

Door Restrictor Maintenance Comparison

Passenger Door Restrictor Maintenance Performance Standards for Elevator Professionals

Elevator companies help clients preserve assets through preventative maintenance and repair, and help building managers ensure tenant satisfaction by installing products that reduce downtime. With the new adoption of ASME A17.1 Door Restriction requirements¹ in most states, every passenger elevator must be equipped with door restriction capabilities to prevent passengers from unsafely exiting an elevator in the event of a power loss or breakdown.

This paper was written to enable elevator companies to compare after-market door restriction products for the purpose of determining the best options for their clients. This paper discusses manufacturer's maintenance standards² for elevator door restrictors and includes likely maintenance costs over the lifetime of an elevator. The goals of this paper are to help elevator companies understand the variables associated with door restrictor maintenance, and assist with determining approaches that can reduce long-term maintenance costs.

Types of Elevator Door Restriction Methodologies

There are two categories of elevator door restriction methodologies: electronic and mechanical. Both methods of restriction essentially perform the same function – to restrict passengers from exiting an elevator at undesigned landings. However, the quality and engineering designs vary greatly. These variations can have a direct impact on the cost of an elevator's maintenance service program. The following door restriction products are on the market today:

Elevator Door Restrictors*

Product Name	Company	Restriction Methodology	Installs with Manufacturer:
ElectroLock	ElectroDYN Systems	Electronic	Any
Door Restrictor QEDR-97	Quality Elevator	Electronic	Any
HatchLatch	Adams	Electronic	Any
Safe X-IT	C.J. Anderson	Electronic	Any
Door Restriction Clutch Kit	Vertical Express	Mechanical	ThyssenKrupp elevators
LWZ Clutch	GAL	Mechanical	GAL elevators
The Restrictor	SEES	Mechanical	Any, for use up to 6 floors
Folding Door Restrictor	Unitec	Mechanical	Otis elevators

*Depending on the elevator manufacturer, there may be limitations on which mechanical door restrictor can be installed. However, most electronic door restrictors are universal and can be installed on virtually any type of elevator.

^{1,2} See References on last page.

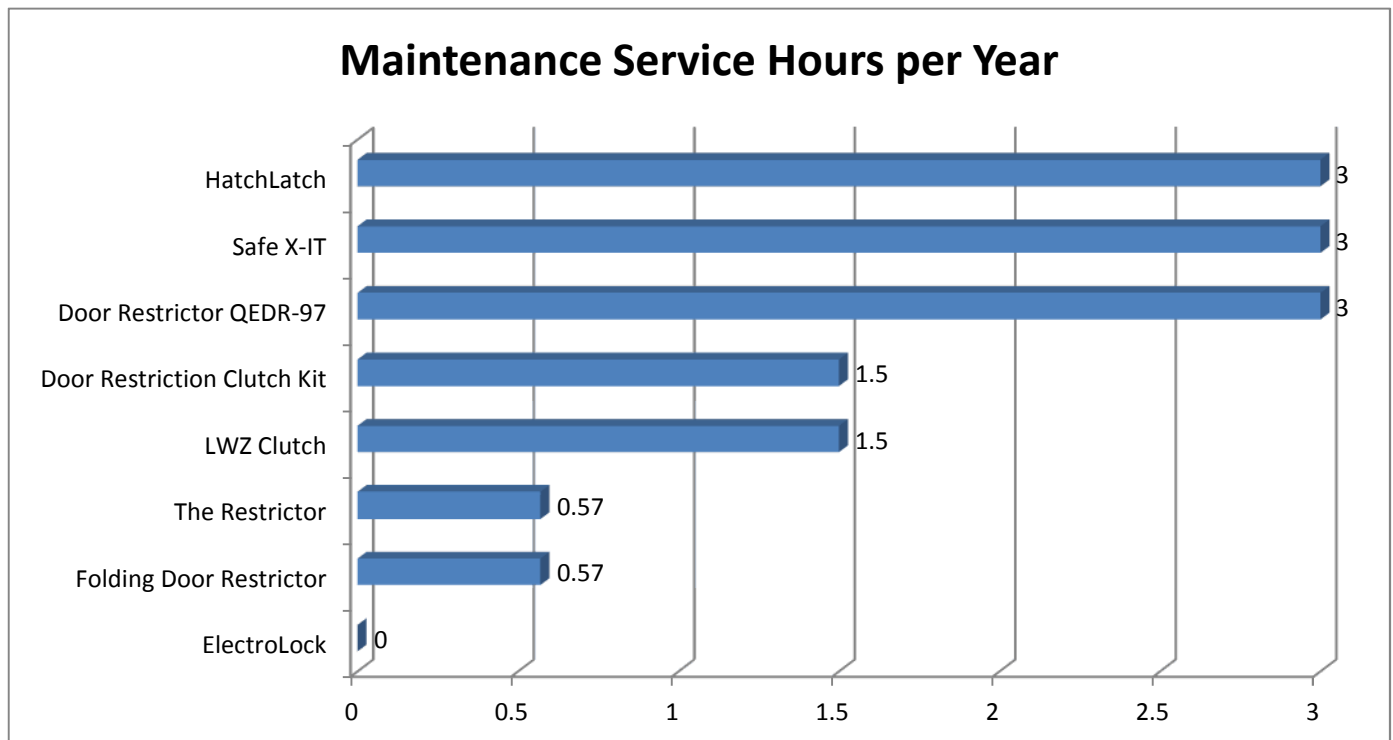
Door Restriction Maintenance Performance Standards & Comparison

