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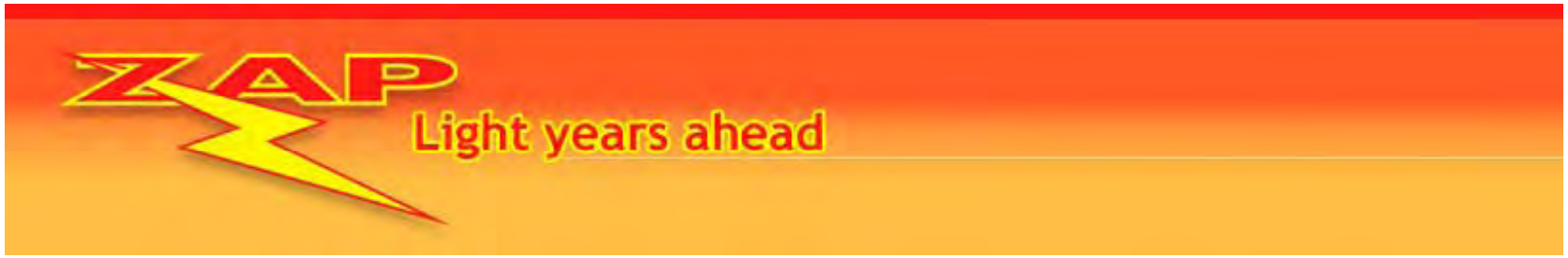
Light years ahead

ZAP Technical Instruction

The Smallest, Quietest & Safest Garage Door Operator in the World!



How ZAP Operators Work

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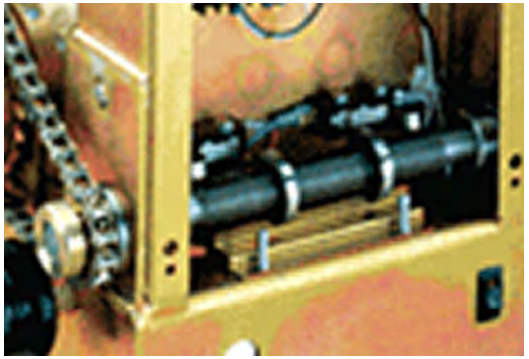
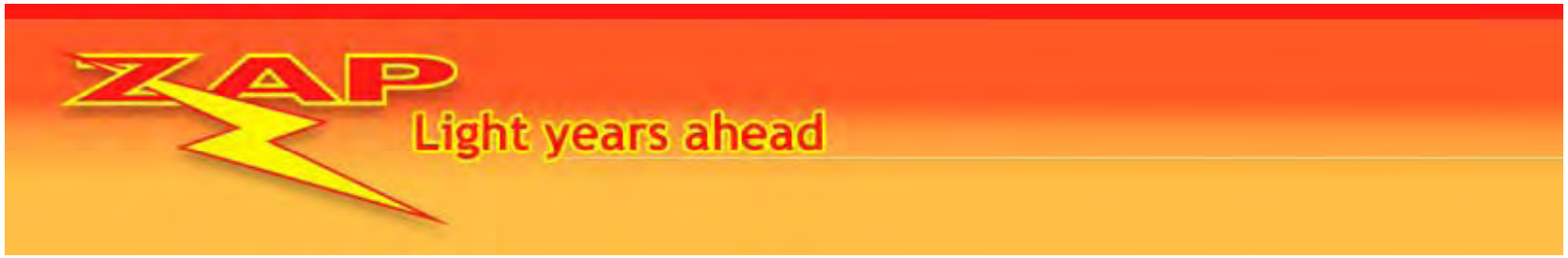
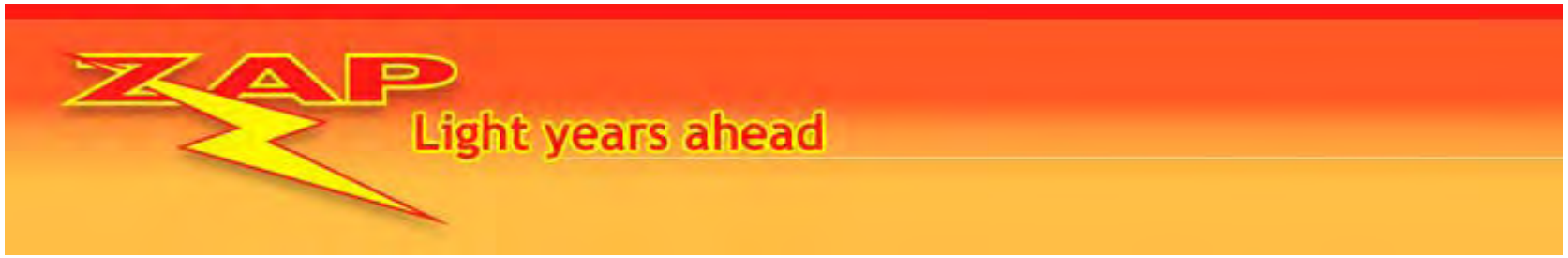
Unlike traditional operators, ZAP operators do not have limit assemblies.

