



Q16 System Description

Q-Drive model Q16 is a sixteen axes control system. The system consists of the following components:

→ Control console. This is a color touchscreen based console with hard buttons for GO, STOP, NEXT, and ESTOP. A keyswitch turns the system on and off. All operational data appears on the touchscreen.

→ PLC module. The PLC contains and executes the program that makes the Q-Drive function. This module also contains the various input and output devices and power supplies associated with the system.

→ Invertor module. Since we normally supply three phase AC motors, we supply invertors to power them. The invertor module contains up to four invertors sized according to your needs, along with circuit breakers and power contactors.

→ Winch or other powering device. We supply winches that can operate deck wagons, linesets, hoists, elevators, turntables, or anything that is cable or chain operated. We also offer powered roller tubes, hydraulic and pneumatic setups, anything that makes movement and can be electrically controlled. The encoder and overtravel limit switches are mounted on these devices.

→ We can also supply mechanical hardware as needed, such as turnaround blocks, dogs and knives, or anything you may need.

→ We can configure a Q16 system in two ways:

- Permanently wall mounted. PLC module is mounted in a hinged door NEMA 1 enclosure, as is each invertor module. These cabinets are permanently powered and fixed in one location.
- Flight case touring package. One flight case that contains the PLC module and one or more flight cases containing the invertor modules, with access to component status on the front and all connectors on the back. Removable doors protect everything when in storage or shipment.

→ The Q16 system is an easy to use, compact system that runs more axes but retains the simplicity of the Q4 system. It is also a great system to learn with. See our Education page.

Q16 Technical Specifications

Number of cues stored	199
Processor	Mitsubishi A series
Invertors	Mitsubishi E500 family
Winch Motors	SEW Eurodrive with built in encoder and brake
Winch Drums	Grooved for cable specified
Power Requirements	20 to 300 amps @ 208Y120 three phase 60 hz
PLC module flight case dimensions	36" H x 30" W x 24" D
Invertor module flight case dimensions	Size as required
Portable or wall mounted cabinet dimensions	
PLC cabinet	36" H x 30" W x 8.75" D
Two 2 HP invertors cabinet	30" H x 24" W x 8.75" D
Two 5 HP invertors cabinet	36" H x 30" W x 8.75" D
Other invertor combinations can be provided. Call for sizes.	

System Parts List:

- 1 ea console
- 1 ea PLC module flight case and invertor flight cases as needed
- Or
- 1 ea PLC cabinet and invertor cabinets as needed
- Winches as specified
- 1 ea 100' control cable
- 1 ea 100' power cable per invertor flight case
- 1 ea 3' power tails with female connector per invertor flight case
- 1 ea power distribution unit if required
- 1 ea 100' motor cable per winch
- 1 ea 100' encoder cable per winch
- 1 ea 25' interconnect cable per winch
- 1 ea control pickle with 100' cable



Cost Savings

Q-Drive promotes cost savings in several ways. The time it takes to pay back the investment varies, but in many cases the system will have paid for itself and be saving you money within two years.

Crew reduction

Q-Drive can reduce the number of running crew people needed because one operator can simultaneously move several scenic units, each of which might normally need two or more people to push them. This applies to rolling deck units, flying pieces, anything that would be moved by crew people. And crew reduction savings pay off each week during the rehearsals and the run.

Save time during load-ins

Q-Drive saves time in load-ins over many other automation systems because it is fast to set up and simple to initialize and program. The components plug together with a minimum of connections, as shown on the System Diagram page. Putting in the basic program settings for each axis is quick and simple. We make hooking up drive cables and similar hardware processes faster and easier by providing a pickle switch on a long cord that a crew person can have right at a motor. This also eliminates needing a person on the console in addition to that crew person during these steps.

Save time during rehearsals

Q-Drive saves time in rehearsals compared to many systems, particularly limit switch based systems, because writing and changing speed and position in cues is so easy. By writing rough cues prior to rehearsal with the motors off, cue writing can take place while other work is being done. Then, in rehearsal, these cues can simply be modified on the fly, just as with light cues. This not only saves time, it keeps the rehearsal flow going, and it allows directors to see changes immediately.

The combination of all of these savings is quite large. Add to these savings the precision of motion and the perfect repetition of movement, and Q-Drive is a great value for any show with moving scenery.

In rehearsal, cues can simply be modified on the fly, just as with light cues. This not only saves time, it keeps the rehearsal flow going, and it allows directors to see changes immediately.

