Management of lifting operations from a central control system improves safety and operational productivity.

EVO-Series

Synchronous Lifting Systems
EVO-Series, Synchronous Lifting Systems

• Lifting system to control 4, 8 or 12 lifting points (12 points for Standard EVO only)
• Intuitive user interface provides easy set-up and control with multiple lifting options
• Accuracy of up to 0.040 in (1 mm) between leading and lagging cylinders
• For use with standard single- or double-acting cylinders
• Built in warning and stop alarms for optimum safety
• Available with several flow options for optimal lifting speed

The Multi-Functional Synchronous Lifting System

What is Synchronous Lifting?
To achieve high-precision movement of heavy objects it is necessary to control and synchronize the movements of multiple lifting points.
The PLC-control uses feedback from multiple sensors to control the lifting, lowering and positioning of any large, heavy or complex structure, regardless of weight distribution.

By varying the oil flow to each cylinder, the system maintains very accurate positional control. By eliminating manual intervention, the sync lift helps maintain structural integrity and increases the productivity and safety of the lift.

PLC-controlled synchronous lifting systems reduce the risk of bending, twisting or tilting, due to uneven weight distribution or load-shifts between the lift points.

Typical Synchronous Lifting Applications
• Bridge lifting and repositioning
• Bridge launching
• Bridge maintenance
• Lifting and lowering of heavy equipment
• Lifting, lowering, levelling and weighing of heavy structures and buildings
• Structural and pile testing
• Lifting and weighing of oil platforms
• Foundation levelling of onshore and offshore wind turbines
• De-propping/load transfer from temporary steel work
• Foundation shoring

Shown: 3600 ton Tunnel Boring Machine lowered and tilted into its starting position with the EVO-Series Synchronous Lifting System.
Synchronous Lifting Systems

Enerpac’s family of EVO synchronous lifting systems provides precision control suitable for most lifting/lowering applications. Custom systems tailored to unique project requirements are also available.

The Standard EVO Synchronous Lift System
It is a comprehensive self-contained design that features simple to use software that is extremely efficient at completing basic to complex applications.

The EVO-System has nine work modes. The operator can navigate to any of these menus:
1. Manual
2. Pre-Load
3. Automatic
4. Retract Fast
5. Depressurize
6. Tilting
7. Stage Lift
8. Weighing*
9. Center of Gravity determination*

* Available in the EVO-W System with calibrated sensors, please contact Enerpac.

Features of the Standard EVO-System
• Utilizes feedback from pressure and stroke transducers to offer both stroke control and load monitoring
• Can be networked to link up to 4 systems together (requires separate master control box)
• Variable frequency drive (VFD) and PLC for precise synchronization and control of oil flow
• Data storage and recording capabilities

The Basic EVOB Synchronous Lift System
Leveraging Enerpac’s market leading Z-Class pumps and components from the standard EVO, the EVOB offers an economical solution to basic applications requiring stroke only control for a maximum of 8 lifting points.

The EVOB-System has three work modes. The operator can navigate to any of these menus:
1. Manual
2. Automatic
3. Depressurize

Reservoir Capacity:
10 or 66 gal.

Number of Lifting Points:
4, 8 or 12

Accuracy:
0.040 inch

Motor Size:
1-10 hp

Maximum Operating Pressure:
10,000 psi

Ease of Operation
• A single operator controls the entire operation
• User friendly interface: visual screens, icons, symbols and color coding

Lifting Cylinders
For a complete line of Enerpac cylinders, see the Cylinder and Lifting Products in our catalog.

Heavy lift and launch of a 43,000-ton floating oil production system in Malaysia for the Gumusut-Kakap offshore field has set high benchmarks for safety through its use of sophisticated EVO-Series synchronous hydraulics to lift, balance, weigh and smoothly launch massive structures.