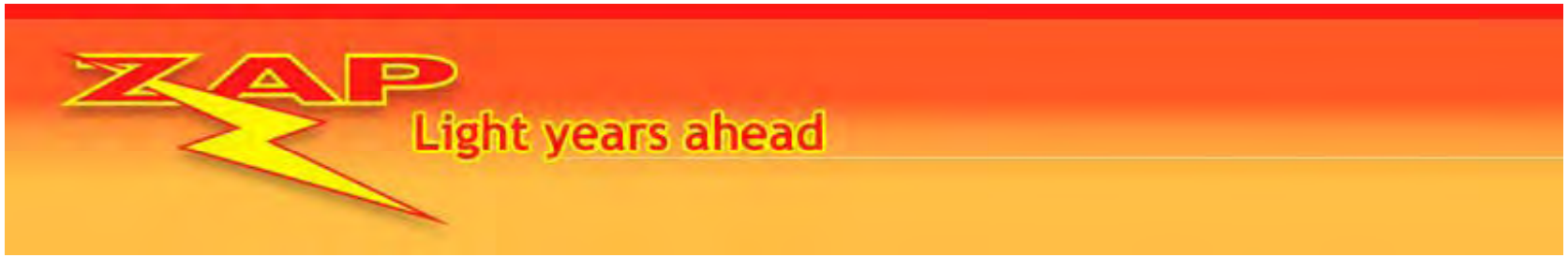




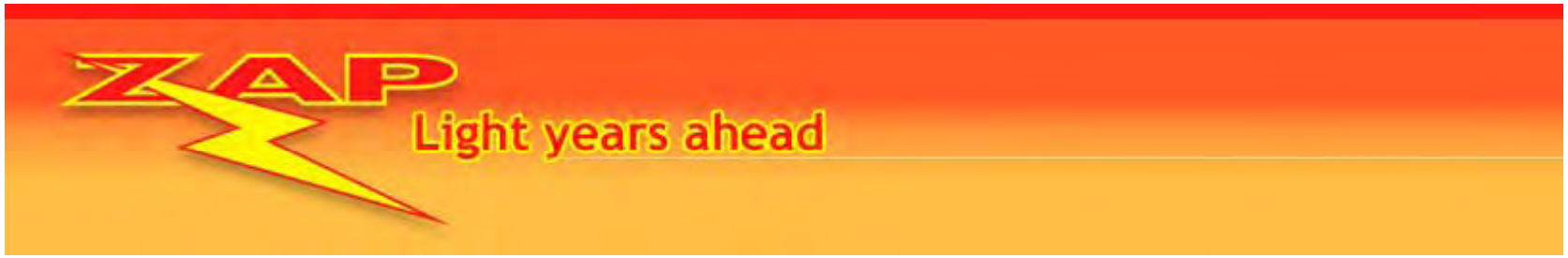
They work with a 21st century technology that uses runtime calibration and current sensing technology to perform the functions of limit assemblies.



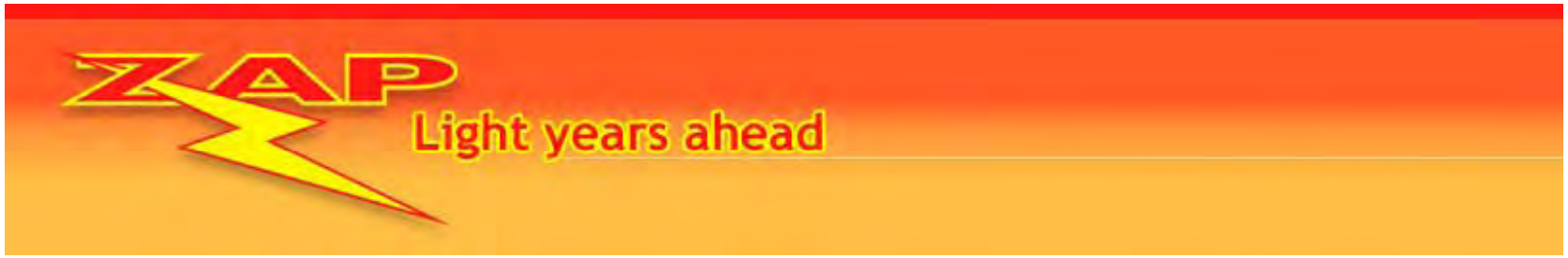
The limits of the door operator are physical in nature.



The floor being the down limit.



A physical stop for the upper limit.



On high-lift and vertical lift doors that can be a bumper or pusher spring.

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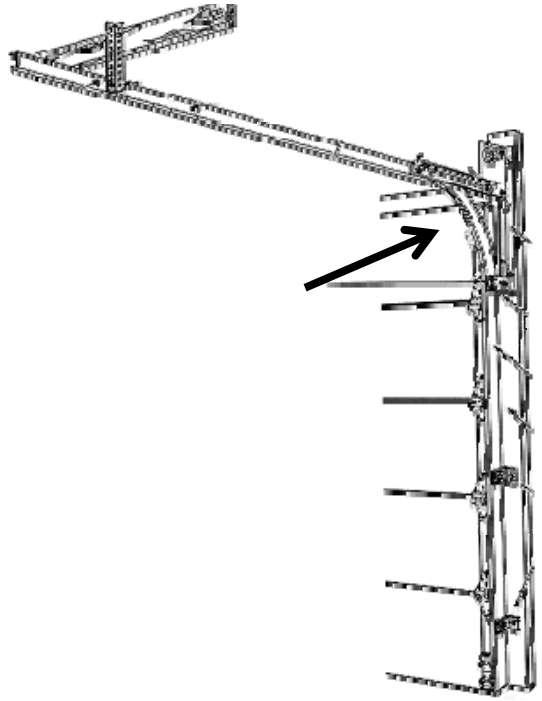
On standard lift and low headroom doors that physical stop is the track radius.



