

# Actuation

Linear fluid power Actuators  
and Control Systems



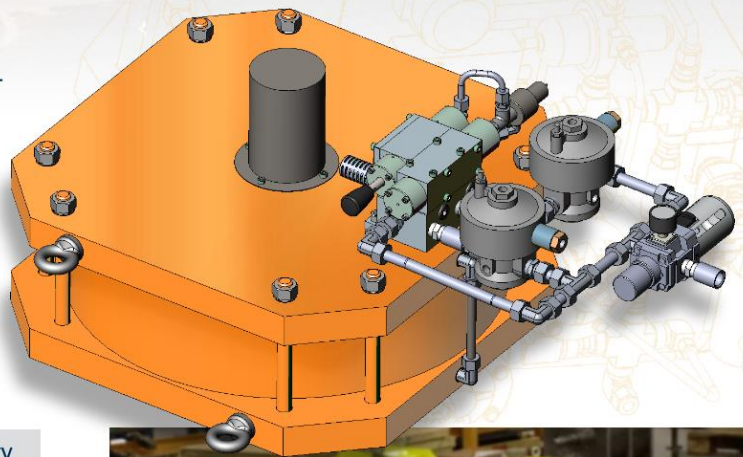
# SchuFli

## Linear fluid power Actuators and Control Systems



**SchuF (UK) Ltd.** is an independently-operated UK-registered limited company.

Its primary activity is the design and manufacture of linear fluid power actuators and control systems.

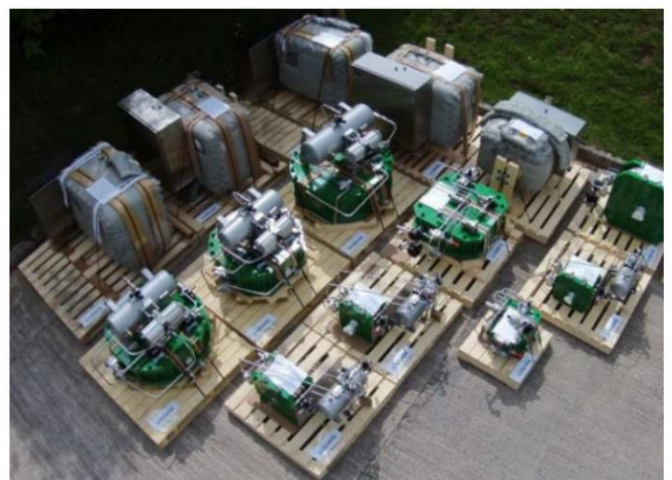


Our dedicated team at **SchuF (UK) [SFUK]** has over thirty years of experience in providing bespoke engineered actuation solutions for the process valve industry. End-user applications include Chemical, Pharmaceutical, Polymer/ PTA, Marine, Power Generation, Up-/ Mid-/ Down-Stream Oil and Gas.



All design work is carried out in-house, working to precise customer specifications. Utilising our four seats of SolidWORKS, our design office will supply 'For Approval' documentation and we can also provide 3D models for integration into the customers' plant assembly models.

All manufacturing, painting, assembly, final testing and packaging are all carried out in-house to achieve and maintain the highest quality standards.



SFUK is *ISO 9001- accredited* and supplies equipment CE markings to the *EU Machineries and Pressure Equipment Directive*.

# Actuators and Control

## Actuator Basic Concepts

Linear fluid actuators operate on the principal of converting fluid pressure into linear thrust. This type of actuator conveniently mounts directly to the process valve, while the source of the fluid power can be mounted remotely and service multiple actuators. The fluid power is then transmitted thru a local distribution system, allowing potentially high fluid flow and/or pressure where needed to the actuators to operate the process valves with high speed and/or force, as required for that size or pressure class of valve.

Most commonly used fluid for pneumatic systems is instrument-quality compressed air, typically in the range 4~10bar g for Hydraulic systems, and oil in the range 10~210bar g. Other fluids types and pressure ranges are used for both pneumatic and hydraulic applications as circumstances demand. Typically the actuator contains a piston with a means of sealing the piston to the tube of the actuator (dynamic seal, diaphragm or bellows). Fluid pressure is applied to the actuator connection port via some means of flow control, such as a solenoid valve. Pressure builds up under the piston until the thrust generated by the fluid pressure is greater than the net load on the piston rod, resulting in the piston, rod and load stroking in the selected direction.