Synchronous lift system used to lift a 1000 ton building.
## EVO-Series, Synchronous Lifting Systems

### EVO STANDARD

<table>
<thead>
<tr>
<th>Flow Group</th>
<th>Motor Size</th>
<th>Fixed Output Flow* (gpm)</th>
<th>Variable Output Flow* (gpm)</th>
<th>Reservoir Capacity</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low Pressure (&lt;1,200 psi)</td>
<td>High Pressure (&lt;1,800 psi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>5</td>
<td>244-812</td>
<td>46-153</td>
<td>66</td>
<td>2900</td>
</tr>
<tr>
<td>40</td>
<td>10</td>
<td>286-952</td>
<td>88-293</td>
<td>66</td>
<td>3100</td>
</tr>
</tbody>
</table>

*Output flow rate is variable and listed at 18-60 Hz.

### EVOB BASIC

<table>
<thead>
<tr>
<th>Flow Group</th>
<th>Motor Size</th>
<th>Fixed Output Flow* (gpm)</th>
<th>Reservoir Capacity</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low Pressure (&lt;1,200 psi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>1</td>
<td>450</td>
<td>10</td>
<td>603</td>
</tr>
<tr>
<td>08</td>
<td>1.5</td>
<td>650</td>
<td>10</td>
<td>612</td>
</tr>
<tr>
<td>16</td>
<td>3</td>
<td>850</td>
<td>10</td>
<td>625</td>
</tr>
</tbody>
</table>

*Output flow rate is listed at 60 Hz. Flow rate will be approximately 1/6 of these values at 50 Hz.
Synchronous Lifting Systems

CUSTOM BUILD YOUR OWN SYNCHRONOUS LIFTING SYSTEM

1) This is how a SyncLift model number is built up.

<table>
<thead>
<tr>
<th>1 Product Type</th>
<th>2 Lift Points</th>
<th>3 Flow Group</th>
<th>4 Voltage</th>
<th>5 Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVO = Standard SyncLift System</td>
<td>4 = 4 Lift Points</td>
<td>EVO</td>
<td>380 = 380-415 V, 3 Ph, 50-60 Hz</td>
<td>W = Weighing</td>
</tr>
<tr>
<td>EVOB = Basic SyncLift System</td>
<td>8 = 8 Lift Points</td>
<td>EVOB</td>
<td>460 = 460-480 V, 3 Ph, 50-60 Hz</td>
<td>(Only available with the EVO Standard SyncLift System)</td>
</tr>
<tr>
<td>12 = 12 Lift Points (EVO only)</td>
<td>*only available with 3 Ph motor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ordering Examples:
Model Number: EVO821460W
EVO has 8 lift points, 153 in³/min, and voltage is 460-480 V, 3-Phase, 50-60 Hz with weighing option.

Contact Enerpac!
Contact the Enerpac office nearest to you for advice and technical assistance in the layout of your ideal Lift System. You can also ask Enerpac for assistance by e-mail at integratedsolutions@enerpac.com.

Brush Stroke Sensors
- Ordered separately, requires one for each lifting point
- Provides stroke feedback to controls
- Includes magnets for mounting

Wire Stroke Sensors
- Ordered separately, requires one for each lifting point
- Provides stroke feedback to controls
- Includes magnets for mounting

Stroke Sensor Cables
- Ordered separately, requires one for each stroke sensor
- Can be connected together for additional length

<table>
<thead>
<tr>
<th>Stroke Sensor Model Number</th>
<th>Stroke Sensor Cable Model Number</th>
<th>Measuring Range (in)</th>
<th>Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVO-WSS-500</td>
<td>EVO-SC-20</td>
<td>19.69</td>
<td>65</td>
</tr>
<tr>
<td>EVO-WSS-1000</td>
<td>EVO-SC-50</td>
<td>39.37</td>
<td>164</td>
</tr>
</tbody>
</table>

Networked synchronous lift system used to lift a 1000 ton building.
Synchronous Lifting Applications

The Enerpac EVO-Series, Synchronous Lifting Systems – the evolutionary result of more than 30 years experience in specialized hydraulic engineering and lifting technology using digitally controlled hydraulics.