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The door can only rise so high into the radius before the torsion shaft would have to counter rotate to allow the door to go higher.

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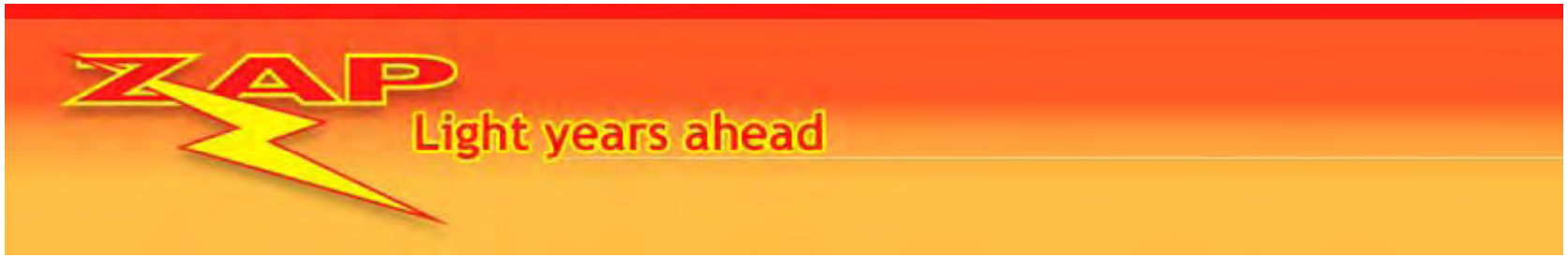
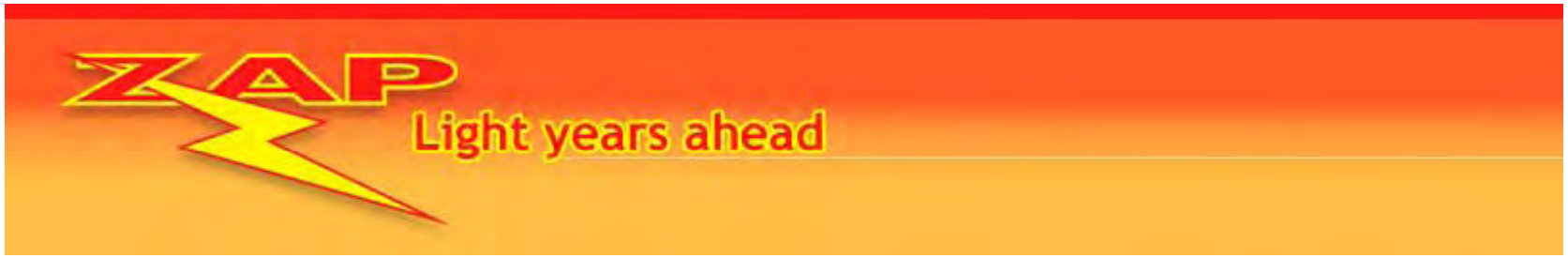
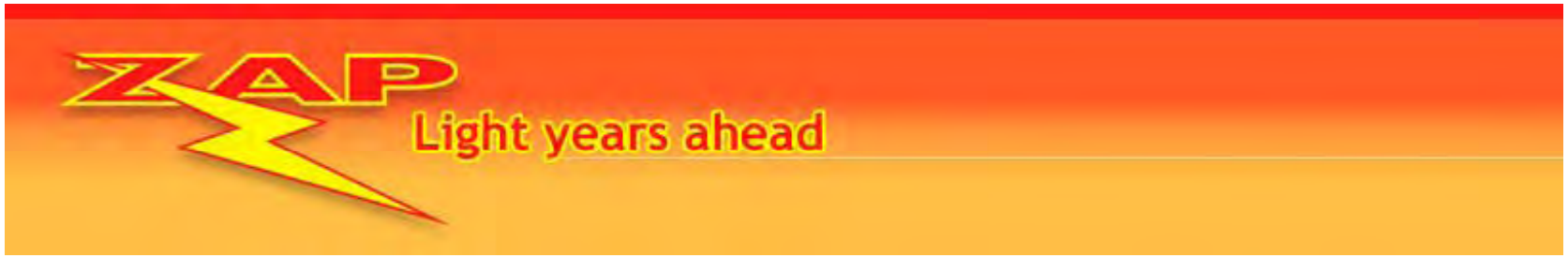
The controller monitors the current load to the motor, it therefore becomes the sensor that detects the door limits as well as the obstructions that can occur on any part of the door.



Runtime Calibration.



Calibration of runtime is needed to determine an approximation of the physical limits.



During the initial open calibration cycle, the controller is measuring the run time to the upper limit.

