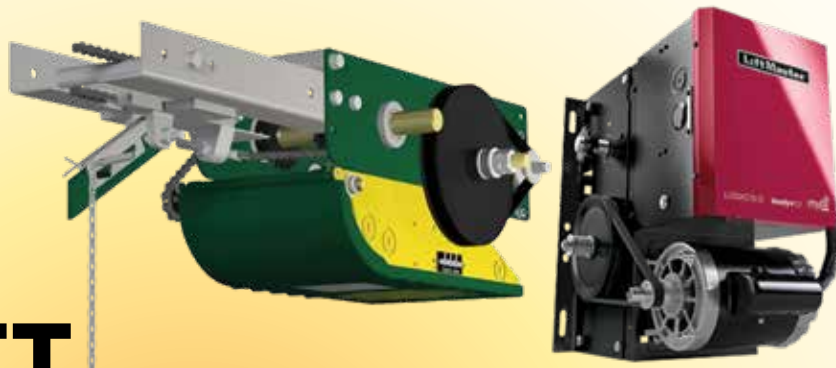


TROLLEY VERSUS JACKSHAFT OPERATORS



Editor's note: A respondent from our D+AS Readership Survey suggested that we publish a story on trolley and jackshaft operators; we thought it was a great idea. We reached out to technical guru Roy Bardowell to learn more about the pros and cons of both types of openers.

By Roy Bardowell, CDDC

What distinguishes a trolley operator from a jackshaft operator?

The number one difference is the speed and torque of each operator type. It's really all about the varying torque requirements and determining how to move the door at a safe speed.

There are also significant differences between residential and commercial jackshaft operators. For example, there are greater safety concerns regarding commercial doors because of the extreme sizes and weights.

The speed required to move a door safely dictates how fast an operator output shaft can rotate. To determine the proper door speed, there are many additional factors that need to be considered, including the size of the cable drum and the size of the pipe used on the rolling doors.

Most commercial installers are aware of the pitfalls when placing a jackshaft on a door using standard lift tracks. Typically, they will only install a jackshaft when high lift or vertical lift tracks are employed. A trolley-type door operator is the perfect match for a door utilizing standard lift tracks.

If a homeowner insists on installing a jackshaft operator with a standard lift track, what should installers do?

One thing they can do is pitch the horizontal tracks a bit so the door tends to roll out of the horizontal tracks. There is a simple formula installers can follow: To pitch a track, raise the rear of the tracks .25 inches for every foot of the door height. A 12-foot high door can allow three inches of pitch, so the formula would be $.25 \times 12 = 3$ inches. For a seven-foot high residential door, the formula would be $7 \times .25 = 1.75$ inches (or round up to two inches).

What if you are unable to pitch the track?

If you cannot pitch the back of the track, then pusher springs are an option. Keeping the tracks clean will help maintain good flow for the rollers, especially in environments where there is a lot of dust.

Particles that fall in the toe of the horizontal tracks can cause resistance that will block the rollers. To help with this, I always rub a towel along both horizontal tracks. That extra step will help remove a great deal of dirt from each toe on the horizontal tracks.

Keeping the track clean will also help the door roll from the horizontal tracks consistently and evenly. When you install a jackshaft on a residential door, this should always be done. Adding grease to the tracks can complicate the issue because the grease will collect all floating particles. When it gets cold, the grease turns into the perfect wheel chocks that will then block the rollers.

Why is the size of the cable drum important?

When customers call me and say they want an operator that, for example, will move a door at six inches per second, they are baffled when my first question is "What cable drum is used on the door?"

The cable drum width is essential because big cable drums have a larger circumference allowing more cable to be moved per rotation. A smaller cable drum will move less door per rotation.

How is the operation of a trolley operator different from that of a jackshaft?

A trolley operator is connected directly to the door top panel and is always in control of the

door. That means the worm gear reducer within a residential motor head or on commercial GH models can help slow and hold a door in place by acting as a brake.

With commercial jackshaft operators, there is no direct connection to the door; to hold a door in place, a solenoid brake is usually required. The connection is achieved by using sprockets and roller chain.

