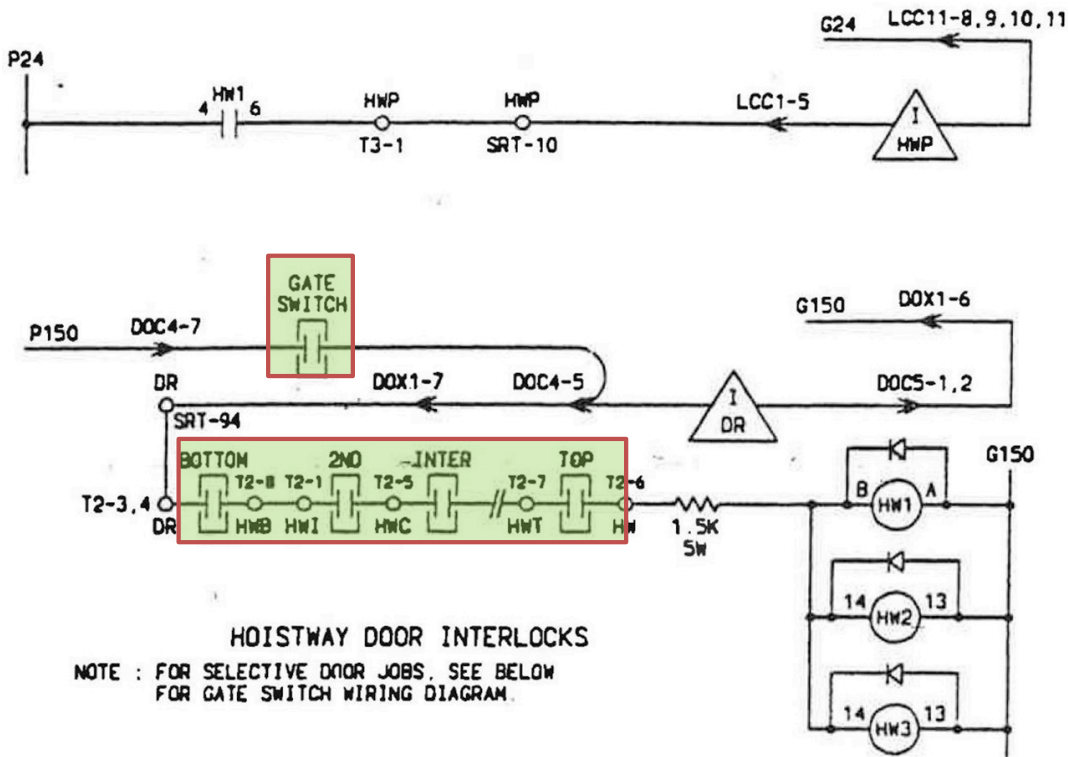
- Space available – how easy is it to fit into existing setup given size and space constraints
- Does it require rewiring or door locks and gate switches?
- Is the device universal or does it require multiple configurations or custom-made versions to handle different controllers and setups?
- Are the devices interchangeable?
- Is the device field upgradable?
- What is the warranty of the device?
- What is the price of the unit?
- Does the devices come with revised prints? Are those prints reviewed by a professional engineer?
- How user friendly is it for signal configuration and troubleshooting? How long will it take to install?

