

# THE FUNDAMENTALS OF LINEAR ACTUATORS

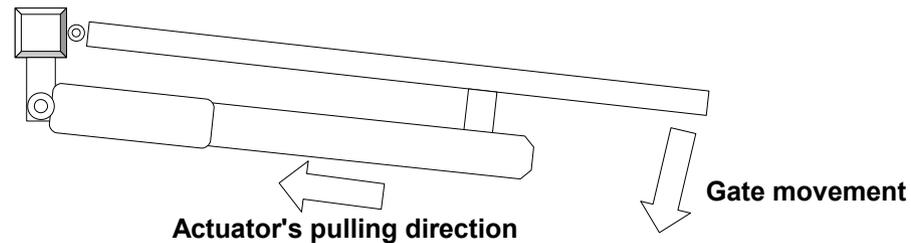
Understanding the importance of its geometry and how it works

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# THE TRUTH ABOUT LINEAR ACTUATORS

Linear gate actuators, electromechanical or hydraulic, exert a tremendous amount of force in order to swing a gate, especially at the beginning of the strokes. They pull and push in a different direction than the gate movement.



Additionally, they are attached to the gate relatively close to the hinge, having very little leverage to move or hold the gate in position. You can experience this condition by comparing the strength required to move a gate if you hold it from the end and pull, against standing behind the gate post, grabbing the gate at an arm's length and pulling.

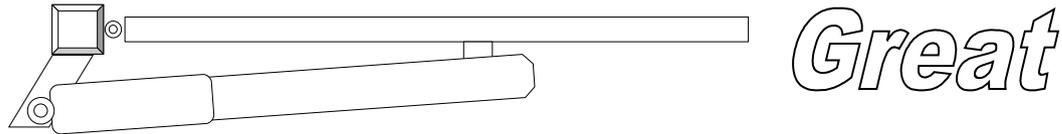


You will find that, from this position, keeping the gate from moving when a small force is applied at the end of the gate leaf, is almost impossible.

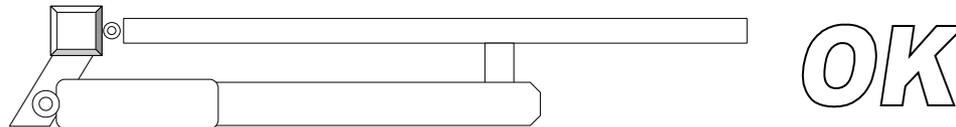


# LEVERAGE... MAKE OR BREAK

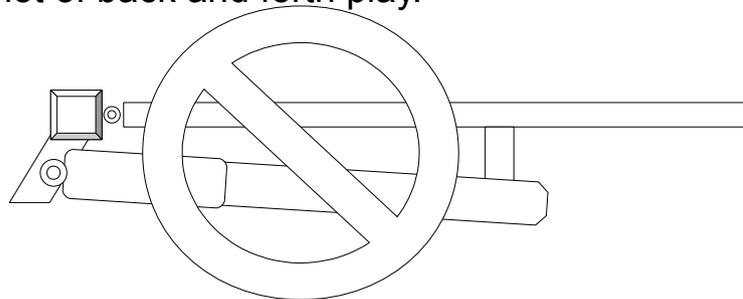
The angle of the actuator in reference to a fully closed gate is very important because this determines how much leverage the actuator is going to have in order to hold the gate in a fully closed position as well as how much leverage is going to have to start the opening motion.



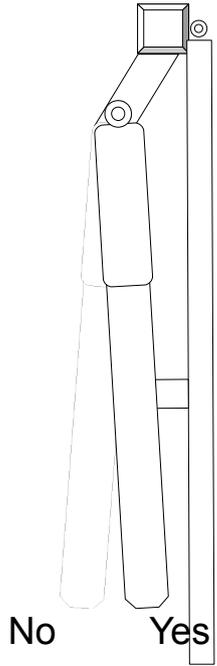
The best leverage is achieved when the actuator is pointing towards the gate. Having the actuator completely parallel to the gate is also acceptable.



