

# Power Transmission Solutions for Stage and Theater Applications

Warner Electric

Stromag

Bauer Gear Motor

Boston Gear

Ameridrives



## ALTRA INDUSTRIAL MOTION PROVIDES ADVANCED POWER TRANSMISSION SOLUTIONS FOR STAGE AND THEATER APPLICATIONS

The well recognized brands of Altra Industrial Motion supply technically advanced limit switches, safety brakes, geared motors, speed reducers and universal joints for a wide range of theater and stage applications including above stage and below stage machinery along with moveable seating systems.

Suspended loads are in motion above the stage throughout most productions. Altra products provide superior performance on various types of hoists that raise, lower and move overhead lighting, sound equipment, scenery and curtains during shows. Altra solutions are also utilized on a wide range of below stage equipment, including scissor lifts, ball screw podium lifts, winch-driven podium lifts, chain lifts, and stage rotators that raise, lower and rotate very heavy sections of a stage depending on the performance.



The companies of Altra Industrial Motion are industry leaders in braking, gearing, controlling and load transmitting products. Warner Electric and Stromag have adapted their product lines to meet the special needs of stage and theater applications. Robust Bauer Gear Motor, Boston Gear and Ameridrives solutions are designed to provide staging, rigging, and trussing OEMs with years of reliable, trouble-free service.

Altra provides complete sales and engineering support to customers around the world from the very first concept to the detailed planning, design variation phase and commissioning.

Advanced Altra power transmission solutions are hard at work in some of the most prestigious, state-of-the-art theaters around the world, including La Bastille in Paris, the Oslo Opera House, the Tobin Center for the Performing Arts in San Antonio Texas, and the Royal Opera House in London.

For detailed information about power transmission solutions for stage and theater applications from Altra Industrial Motion including case studies, literature, and service manuals, visit

**[www.AltraStageandTheater.com](http://www.AltraStageandTheater.com)**



## ALTRA DRIVETRAIN TECHNOLOGIES PLAY AN IMPORTANT ROLE IN STAGE AND THEATER PRODUCTIONS... WORLDWIDE



### Warner Electric Brakes and Sensor

For decades, Warner Electric's low noise emission safety brakes have been a preferred choice by many global stage and theater equipment manufacturers.

A variety of single and redundant braking solutions is offered, including FENIX S Series Brakes; FENIX Series Brakes; ERS VAR 15 Series Brakes for use on all types of upper and lower stage equipment.

Within a range from 5 Nm up to 5000 Nm all Warner Electric brakes noise emissions are below 50dB(A) and comply to the most recent regulations and directives such as BGV C1, DIN 56950-1; DGUV V17; EN81-20/50. All units feature convenient "plug & play" installation. The new WES sensor is now installed on all our braking solutions offering contactless monitoring.



### Stromag Controls and Sensors

Stromag's unique Series 51 geared cam limit switch, based on a planetary gear with form fit connections inside, is particularly popular for use in a wide range of stage and theater applications. It demands the highest standard of safety as per DGUV V17 and is used to provide precise positioning of upper and lower stage machinery.

With a wide range of possible gear ratios up to 16000 turns and different number of contacts it offers significantly improves for switching off the point hoists of upper machinery or for spindle lifts in the lower machinery. The switches are available with integrated encoder technology or can be customized to meet other advanced application requirements.



### Bauer Gear Motors

Bauer engineers develop technically-advanced solutions that feature energy-efficient motors paired with optimal gearboxes to provide customers with the lowest possible cost of ownership.

The Bauer BK helical bevel geared motor is ideally suited for stage and theater applications. It sets new standards for reliability, efficiency and economy and includes unparalleled features including hollow shafts in the smallest sizes. The BK gear motor offers total flexibility in mounting options including shaft, base, face, and flange solutions.



### Boston Gear Speed Reducers

Due to their exceptional performance, 700 Series speed reducers from Boston Gear are a popular choice for use on automated theater seating systems that lift and rotate (invert) a full row of seats at a time.

Boston Gear's spiral bevel gear drives are designed for high efficiency and quiet operation. These units are widely used on many types of stage lifts.