Process Considerations

1. Identify the non-compliant elevators

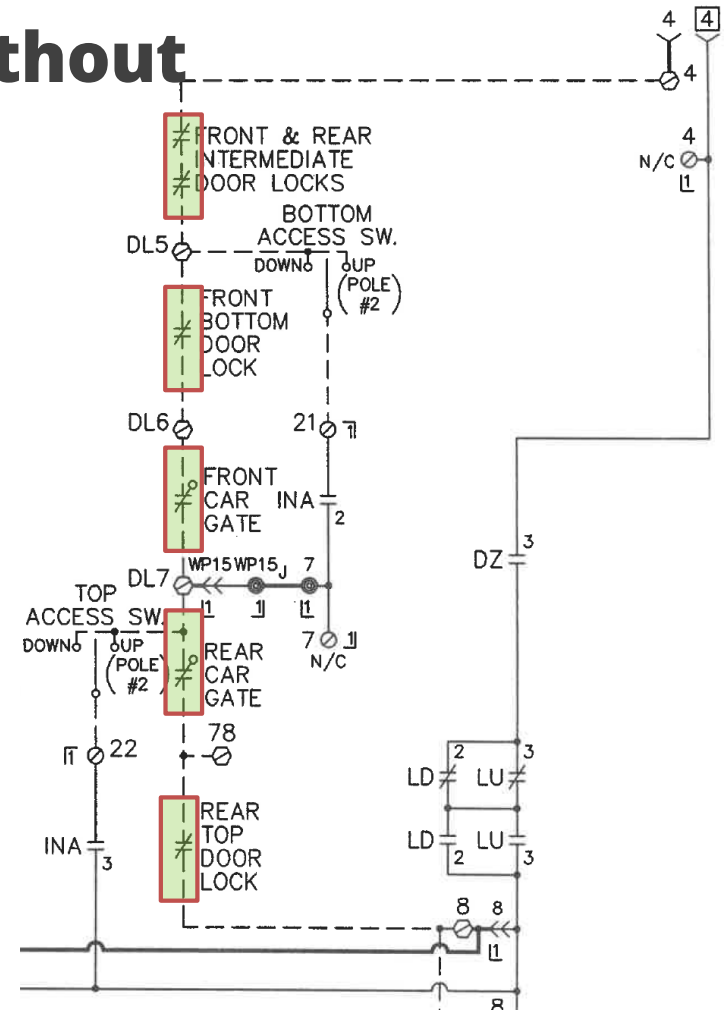
- Date of adoption of ASME A17.1 requiring DLM. **For example, in Florida the code went into effect on 10/04/2000 starting with State Serial #59628.**
- Contacting the controller manufacturer
- Functional test
- Analyzing the controller wiring (elevator prints)

Controller Wiring - Controller without



HOISTWAY DOOR INTERLOCKS

NOTE : FOR SELECTIVE DOOR JOBS, SEE BELOW FOR GATE SWITCH WIRING DIAGRAM.



Process Considerations

2. Installation

- Straightforward
- Most of the time it is a 3–4-hour process
- It is recommended to plan for a full day

3. Validation and testing

- The testing procedure is part of the documentation provided

4. Inspection by the City / State officials/ Third party

- Depending on the jurisdiction, the inspection might be required before the elevator goes back to service

Revised Prints

1. Device Mounting

The Argus Elevator Door Lock Monitor is designed to be mounted on an industry-standard 20mm DIN rail. It also comes with mounting feet that allow easy installation with just two screws.

1.1 Device with DIN rail

1.2 Device with screws

ELEVATOR CONFIGURATION

Parameter	Value
1. Car Doors Opening	"Single Opening, 1 COS and 1 HDL"
2. Explicit Fire Phase 3 Signal	"Onboard"

1. Connection Instructions

The Argus Elevator Door Lock Monitor is designed to be mounted on an industry-standard 20mm DIN rail. It also comes with mounting feet that allow easy installation with just two screws.

2. Testing Instructions

After confirming the Argus Door Monitor's correct wiring, the elevator's proper behavior must be verified. The following procedure must be completed automatically before leaving the unit operating.

3. Terminal Wiring

Terminals	Wire #
21-22	
23-24	
25-26	
27-28	
29-30	
31-32	
33-34	
35-36	
37-38	
39-40	
41-42	

1. Wiring

Observe the wire size specifications and bend radius. All conductors must be stranded copper. All protection and response systems and control devices must be appropriate for the application. Single conductor assemblies cannot be used on stranded wire. Tighten the screws on the terminal block to 5.5 Nm (40 in-lb) (1.5 Nm (13 in-lb) for screw terminals).

4. For example, the Car Door Icon Pop Light when the car is levelled.

v, all outputs will be green on the main page below to access our troubleshooting

Job Name: **Public Storage 7001 (Kirkman)**

Company Name: **Kone Inc - Orlando**

Controller Type: **Ons**

Elevator ID #: **52104-105**

Address: **900 South Kirkman Road, Orlando, FL 32811**

PO#: **4542150419**

ARGUS ELEVATOR

SHEET 1 OF 2

Job Name: **Public Storage 7001 (Kirkman)**

Company Name: **Kone Inc - Orlando**

Controller Type: **Ons**

Elevator ID #: **52104-105**

Address: **900 South Kirkman Road, Orlando, FL 32811**

PO#: **4542150419**

ARGUS ELEVATOR

SHEET 2 OF 2

Benefits

- Show exactly how to configure and wire the unit for a particular job.
- Independently reviewed and signed by professional engineers licensed in the corresponding jurisdiction.
- Provide written record of what was changed

