

Actuation, Lifting & Positioning Solutions for the Nuclear Industry

Research



Power Plants



Waste Treatment



Decommissioning





Capability



OUR EXPERTISE HAS BEEN BUILT ON A HISTORY OF MORE THAN 100 YEARS OF ENGINEERING, CRAFTSMANSHIP, VISIONARY DESIGN, QUALITY MANUFACTURE AND CUSTOMER CARE.

Power Jacks is the leading UK manufacturer of electro-mechanical actuation, lifting and positioning solutions. It specialises in the design of bespoke systems for application in industrial automation, energy, defence, transport and civil engineering.



Headquartered near Aberdeen in the UK, the company is the UK's largest screw jack manufacturing facility, that uses the latest engineering technologies to deliver quality products (ISO 9001) that offer reliability, performance and economy.

Power Jacks deliver this high quality service in a safe (ISO 45001) and environmentally friendly (ISO 14001) working environment thanks to the highly trained, flexible and motivated teams that work throughout the business driving the company to higher levels of performance.

We know our customers demand our engineering expertise to help find a solution for their applications. We take pride in designing and delivering the best solution using standard or special designs that help improve your business.

Our Vision is to become the partner of choice for our products globally

Our Mission is to provide high quality precision actuation, lifting & positioning solutions.

Global Reach

UK HEADQUARTERS, 3 STRATEGIC SALES OFFICES & A NETWORK OF 25 DISTRIBUTORS WORLDWIDE PROVIDING AUTOMATION SOLUTIONS TO CUSTOMERS IN 80 COUNTRIES.



A global reach with a local service as we work closely with our customers to ensure the best solution for all their nuclear lifting and positioning applications.

- Headquarters & Factory
- Local Power Jacks Sales Offices
- Local Representative

Engineered Solutions

WHEN THERE CAN BE NO COMPROMISE ON PERFORMANCE, SAFETY, QUALITY, RELIABILITY AND DURABILITY. TRUST POWER JACKS ENGINEERED SOLUTIONS FOR THE MOST DEMANDING NUCLEAR APPLICATIONS.

We have manufactured products for the nuclear sector for over 40 years. Our bespoke design service allows Power Jacks to provide standard product, customised product or start from scratch. Design features can include requirements such as radiation resistant, seismic rated, auxiliary drives, high corrosion resistance, special gear ratios, low noise products, high precision, specialist monitoring & feedback, tailored interface & mounting arrangements and submersible options. Whatever the application, our innovative and experienced team of engineers will work with you to meet the challenge.

Typical applications for our products are found on shield doors, manipulator arms, working platforms, waste crushers, automated bogies, container handling systems, in-core inspection equipment and many more.



Shield Doors

Pairs of screw jacks with individual capacities up to 2000kN are used to open and close over 25 shield doors in Sellafield, Hinkley and Hunterston to name a few.



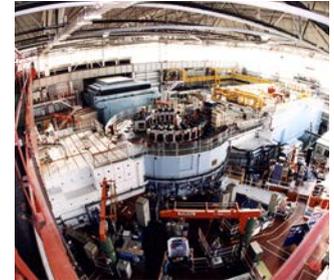
Manipulator Arms

Power Jacks linear actuators provide precision and reliability for dynamically balanced master-slave manipulator arms such as the VNE80 & 90.



Platform Lifts

Screw Jack system provide an ideal mechanism to raise and lower platform lifts such as the Waste Container Platform Lift at the Dounreay cementation facility.



Proton Beam Target Shutters

Opening and closing the 30Te target shutters for neutron generation at the ISIS pulsed spallation facility in Harwell.



Graphite Crusher

Jaws of the graphite crusher are actuated using special ball screw jacks and bevel gearbox drives. Decommissioning at Chapelcross magnox power station.



Tokomak Manipulator

Screw Jacks provide main tilt & side tilt for boom arm positioning of the manipulator used by JET to remove and replace beam limiter plates.



In-Core Inspection

Fuel channels inspected by camera using a machine that engages with the reactor stand pipe. Vertical positioning by a special Rolaram Electric Linear Actuator



Drum Posting (DPE)

Dounreay Cementation Plant waste transfer facility the drum transfer table on the DPE is lifted and lowered by a stainless steel screw jack system.

Research

THE AREA OF RESEARCH COVERS A BROAD SPECTRUM INCLUDING THE DEVELOPMENT OF POWER GENERATION, ADVANCING SCIENTIFIC RESEARCH, DEVISING NEW WAYS TO PROCESS AND DISPOSE OF WASTE AND PROVIDING INNOVATIVE SOLUTIONS FOR DECOMMISSIONING FACILITIES. IN ALL OF THESE AREAS POWER JACKS EXPERTISE, ENGINEERED DESIGNS AND HIGH QUALITY LIFTING AND POSITIONING PRODUCTS ARE PROVIDING NUCLEAR ENGINEERS WITH THE TOOLS AND SOLUTIONS TO HELP THEM ADVANCE NUCLEAR TECHNOLOGY.