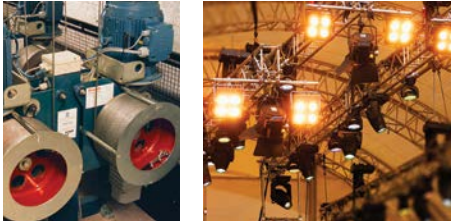
### Ameridrives Universal Joints

Rugged universal joints from Ameridrives are an ideal selection to connect the multiple drives required on large stage lifts. Ameridrives designs and manufactures custom drive shafts based on specific joint, slip and shaft length requirements for each application.



# ABOVE STAGE - Upper Machinery

A wide range of winches and hoists, positioned above the stage, are utilized to move lighting, sound equipment, scenery and curtains during shows. Stromag, Warner Electric and Bauer Gear Motor provide reliable limit switches, braking solutions and geared motors to meet the challenging needs of stage and theater hoist applications.



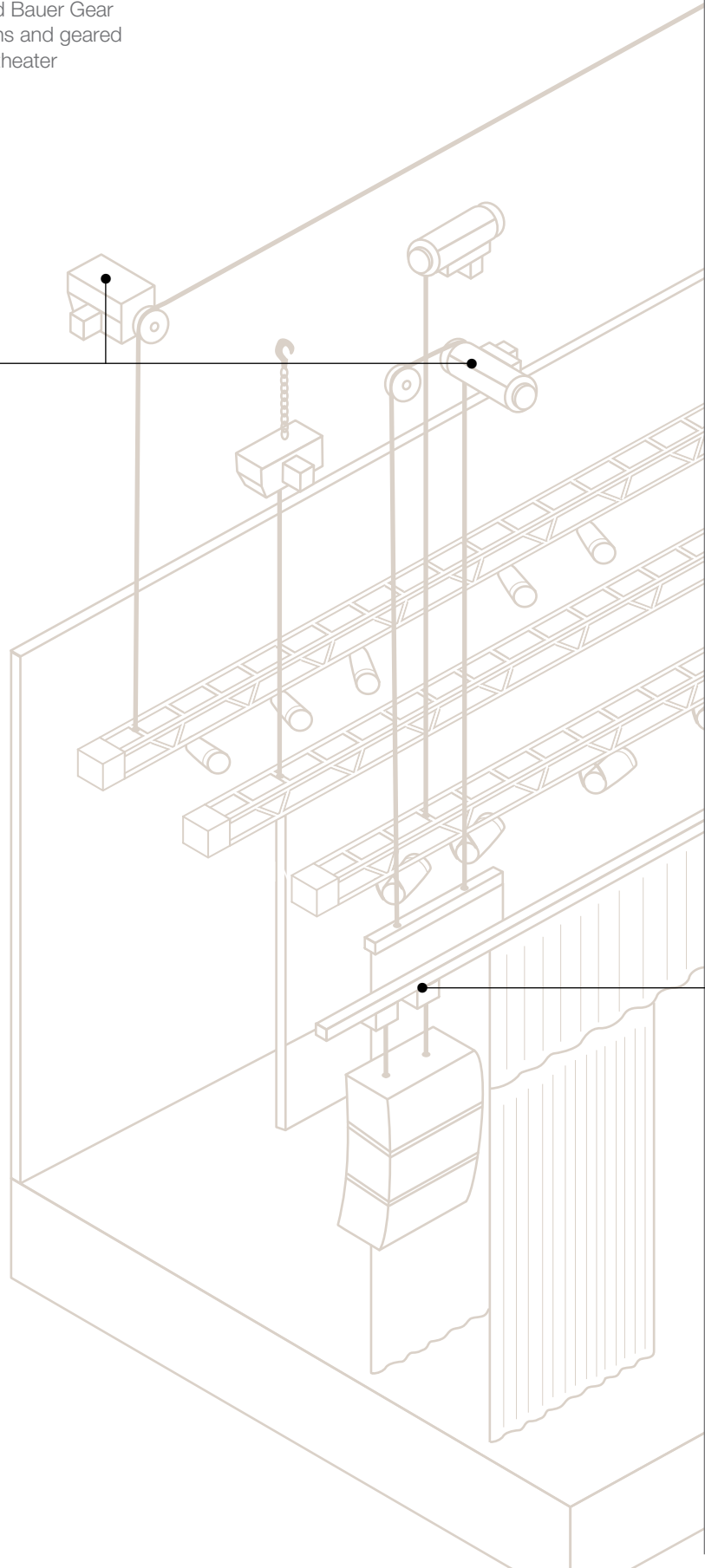
## Point Hoists

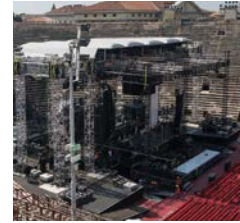
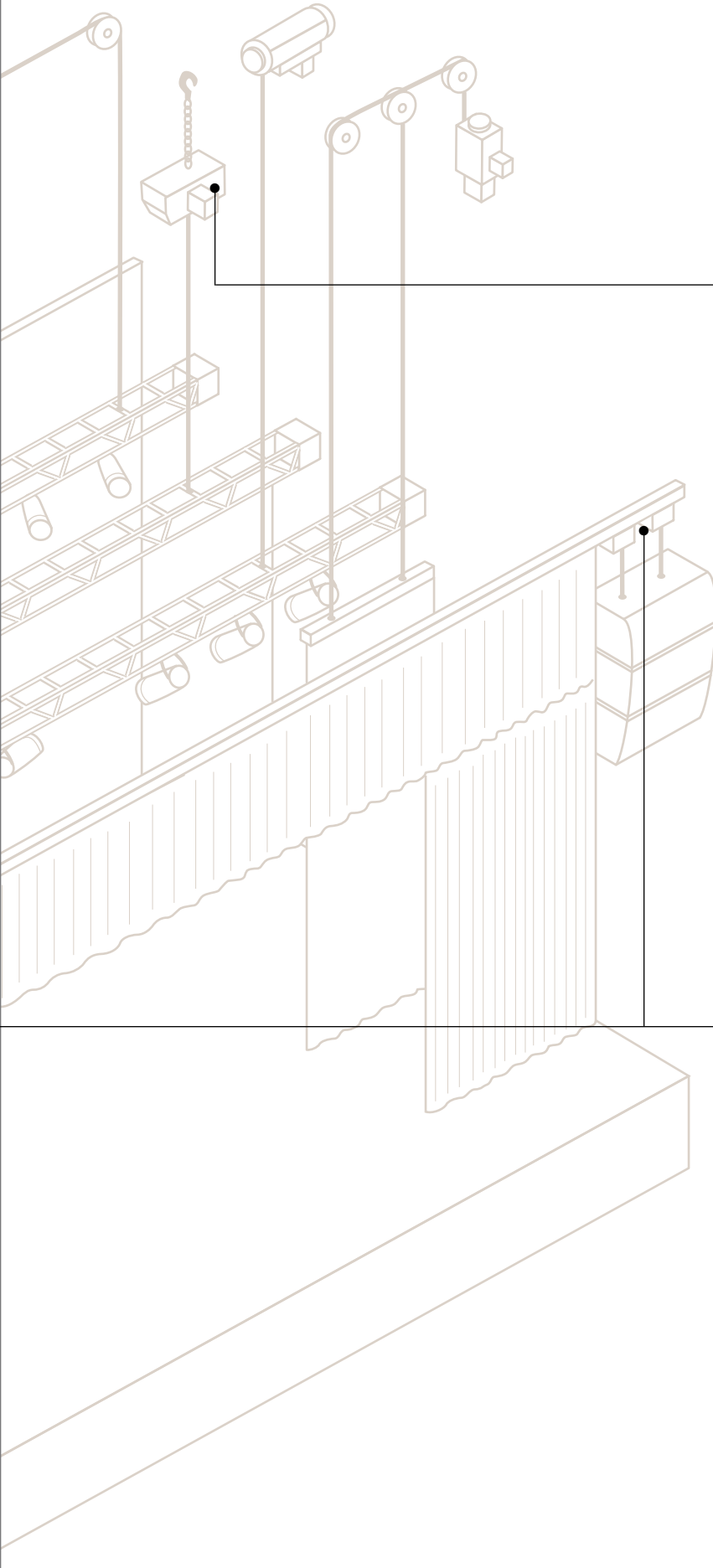
Fixed-position point hoists are installed within the stage's upper machinery truss (gridiron) framework. Multiple units are typically grouped to raise and lower lighting, sound equipment, scenery backdrops and curtains during stage shows. Stromag limit switches are a critical component on these single rope hoists. Warner Electric safety brakes and Bauer geared motors are also utilized.

**Stromag** Series 51 Limit Switches

**Warner Electric** FENIX S Series Brakes; FENIX Series Brakes; ERS VAR 15 Series Brakes;  
WES Contactless Sensor

**Bauer Gear Motor** BK Series Geared Motors





## Silent Chain Hoists

Warner Electric PK-S and PK-DS models are an ideal choice for use as motor brakes on silent chain hoists that move lighting and sound equipment. The brakes, equipped with a dampening system, are silent and can be operated during stage and theater productions without creating a disruption.

