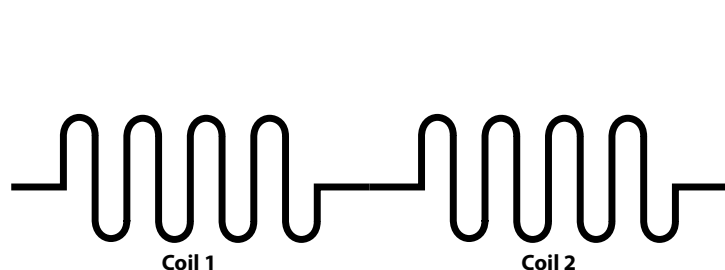


OVERVIEW

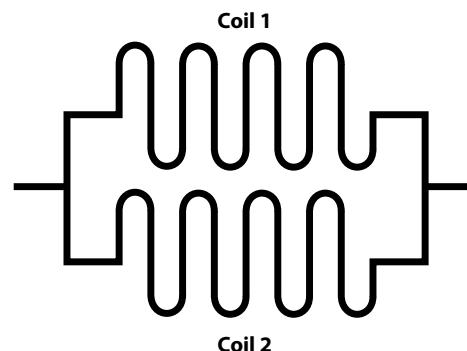
One of the key components of an access control system is the locking device itself. Failure of a locking device can cause an opening to become unsecured, or in some cases prevent entry. There are two potential failure modes for an electro-mechanical locking device: electrical failure or mechanical failure due to wear. LifeSafety Power's M8 managed lock output module can help mitigate risk and potential loss of security of an opening through predictive monitoring.

ELECTRICAL LOCK FAILURE NOTIFICATION

Modern locking devices typically use two coils of wire that are either series or parallel connected for 12 or 24V operation.



24V Operation



12V Operation

Due to factors such as operational heat, environmental temperature changes, and mechanical shock and vibration, these internal coils can become compromised, either as a short, partial short, or open circuit. Often, when these failure modes occur, the lock may still operate, albeit at a higher operating temperature and lower holding/activation force. Although building occupants may not notice a change, complete lock failure is not far behind.

When the coils develop problems, the current draw to the lock will change - in 12V mode, an open coil will produce a lower operating current, while at either voltage, a partially or fully shorted coil will show as an increase in operating current.

A fully shorted coil at 12V will appear as a short circuit and will rupture the fuse or PTC on the output, while a fully open coil at 24V will show as an open circuit with zero current draw (and the locking device will no longer be functioning).

The LifeSafety Power M8 lock control module can monitor the current draw of each lock so that problems with the coils can be alerted before complete lock failure.

Determining Lock Current Limits

First, the upper and lower current limits of the lock must be determined. A good starting point is the datasheet for the locking device. The normal current draw is often listed with a +/- tolerance, or the manufacturer can be contacted for the current range. If the range is unable to be determined, a safe number is typically +/- 15% of the nominal rating. A tighter limit would provide more sensitivity to potential failures, but could lead to false alerts, so a balance should be struck. Increasing the spread of the limits slightly may help prevent false triggers.

Configuring Lock Current Monitoring

Once the limits have been determined, the limits can be programmed manually for each lock, or automatically as a batch. To program the limits, log into the NetLink module, navigate to the M8 board being programmed, and click the "Programming" button in the top left of the screen.

Manually Programming Current Limits

On the right side of the programming screen are the fields where the limits can be entered. For each output, enter the upper and lower current limits as determined by manufacturer ratings or calculation. When done, click the "Save Settings" button.

