

The Power of Innovation





We Enjoy a Challenge

Power Engineering and Manufacturing (PEM) is an electronic, mechanical, and software engineering company that designs and manufactures electromechanical linear and rotary actuators for a variety of industries. Our customers are involved in diverse markets – mobile, industrial, pharmaceutical, and HVAC. We enjoy listening to our customers' needs and designing the perfect control solution. We'll take your ideas from concept through production within your time-table and budget.

PEM's primary business concept is to partner with our customers for design and production of control products that are not available off the shelf or from a catalog. We can develop a new design that meets your exact requirements. Just tell us what you have in mind. When requested, PEM agrees to protect your interests by private labeling or making the actuator proprietary in your market. Many of these proprietary products are approved for sale outside the original market.

Product Applications

Our actuators control devices like high-speed HVAC dampers, hydraulic valves, proportional flow systems, and exhaust-gas recirculating valves. General applications include:

- Hydraulic controls
- Engine throttle controls
- Fume hood dampers
- HVAC controls
- Mechanical lifts and positioners for mower decks, industrial brooms, and medical and dental equipment
- Controls for security cameras, exercise equipment, or automatic doors
- And more! *Call us with your application.*

The PEM Advantage

PEM offers complete engineering and production capabilities, and we possess many key advantages:

- Fully integrated solutions – mechanical, electrical, software
- Custom designs for niche markets
- Expertise in precision control systems
- Low-risk prototyping
- Design and manufacturing
- Competitive prices
- Low quantities – 25,000 units/year or less!
- Confidentiality and exclusivity
- Quality Management System certified to ISO 9001:2000

Our Commitment to Quality

We're determined to provide the highest quality to our customers and vendors, through every stage of operation. You'll see our quality difference in product design, manufacturing, continuous improvement, and problem resolution.



**Our
philosophy
is simple:**

We listen.

We design.

***We build
products
that solve
problems.***

About the Company

Power Engineering and Manufacturing, Inc. was established in 1994 by the merger of Power Engineering and System Design Engineering. The combined strengths of these two companies gave PEM advanced capabilities in the design of rugged, remote, low-maintenance electromechanical products. PEM has proven its design and manufacturing expertise in military, industrial, medical, and commercial applications. We have a strong reputation for quality, value, and service with our worldwide customer base.

Unique Partnerships

Continual partnering with customers has led PEM to provide a full range of product solutions. Past successes include mission kits used by the U.S. Army, hydraulic flow controls used in oil wells, HVAC actuators, and hydraulic directional-control valves. PEM recently expanded its product line to include a line of low-cost motors and actuators. They are the result of combining our expertise in design with efficient manufacturing practices. These high-quality controls are stock items, already in production. They provide an economical option for your control applications.

Subsidiaries

PEM has successfully launched two subsidiaries to focus resources on serving targeted customers with innovative new products. **C3 Trans-Systems LLC** was established in 2000 and is a leader in communications for transportation safety systems. **Quant Technologies LLC** was founded in 2003 to develop scientific instrumentation that measures the physical, chemical and biological properties of airborne particles.

Both companies are located in PEM's facility and share essential business resources to maximize operational efficiency. Cross-fertilization of ideas from diverse markets and a breadth of resources enable PEM and its subsidiaries to scale and operate like much larger companies.