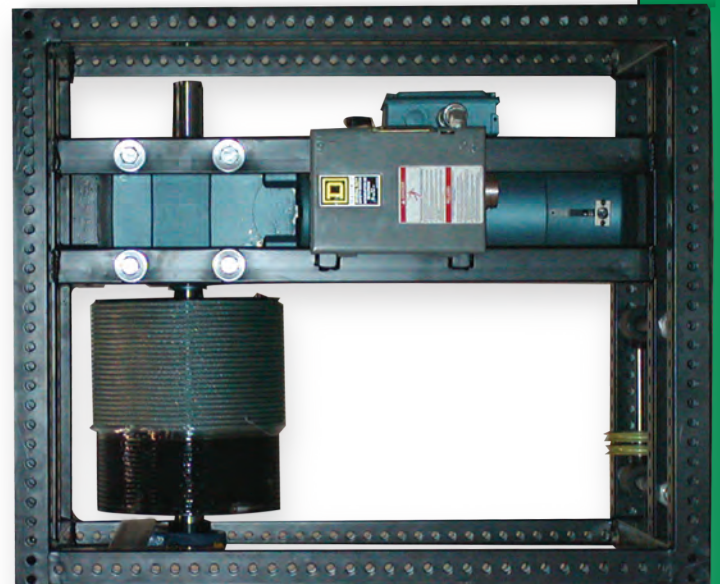
Q-Drive is available on a rental basis. We offer short or long term rentals of equipment, and we can provide training on site or in our shop. Many shows, particularly industrial shows, plays and musicals, opt for renting to keep costs down when there is no ongoing need for automation equipment.

Q-Drive rental packages ship out in road cases, with all the necessary cables and equipment, so setting up on site is as simple as plugging everything together and getting started. In many cases we can preinitialize the system with each channel optimized for your use, making setup even easier.

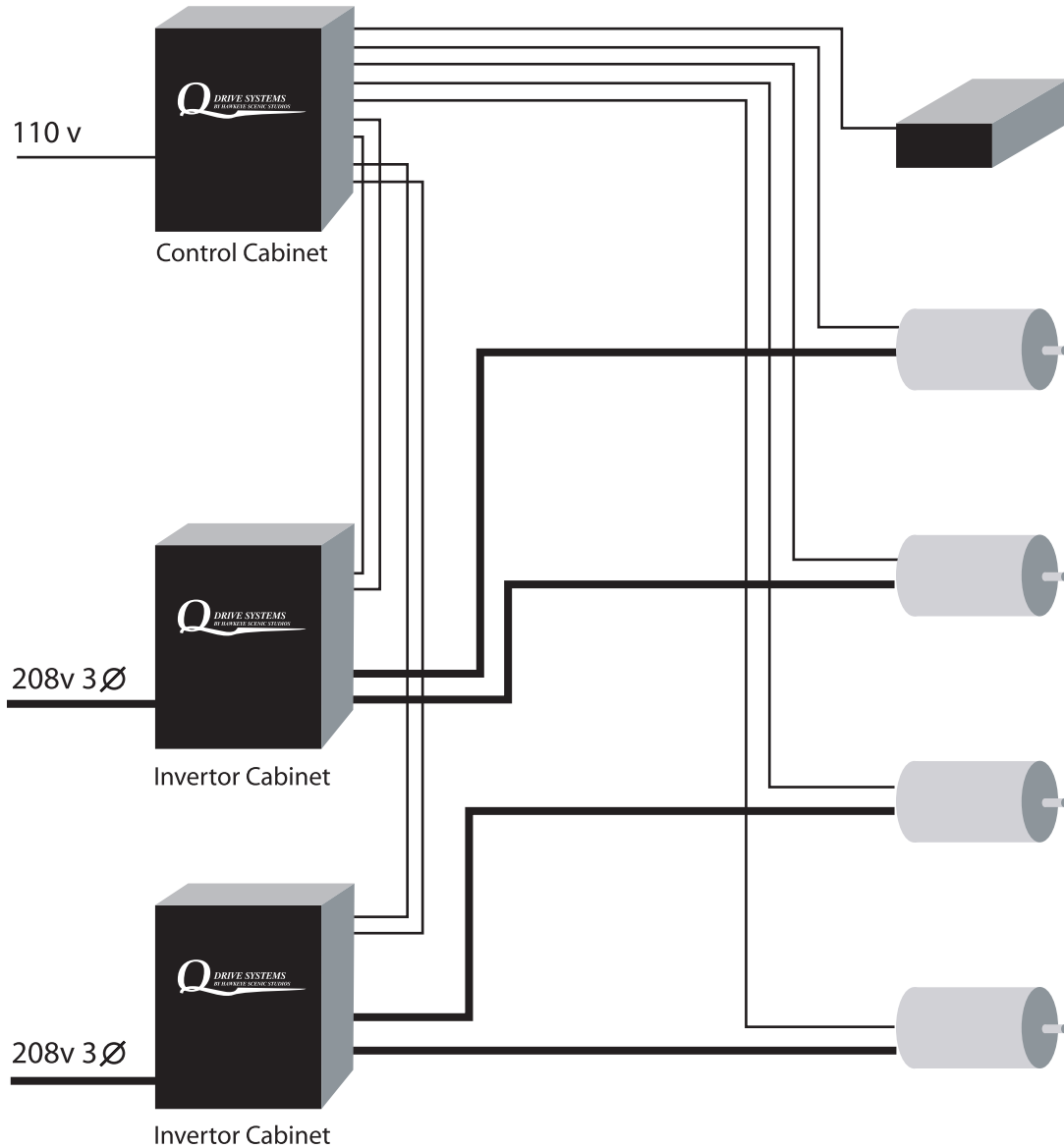
We have the following equipment for rent:

