

CONTROLLED LIFTING SOLUTIONS

*Essential Criteria from Manual to Advance
Movement & Positioning Solutions*



ABOUT POWER TEAM

Over 100+ years experience in supplying Professional Grade High Pressure Hydraulic Pumps, Cylinders, Jacks, Pullers & Tools.

Power Team has been instrumental in the development of innovative high force hydraulic power products, systems and tools. Many of our products are known as the industry standard for reliability, and are built tough with strict ISO 9001 manufacturing processes and are covered by a Lifetime Powerthon Warranty* for a long service life.

Choosing the right equipment for your project is a critical part of your success.

There are many factors to consider: what equipment is needed, will this equipment meet the project time requirement, is this a good solution for my future need, is this method safe for my team and object, how does this fit my budget, the list is extensive and there is never one right answer. This is where we can help. We want you to be successful and will help you understand how each piece of hydraulic equipment will fit the project today and how it will fit into your future.

There are many ways to lift a heavy object and many equipment types. Taking a hands-on approach our P-series hand pumps coupled with the correct valving, manifold, hoses, and cylinders offer an economical solution for quick setup and portability. On the opposite side of the scale is our Motion Control System (MCS) which offers a multi-pump system, lifting accuracy of 1mm between points, and up to 128 points systems controlled by one user by a touch screen control.

There are tradeoffs to every high-pressure hydraulic system and supporting components. Our team will help you understand each advantage and offer our expertise with real world project experience.



Controlled Lifting Solutions Common Applications

- Bridge lifting, repositioning, maintenance & launching
- Controlled movement and positioning of heavy equipment, buildings, concrete segments and other construction components
- Structural testing in civil engineering
- Lifting, weighing and/or determining center of gravity
- Structure raising, leveling & shoring
- Power plant rotor maintenance and separation.
- Tilting and leveling heavy objects



SYSTEMATIC APPROACH

Our Approach:

Whether it's a small bearing replacement on a roller in a steel mill or replacement of bearing on a bridge cap, Power Team offers a host of product solutions to meet a wide array of demanding MRO applications. Utilize the following pages to navigate through the selection process:

STEP 1:

Application Overview

Determine the type of lift or positioning equipment required for your application.

Things to consider:

- Single or multi-point lift?
- Balance or unbalanced load?
- Guided or unguided load?
- Synchronized or unsynchronized positioning?



STEP 2:

What function is required?

Understanding the application movement will determine the type of pumps and tools required.



STEP 3:

What System Components are Required

Pump selection questions	Other considerations
Power Source	Overall time savings
Reservoir capacity	Impact on safety for the object or team
Volume oil delivery	Support
Portability	Spare parts
Single or Two-Speed	Cost of ownership
Intermittent or high-cycle operation	Purchase price
Space limitations	Easy to use
Worksite sound restrictions	Does pump eliminate additional tasks
Valve options	Transportation
Setup Time	Labor & training
Lifting speed	Productivity benefits
Operating pressure	Technology
Spark-free operation	Life expectancy
Synchronous lifting	Brand
Leveling	Lead time for purchase
Real time feedback	Manufacture warranty
Weighing	Local distributor
Points needed	Paired brand products
Type of control	Does pump fit future projects

MANUAL VS. AUTOMATION

Advantages of manual system:

- Manual systems do not require a heavy initial investment.
- Easy For Employees To Adapt – Manual systems do not involve advanced technology. So, there is no intense employee training required. There is a necessity for safety training though to ensure that employees handle equipment safely.
- Improves Process Efficiency – Involvement of experienced and well-trained employees ensures efficient task completion. As a manual factor is involved, dynamic processes, which see a change of parameters frequently, can be completed with great efficiency.

Disadvantages of manual systems:

- Difficulty To Scale – Manual systems can be employed for only one process at a time. If your business scales up and your operation needs to handle multiple lift operations simultaneously, then manual controls cannot match the demand.
- Error-Prone – Human intervention makes manual heavy lifting prone to errors and inaccuracies.
- Degree of accuracy is less than an automated PLC system.
- Requires more labor to operate efficiently.