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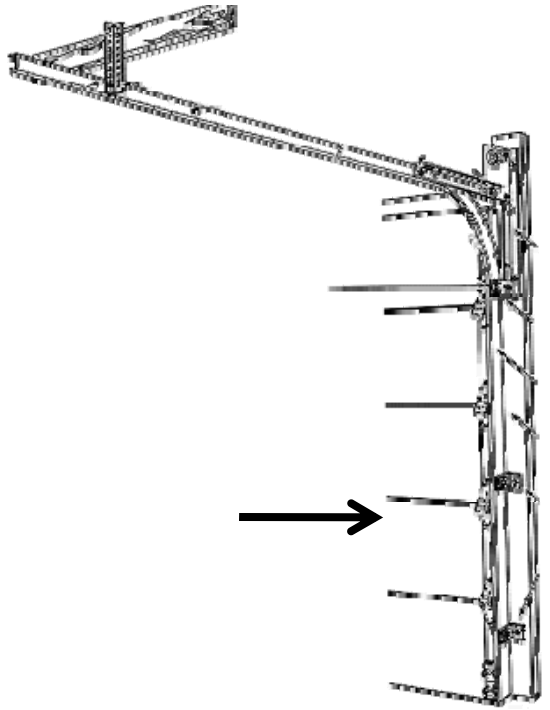
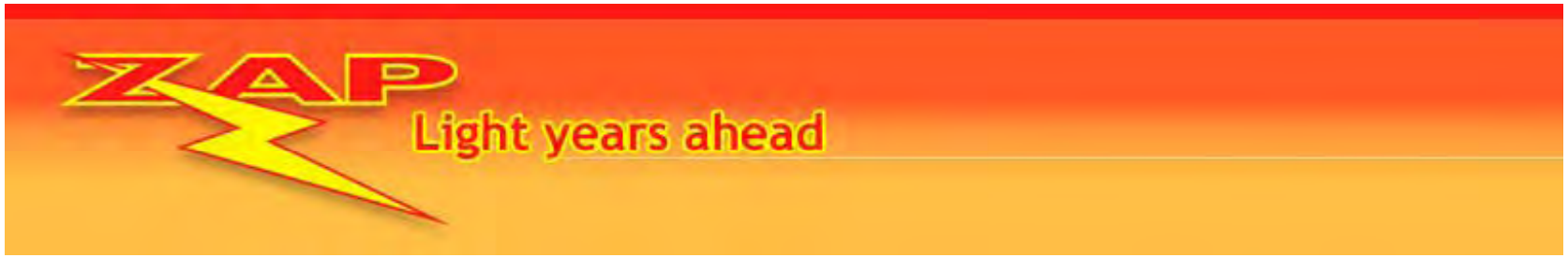
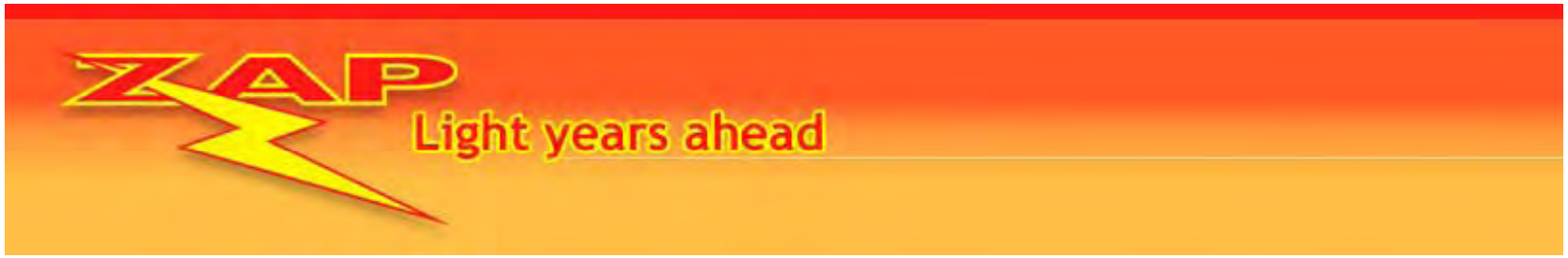
Approximately half way through the first cycle of operation, you will notice that the door slows down.





This slow down is called a speed change point.



After completing the first upward cycle, the run time to the upper limit is stored into memory.