- Q-4 systems
- Winches suitable for deck wagons, turntables, flying, etc.
- Roll tubes suitable for rolling drops or scrims from the top.

Call us for pricing at 773.529.1800
or email us at info@hawkeyescenic.com



System Diagram



Further Information

Thank you for your interest in the Q-Drive. Being technicians ourselves, we were not satisfied with the time and precision problems with limit switch based systems and the complexity and reliability of some computer based systems. We finally decided to develop our own easy to use system, and address what we saw as a gaping hole in the market. There are currently no systems that can compare to the the Q-Drive's solid performance and affordability.

We also designed this system to be extremely flexible. With 30 years in the business, we realize that no two projects are alike. In fact, that is why we love this business - for the new challenges that arise on a daily basis. We will work with you to design a system that will address your requirements specifically. A touring show has vastly different needs than an industrial or university, and we have designed this system to be able to address the issues of all.

If you would like further information about what we can do for you, please feel free to call or email us. We'd love to hear about your project.

Sincerely,

Rich Bynum
President
Hawkeye Scenic Studios

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Overview

The Q-Drive Scenery Automation System provides an inexpensive control of one or more motorized winches or other powered devices at the push of a button. Each device, or axis of motion being controlled travels towards a preset position at a preset speed with safety and precision. Q-Drive comes in two models, the Q4 and the Q16. The Q4 operates up to four axes of motion, while the Q16 handles up to 16 axes.

Recording cues is much like recording cues on a light board. Running a show is a matter of pushing the GO button on cue, and the moving scenic units travel to their desired locations. We can typically train an operator to record and play back cues in thirty to sixty minutes.

Simple to set up

Q-Drive is very simple to set up. The components connect together using plugs that cannot be misconnected. The process of initializing the settings in the system to accommodate the motors and distances being used is accomplished on the touchscreen using walk through menus. Q-Drive does not require any user-performed field wiring, ever.

Simple to operate

Q-Drive functions like a modern day lighting system. You can record up to 199 cues, each containing both target position and speed of travel for each axis of motion being controlled. Recording cues is much like recording cues on a light board. Running a show is a matter of pushing the GO button on cue, and the moving scenic units travel to their desired locations. We can typically train an operator to record and play back cues in thirty to sixty minutes. Some automation systems are so complicated that you need a factory trained operator. We train your operators either at our shop or at your theatre.

Overview

Reliable

Q-Drive is an extremely reliable system. The heart of the controller is a programmable logic controller (PLC) computer that is designed for rough service industrial applications. This makes Q-Drive very rugged and resistant to damage from life backstage and on the road. The PLC operating system is also extremely stable, much more so than available PC operating systems. In fact, we have never yet had a software crash for any reason in any of our systems, at home or on the road. The components and wiring are all chosen for long life and reliability.

Precise

Q-Drive controls have an accuracy of within two hundredths of an inch. Every time a cue is played back, the scenery behaves exactly as it should. Cues with many units moving always look the same, no matter how complex.

Each axis of motion has a digital encoder that feeds position information to the PLC at all times. Since the PLC knows where each unit is and how fast it is moving, the PLC can initiate soft starts and stops, easing a moving unit gently into its desired position. The scenic unit therefore stops precisely on target regardless of direction or speed of travel.