Advantages of automated system:

- Automated systems are programmed computerized systems with built-in technology for task completion. These systems feature advanced technology for movement and a high degree accuracy.
- Automated systems are flexible. If you are scaling your operations, then you can program these systems accordingly to handle more than one process at a time. With proper planning, you can use automated systems to scale up or downsize in real time.
- More control ability with computer automation.
- Automated systems save money in the long run. The technology may be expensive, especially if it is a customized product. But the cost can be compensated because manual labor is reduced.
- With automation, tasks can be performed faster and with precision, which increases productivity.
- Larger projects are possible with next level project capability for a complete line of equipment engagement.

Disadvantages of automated systems:

- Initial startup cost is much greater than a manual system.
- Requires more training to operate and input parameters.
- Higher risk projects.

Below: 8-point manual manifold lift system



Below: 48-point plc motion control system



MANUAL VS. AUTOMATION

Which Lifting or Positioning System Is Best For My Business or project?

Manual and automated systems come with their own benefits and drawbacks. The type of lifting or positioning system design and the decision depends on several factors. Business budget, usage and volume are key factors to consider. Today, in order to properly have a successful lifting or positioning solution, you need options.

- Businesses that handle dynamic processes can benefit from manual systems. We offer a host of manual systems that can be cost effective, but very effective in covering an array of applications or projects.
- If you expect your projects orders to increase in the future, then an automated system would work better. If you have an existing manual system and are looking to upgrade, then automation on a small scale could be a prudent first step. Businesses such as EPC's, riggers or heavy hauler which deal with large volumes of material handling and repetitive tasks on a regular basis benefit from automated systems.

Power Team is here to help you discover the best solution for your business. Whether you are looking to grow or refine your operations, our team is equipped with a compiled 100+ years of experience to help you become the best in your industry space. We will assist with every step including consultation, project proposal plans and management, and even post-project support and maintenance. Contact one of our Heavy Lift Solution Specialists to get started today.



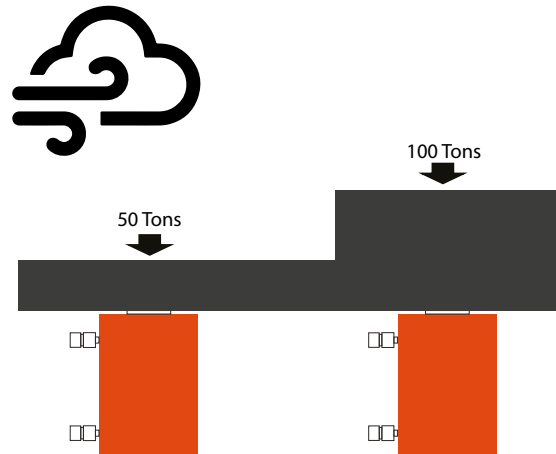
SYSTEM DESIGN

System Arrangement Consideration:

- What degree of accuracy is needed for the application?
(For higher accuracy, recommend PLC Automation controls vs. manual)
- What push or pull tonnage / stroke required per cylinder in your application?
(Consider what accessories or end attachments)
- Does the application require multiple cylinders? (Consider how these will be connected or plumbed in a circuit)
- Is the application stationary, or must the components be light in weight for easy portability?
(Steel vs. Aluminum materials)
- Do you need to extend a rod or cable through the center of the cylinder for the application, as in a tensioning operation?
- Does the application require that the cylinder fit within limited-clearance work areas? (Review cylinder stupefactions)
- Will the cylinder need to withstand off-center loads? (Consider Double Acting or swivel load caps to maintain loading)
- Does the application require that the lifted load be supported for extended periods of time?
(Consider locking collars are ideal for such jobs, as are cribbing blocks)

Key Points to Properly Sizing Hydraulic System:

- Total system load
- Application loading conditions
- Operating intervals
- Movement velocity requirements
- Environmental conditions
- Mounting requirements
- Pump configuration (Hand or powered)
- Cylinder Movement (Single or Double Acting)
- Cylinder type
(Spring, Load, Locking, Center Hole, Low Height)
- Control options
- Automation needs (Manual or PLC Controlled)
- System component hardware required



WHAT TYPE OF CYLINDER DO YOU NEED?

To determine oil capacity of a cylinder:

Oil Cap
(cu. in.)

Cylinder
Area
(sq. in.)

X

Cylinder
Stroke
(in.)