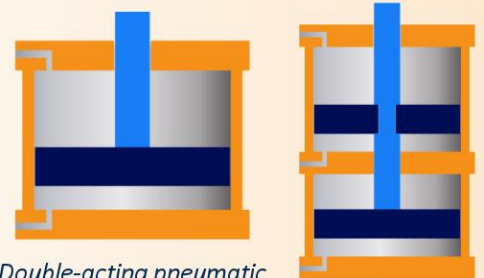
To use for a moment imperial units, pressure is measured in PSI, or Pounds force per Square Inch. That is to say, a force applied over an area. Thus 58 PSI, applied to a piston with area of 1 square Inch would result in a thrust of 58 pounds force, (ignoring friction & mass of components of the actuator). The actuator in this example would have a piston of ~1.128" (29mm) dia.

The typical forces required to operate process valves are significantly higher than the above example, so we have the option of increasing the fluid pressure or the pressure area of the piston (and thus the piston diameter). Typical pneumatic actuators we produce with an operating pressure of 4~10bar g are in the range of 100mm bore to 1200mm bore, offering a wide range of thrust options (~3000N to 1000kN), to suit the process valve application. If there are physical constraints in the process valve location, an alternative may be to increase the operating pressure, using hydraulic fluid & reduce the piston area significantly. By comparison, a 210bar g Hydraulic actuator of 260mm bore produces ~1000kN.

There are two basic types of Linear Fluid actuator:

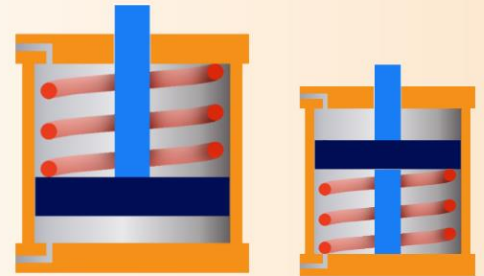
**Double-acting (PKD)**, having fluid pressure applied to either side of the piston alternately to stroke the actuator in one direction and then the other.

**Single-acting/spring return (PKE & PKR)**, having fluid pressure applied to one side of the piston to stroke and a spring to return the piston stroke as fluid pressure is removed from the pressure side. There are two sub-categories of the single-acting actuator- 'spring to extend' the piston rod, (PKE), or 'spring to retract' the piston rod, (PKR). Hybrids of the PKD, PKE & PKR can be configured to provide special-function, multi-power or multi-position actuators, including rotary or quarter- turn functions as required.



*Double-acting pneumatic actuator (PKD)- air power supplied to both sides*

*Tandem Option for higher forces*



*Single-acting pneumatic actuator (PKR) - air power to extend, spring force to retract*