Economical

Q-Drive makes writing and changing cues very fast. Cues can be written in advance without moving anything, and then quickly altered in rehearsal. To record a new position for a unit, jog it to its new location and record the cue. To change a speed, type in the new speed and record the cue.



Safety

With overtravel limits, several ways to stop, constant position information, and multi-level security codes, Q-Drive is among the safest scenery automation systems available. With all these built-in safeties you can relax, knowing that your system will perform safely and accurately, every time.

Safety is of utmost importance when machines move scenery. A problem with the execution of a light or sound cue is jarring, but a motion control problem can cause damage or injury. While developing the Q-Drive, we have been very conscious of these safety issues.

Q-Drive contains several levels of safety to prevent problems:

- Software recorded (soft) travel limits for each axis of motion. Q-Drive will not allow a unit to move beyond these limits, whether in a cue or in JOG mode. Nor will the system record a cue with a position outside of the soft limits.
- Hard overtravel limits. A mechanical limit switch on the unit switches off the power contactor to that axis if tripped. Normally the hard overtravel limits are set just outside of the soft limits. These protect against any kind of potential electronic failure in the ON mode.
- Controls monitor loads. If Q-Drive senses an excessive load, that axis stops immediately. A mechanical problem or an unexpected obstacle will be detected, and many problems prevented.

Safety

→ Three ways to stop. Each axis has a STOP button on the screen. The console has a master STOP button. Finally, the console also has an ESTOP button that kills power to the entire system.

→ Constant position information. The screen shows the realtime position for each axis as a cue progresses. A unit moving (or not moving) when it should be doing the opposite is immediately apparent.

→ Encoder data loss stops that axis. If a unit's encoder signal stops arriving at the control system, that axis stops moving, because without encoder data, the control system cannot know where the unit is.

→ Multi level security codes. Users can log in at three levels. Level 1, play cues and jog only; Level 2, also record cues; Level 3, also system setup and initialization. This prevents unauthorized people from altering cues or system settings.

→ Keyed on-switch. If the key is removed, the system cannot be turned on.

→ Optional GO ENABLE, STOP or ESTOP buttons or switches. Additional controls for use on or near the unit being moved. These can also be built into scenery pieces to serve as a deadman switch for an actor, for example.

Our many built-in safety features make Q-Drive among the safest scenery automation systems available, without adding more complexity.



Education

With the rapid evolution of industry technology, having access to up to the minute equipment is crucial to the success of today's technical theatre students.



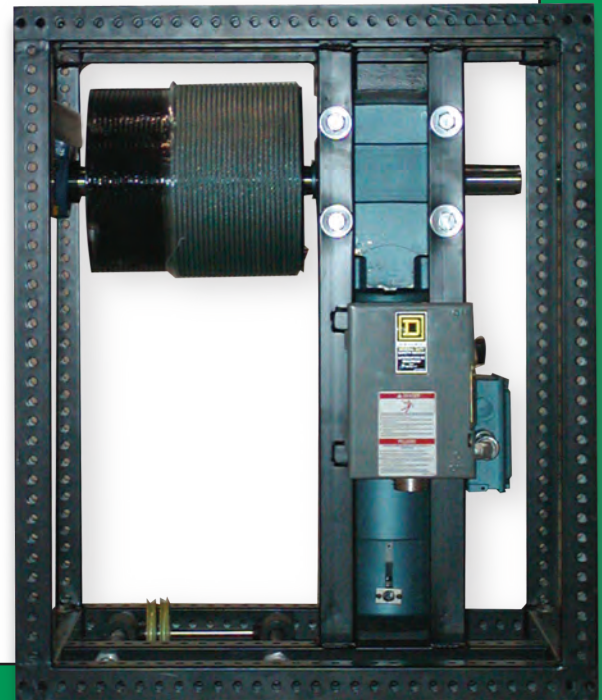
Today's technical theatre student will be working with entertainment industry technology as it rapidly evolves for his or her entire career. These students must have access to the latest in control systems - be they lighting, sound, or motion. Computer controlled scenery automation has increasingly been the norm in many areas of the industry since it came into use over twenty years ago, since before your undergraduates were born. Yet many schools do not possess these systems.