The application possibilities are infinite with the EVO-Series, powering interlinked hydraulic cylinders. Our PLC-controlled Synchronous Lifting Systems provide hydraulic solutions to meet customer requirements for safe, precise control of movement and positioning.

**B R I D G E  B E A R I N G  R E P L A C E M E N T**
A 200 ton bridge was lifted 22 inches using 8x CLRG10012 cylinders with an EVO-System to replace the old bearings. The accuracy during lifting was 0.040 inch between the leading and lagging cylinder.

**I N C R E M E N T A L  L I F T I N G**
Lift and crib: The 360 ton bridge was lifted to its final position. Four Enerpac BLS-Series climbing jacks were connected to the PLC-controlled Synchronous Lifting System and operated with the stage lift work mode.

**P R E C I S I O N  L E V E L I N G  C A I S S O N  P I E R  B O X**
Three EVO-Systems connected with 32 jacks lowered the 1100 ton bascule pier box. Utilizing the EVO system, the customer was able to improve accuracy, productivity, and efficiency. The caisson lowering and leveling was completed in 3 working days.

**B R I D G E  L I F T I N G  &  L A U N C H I N G**
Synchronous Lifting Systems used for incremental deck launching, incremental lifting (stage lifting) for temporary pier erection and deck nose recovery.

**B O X  J A C K I N G  &  T U N N E L  P U S H I N G**
Tunnel segments are pushed under the railway using a multi-point (35) Synchronous Lifting System.

**H O R I Z O N T A L  S K I D D I N G**
Long stroke RR-Series cylinders are attached to a sliding and guiding system, pulling the arched roof assembly of Athens Olympic Stadium step by step into the final position.

**L I F T I N G  &  C L I M B I N G  S Y S T E M**
The complete hoisting system for each stage consists of 16 lifting cylinders, 16 locking cylinders and 4 PLC-controlled hydraulic units. The system is used to assemble and dismantle the 230 ton stage construction.

**P R E C I S I O N  L E V E L I N G  C A I S S O N  P I E R  B O X**
Three EVO-Systems connected with 32 jacks lowered the 1100 ton bascule pier box. Utilizing the EVO system, the customer was able to improve accuracy, productivity, and efficiency. The caisson lowering and leveling was completed in 3 working days.

www.enerpac.com
Synchronous Lifting Applications

WEIGHING & MANIPULATION SYSTEM
Five blocks are moved to build one ship of which the heaviest block weighs over 1400 tons. Enerpac’s Synchronous Lifting System ensures that the desired load paths into the ship’s hull structure are maintained during transport.

SUPERLIFT & LAUNCH
The lift and launch of a 43,000 ton floating oil production system for the offshore field set high benchmarks for safety through its use of sophisticated EVO-Series synchronous hydraulics to lift, balance, weigh and smoothly launch massive structures.

MULTI-POINT STAGE LIFTING
30 hydraulic climbing systems with 6 power units in a synchronous system to lift and lower the umbrella deck for casting concrete blocks. Each climbing unit consisted of two push/pull cylinders and two locking cylinders.

FOUNDATION REPAIR
A Synchronous Lifting System was used to manage the lifting force and extension of 22 high tonnage double-acting hydraulic cylinders (CLRL-Series) to safely and accurately lift the foundation and building to the required position. Managing the lifting operation from one central control system improved safety and operational productivity.

MONITORING AND ADJUSTING
A Synchronous Lifting System monitored foundation movement between church, museum basement and surrounding buildings. All 34 CLL-500 ton lock nut jacks with class A load cells were positioned horizontally in two floor levels to support the concrete walls and floors.

MOVING, POSITIONING & MONITORING
Hydraulically monitored the movement and forces that occurred during the movement this 1600 ton railway bridge. The synchronous hydraulic system offered an effective method for both vertical and horizontal movement and positioning.