- ▶ Alignment of particle accelerator ring segments.
- ▶ Positioning of manipulator arm for Tokomak reactors.
- ▶ Actuation of target doors for particle experiments.
- ▶ Beam cleaning actuation systems.
- ▶ Test rig automation and reconfiguration for operational, waste and decommissioning experiments.

- ▶ Shield door opening and closing mechanism.
- ▶ Lifting & positioning systems for shield door installation equipment.
- ▶ Actuation of crusher jaws in graphite handling machine.
- ▶ Jack-Up system for Upper Core Structure retrieval and replacement.
- ▶ Positioning of shield covers and locking system for spent fuel loading into containers.

Decommissioning

DURING DECOMMISSIONING THERE IS OFTEN THE REQUIREMENT FOR SPECIALIST MACHINERY WITH NOVEL SOLUTIONS IN ORDER TO OVERCOME UNUSUAL AND UNIQUE PROBLEMS. THIS IS WHERE POWER JACKS TEAM OF ENGINEERS EXCEL IN DEVELOPING AN INNOVATIVE YET PRACTICAL AND COST EFFECTIVE SOLUTION FOR LIFTING AND POSITIONING APPLICATIONS. WE WORK CLOSELY WITH CLIENTS OPERATING AT SITES SUCH AS DOUNREAY, HINCKLEY, HUNTERSTON AND SELLAFIELD TO NAME A FEW.



Power Plants

THE QUALITY, SAFETY, RELIABILITY AND LONGEVITY OF POWER JACKS PRODUCTS ARE SOME OF THE KEY ATTRIBUTES THAT HELP NUCLEAR POWER PLANTS TO OPERATE 24/7 AND MAINTAIN A SAFE NUCLEAR ENVIRONMENT. MAINTAINING IN-SERVICE PRODUCTS IS ESSENTIAL TO THE OPERATION AND SAFETY OF A NUCLEAR POWER PLANT. PRODUCT OBSOLESCENCE CAN BE A BIG PROBLEM FOR OLD DESIGNS. THAT'S WHY POWER JACKS SUPPORTS CLIENTS WITH THE SUPPLY OF SPARES AND REPLACEMENTS FOR PRODUCTS THAT CAN BE OVER 40 YEARS OLD. WE ALSO PROVIDE A REVERSE ENGINEERING SERVICE SO THAT WE CAN PRODUCE PARTS FOR OTHER MANUFACTURES PRODUCTS.



Power Plants

- Shield door opening and closing mechanism for large and small vertical and horizontal doors. ◀
- Opening & closing system for personnel access doors and hatches. ◀
- Through wall drive actuators. ◀
- Actuation of reactor fuel channel inspection equipment. ◀
- Lifting mechanism for working platforms. ◀
- Valve actuation for control valves. ◀



Waste Treatment

- Shield door opening & closing mechanism. ◀
- Drum posting lift system. ◀
- Actuators to raise and lower mixing and grout-capping station head assemblies. ◀
- Waste container access platform lifts. ◀
- Nuclear waste compaction press system. ◀
- Automation for nuclear waste remote handling systems. ◀
- Actuation and drive for storage pond transfer bogie. ◀

Waste Treatment

WASTE MANAGEMENT FOR THE LIFETIME OF A NUCLEAR FACILITY IS A KEY PART OF OPERATIONS. THIS INCLUDES THE ABILITY TO HANDLE AND TRANSFER RADIOACTIVE MATERIAL SAFELY AND RELIABLY. POWER JACKS HAS A LONG HISTORY AND EXCEPTIONAL EXPERIENCE IN THE DESIGN AND MANUFACTURE OF LIFTING AND POSITIONING SOLUTIONS FOR AUTOMATION AND HANDLING EQUIPMENT FOR NUCLEAR WASTE HANDLING SYSTEMS THAT ARE USED FOR ALL REACTOR TYPES. THE HIGH QUALITY OF OUR PRODUCTS CAN SEE THEM OPERATE FOR DECADES, GIVING YOU THE PEACE OF MIND THAT YOU HAVE THE RIGHT EQUIPMENT TO GET THE JOB DONE SAFELY EVERY TIME.

SCREW JACKS, LINEAR ACTUATORS, PLANETARY ROLLER SCREWS, BEVEL GEARBOXES, JACKING SYSTEMS & DESIGN SUPPORT

Our products have the advantage over hydraulics of improved performance, effectiveness, safety and more environmentally friendly while at the same time lowering costs. Simple to install and easy to control our products allow the move to complete electro-mechanical systems.

KEY DESIGN FEATURES AVAILABLE FOR ALL LINEAR & ROTARY PRODUCTS

- Full range of anti-corrosion options.
- Seismic shock load resistant designs.
- Radiation resistant designs.
- Submersible units.
- Tropicalised Units.
- Low (-65°C) to High (+250°C) temperature solutions.
- Full range of feedback devices for speed, position and load monitoring control.
- Bespoke engineered designs available



SCREW JACKS

Ideal for use as a single jack or in multiples as a jacking system to push, pull, tension, lock, unlock, tilt, pivot, roll, slide and lift or lower loads, anything from a few kilos to thousands of tonnes.