Having the actuator point away from the gate reduces the leverage requiring the operator to exert more force to move the gate and impedes the actuator from being able to hold the gate in position making the leaf "bounce" at the end of the stroke and having a lot of back and forth play.

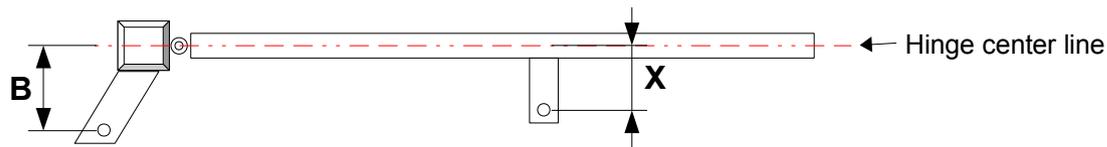


# GEOMETRY IS THE LAW

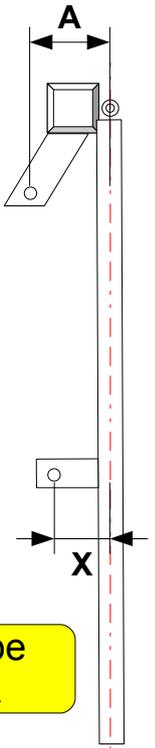


The same principle applies when the gate is fully open. If the actuator is pointing towards the gate, the gate will be a lot sturdier than if the actuator is pointing away from the gate.

These angles are determined by the **INFAMOUS BRACKET GEOMETRY**. The distance from the attach point on the gate bracket to the center line of the gate hinge should never exceed the distance of the actuator's pivot point on the post bracket to the gate hinge center line on both the fully open and fully closed positions.



**X should not be greater than B**



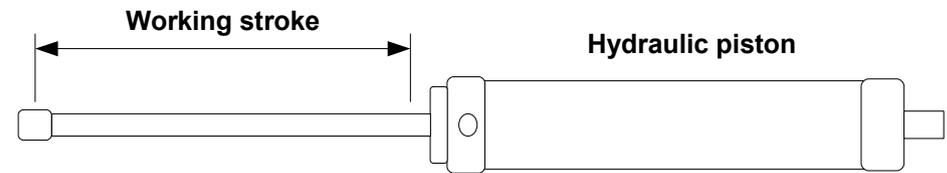
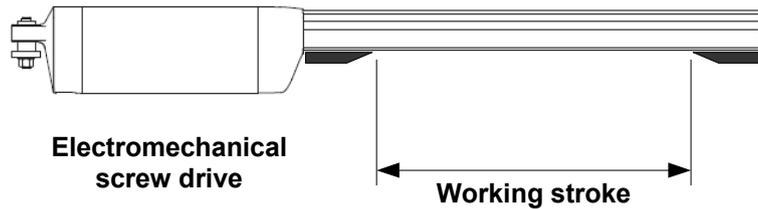
**X should not be greater than A**