For residential jackshafts, the operator is usually coupled to the door shaft. However, most manufacturers offer a chain solution option. By winding the shaft, you can pull the door open. It should be noted that unwinding the cable doesn't necessarily close the door; it can result in a crashing door, which is the most hazardous condition we can encounter.

Is it possible to unwind the cable drums with a jackshaft operator without the door falling?

That is the fundamental flaw with cables and cable drums. You can pull a door up using a cable, but you cannot push a door down using a cable. In this scenario, gravity is the only physical property responsible for the closing of the door. Trolley operators offer pull up and push down capability, which is the ideal option to maintain true control of a door.

What is the difference in output speed between the two opener types?

Trolley operators exhibit an output speed of approximately 120 RPM, which in turn will move a door at seven to nine inches per second. Modifying the drive sprocket on the output shaft will change the door speed. To do this, I recommend contacting manufacturer tech

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A hand chain operator is never acceptable! Most residential garage doors utilize standard lift tracks as shown in this image.

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support. Any improper modification could have severe consequences on the entire system.

Jackshaft operators have traditionally exhibited an output speed of 37-45 RPM when the operator is designed to be coupled directly to the door shaft. With residential jackshafts, it can be coupled either at the end of the shaft or in the center. The internal reduction in the operator must then be modified to produce an output shaft speed of 22-24 RPM.

That is the absolute fastest speed that should be used for jackshaft operators. For a sectional or rolling type door, the 37-45 RPM speed has been engineered to provide enough torque. Either door type will require different sprocket sets that will move the sectional or rolling doors at the best and safest speed.

How do the connections differ for the two operator types?

UL 325 requirements dictate that any residential door operator must include an inherent reversing mechanism that will reverse a door when obstructed while closing. A trolley operator connects directly to the door shaft and will detect an opposing force and reverse or stop the door. They also offer the unique ability to lock a door closed.

On residential operators, the courtesy lighting is located at the motor head of the operator, which is centered in the garage and distributes the lighting evenly. Many home builders ask their electricians to prewire a garage. Typically, they place the power outlet near where the motor head should be mounted. A homeowner would need to hire an electrician to wire power to the side of the door for a residential jackshaft.

On the other hand, a jackshaft operator can

only connect to the door shaft and will only reverse the door when the cable slackens. It also requires an additional electric lock to secure the door from being lifted from the outside.

The courtesy lighting is external, and installers may need an extension cord to run the power to the side-mounted jackshaft. Interestingly, manufacturers recommend that you should NOT use an extension cord.

What are the minimum requirements for a jackshaft operator installation?

You need about two inches of room above the highest arc of the door for residential installations and four to six inches above the door for commercial installations. Jackshafts need between 12-15 inches of space on the sides of the door tracks.

Is it appropriate to install a jackshaft operator on a door with standard lift door tracks?

At one point in my career, it was not appropriate. Today, however, there are three manufacturers that offer residential jackshaft operators, and there are certain situations for which it has become a viable option.

What are the advantages of jackshaft openers?

The main reason jackshaft openers are growing in popularity for residential installations is because they save valuable ceiling space. Homeowners can use that ceiling space for other purposes, such as adding storage systems, extra lighting, or for adding dropdown stairs to an attic.

The placement of the operator is tucked in the corner of the garage and is barely visible. If a ceiling beam is hanging down, or there is simply no room for a trolley operator, then a jackshaft operator is the best solution. Additionally, any excessive noise the operator makes does not travel upward into a bedroom like it does with a ceiling mounted trolley operator.

The advantages are more profound with commercial doors. H- and GH-type jackshaft models have a built-in hand chain that permits manual operation when there is a power outage. J-type models have a simple pull chain release to switch the door to manual operation. With commercial trolley operators, you need to use a ladder to reach the arm. Residential releases on the trolley can be reached from the floor.

Jackshaft openers can be shipped by courier if you need one right away. They are more expensive, so there is potential for better profit margins. Jackshaft operators are the only opener that can be applied to any rolling type door using a shaft as the driving element.

What are the disadvantages of jackshaft openers?