Standard Pages

Page 1: General Job information

- Address, job name, controller type, ...etc.
- Mounting instructions
- Test procedure to validate correct installation

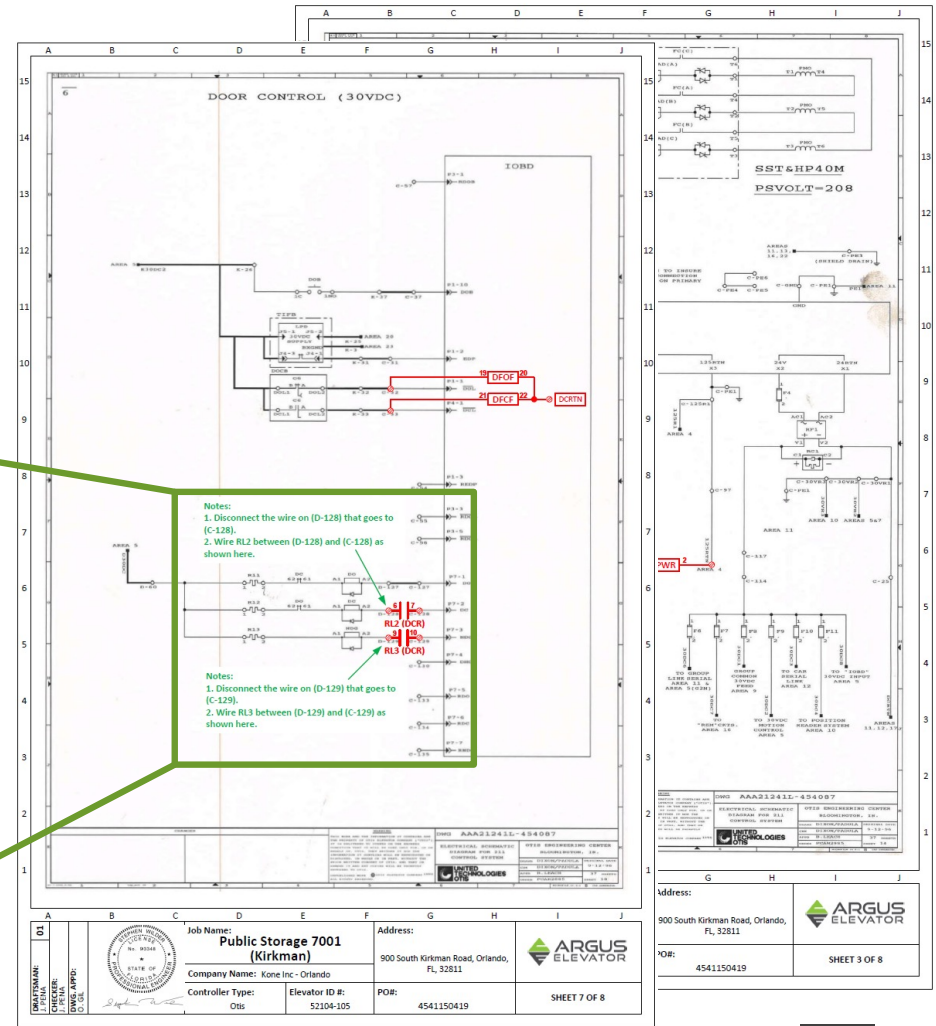
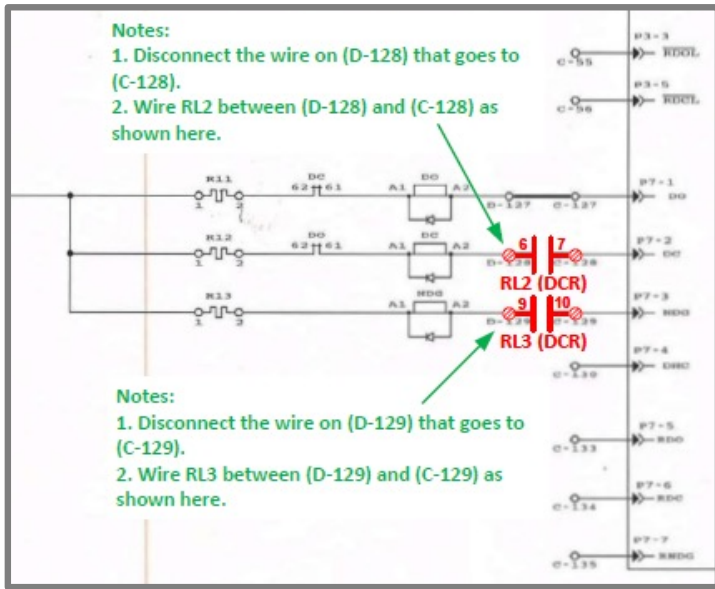
Page 2: Configuration Tables