Hinge center line

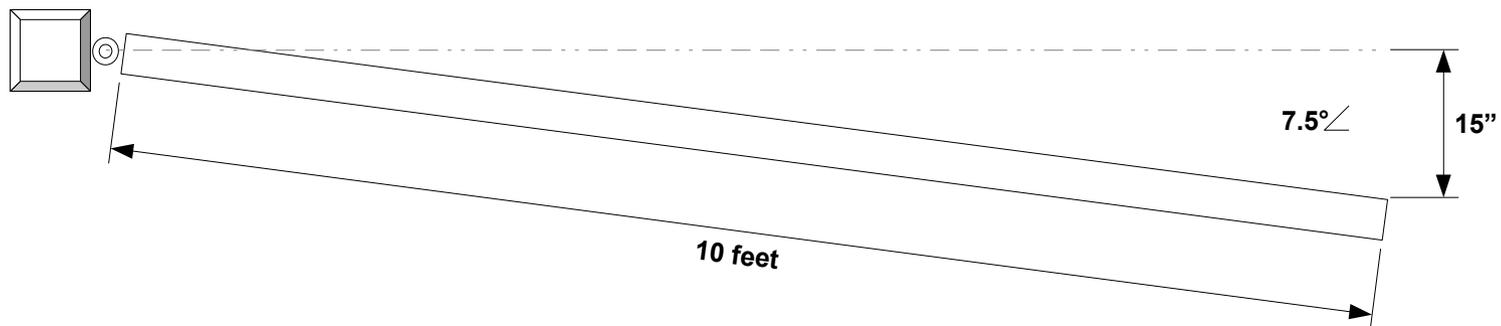


# NO EYE-BALLING!

Actuators are designed to use the maximum stroke possible. Its speed, gate size and weight capacities are calculated with taking in consideration the maximum usable stroke of the operator. Any reduction in operation stroke directly affects and reduces the operator's capacities.



On an actuator that has 12 inches of working stroke, each inch of stroke moves the gate 7.5 degrees. On a 10 feet long gate, 7.5 degrees translate to over 15 inches of travel at the tip of the gate.



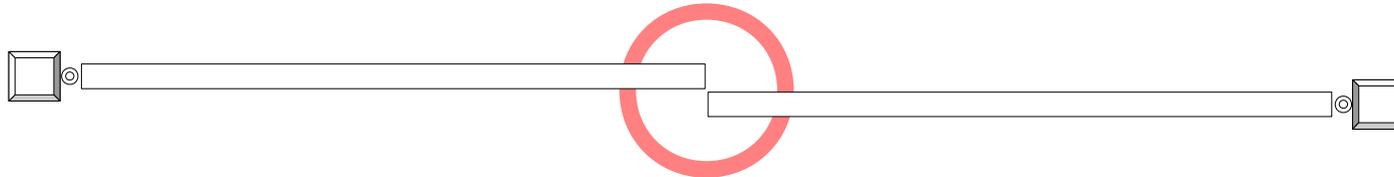
Based on these facts, visualize what impact both on performance and gate movement can 1/2" deviation could have on an installation.



# IMPERFECT WORLD... IMPERFECT CONDITIONS

It is very common to have imperfect conditions at the installation site

**Offset gate posts**



**Gate posts not square**



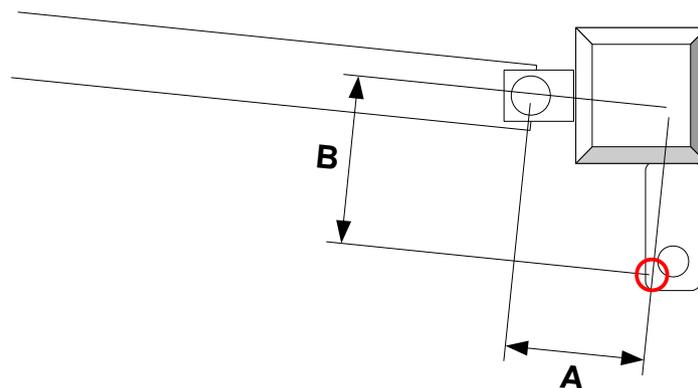
The most commonly overseen mistake by experienced installers is using the gate post as angle reference when placing the post bracket. If, when the gate is in its fully closed position, the gate frame is not square with the gate post, the gate post can no longer be used as angle reference.

# WHEN BEING SQUARE IS BEING GOOD

As we all know, the gate bracket placement uses the gate's hinge pivot point as distance reference. This distance is measured at 90 degree angles, away from the center of the driveway (A), and in towards the property (B).



When the gate, in its fully closed position, is not square with the gate post, A and B, while remaining the same value, are not in the same location as when the gate is square with the post.



# RECAP

Be as precise as possible when measuring your geometry – Fractions of an inch here and there can have a big impact on the performance of your actuator

Observe the angle your actuator has in reference to the gate – If your actuator doesn't have enough leverage, your gate can be “spongy” at the ends of the strokes and can potentially damage internal components.

Use as much of the stroke as possible to open the least degrees possible – Moving a gate the same distance with a shorter stroke, is like accelerating a car from a standstill while in a gear other than 1st.

Measure your geometry being square with a fully closed gate, not necessary the gate post – always measure the geometry with a fully closed gate, square with the gate.