They can be less convenient. Many new home builders prewire a garage for an operator with a trolley-type operator in mind. They can be more dangerous; some jackshafts have exposed moving parts that could cause harm should a person touch them during operation. Most trolley operators cover their moving components so that they cannot be easily accessed.

Jackshafts cost more than the average traditional trolley-type door operator. Residential jackshafts lack good courtesy lighting options and require an external electric lock to secure the garage and home when closed.

What are the advantages of trolley openers?

Trolleys have a long history and a proven track record of success in the field. Additional advantages include:

- There is a wide selection; many companies manufacture trolley operators.
- By employing longer rails you can place the operator further back to avoid a beam or other obstruction.
- New home builders prewire the houses for trolley operators by installing a power outlet in the ceiling near where the motor head should be.
- They are less expensive than a jackshaft making them easier to sell.
- They are securely connected directly to the garage door top panel, providing the best control of the door.

Are there any disadvantages of trolley openers?

Yes. A few disadvantages are:

- Professional installing dealers now must

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Quick snapshot: Trolley versus jackshaft openers

Trolley-type	Jackshaft-type
Connects directly to the door.	Can only connect to the door shaft.
Can reverse when the door is obstructed.	Can reverse when the cable slackens.
Can lock a door closed.	Requires an additional electric lock.
Courtesy lighting is at the operator head.	Courtesy lighting is external.
Power outlet is in the ceiling near the operator head.	Power typically must be run with an extension cord.

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compete with big box DIY stores who are selling the same or similar products and undercutting the prices.

- Most of the time, they can only be connected to doors using standard lift tracks, but there are methods that can be employed to use a trolley operator on doors with a short high-lift tracks.
- Homeowners may have objections regarding the ceiling space they take up and the excessive noise and vibration.
- Chains that are overly lubricated might drip oil or grease on a homeowner's vehicle.
- You need to carry seven, eight, or 10-ft.-high rails to cover most door heights. Rails of this size can be difficult to transport.
- UPS and FedEx will not transport anything over 108" in length (the length of all trolley rails).

Is it ever appropriate to replace a trolley operator with a jackshaft operator?

If the original installation was done correctly, and the system is working properly, then I don't see any reason to swap a trolley operator out for a different type. However, my son (at Luxor Doors) said that recently, he has received more than a dozen requests from homeowners that want to remove their traditional trolley-type operator and replace it with a jackshaft operator.

That is something I never would have considered. As more Tesla cars are being purchased,

it's a great alternative. Some Tesla models have swing-up doors (also called gullwing or butterfly doors), and they can make contact with an operator head or rail when parked inside.

What are the key technical guidelines that an installer should know?

Commercial doors that are extremely wide should not be motorized by a trolley operator because of the extreme load placed on the center of the top panel. Jackshafts rotate the door shaft, which has a pair of cables that are connected to both sides of the door bottom panel. That method pulls the door upwards evenly with the load shared equally.

There are different rules for residential and commercial applications. Some residential door installers with experience installing trolley operators may not be familiar with the problems associated with installing a jackshaft operator on a sectional door utilizing standard lift tracks.

When motorizing a sectional door with standard lift tracks, you should use a trolley operator, not a jackshaft operator. When there is no room on the side for a jackshaft, a trolley-type operator should always be considered first.

It is critical that any technician interested in installing jackshaft openers be educated on the application and technical guidelines required before performing this type of installation.

When did jackshaft operators become more widely accepted for residential applications?

When LiftMaster launched their myQ technology, jackshaft operators became much more popular. In the United States, people are now installing jackshaft operators regularly. However, before any technician installs one, they should consider any potential risks.

What are the potential risks?

Door cables can be thrown off the cable drums. If that happens, then the door can drop and crash to the floor, which is an extremely dangerous situation. Explaining the mechanics on why the cables can jump off a drum is complicated, but if this happens, then the potential safety and property damage implications are extensive.

What is the most important thing to consider when deciding between a trolley or jackshaft opener?

There are specific operator models made for specific doors; this should always be respected. Call your operator supplier for advice before attempting something out of your area of expertise. ■

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