**Warner Electric** FENIX S Series Brakes;  
WES Contactless Sensor

**Stromag** Series 51 Limit Switches



## Mobile Point Hoists

Mobile point hoists move along a track and are positioned as needed above the stage to meet particular show requirements. The hoists raise and lower lighting, sound equipment, scenery backdrops and curtains during performances. Reliable Stromag limit switches, along with Warner Electric brakes and Bauer geared motors are utilized on these hoists.

**Stromag** Series 51 Limit Switches

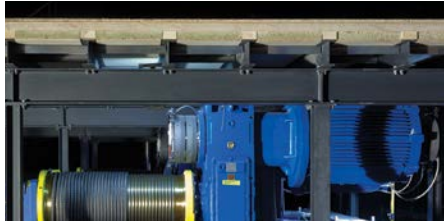
**Warner Electric** FENIX S Series Brakes; FENIX Series Brakes; ERS VAR 15 Series Brakes;  
WES Contactless Sensor

**Bauer Gear Motor** BK Series Geared Motors

# BELOW STAGE - Lower Machinery

A variety of below stage equipment, including scissor lifts, ball screw podium lifts, winch-driven podium lifts, chain lifts, and stage rotators are utilized to raise, lower and rotate sections of a stage during performances. Warner Electric, Stromag, Bauer Gear Motor and Ameridrives offer technically advanced limit switches, braking solutions, geared motors and universal joints to meet these stage and theater applications. Boston Gear speed reducers are also used on most types of stage lifts as well as in complex automated seating system drivetrains.

© by Alexander Schippel



## Revolving Stages

From basic turntables to complex lifting cylinders, rotating stages create dramatic effects in all types of theater and concert productions. Bauer geared motors and Warner Electric safety brakes provide reliable performance on a wide range of revolving stage systems.

**Warner Electric** FENIX S Series Brakes; FENIX Series Brakes;  
ERS VAR 15-Series Brakes; WES Contactless Sensor

**Bauer Gear Motor** BK Series Geared Motors



## Podium Scissor Lifts, Winch-Driven Lifts and Ball Screw Lifts

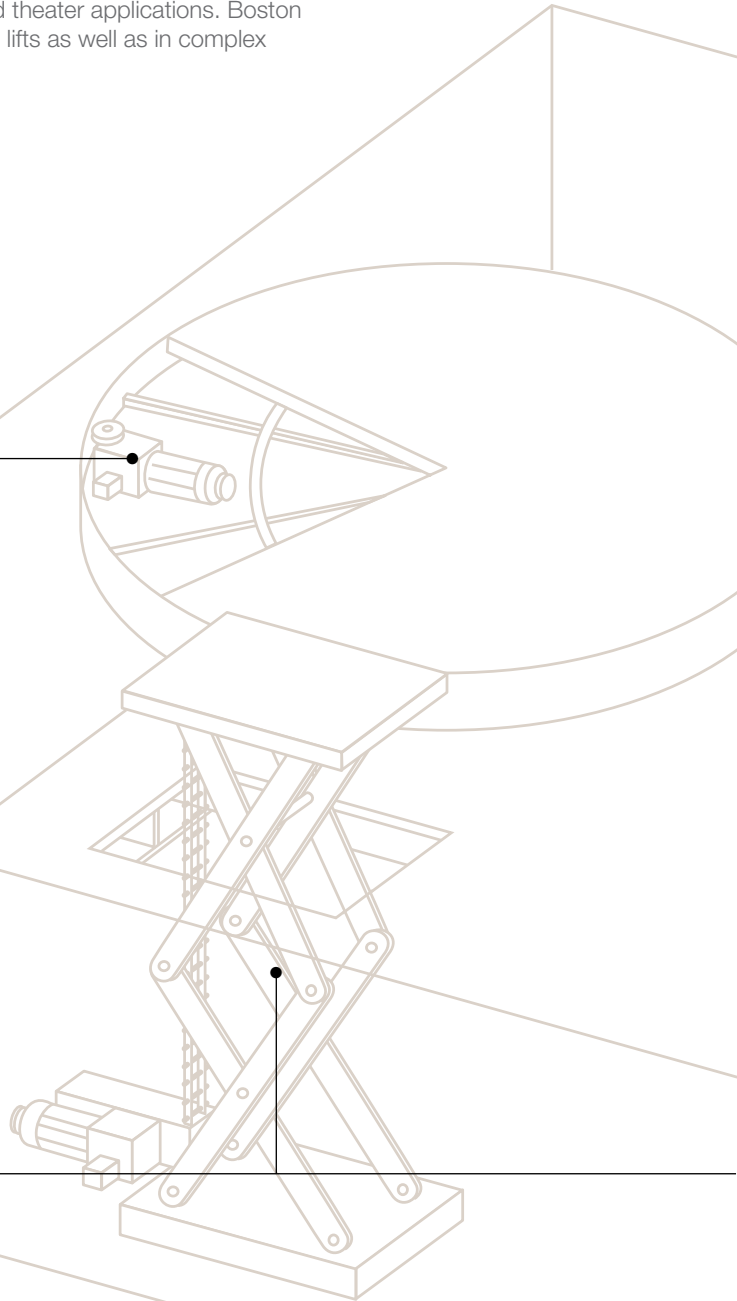
Boston Gear spiral bevel gear drives are a critical drivetrain component on these stage podium lift systems that raise and lower performers and set props on smaller stage sections. Warner Electric safety brakes, Stromag limit switches and Bauer geared motors are also used on many of these types of lifts.

