

AC Technology Improves Lift Truck Performance and the Bottom Line

The job of any good lift truck operator is to store and retrieve pallets as efficiently and cost-effectively as possible. However, the operator is only as good as the lift truck. Without the right equipment, even the best operators may fall short of optimal performance.

Simple “Care and Feeding”

The most efficient operations use lift trucks that are easy to own and maintain. With that philosophy in mind, The Raymond Corporation has developed trucks with AC technology. Raymond’s latest development is the exclusive *ACR System™*, which incorporates the benefits of AC technology and ergonomic design.



Compared to DC-powered lift trucks, AC trucks have lower maintenance and parts costs, fewer and less frequent maintenance needs, increased battery performance, better control and acceleration, and superior truck utilization rates. All of these factors improve the bottom line for the user.

Easy Maintenance

An AC lift truck has simpler and less frequent maintenance needs than a DC truck. Unlike a DC motor, AC motors have no wearable parts — no brushes, spring sets or commutators. In fact, AC motors only have a stator and a rotor.

Annual Maintenance Comparison

DC Motors	AC Motors
Parts <ul style="list-style-type: none"> • Brush Sets • Spring Sets • Commutators 	Parts <ul style="list-style-type: none"> • No Brush Sets • No Spring Sets • No Commutators
Labor <ul style="list-style-type: none"> • Monthly Cleaning • Removing Carbon Dust • Monthly Brush Inspections • Replacing Brushes & Springs • Servicing Commutators 	Labor <ul style="list-style-type: none"> • No Monthly Cleaning • No Carbon Dust • No Brushes • No Brushes & Springs • No Commutators

The brushes and commutator are the highest wear items on a DC truck. Brushes have to be changed regularly and cause messy carbon dust that needs regular cleaning to prevent build-up in the motor compartment. Replacing or adjusting a commutator is a labor-intensive process that requires disassembling and rebuilding the motor.

By eliminating these parts, technicians find AC lift trucks faster and easier to service. Plus, there are no wearable parts to order and stock for an AC motor, so parts costs are lower, too.

In addition, AC controllers provide on-board, self-checking capabilities for regulating motor performance. This ongoing monitoring minimizes downtime by making it simple to troubleshoot problems and improving the truck’s reliability.

Bottom Line:

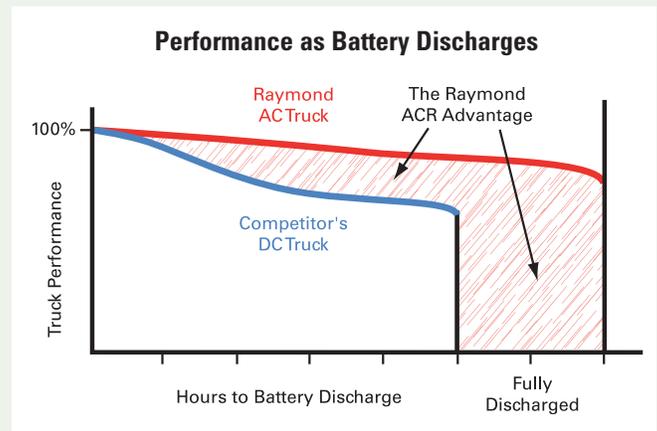
- AC trucks spend less time being serviced and more time moving pallets
- Lack of wearable parts reduces costs
- AC controllers make troubleshooting fast and simple, improving the truck’s reliability

Energy Efficiency

AC motors are inherently energy efficient. In fact, an AC motor has at least 10 percent higher operating efficiency than a DC motor. AC motors draw fewer amps, so batteries last longer. Raymond's *ACR System* also uses regeneration, which captures the momentum of the lift truck and turns it into electrical energy to recharge the battery. All this means that users replace batteries less often, and that they may be able to use smaller, less expensive batteries.

Raymond's *ACR System* also delivers more runtime per battery charge because there is significantly less reduction in truck performance as the battery discharges. Unlike DC-powered trucks that gradually lose performance as the battery discharges, lift trucks with the *ACR System* maintain high performance until the battery is fully discharged.