- Inputs Table
- Outputs Table
- Notes
- QR code For troubleshooting guide
- Symbol legend

Revised Prints

Wiring Diagrams

- Pages 3+ show exactly how Argus A100-DLM unit is wired into existing setup
- Notes provide useful tips on how this can most easily be accomplished



Certification



Challenges: Contractor's point of view

1. Submitted prints do not match the job

2. Getting the customers to decide

- Modernization vs DLM installation
- Avoiding procrastination

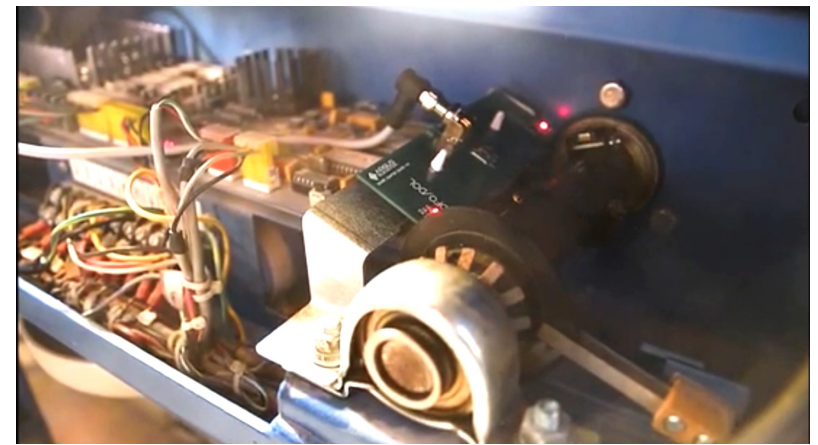
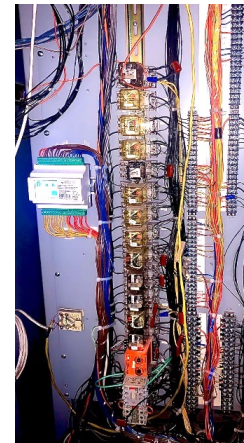
3. Qualified labor

- Limited qualified labor and lot of work to do

Installations

Mounting Examples

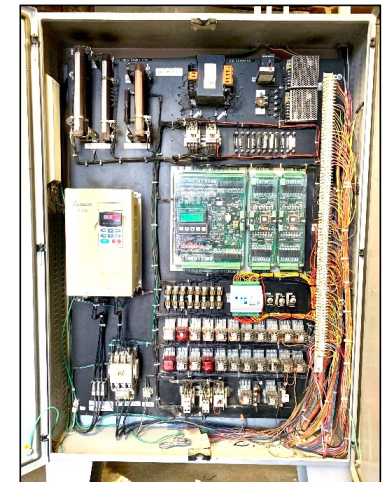
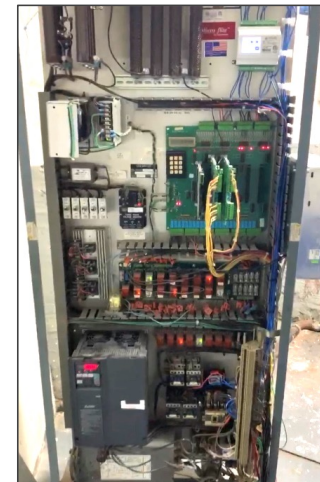
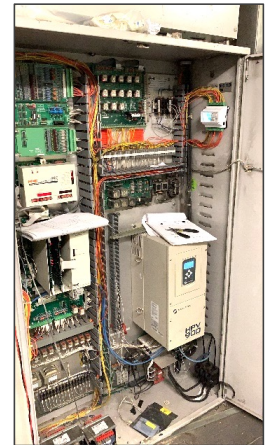
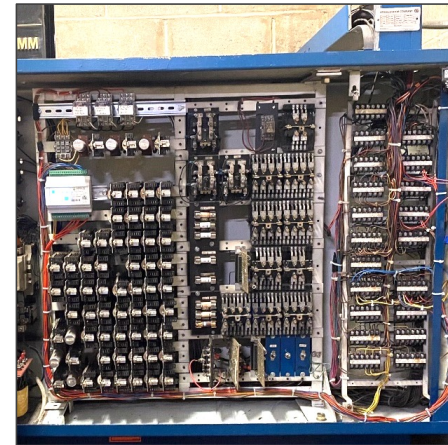
- Top left and top center: TAC50
- Top right: ACCT controller (local NYC company, no longer in business)
- Bottom left and right: Dover DMC-I