To determine reservoir capacity needed for a multiple cylinder system:

Usable
Oil

CYL. OIL
CAP.
(CU. IN.)

X

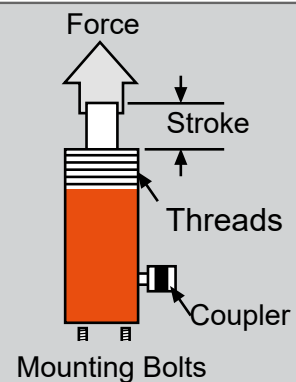
Number
of Cyl. in
System



Power Team recommends using 80% of the rated capacity and stroke to maximize product performance and safety.



RH Series Cylinders are equipped with a through hole design for additional applications and uses for pulling.



SYSTEM DESIGN

Cylinder Selection:

- Type of cylinder: Single or Double Acting
- Design Type: Spring Return, Load Return, Center Hole, Low Profile, or Flat Jack
- Steel or Aluminum, Footprint, Lift Extension
- Flat or Swivel Load Cap
- Handling
- Tonnage Requirements



Automation Pump Options:

- Pump with an integrated PLC offers synchronized lifting, pressure control, data capture, tilting, ect.
- What degree of accuracy do you require from leading to lag cylinder in hydraulic circuit?
- How many points are required for the application?
- Do you need data capture?



Pump Selection:

- **What is the preferred source of power?**
Manual: Provides portability.
Air/Hydraulic: shop air or portable compressor
Electric/Hydraulic: Many voltage / battery options
- **Single or two-speed pump required?**
Two-speed pumps deliver high volume at low pressure, and low volume at high pressure.
- **Valve Control Requirements**
(2/3/4 Way, Manual or Solenoid)



Accessories to be Considered:

- Hose Type (Material, lengths and ID Size)
- Manifold Requirements
- Gauges (Analog and digital are available)
- Valve (In-line Valve / Flow Control Requirements, Pump/Remote, single or double-acting cylinders, valve, Will the valve be manually operated or solenoid control)
- Is independent control of multiple cylinders, or hydraulic tools preferred?



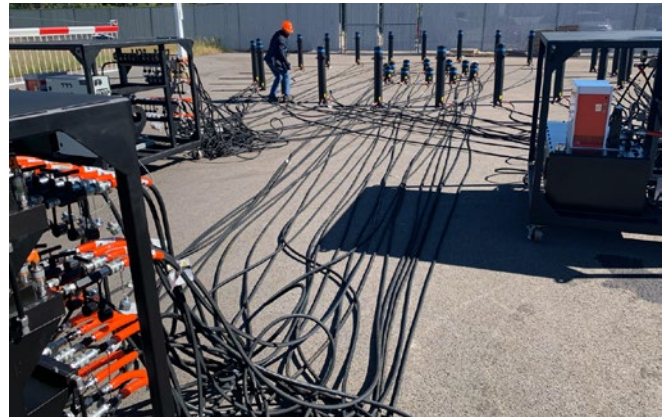
SYSTEM ARRANGEMENTS

Countless applications are possible with Power Team hydraulic components. For presses, lifting, jacking applications, production or maintenance setups. The system arrangements below are a small sample of typical solutions that can be configured.

Identification Key:

1. Cylinder/Jack/Tool – applies hydraulic force.
2. Pump – a device for converting mechanical energy to fluid energy.
3. Directional valve – controls the direction of hydraulic fluid in the system.
4. Gauge – measures P.S.I. pressure (Pounds per Square Inch) and/or force.
5. Hose – transports hydraulic fluid.
6. Manifold – allows distribution of hydraulic fluid from one source to several cylinders.
7. Quick Coupling – “hose half” and “cylinder half” couplings are used for quick connection and fluid flow check when separated.
8. Shut-Off Valve – regulates the flow of hydraulic fluid to or from cylinders.
9. Load-Lowering Valve – allows metered lowering of cylinder and provides safety when prolonged load holding is required.
10. T-Gauge Adapter – allows for installation of pressure/tonnage gauge anywhere in the hydraulic system.