- Capacities up to 2000 kN (200Te) as standard.
- Capacities up to 35000 kN (3500Te) on request.
- Seismic rated units available.
- Machine Screw, Ball Screw and Roller Screw Jacks.
- Translating & Rotating screw configurations
- Standard material or full stainless steel screw jacks.
- Self-Locking (only use power when moving).
- Anti-rotation mechanism for unconstrained loads.
- Anti-Backlash or Zero-Backlash mechanism for axial positioning.
- Dual Nut (safety nut) fail safe load holding option.
- Electric and hand powered drives.



LINEAR ACTUATORS

Fully enclosed electro-mechanical linear actuators, supplied with or without integrated electric motors & feedback devices. Ideal for manipulator mechanisms & automated handling systems.

- Capacities up to 1000 kN (100Te) as standard.
- Capacities up to 2000 kN (200Te) on request.
- Machine Screw, Ball Screw and Planetary Roller Screw actuators.
- Standard material or full stainless steel linear actuators.
- Self-Locking versions available.
- Anti-rotation mechanism in ram for unconstrained loads.
- Zero-Backlash mechanism for axial positioning.
- Dual Nut (safety nut) fail safe load holding option.
- Auxiliary electric and hand powered drives.

LINEAR SCREWS

We can manufacture linear screws to your requirements whether for positioning drives, winches, winders, valves, gates, hatches to name a few.



PLANETARY ROLLER SCREWS & NUTS.

- Dynamic load capacity up to 1200kN, Static load capacity up to 1800kN
- High standard lead options up to 54mm
- Roller screw diameters from 15mm to 120mm. Stroke lengths up to 6m.

LEAD SCREWS & NUTS

- Trapezoidal, Sharp, Butress, Knuckle, Coarse, Reverse / Diamond & Custom thread profiles.
- Multi start threads with 1, 2, 3 up to 50 threads and variable pitch threads.
- Screw lengths from 0.01m up to 20m. Screw diameters from 10mm to 300mm.

PROVEN TECHNOLOGY ENGINEERED FOR YOUR APPLICATION



2000kN Shield Door Jack



50kN Linear Actuator



Stainless Steel Bevel Gearbox

**BEVEL GEARBOXES**

Distribute mechanical rotary power throughout your drive system with these bevel gearboxes.

- Compact Bevel Gearbox Design
- 2-way, 3-way & 4-way Configurations
- Solid Shaft & Hollow Shaft
- Gear Ratios: 1:1, 1.5:1, 2:1, 3:1 & 4:1 as standard with special gear ratios on request.
- Torque Ratings up to 7000 Nm as standard and 20000Nm on request.
- SG Iron Housing as Standard. Full stainless steel on request
- Available with integrated electric motor and feedback devices.
- Submersible gearbox designs available with or without integrated electric motor.

**JACKING SYSTEMS**

Jacking system arrangements or configurations can be built in many formats with the use of screw jacks, bevel gearboxes, motors, reduction gearboxes, drive shafts, couplings, plummer blocks and motion control devices.

Four of the most popular system configurations are the 'H', 'U', 'T' and 'I' configured jacking systems.

Jacking Systems have 2 main features:

1. They allow for the movement of large loads driven by a single motor.
e.g. 4 x EMT1000 screw jacks arranged in a screw jack system could move a load of 400 Te (4000kN).
2. Support loads evenly over a relatively large surface area
e.g. 20Te load over a 24m² area using four screw jacks with 6m x 4m centre spacing.



Multiple screw jacks can be linked together mechanically or electrically. The latter is useful if there is no space for linking drive shafts. This can also be expanded so that multiple mechanically linked jacking systems are synchronised / controlled electronically allowing linear motion solutions to be provided on a massive scale. Such as vessel lift systems where typically 20 - 60 screw jacks are electronically synchronised to lift up to 8000Te vessels.

**DESIGN SUPPORT**

For product or project development Power Jacks highly experienced team of design engineers are available to help you achieve the best solution for your application. Based at our factory in Scotland, the team works at both design and project levels to provide you with a smooth and efficient development process. Our speciality is in designs requiring mechanical or electro-mechanical linear or rotary motion solutions whether at a component part or complete system level.



Power Jacks specialises in the design and manufacture of precision linear actuation, positioning and lifting equipment.

Our products are supplied globally across many sectors including Industrial Automation, Energy, Transport, Defence and Civil.

Power Jacks Ltd
Kingshill Commercial Park
Prospect Road, Westhill
Aberdeenshire AB32 6FP
Scotland (UK)
Tel: +44 (0)1224 968968

www.powerjacks.com
sales@powerjacks.com

PJB-IND-NUC-EN-04



All information in this document is subject to change without notice. All rights reserved by Power Jacks Limited. May not be copied in whole or in part. ©Power Jacks Limited 2026, Aberdeenshire, Scotland, United Kingdom.