**Boston Gear** R100/R200 Series Spiral Bevel Gear Drives

**Warner Electric** FENIX S Series Brakes; FENIX Series Brakes;  
ERS VAR 15 Series Brakes; WES Contactless Sensor

**Bauer Gear Motor** BK Series Geared Motors

**Stromag** Series 51 Limit Switches





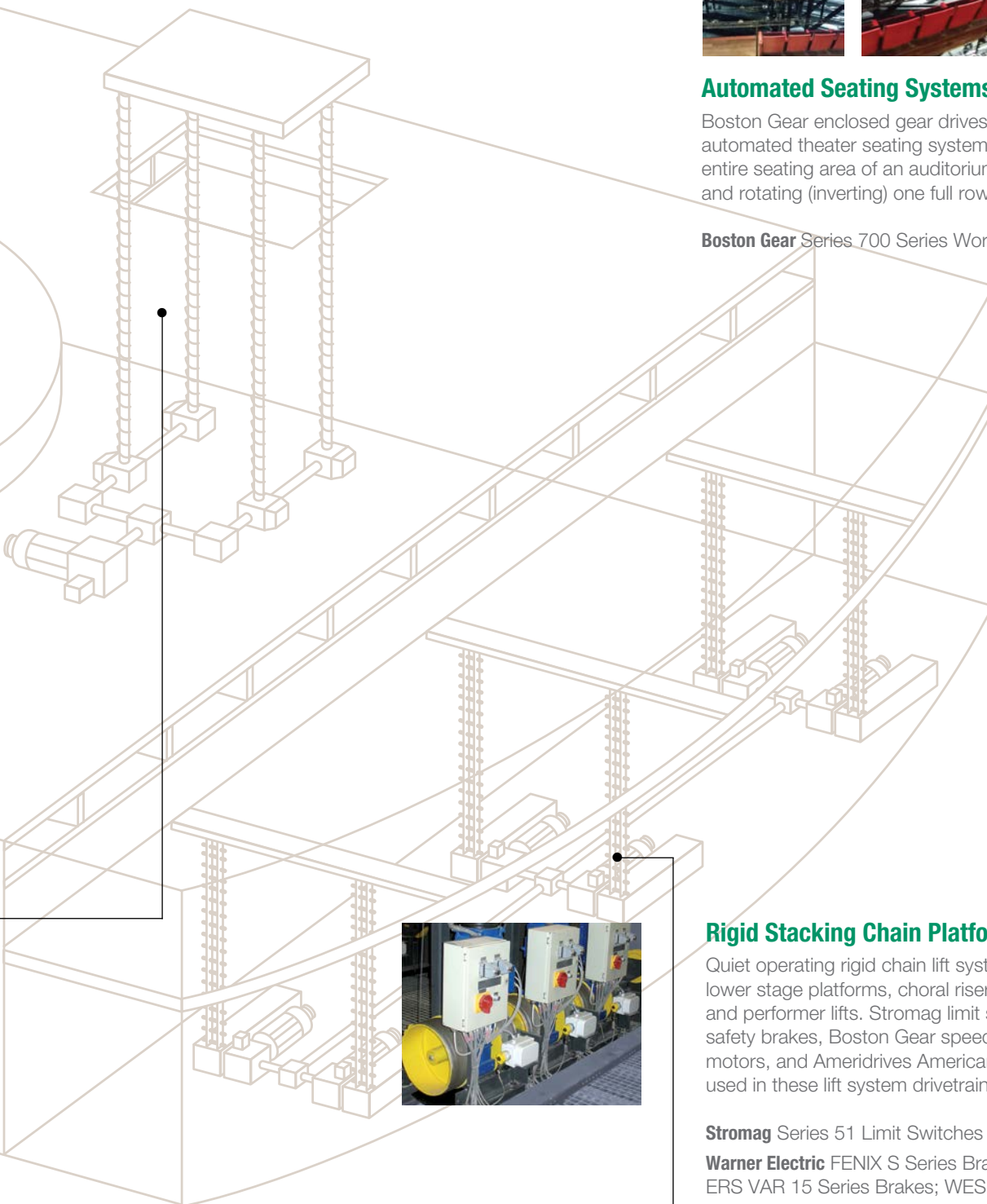
Photos courtesy of Gala Systems, Inc.