36 Point Jacking System with an PLC Power Unit



4-point Jacking System with Electric Power Pump, port Manifold w/controls and Gauges



SYSTEM ARRANGEMENTS

1-point Jacking Systems with an Hand Pump Flow control and a Gauge



4-point Jacking Systems with an Hand Pump, Manifold w/flow control and Gauges



1-point Spreader Systems with an Hand Pump and Gauge



CASE STUDIES

APPLICATION/INDUSTRY

Construction, Building Lifting

SITUATION

Lift a 7,400 ton 100+ year old 1,700 seat theater 30 feet within another building. Requirements; less than 4mm tolerance from point to point, no acceptable pitch, roll or yaw, no vibration or damage to the valuable historical decor within the theater.

PRODUCT SOLUTION

48 Point Motion Control System (MCS) consisting of 2 -24 point skids (each with a PE4004 pump) tethered together sharing a HMI 48 Point control, 4-SLJ1012 12" 10T strand lifting jack cylinders.



APPLICATION/INDUSTRY

Construction, Bridge Formwork Traveler

SITUATION

25T formwork traveler installation lifting 80m using strand lifting jacks. Requirements; 3,600psi system, Lifting Speed 10m / hour

PRODUCT SOLUTION

MCS 4-8 Strand Lifting Jack (SLJ) – 4 points MCS system c/w 8 points chucking control 4 units, 1 skid.

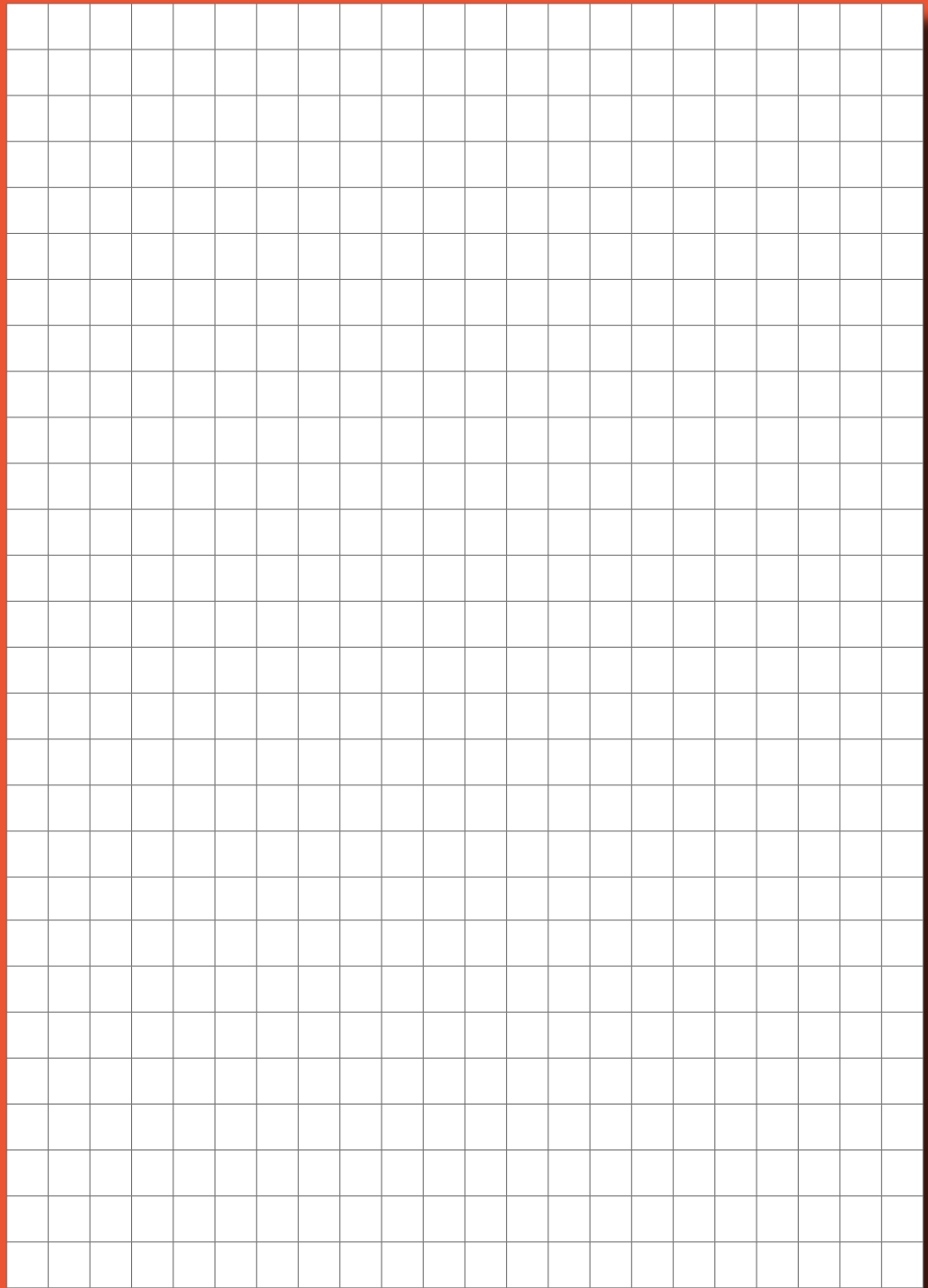
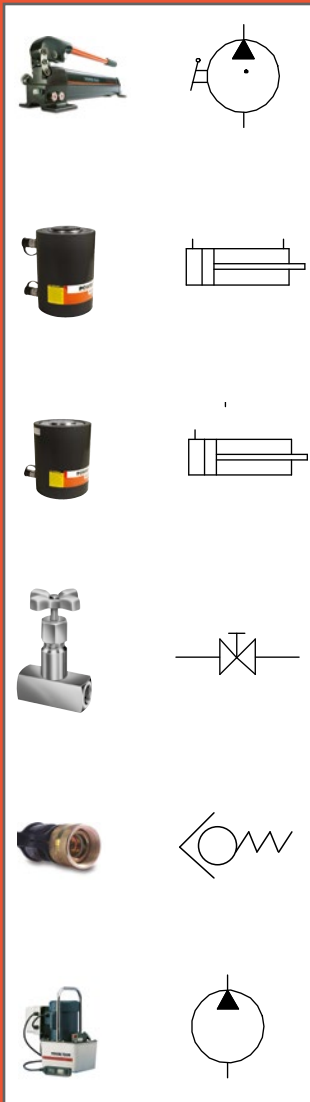
10T Stand Lifting Jack (used 4 points) each SLJ allows for (1) strand