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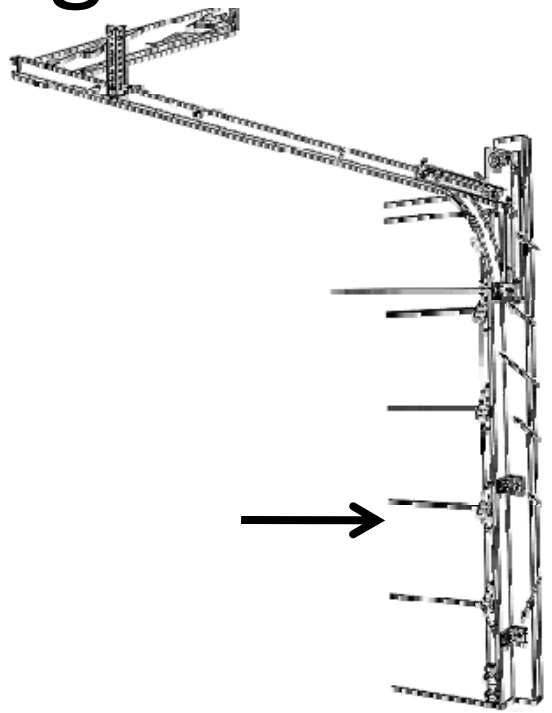
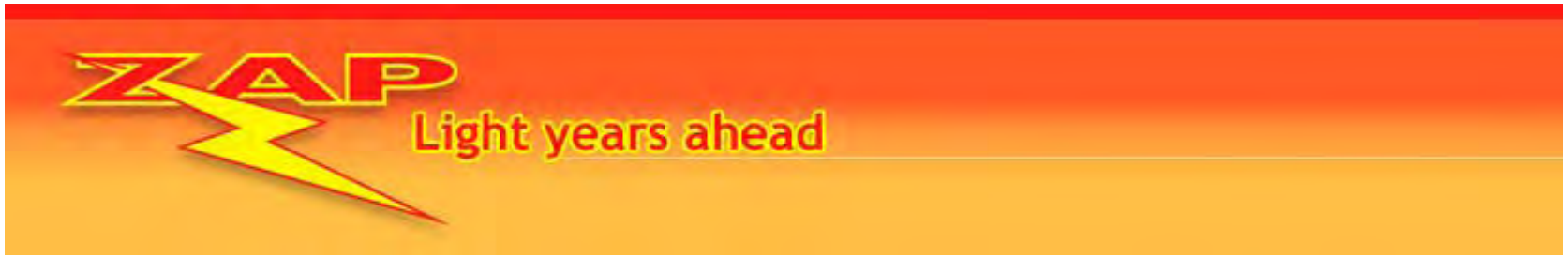
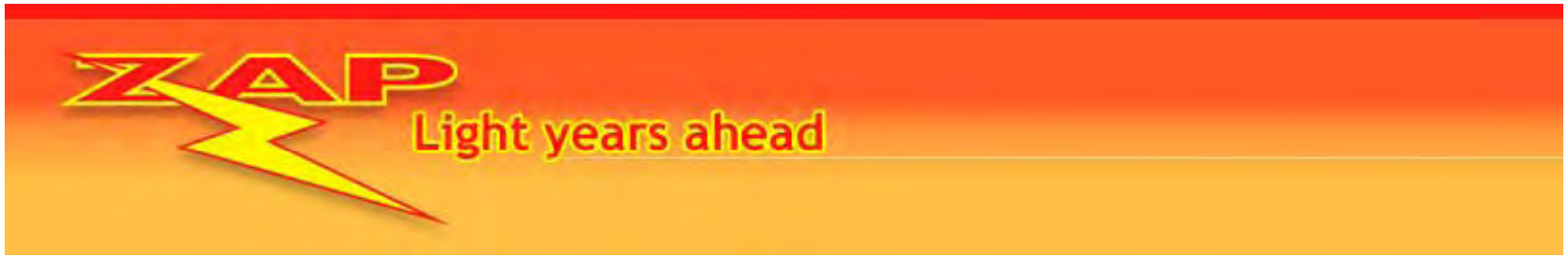
The same thing occurs on the closing calibration cycle.

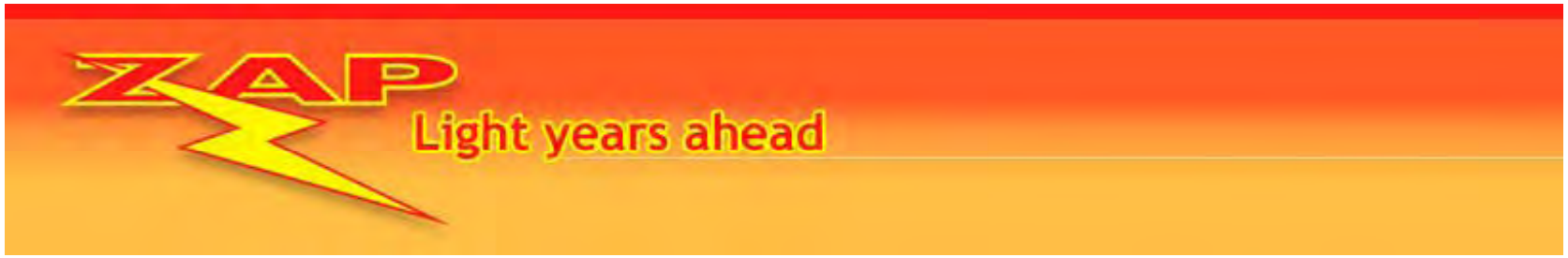




After completing the first close cycle, the close run time is stored into memory as well and is compared to the open run time.



During the second calibration run, the run times are verified against the first set of run times.



It takes 2-3 complete cycles to fully calibrate the run time.