PRECISION LIFT & BEARING ALIGNMENT
High precision lifting with a Synchronous Lifting System enabled exact aligning of bearings on the rail on which this 3500 ton mining dragline rotates. The PLC-controlled system simultaneously controlled 80 x 100-ton hydraulic cylinders.

VERIFYING TRANSFORMER WEIGHT
The EVO-W weighing system and four RACL-Series lock nut cylinders were used to lift and weigh the transformer. Calibrated pressure transducers provided weigh data to the EVO system. Verifying the weight was under local shipping port weight limits saved the manufacturer significant freight costs.

LEVELING WIND TURBINES
Enerpac’s Synchronous Lifting System used to level the supporting cross piece accurately and in a short time frame. Each foundation has 9x 100 ton cylinders and are connected to the EVO-System on board the installation vessel, which levels the supporting cross piece with one push of the button.
Synchronous Lifting Systems

Enerpac Worldwide Locations
For a complete list of addresses see: www.enerpac.com/en-us/enerpac-locations

About Enerpac
Enerpac is the leading global provider of high-pressure hydraulic tools and solutions with a broad range of products, local expertise and worldwide distribution network. With a proven track record in a wide range of markets, Enerpac designs and manufactures high-quality tools and solutions for all industrial applications.

Enerpac has gained unique experience in delivering hydraulic solutions for the controlled movement and positioning of heavy objects. Enerpac supports your business by offering the right solutions and service to help you get your work done efficiently and safely.

Ordering Products and Catalogs
To find the name of the closest Enerpac distributor or service center, to request literature or technical application assistance, contact Enerpac at: www.enerpac.com.

Hydraulic solutions for controlled movement and positioning of heavy loads

While Enerpac has the world’s largest product portfolio for heavy-lifting and load-control applications, we also have the knowledge to put all these programs together or modify them to provide a lift system for your most demanding and unique applications.

• Synchronous Lifting Systems
• Stage Lifting and Climbing Systems
• Bridge Launching Systems
• Synchronous Hoisting Systems
• Hydraulic Gantilles
• Heavy-lifting Strand Jacks
• Skidding Systems
• Self-Propelling Towers
• Self-Propelled Modular Trailer
• Chain Pulling Systems
• Chain Pulling Systems

The Industrial Tools Line
Cylinders and Lifting Products
• General Purpose
• Aluminum: Lock Nut, Solid- and Hollow Plunger
• Pancake, Low Height
• Pull
• Load Plunger
• Precision
• Stroke
• High Torque
• Jacks
• Level Lift System
• Pow’R-LIFT® Lifting Jacks
• Pow’R-Lock™ Lifting Jacks
• Extreme Environment Products

Pumps
• Manual
• Cordless and Electric Driven
• Compressed Air Driven
• Petrol Driven

System Components
• Hoses, Couplers, Oil
• Manifolds, Fittings
• Gauges, Adaptors

Valves
• 3-and 4-Way Directional
• Pressure and Flow Control

Presses
• H-Frame, Roll Frame
• C-Clamp and Arbor
• Tension Meters, Load Cells

Pullers
• Master Puller Sets
• Multi Purpose Puller Sets
• Pow’R-Lock® Pullers

Tools
• Maintenance Sets
• Punches
• Lifting Wedges
• Machine Lifts
• Load Skates
• Wedge, Spreaders
• Cutters
• Pipe Benders

Bolting Tools
• Multipliers
• Torque Wrenches
• Impact Sockets
• Wrench and Tensioner Pumps
• Twin Safety Hoses
• Nut Cutters / Splitters
• Flange/Wedge Spreaders
• Flange Alignment Tools
• Flange Face Tool

Integreted Solutions
• Synchronized Lifting Systems
• Jack-Up Systems
• Bridge Launching Systems
• Synchronized Hoisting Systems
• Hydraulic Gantilles
• Heavy-lifting Strand Jacks
• Skidding Systems
• Self-Envolving Towers
• Self Propelled Modular Transporter
• Chain Pulling Systems
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