SYSTEM CONCEPTS

Design Your System Arrangement:

Key:



CUSTOMER SERVICE CENTERS

Rockford, Illinois USA
5885 11th Street
Rockford, IL 61109 USA
Tel: +1 800 541 1418
Fax: +1 800 288 7031
info.powerteam@spxflow.com

Gonzales, Louisiana USA
3141 S. Darla Avenue
Gonzales, LA 70737 USA
Tel: +1 225 774 0888
info@spxboltingsystems.com

Houston, Texas USA
3106 E Pasadena Freeway,
Pasadena, TX 77503 USA
Tel: +1 713 472 2500
info@spxboltingsystems.com

Corpus Christi, Texas USA
4930 Gemini Street,
Corpus Christi, TX 78405 USA
Tel: +1 361-445-3727
info@spxboltingsystems.com

Europe
Albert Thijsstraat 12
6471 WX Eyselshoven
The Netherlands
Tel: +31 45 567 8877
cs.emea@spxflow.com

India
Power Team Hydraulic Technologies
India Private Limited
Odhav, Ahmedabad - 382 415
Tel: +91 99099 85454
Fax: +91 97277 19950
ft.apac.ht@spxflow.com

South East Asia
Power Team Hydraulic Technologies
Singapore Pte. Ltd.
2 Bukit Batok Street 23,
#02-07 Bukit Batok Connection,
Singapore 659554
Tel: +65 6265 3343
singapore@spxboltingsystems.com

China
Hydraulic Technologies China Ltd.
No 666, Fengjin Road, Xidu Industrial
Park Fengxian District,
Shanghai 201401, China
Tel: +86 021 2208 5659
Fax: +86 21 2208 5682
china@spxboltingsystems.com

Australia
Hydraulic Technologies
Australia Pty Ltd,
211 Atlantic Drive, Keysborough,
Victoria 3173, Australia
Tel: +613 9589 9215
Fax: +61 02 9763 7888
ft.apac.ht@spxflow.com

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