Because the truck maintains peak performance longer, operators can do more work in a shift. Longer peak performance also reduces the need for extra batteries, premature battery changes, and unnecessary charging costs.



Bottom Line:

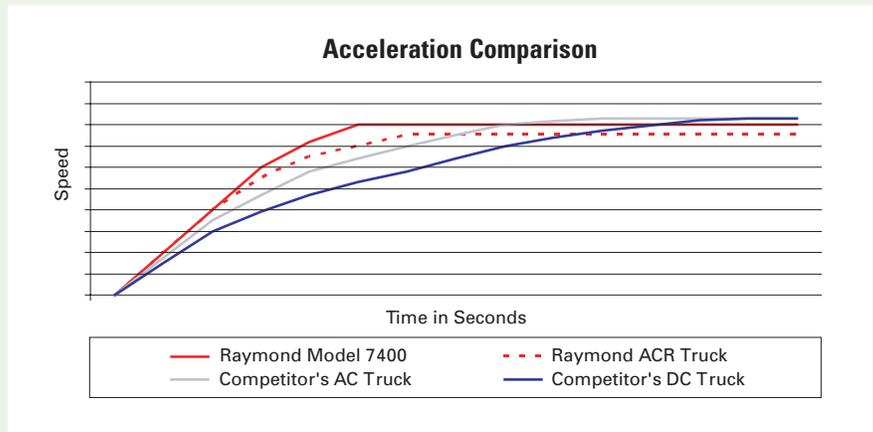
- Fewer battery changes means that the AC lift truck has less downtime and higher utilization rates
- Extended peak performance of the battery optimizes the operator's productivity per shift
- Costs are reduced by eliminating unnecessary battery changes and by reducing energy requirements through fewer battery charges
- Costs may be further reduced by using smaller batteries or fewer batteries

Superb Control and Acceleration

A cycle of storing and retrieving a pallet involves a lot of turns, stops and accelerations. AC technology maximizes the efficiency of this process by providing quicker acceleration, smoother direction changes and better load handling.

AC increases the rate of acceleration, so operators get up to top speed faster. DC motors have a time delay when changing speed or direction, most noticeable when the operator plugs to a stop and reverses direction. AC motors don't have this delay, so they respond instantly to acceleration, stops and direction changes. The truck's instant response improves the operator's control of the load, making pallet positioning more precise. This precision is most important when right-angle stacking loads at high elevations.

With improved acceleration and control, operators of AC lift trucks can shave seconds off each cycle. Considering how many cycles are completed by each operator, each day, each year, that adds up to a lot of additional productivity that a DC lift truck can't provide.



Bottom Line:

- **Faster acceleration improves productivity of the operator**
- **Better control of the load saves on positioning time and increases productivity**

Cool Running

Brushes and commutators cause heat in a DC motor. Because AC motors don't have those parts, they run cooler, making the work compartment cooler and more comfortable for the operator. Comfortable operators are more productive and need to take fewer "cool-off" breaks.

Heat from the DC motor also decreases the life of some parts, such as wires, brakes and bearings. AC truck owners don't have as many heat-related parts failures, which translates to less maintenance and lower parts costs.

Bottom Line:

- **Cooler compartments make operators more productive and increase utilization rates**
- **Fewer heat-related parts failures reduces maintenance downtime and decreases parts costs**

Whether for 24/7/365, heavy duty applications or intermittent, light duty ones, AC lift truck owners can enjoy cost savings, energy efficiency, improved uptime and overall improved productivity. These benefits can ultimately improve the bottom line. AC lift trucks are the trucks everyone — operators, service technicians, plant operators and managers — can agree on.

Lift truck productivity ultimately affects the bottom line. To calculate the cost of productivity, consider the costs associated with each of these factors, comparing an AC truck to a DC truck.

Calculate the Cost of Productivity

Cost Factors	AC	DC
Cost of Accessories		
• Batteries		
• Wearable Replacement Parts		
• Heat-worn Replacement Parts		
Utilization Rates		
• Downtime due to battery changes (in hours)		
• Downtime due to routine maintenance (in hours)		
• Number of loads moved per shift, per truck		
• Runtime per battery charge, per truck (in hours)		