Installations

Controller Examples

- Top left: Otis 411
- Top center: Otis Relay Logic
- Top right: MCE controller
- Bottom left: Virginia Controls
- Bottom center: O. Thompson
- Bottom right: ESI (Local NYC company)



A100-PFD PIT FLOOD PROTECTOR



PREVENT COSTLY FLOOD DAMAGE & INCREASE SAFETY

Prevent costly flood damage, enhance passenger safety, and maximize elevator uptime with the A100-PFD pit flood protector and flood sensor.

This intelligent protector and float sensor combination automatically identifies liquid in the pit, moves the elevator to a pre-determined floor above the floodplain, and enables passengers to exit safely. The elevator is then disabled, ensuring that both the cab and counterweight do not descend below the floodplain until a qualified mechanic resets the device.

A100-PFD

PIT FLOOD PROTECTOR



arguselevator.com

PREVENT FLOOD DAMAGE

Help prevent flood damage and avoid costly repairs caused by heavy rainfall from hurricanes or tropical storms, storm surges, river overflows, melting snow and ice, or burst pipes

24/7 EARLY DETECTION

The A100-PFD continuously monitors for water in the pit 24 hours a day, 7 days a week. If 1 inch of water is detected, the PFD is triggered, moving the elevator and its passengers to a safe, pre-determined floor.

INCREASE PASSENGER SAFETY

When water is detected, the PFD moves the car and its passengers to a safe floor above the floodplain and opens the doors so they can exit. It then disables the elevator, preventing additional passengers from using the elevator until it is manually reset.

MAXIMIZE UPTIME

Once water is detected, the PFD moves the car above the floodplain, preventing damage and avoiding costly repairs. After the water has receded, having sustained no damage, the elevator can be quickly restored to service by a mechanic.

A100-BMD MOTOR BRAKE MONITOR



IMPROVE SAFETY WITH EARLY MOTOR BRAKE FAILURE DETECTION

The motor brake is a crucial component of a safe and efficiently functioning elevator. With time and usage, the brake's parts can wear down or even break. It's essential to address these straightforward maintenance items before they evolve into significant functional or safety problems.

By monitoring the brake's switches, the A100-BMD brake monitor detects failures to pick or drop, worn brake pads, open or shorted solenoid coils, and other common brake issues. Early intervention in addressing these problems can help prevent sudden car jerking, drifting after leveling, entrapments, and other safety hazards.

A100-BMD

MOTOR BRAKE MONITOR



arguselevator.com

EARLY DETECTION

The A100-BMD monitors both pick/drop failures and the duration of the pick/drop cycles. Often, before a brake fully fails, it shows early signs, such as sticking or a delayed response. By catching these changes, preventative maintenance can be carried out.

24/7 CONTINUOUS MONITORING

The A100-BMD continuously monitors the pick/drop and wear pad switches for signs of necessary brake maintenance, 24 hours a day, 7 days a week. This ongoing detection adds an extra layer of safety between scheduled in-person maintenance visits.

INCREASE PASSENGER SAFETY

A brake that fails to fully engage after leveling or engages while the car is in motion can pose serious safety risks for passengers. By identifying potential brake issues early, these hazardous situations can be prevented.

PREVENT ENTRAPMENTS

Once a fault is detected, the car will finish its current trip, the doors will open, and passengers will be allowed to exit before the elevator is disabled. This process helps prevent entrapments and allows for maintenance to be conducted on a scheduled basis.

New Argus Product Being Released 2025!

1. Elevator Door Restrictor

We've developed an improved door restrictor in response to frequent complaints about other door restrictors' premature failures in the field. This new version features fewer components, stronger, thicker metals, stainless steels, and a brand-new set of electronics, with the same ease-of-use as the Argus DLM.

2. Unintended Car Movement

As mandated by NYC code for 2027, Argus has been field-testing UCM devices and is planning a full launch in Q2-Q3 of 2025. Similar to the Argus DLM, the UCM device will be compact, user-friendly, and feature a bright, easily readable interface. It's designed for quick and simple setup, making it super easy for mechanics.



Thank you!

Q&A