Output #	Output Description	Control Input Type	Output Load Type	Unlock on FAI Activation	Unlock on AC Loss	Email Alert on Fault	Voltage Lower Limit (V)	Voltage Upper Limit (V)	Current Lower Limit (A)	Current Upper Limit (A)	Cycle Count Limit
	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All
1	West Entrance 1	Disabled	Constant ON	No	Yes	Yes	8.68	16.12	0.00	1.20	1000000000
2	S.Lab 104	Disabled	Constant ON	Yes	No	Yes	8.68	16.12	0.00	1.20	1000000000
3	Science Lab 102	Disabled	Constant ON	Yes	No	Yes	17.61	32.70	0.40	0.93	1000000000
4	S. Ent. #5 Hes 9400	Disabled	Constant ON	No	No	Yes	8.72	16.19	0.00	1.20	1000000000
5	Stockroom 1	Disabled	Constant ON	No	No	Yes	8.68	16.12	0.00	1.20	1000000000
6	Stockroom 2	Disabled	Constant ON	Yes	No	Yes	8.68	16.12	0.00	1.20	1000000000
7	IT Closet	Disabled	Constant ON	No	No	Yes	8.70	16.15	0.00	1.20	1000000000
8	Shipping Dock	Disabled	Constant ON	No	No	Yes	8.68	16.12	0.00	1.20	1000000000

Automatically Programming Current Limits

At the bottom of the programming screen is a tool to help set the limits automatically.

Prior to automatically configuring lock current monitoring, the lock should be in its normal state with its temperature stabilized, since operating current can vary with temperature. Fail safe locks should be powered for at least 15 minutes prior to setting the current limits.

Once temperatures have stabilized, enter the percentages for upper and lower limits for voltage and current of each zone. The voltage limit window can be set wide if voltage monitoring isn't required. Remember that the voltage will drop when on battery power as the batteries discharge - set the lower voltage limit below the battery cutoff point to prevent output faults as the batteries discharge.

When the percentages are entered, click the "Start Measurement" button to have the M8 measure and calculate the setpoints.

Output Limit Setting Aid

Set voltage Lower limits to % below the measured values
Set current Lower limits to % below the measured values

Set voltage upper limits to % above the measured values
Set current upper limits to % above the measured values

Start Measurement

Output Limit Setting Aid aids in setting the output voltage and current limits of all outputs to a certain percentage above and below the measured value. Verify that all outputs are connected to their normal operating load and be aware that during this process ALL outputs will be simultaneously powered. Enter the desired percentage values for upper and lower limits, then click the "Start Measurement" button. The process will take approximately 10 seconds, after which the upper and lower limits of all output voltages and currents will be set according to the entered percentages.

MECHANICAL LOCK END OF LIFE NOTIFICATION

Typically, electro-mechanical locks, such as strikes, are rated for a set number of cycles, which can be found on the datasheet for the lock or by contacting the manufacturer. Typically, this number ranges from 100,000 to 1,000,000 cycles. A cycle is one activation and deactivation of the locking device.

When an electro-mechanical lock activates, a physical movement is made within the lock. Repeated activations will inevitably cause mechanical wear, eventually leading to the failure of the mechanism.

The M8 is able to track the number of activations of the lock and can provide a notification when the lock is nearing the end of its rated life. To program the cycle count limit, log into the NetLink module, navigate to the M8 board being programmed, and click the "Programming" button in the top left of the screen.

Programming Cycle Count Limits

On the far right of the programming screen is the Cycle Count Limit column, where the limits can be entered. For each output, enter the cycle count limit as determined by manufacturer rating. When done, click the "Save Settings" button.

Output #	Output Description	Control Input Type	Output Load Type	Unlock on FAI Activation	Unlock on AC Loss	Email Alert on Fault	Voltage Lower Limit (V)	Voltage Upper Limit (V)	Current Lower Limit (A)	Current Upper Limit (A)	Cycle Count Limit
	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All	Fill All
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5	Stockroom 1	Disabled	Constant ON	No	No	Yes	8.68	16.12	0.00	1.20	1000000000
6	Stockroom 2	Disabled	Constant ON	Yes	No	Yes	8.68	16.12	0.00	1.20	1000000000
7	IT Closet	Disabled	Constant ON	No	No	Yes	8.70	16.15	0.00	1.20	1000000000
8	Shipping Dock	Disabled	Constant ON	No	No	Yes	8.68	16.12	0.00	1.20	1000000000

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