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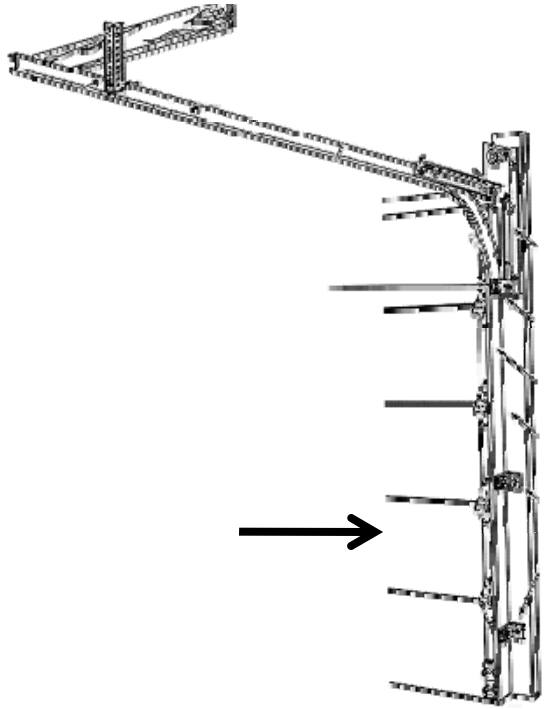
Once the operator has fully calibrated the run times, the controller moves the opening speed change point to within seconds of the end of the calibrated open run time.



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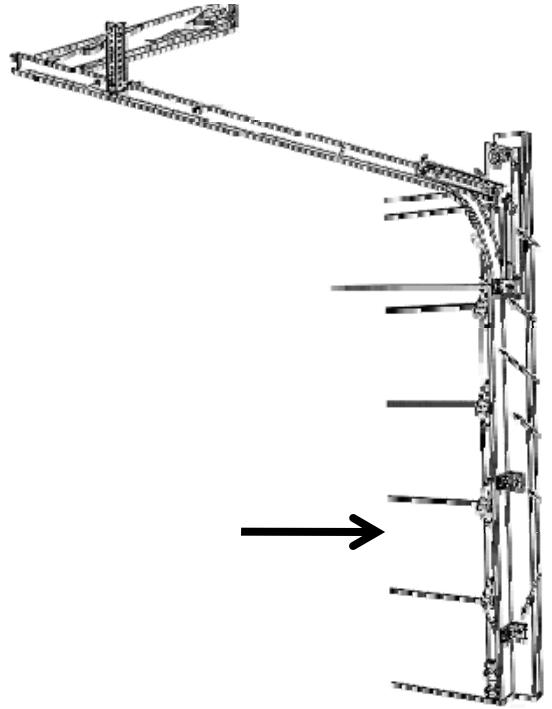
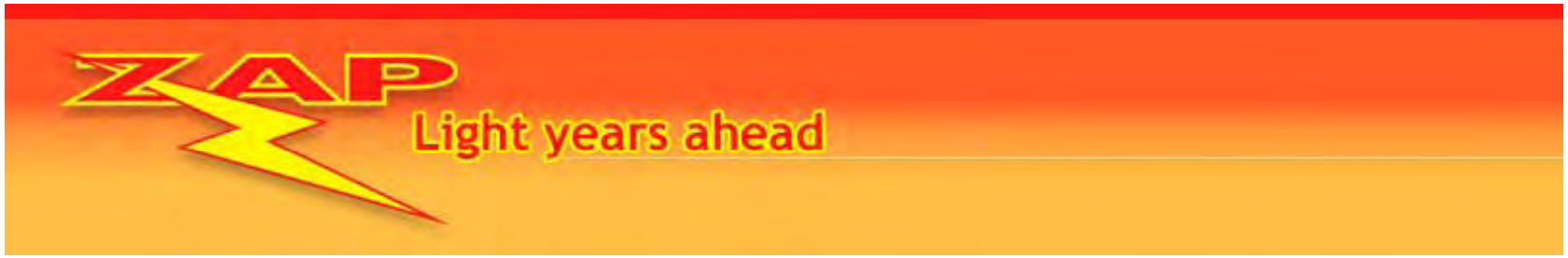
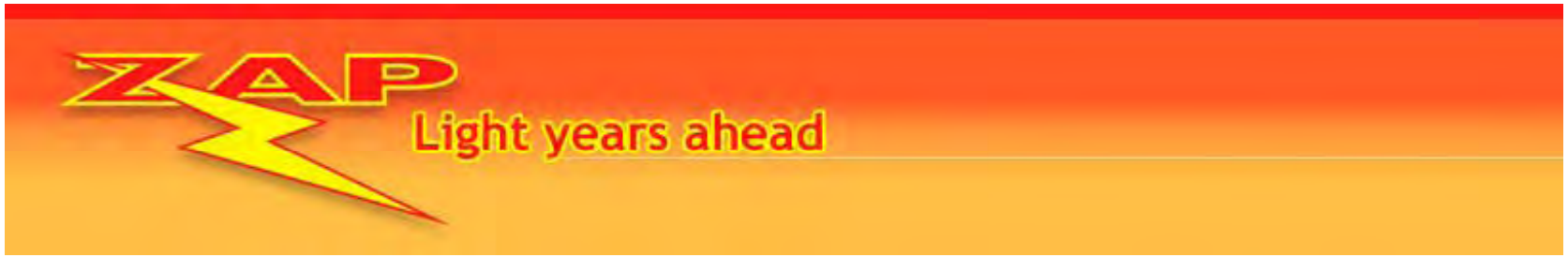
On the close Cycle, the closing speed change point is also moved to within seconds of the end of it's calibrated run time.