*You know
your markets;
we know
controls –
let's talk!*



Products and Applications

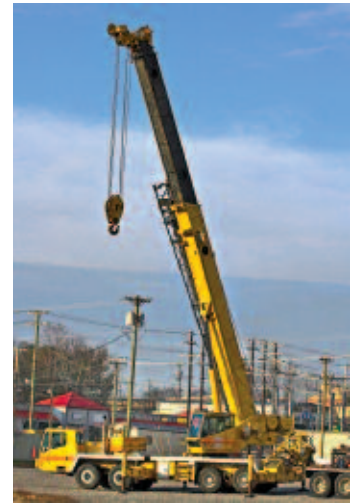
PEM-L1.25-F90 Linear Actuator

Applications

- Mobile hydraulic controls
- Mechanical lifts and partitions
- Automatic doors



Developed in cooperation with a leading manufacturer of heavy-duty tow trucks, the PEM-L1.25-F90 Linear Actuator allows remote radio control of hydraulic directional-control valves for nearly any function. It connects with the valve control linkage and can be installed at the factory or in the field. It had to be a maximum of 1.5 inches wide, yet still provide a 0.625-inch extension and retraction stroke with a push/pull force of 100 pounds. Intended for rugged use, we build this electrical control for our customer's exclusive use within the towing industry. However, our manufacturing agreement allows us to sell it in other noncompetitive markets.



PEM-A75-R90 Rotary Actuator

Applications

- HVAC controls
- Industrial and laboratory fume hoods

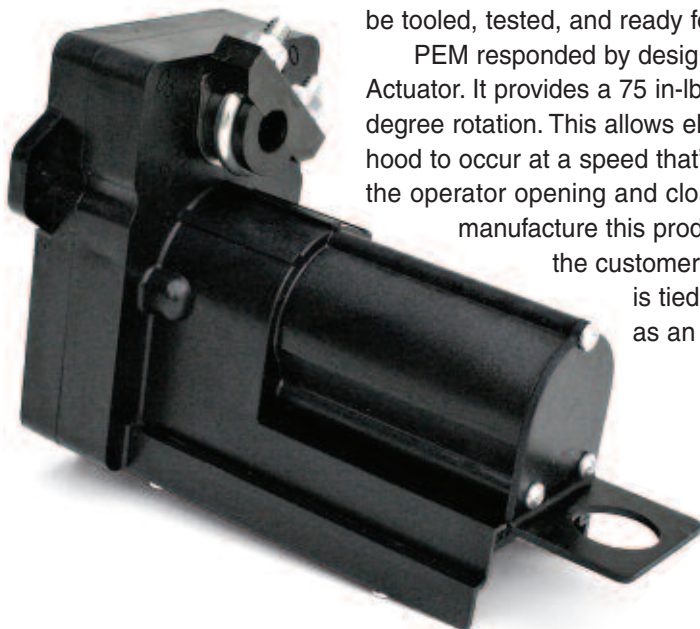
When an instruments manufacturer needed an innovative HVAC damper solution, they came to PEM because they knew we could meet their design requirements – *and their deadline*. They specified a low-cost, high-speed, high-torque, 90-degree actuator for dampers in laboratory/pharmaceutical fume hoods. To meet sales commitments, the actuator had to be tooled, tested, and ready for shipment in only 5 months.

PEM responded by designing the PEM-A75-R90 Rotary Actuator. It provides a 75 in-lb force with 1.5-second, 0-90 degree rotation. This allows electronic flow control in the fume hood to occur at a speed that's approximately the same as the operator opening and closing the sash. Currently, we

manufacture this product in large quantities to meet

the customer's monthly sales forecasts. PEM

is tied directly into their MRP system as an approved and certified vendor.



Your application. Our expertise.