*Spring-to-extend (PKE) option, air force to retract*

## SchuF (UK) Capabilities

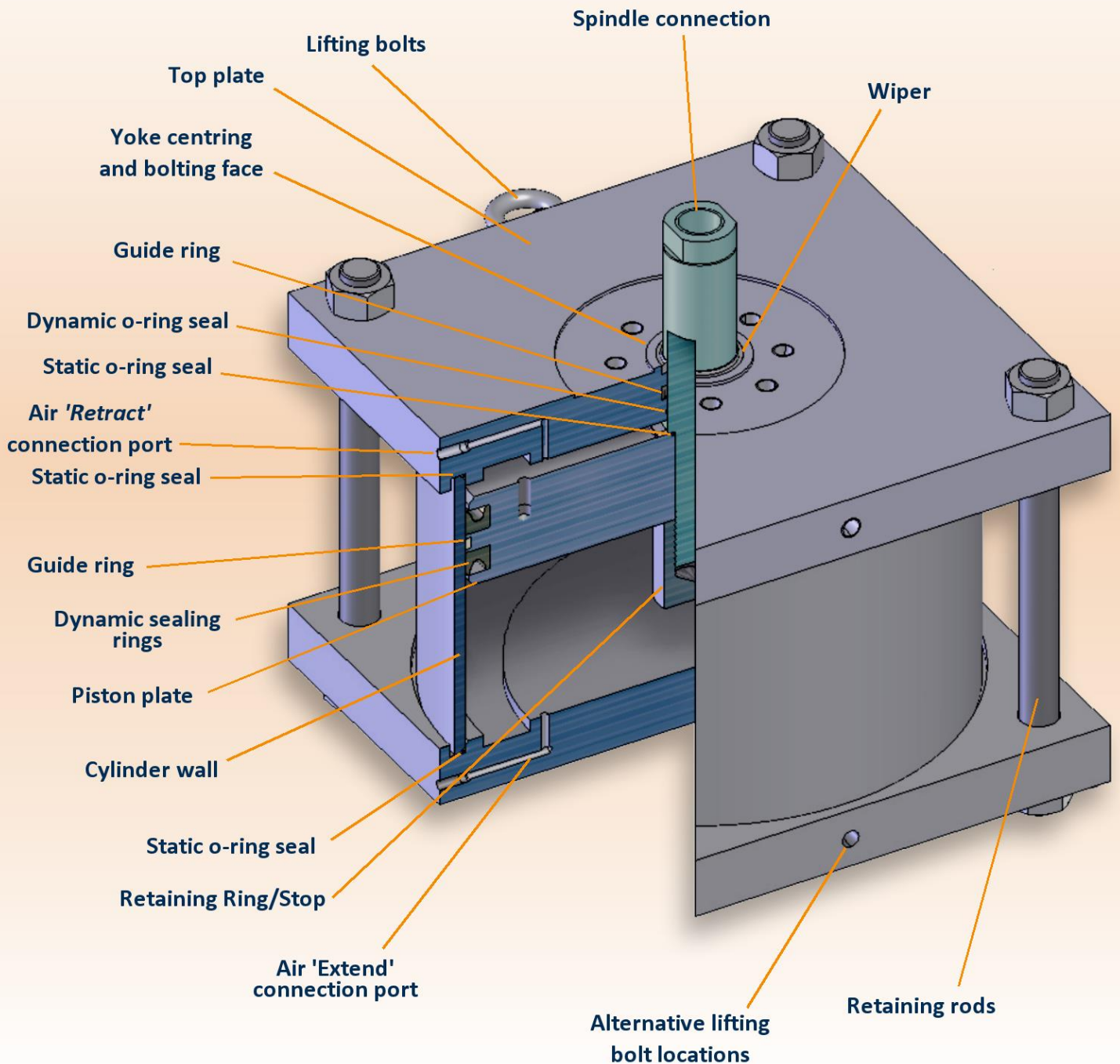
- SchuF UK is uniquely positioned to understand valve manufacturers requirements / specifications and provide the most technically appropriate & cost effective solutions.
- From a simple "spring to close" actuator for high integrity ESD function to large-bore double-acting actuators with modulating controls, incorporating protected air-fail systems and fire-safe enclosures (inc. pictures of fire test).
- All of our actuators are manufactured using materials from EU PED certified mills, providing full 3.1 material traceability.
- All actuators are CE marked & documented under Module H of our PED accreditation, in conjunction with our ISO 9001 accreditation.

# Actuator Features- PKD

## Double-Acting Pneumatic Actuator

All **Double-Acting Actuators (PKD, HKD)** are supplied "bespoke" to your specific requirements. Bore size is selected to suit the available system fluid pressure and design differential pressure of the process valve, applying individual customer's specific safety factors. Actuator strokes are tailored to the valve type and size to optimise the

size and weight of the actuator. We understand the need for over-stroke to ensure long lasting service on metal-to-metal seal process valves or for back-seating of packing glands, and for soft-seal valve designs where the actuator is used to control the stroke of the valve, together with the possibility of adjustable stroke stops.