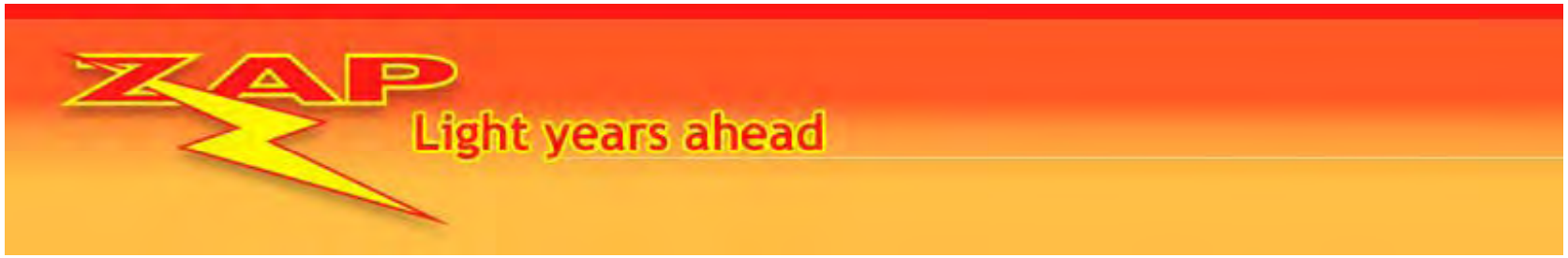


This is how the controller knows where the limits are and where to stop.



This is why proper tension of the drive belt is important.

We will cover this aspect later in the training.



Automatic reversing and safety stop

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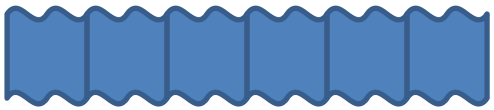
Picture if you will, current flowing through the motor.



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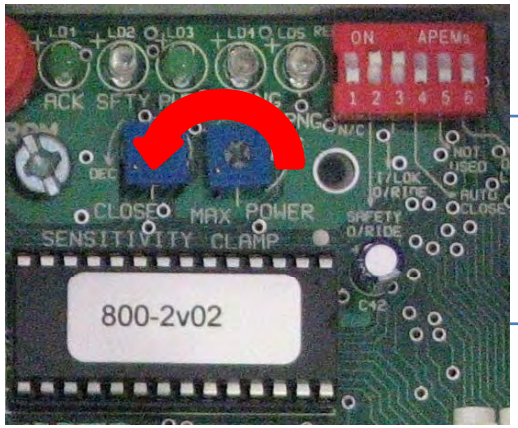
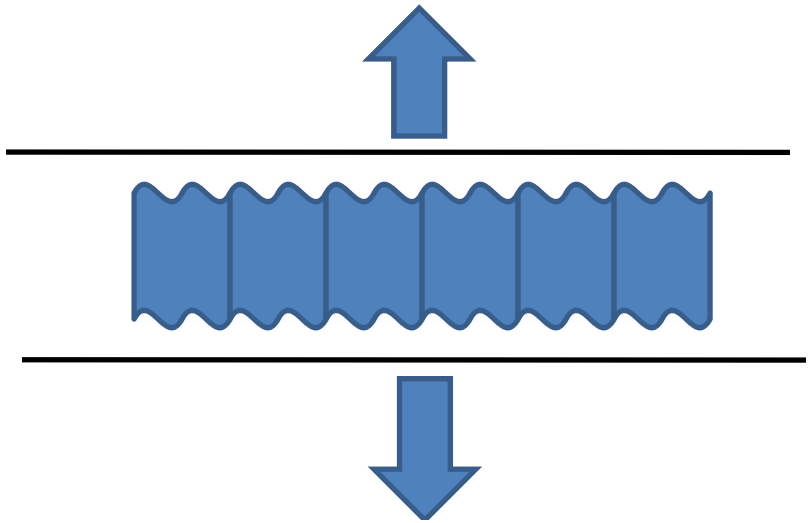
If you increase power at the power potentiometer, it opens up the range of power that can be applied.