The Q-Drive system is perfect for student use both in production and in a lab setting. Q-Drive offers many features:

- Very fast learning curve. Many people operate Q-Drive with only thirty to sixty minutes of training.
- Multi-layered redundant safety systems. Q-Drive is very safe to learn with. Turn to our Safety page for details.
- Compact size. The control console and equipment racks are much smaller than most other systems with similar features, making them at home in cramped booths and backstages as well as classrooms.

- Plug and play operation. This system cannot be misconnected. Connect the system components with the interconnect cables provided, initialize the system settings using the step through menus on the screen, and you are ready to start recording and playing cues. No field wiring. Ever.
- Use existing winches. Many existing motor controllers can be wired to work with Q-Drive, so your existing stock of motors and controllers will still work for you. Or we can supply controllers for existing motors.
- Control more than motors. Q-Drive also controls hydraulics and pneumatics.
- Student participation. Some customers elect to build their own winches. We will work with you to help you configure your project to work with Q-Drive. This affords your students the opportunity to become even more hands-on.

Q-Drive is the ideal computer controlled scenery automation system for colleges. Building a whole system from scratch is a daunting process that never seems to fit into the busy production calendar. Like building a car from parts, many of us can do so, but who has the time? Plus, Q-Drive has been tested and debugged and used extensively in many venues, so you know it works right out of the box.



Q4 System Description

Q-Drive model Q4 is a four axes control system. The system consists of the following components:

→ Control console. This is a touchscreen based console with hard buttons for GO, STOP, NEXT, and ESTOP. A keyswitch turns the system on and off. All operational data appears on the touchscreen.

→ PLC module. The PLC contains and executes the program that makes the Q-Drive function. This module also contains the various input and output devices and power supplies associated with the system.

→ Invertor module. Since we normally supply three phase AC motors, we supply invertors to power them. The invertor module contains up to four invertors sized according to your needs, along with circuit breakers and power contactors.

→ Winch or other powering device. We supply winches that can operate deck wagons, linesets, hoists, elevators, turntables, or anything that is cable or chain operated. We also offer powered roller tubes, hydraulic and pneumatic setups, anything that makes movement and can be electrically controlled. The encoder and overtravel limit switches are mounted on these devices.

→ We can also supply mechanical hardware as needed, such as turnaround blocks, dogs and knives, or anything you may need.

→ We can configure a Q4 system in three ways:

- As portable cabinets. These cabinets can be free standing or on casters. Typically the PLC module is on one cabinet, with two to four invertors in each invertor module.
- Permanently wall mounted. Cabinets are as above but permanently powered and fixed in one location.
- Flight case touring package. One flight case that contains the whole system, with access to component status on the front and all connectors on the back. Removable doors protect everything when in storage or shipment.

→ The Q4 system is an easy to use, compact system that fills the needs of many theatres. It is also a great system to learn with. See our Education page.

Q4 Technical Specifications

Number of cues stored	199
Processor	Mitsubishi FX2N series
Invertors	Mitsubishi E500 family
Winch Motors	SEW Eurodrive with built in encoder and brake
Winch Drums	Grooved for cable specified
Power Requirements	20 to 300 amps @ 208Y120 three phase 60 hz
Flight case package dimensions	36" H x 30" W x 24" D

Portable or wall mounted cabinet dimensions

PLC cabinet 36" H x 30" W x 8.75" D

Two 2 HP invertors cabinet 30" H x 24" W x 8.75" D

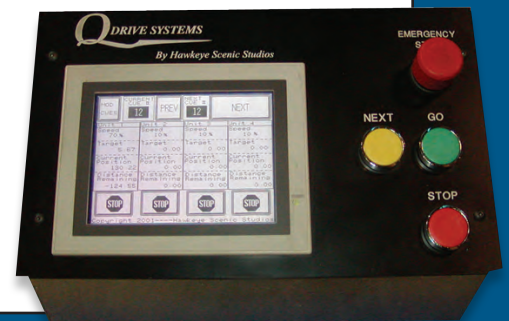
Two 5 HP invertors cabinet 36" H x 30" W x 8.75" D

Other inverter combinations can be provided. Call for sizes.

Console dimensions	8" H x 12" W x 10" D
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System Parts List:

- 1 ea console
- 1 ea flight case
- Or
- 1 ea PLC cabinet and up to two inverter cabinets
- Winches as specified
- 1 ea 100' control cable
- 1 ea 100' power cable
- 1 ea 3' power tails with female connector
- 1 ea 100' motor cable per winch
- 1 ea 100' encoder cable per winch
- 1 ea 10' interconnect cable per winch (portable cabinets only)
- 1 ea control pickle with 100' cable





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