## Automated Seating Systems

Boston Gear enclosed gear drives are utilized on complex automated theater seating systems that can reconfigure the entire seating area of an auditorium within an hour by lifting and rotating (inverting) one full row of seats at a time.

**Boston Gear** Series 700 Series Worm Gear Drives



## Rigid Stacking Chain Platform Lifts

Quiet operating rigid chain lift systems are used to raise and lower stage platforms, choral risers, orchestra pits and scenery and performer lifts. Stromag limit switches, Warner Electric safety brakes, Boston Gear speed reducers, Bauer geared motors, and Ameridrives Americardan universal joints are all used in these lift system drivetrains.

**Stromag** Series 51 Limit Switches

**Warner Electric** FENIX S Series Brakes; FENIX Series Brakes; ERS VAR 15 Series Brakes; WES Contactless Sensor

**Boston Gear** R100/R200 Series Spiral Bevel Gear Drives

**Bauer Gear Motor** BK Series Geared Motors

**Ameridrives** Universal Joints

## A Global Footprint to Support Customers Around the World

★ Altra Headquarters

● Altra Engineering & Service Centers

● Altra Manufacturing Facilities

## The Brands of Altra Motion

### Couplings

**Ameridrives**  
www.ameridrives.com

**Bibby Turboflex**  
www.bibbyturboflex.com

**Guardian Couplings**  
www.guardiancouplings.com

**Huco**  
www.huco.com

**Lamiflex Couplings**  
www.lamiflexcouplings.com

**Stromag**  
www.stromag.com

**TB Wood's**  
www.tbwoods.com

### Linear Systems

**Thomson**  
www.thomsonlinear.com

**Warner Linear**  
www.warnerlinear.com

### Geared Cam Limit Switches

**Stromag**  
www.stromag.com

### Engineered Bearing Assemblies

**Kilian**  
www.kilianbearings.com

### Electric Clutches & Brakes

**Matrix**  
www.matrix-international.com

**Stromag**  
www.stromag.com

**Warner Electric**  
www.warnerelectric.com

**Deltran**  
www.thomsonlinear.com

### Belted Drives

**TB Wood's**  
www.tbwoods.com

### Heavy Duty Clutches & Brakes

**Twiflex**  
www.twiflex.com

**Stromag**  
www.stromag.com

**Svendborg Brakes**  
www.svendborg-brakes.com

**Wichita Clutch**  
www.wichitaclutch.com

### Gearing & Specialty Components

**Bauer Gear Motor**  
www.bauergears.com

**Boston Gear**  
www.bostongear.com

**Delevan**  
www.delevan.com

**Delroyd Worm Gear**  
www.delroyd.com

**Nuttall Gear**  
www.nuttallgear.com

### Engine Braking Systems

**Jacobs Vehicle Systems**  
www.jacobsvehiclesystems.com

### Precision Motors & Automation

**Kollmorgen**  
www.kollmorgen.com

### Miniature Motors

**Portescap**  
www.portescap.com

### Overrunning Clutches

**Formsprag Clutch**  
www.formsprag.com

**Marland Clutch**  
www.marland.com

**Stieber**  
www.stieberclutch.com



www.altramotion.com