Below are the manufacturer recommended maintenance intervals, and estimated industry service times by each door restrictor product. Depending on the type of door restrictor, service maintenance time would include the following types of maintenance.

Types of Maintenance

0. None,
1. Replacing back-up batteries,
2. Cleaning optics required for operation,
3. Mechanical adjustments and realignments due to wear.

<u>Product Name</u>	<u>Types of Maintenance</u>	<u>Company</u>	<u>Service intervals (months)</u>	<u>Estimated Average Service Time (hours)*</u>	<u>Service Hours per Year</u>
ElectroLock	0.	Electrodyn Systems	0	0	0
Folding Door Restrictor	3.	Unitec	42	2	0.57
The Restrictor	3.	SEES	42	2	0.57
LWZ Clutch	3.	GAL	6	0.75	1.5
Door Restriction Clutch Kit	3.	Vertical Express	6	0.75	1.5
Door Restrictor QEDR-97	1. 2.	Quality Elevator	4	1	3
Safe X-IT	1. 2.	C.J. Anderson	4	1	3
HatchLatch	1. 2.	Adams	4	1	3



Higher Maintenance Reduces Profit over the Lifetime of the Elevator

The figures below represent the estimated service maintenance costs incurred for each elevator, over a 20-year lifetime. These figures are conservatively estimated based on a calculation of service mechanic time (2-person team, calculated at the per person hourly wage of \$33.65 (2011 U.S. Average)), alignments/adjustments to the restrictor due to wear, and estimated cost of replacement parts. Please note, figures represented below are per elevator. Multiply these figures by the number of elevators on the customer site for a more accurate assessment.

Annual Cost of Maintenance

<u>Product Name</u>	<u>Maintenance Hours per Year</u>	<u>2-person Team</u>	<u>Cost to an Elevator Company to perform Annual Maintenance</u>
ElectroLock	0	\$67.30	\$0.00
Folding Door Restrictor	0.57	\$67.30	\$38.36
The Restrictor	0.57	\$67.30	\$38.36
LWZ Clutch	1.5	\$67.30	\$100.95
Door Restriction Clutch Kit	1.5	\$67.30	\$100.95
Door Restrictor QEDR-97	3	\$67.30	\$201.90
Safe X-IT	3	\$67.30	\$201.90
HatchLatch	3	\$67.30	\$201.90

Lifetime Cost of Maintenance

The figures below represent the cost of mechanic hours required for maintaining a door restrictor's operation over the lifetime of an elevator. This is the cost to the elevator company in terms of mechanic hours, calculated at the U.S. National Average wages of a 2-person team.

<u>Product Name</u>	<u>Total Maintenance Hours Over a 20-year Life of an Elevator</u>	<u>Cost of Lifetime Maintenance to the Elevator Company</u>
ElectroLock	0	\$0.00
Folding Door Restrictor	11.4	\$767.22
The Restrictor	11.4	\$767.22
LWZ Clutch	30	\$2,019.00
Door Restriction Clutch Kit	30	\$2,019.00
Door Restrictor QEDR-97	60	\$4,038.00
Safe X-IT	60	\$4,038.00
HatchLatch	60	\$4,038.00