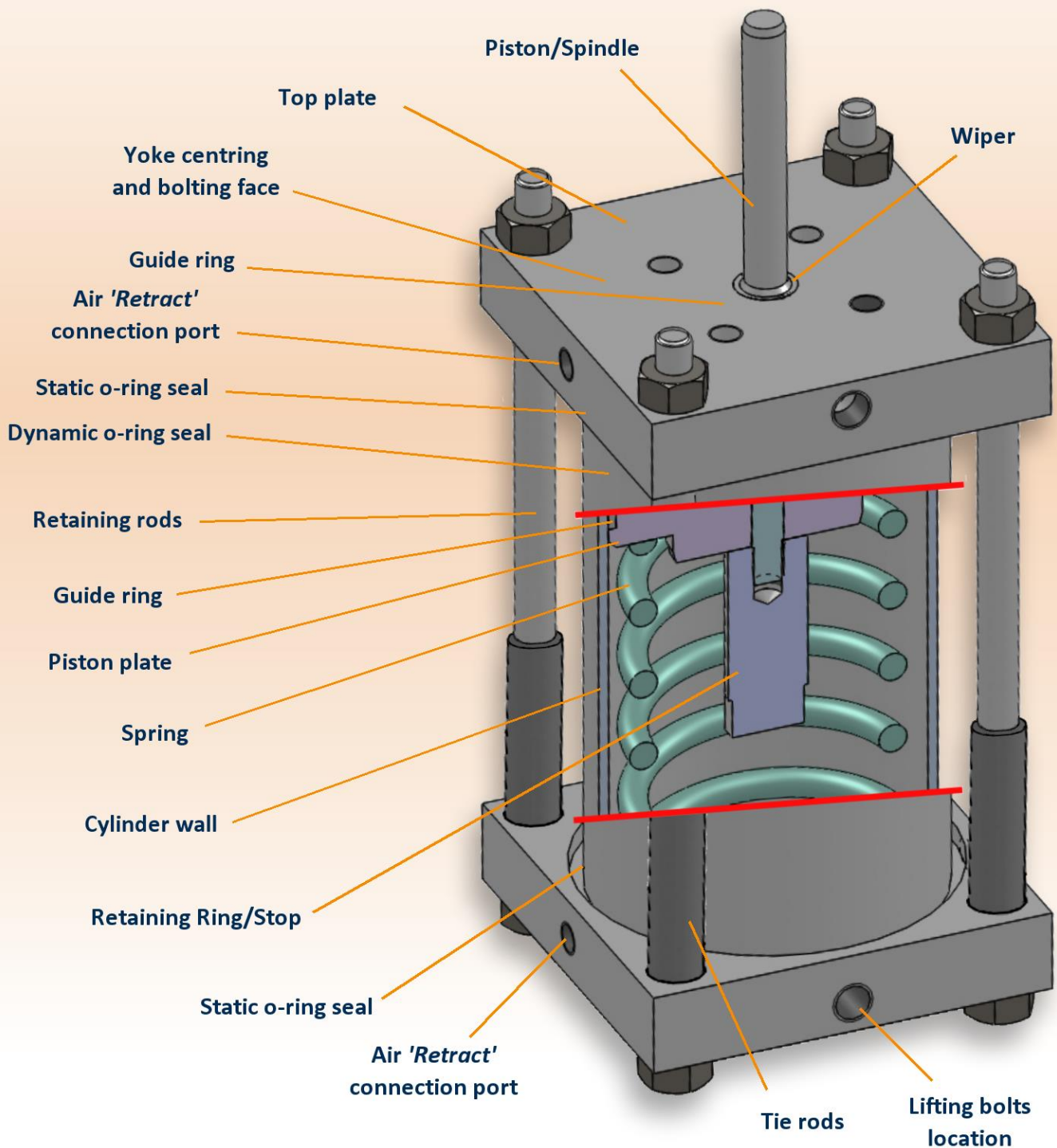


# Actuator Features- PKE

## Single-Acting (spring -returned) Actuator

All Single-Acting (Spring-return) actuators (PKE, PKR) are supplied "bespoke" to your specific requirements. Bore size is selected to suit the available system fluid pressure and design differential pressure of the process valve, applying individual customer's specific safety factors. Actuator strokes are tailored to the valve type & size to optimise the