Power
Range
Adjustment



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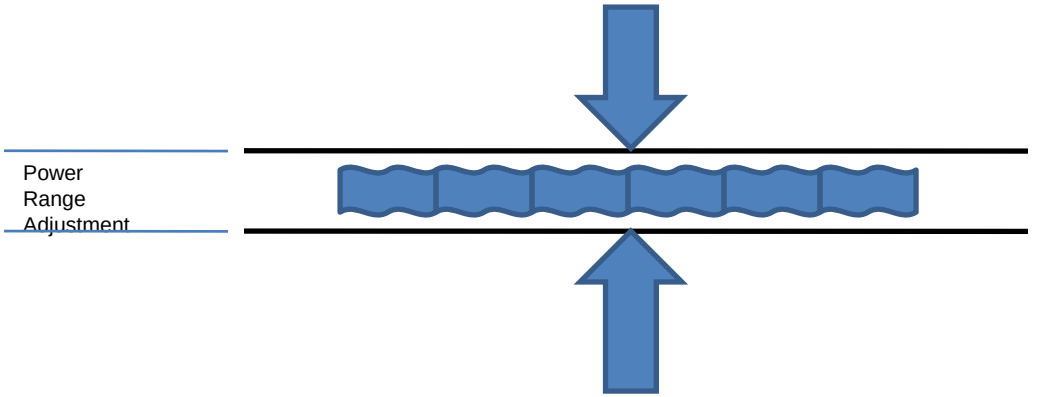
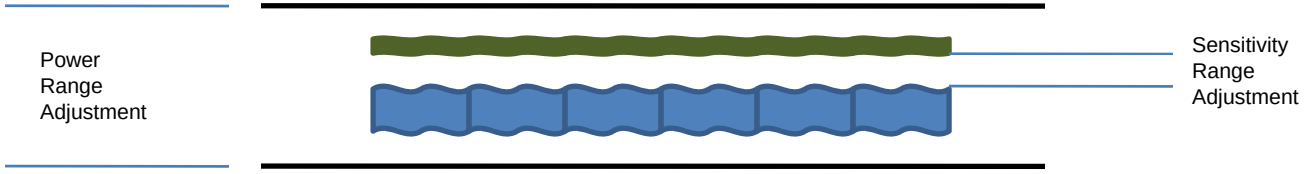
If you decrease power at the power potentiometer, it shortens the range of power that can be applied.



While the operator is running, the current flow is monitored by the controller, as indicated by the green line below.



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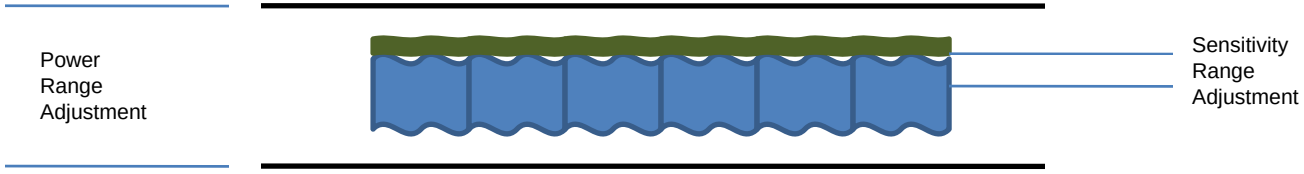
If the door meets an obstruction and the power demand spikes above the sensitivity potentiometer setting, it causes a certain function depending upon the cycle of the door.



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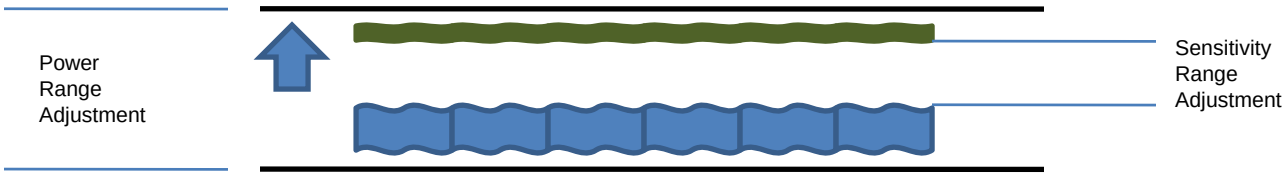
If you decrease the sensitivity on the sensitivity potentiometer, it opens up the tolerances of the detection.



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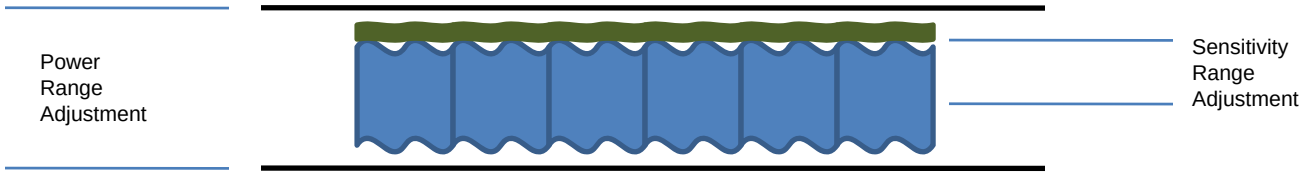
Requiring a bigger spike in power demand to reach the sensitivity setting.



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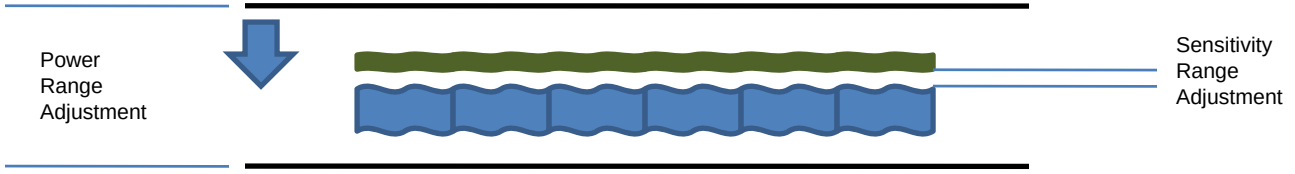
If you increase the sensitivity at the close sensitivity potentiometer, it narrows the tolerance of the detection.



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Requiring much less of a power demand spike to detect the obstruction.