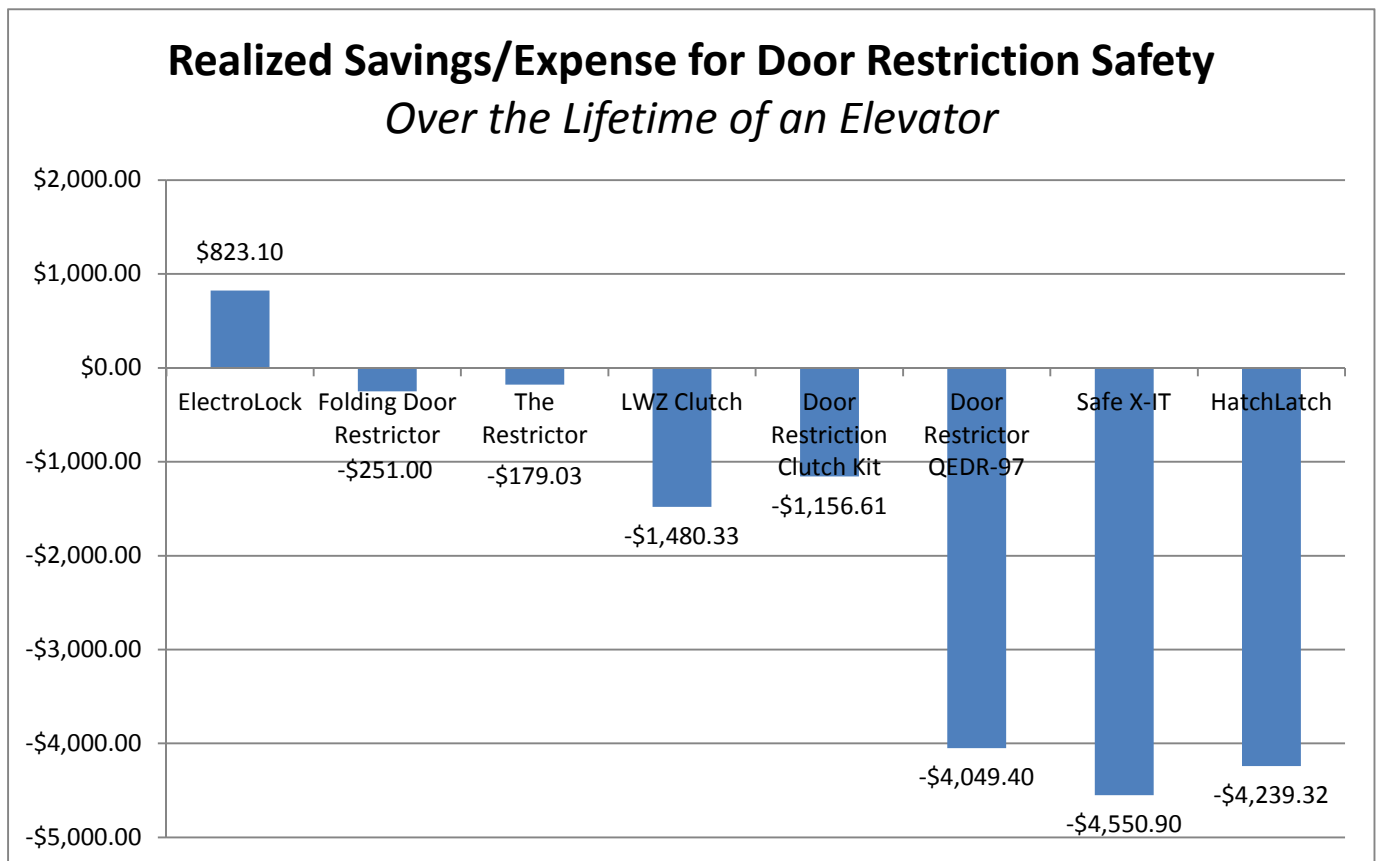
Total Savings/Expense over the Life of the Elevator

The chart below totals the cost of the product, time to install, and lifetime maintenance. This data is based on the manufacturer's recommendations.

The type of door restriction technology installed in your client's elevators can add to your service costs over time, making it less attractive to maintain over the life of the elevator. Therefore, it is in an elevator company's best interest to understand these differences prior to using door restriction products.

As indicated below, the cost of installing a door restrictor, plus its lifetime maintenance expenses can vary greatly depending on the type of product used. The below graph is based on the manufacturer's sale price of each product, along with the manufacturer's suggested maintenance intervals. Maintenance intervals are calculated by multiplying the number of hours per year by the mechanic's hourly wage (U.S. Average) and assumes a two person team.

Chart below is the total realized savings/expense over a 20-year period for each door restrictor product. It totals the MSRP, manufacturer's recommended installation time, and industry-based maintenance requirements.



With the right technology, elevator companies can help their clients achieve asset preservation, reduce service/maintenance costs and attain tenant safety & satisfaction all while reducing down-time due to maintenance.

Reference:**¹ ASME A17.1 Building Code Adoptions**

Several electronic door restrictors on this list were engineered prior to the most recent adoption of new ASME building code regarding battery back-up exclusion requirements. Though they are still for sale today, they do not currently meet ASME building code requirements for door restriction. By understanding this, elevator companies can help their clients avoid inspection issues and/or replacement costs.

² Assumptions

The comparatives and analysis used in this paper are directly based on manufacturer recommendations of scheduled preventative maintenance intervals for door restrictors. For the purposes of this paper, each comparison uses an identical scenario: 20-year elevator life, 5-landings, 7ft. hoistway, single speed elevator, left-hand opening and a two-person maintenance team. This scenario uses census data of the most *average* type of elevator in operation today. Additionally this paper assumes that buildings with more than 5-landings and that have center-opening doors should increase the maintenance costs highlighted in this paper. These figures do not assume replacement of an entire restrictor system, only replacement of its parts.