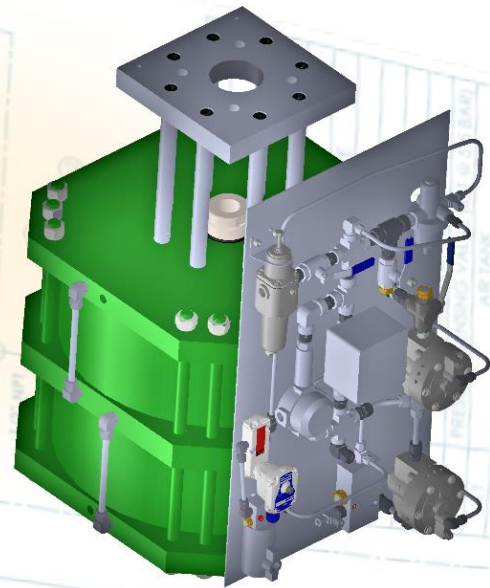
size and weight of the actuator. The springs used are of the highest quality with designs that are conservative to ensure negligible spring set/fatigue over the process valve's service life. As with PKD actuators, the highly-experienced SFUK team are familiar with all aspects of the design, manufacture and usage of these types of actuator.



# Actuator Controls

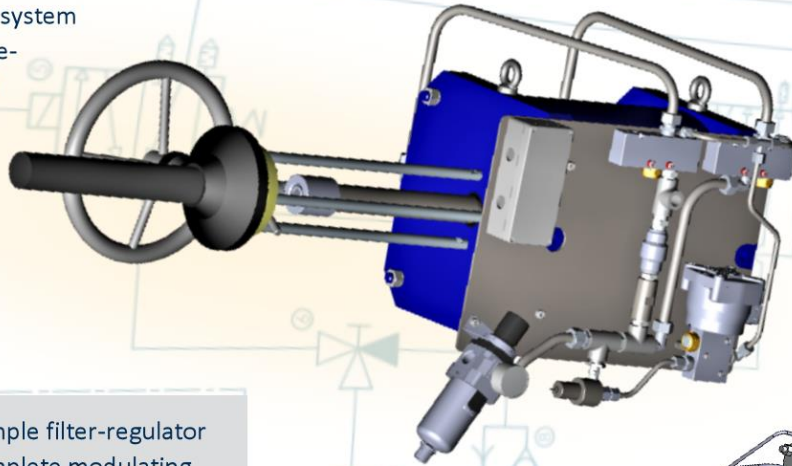
## Bespoke Actuator Control Systems

Tandem PKD 550, with control system incorporating mechanical lock-up valve, retraction on air-fail, partial stroke test facility, solenoids, filter-regulator, check valves, booster valves, silencers and pressure-switch.

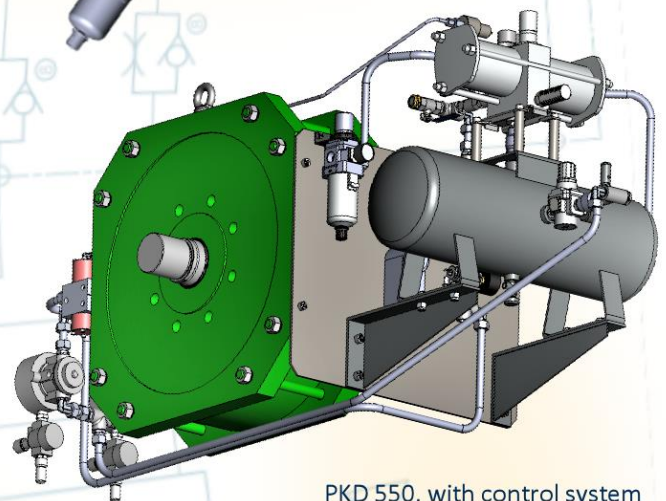


At SchuF UK we complement the actuators we manufacture with the appropriate control systems, incorporating the actuators and controls into complete, fully leak- and function-tested assemblies.

