



**STRONG PARTNERS.
TOUGH TRUCKS.™**

HYSTER® ROBOTICS

FREQUENTLY ASKED QUESTIONS



1. What are the best scenarios for a Hyster® robotic lift truck?

- Multiple shifts
- Repeatable paths
- Long runs
- Dedicated head count

2. What applications are not appropriate for robotic lift trucks?

- Outdoor environments
- Rough floors
- Environments less than 32 degrees
- Facilities where the walls, rack and building columns are blocked by stacked loads
- Ramps greater than 4 degrees

3. What roles would be best to speak to about automation?

- Operations
- Automation engineers
- C level
- Safety personnel
- Cost improvement engineers
- Plant managers

4. Why are businesses buying automation?

- Relatively quick ROI
- Increases put away accuracy
- Reduces accidents
- Solves the increasing problem of not being able to find suitable/available employees
- Stays consistent in applications with a high employee turn over
- Allows you to reassign operators to more engaging positions

5. Are robotic lift trucks safe?

- Models follow all guidelines of B56.5
- Machines default to stop
- Senses ground level items as well as suspended items (such as a ladder on the back of a burden carrier).

6. Can robotic lift trucks pass each other in the aisle?

Yes, but there are safety clearances as set by B56.5.

7. What happens when the battery gets low?

The unit completes its current assignment and automatically goes to a battery room. The horn sounds or the unit sends an e-mail/text to alert a battery change or charge is needed.

8. Do I need perfect pallets?

No, the counterbalanced stacker can handle disposable pallets. An end rider requires Grade B or better pallets with 600 lbs. (Note, there are ways to handle lighter pallets.)

9. Do I need to modify my facility to get a robotic lift truck to work?

No, the existing infrastructure is used to program and guide the truck.

10. If a path change is needed does Hyster need to make the adjustment?

For most changes, no. Alternative paths are built in during installation. However, major changes do require assistance from Balvo.

11. What is lead time?

26-36 weeks after purchase

12. What are terms?

30% down with order
30% with shipment of 1st unit
30% with shipment of last unit
10% upon system acceptance

13. Can I lease a robotic lift truck?

Yes

14. Who does the maintenance?

All Hyster® robotic lift trucks are purchased with our standard Class III warranty. The warranty covers both the basic lift truck and components installed to make the unit robotic. An Extended Protection Plan can be purchased to extend the warranty up to 5 years or 10,000 hours, whichever comes first.



15. How many units are needed to justify the system?

The system is fully scalable. An application can start with one unit and then add on as desired.

16. Typically, how many robotic lift trucks does it take to do the work of one human operator?

Under most circumstances, 1.3 robots are required to do the same work of one operator.

17. Can the robotic technology be added to any Hyster® truck?

Currently the technology is only available on the counterbalanced stacker (S1.0-1.5C), end rider (B80Z^{HD}) and tugger (LO7.0T).

18. Who can provide service for this robotic technology?

Any certified Hyster® dealer.

INTEGRATION

1. What type of surface and grade is best for a robotic lift truck?

- flat, free of bumps
- no light reflection
- no macadam or vinyl (due to static energy)

2. Will the robot interface with my WMS or ERP?

Yes, it uses a custom connector and Combox.

3. How long does integration take?

6 to 9 months depending on the number of trucks, type of application and site complexity.

4. Can I adapt the robotic technology to an existing Hyster® truck?

No, existing trucks are not optimized to receive this technology due to precision and speed distort issues.

OPERATIONS

1. How does the robotic lift truck manage loading/unloading? For example, recognizing when docks need to be emptied.

Ground sensors and drive-by scanners report to the Robotic Operations Manager to dispatch robotic lift trucks within zones.

2. How does the truck navigate?

- Uses the environment as a map
- Targets, ground wires and reflectors are not necessary

3. How long does a fully charged battery last?

Lead batteries last 8 hours depending on the missions. LTO batteries last 2 hours.

4. Do the robotic lift trucks need to be monitored during programmed operation?

No. The unit is fully autonomous when performing programmed tasks.

5. How does the truck switch from automated to manual mode?

The operator can either push a button, step on the truck platform or pull down the tiller.

6. What happens if our network is down or the battery dies?

Trucks finish their circuit reservation then stop. Batteries do not fully discharge. The system reserves a small amount of charge to allow it to return to recharge area. In the unlikely case where an operator removes the unit from the system and the state of charge is extremely low, there are safe guards that force the unit into a creep mode. Following restart, the unit resumes mission priorities.

COST INFORMATION

1. What is the average cost of a lift truck with robotic technology?

Basic catalog price range starts at \$100K.

2. How long will it take to see a return on investment?

The customer could achieve a return on the investment in 12-18 months in a 3-shift application or 18-24 months in a 2-shift application.

3. Do robotic lift trucks replace humans?

No, they do not replace employees; the trucks allow existing workers to perform more meaningful tasks.

4. How long do robotic lift trucks last?

With proper maintenance, the Hyster® robotic lift trucks should last 4-5 years. Life limits are associated with truck limitation on operating hours.