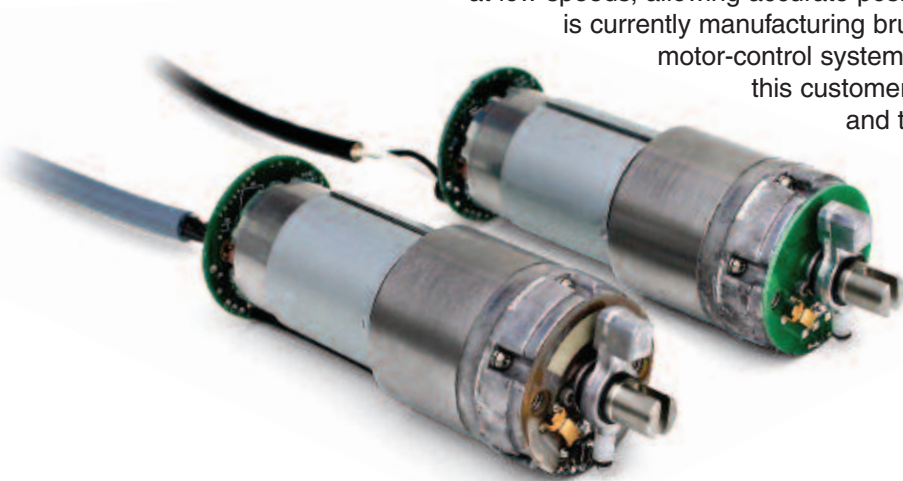
PEM-A15-R90 Rotary Actuator

Application

- Hydraulic controls

Another customer chose PEM to help them upgrade their line of motorized flow controls. We designed the PEM-A15-R90 Rotary Actuator to provide long operational life with high torque and speed. Its low-backlash design allows the performance approximation of a closed-loop proportional valve, but at lower cost.

This flow control valve is typically installed in a 0-1 to 0-120 GPM, 3000-psi hydraulic valve assembly. By controlling the motor speed electronically, full torque is achieved at low speeds, allowing accurate position control. PEM is currently manufacturing brush and brushless motor-control systems for use in many of this customer's valve applications, and they can be used in your products, too.



PEM Electric Rotary and Linear Actuators

Applications

- Floor cleaners
- Wheelchairs
- Fertilizer spreaders
- Lawnmower decks
- Salt or sand spreaders
- Water flow and irrigation systems
- Gate controls
- Hospital bed lifts
- *And more!*

PEM's family of Electric Rotary and Linear Actuators includes high-quality, low-cost controls that may be used in any application where you need to move or lift an object. You define the actuator specifications based on the requirements of the application.

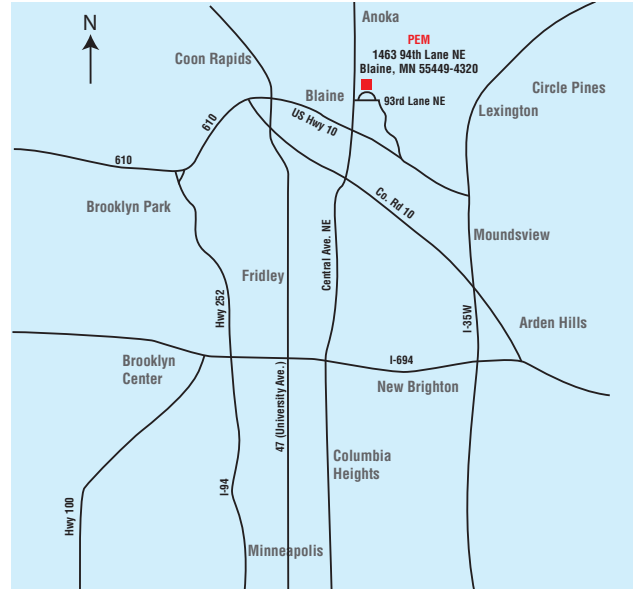
For example, some applications require long life, while others are low duty. This determines whether or not a brush or brushless motor is needed. Some actuators require large forces and others small. This defines motor size, RPM, and gear ratio. The specifics of the application define the actuator characteristics, with many evolving into custom designs to achieve the specific goals of each customer.



The perfect solution.

Mission Statement

Power Engineering and Manufacturing strives to be the most responsive full-service provider of innovative designs to advance the current technological state of its target markets. Our market base is broad and draws upon our technological strengths in electromechanical design, control systems, optics, communications, software development, electronics design, remote radio control, fluid handling, and packaging, as well as brushless motors and controllers, and long-life remote environments. We use our multidisciplinary background to give our customers unsurpassed quality, integrity, design innovation, focus, pricing and timeliness, while maintaining an uplifting work environment that promotes long-term relations, employee development, and continual growth.



PEM's 16,000-square-foot building in Blaine, Minnesota is a modern facility that houses our offices, engineering labs, computer development lab, large production assembly and testing areas, an ISO 14644 Class 5 clean room, a machine shop for prototyping, raw material storage, and shipping department.

The Power of Innovation

Contact us for innovative solutions.

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