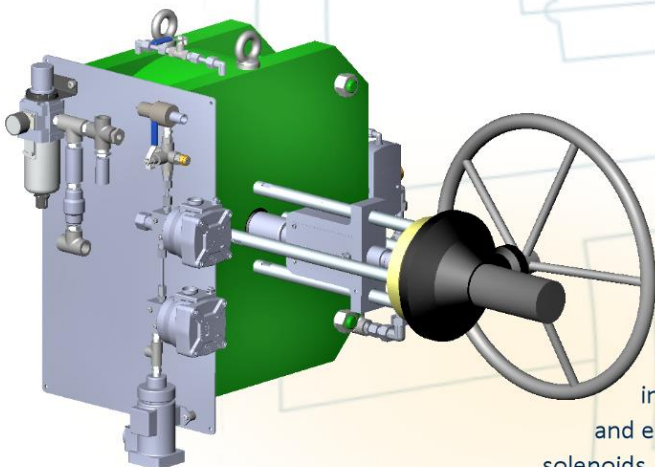
PKD 320, with control system incorporating pressure-sensing valve, manual override on air-fail, solenoid, filter-regulator valve, pilot valves and quick-exhaust valve



We can supply everything from a simple filter-regulator with solenoid valve through to a complete modulating control configuration with a 'protected air' ESD system—all of which can be fitted with certified fire protection, if required. We can offer our tried-and-tested standard systems or supply an entirely custom-built arrangement to fulfil complex project-specific requirements.



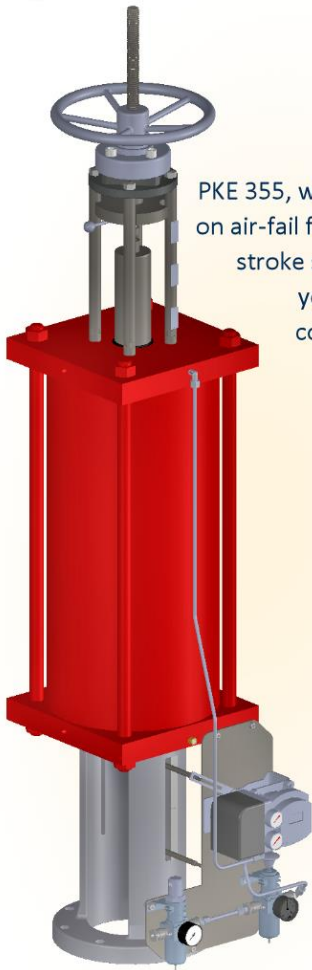
PKD 550, with control system incorporating air tank for closure on air-fail, solenoid, filter-regulator valve, and flow-booster valve



PKD 500, with control system incorporating retraction on air-fail and electrical-fail plus manual override, solenoids, filter-regulator, flow booster and flow regulator valves with silencers

# Actuation

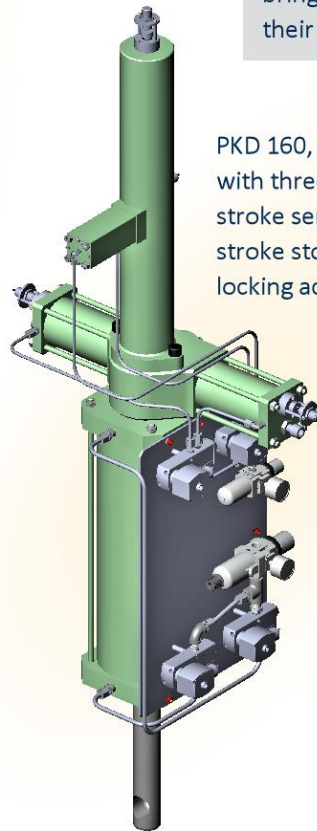
## Specials and Accessories



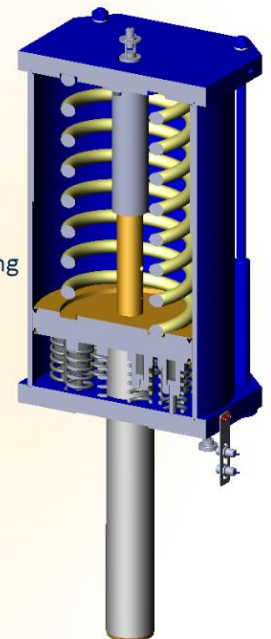
PKE 355, with manual override on air-fail featuring mechanical stroke stop and custom yoke/bridge construction

*SchuF UK* has a long track record of working with their customers to create the ideal pneumatic actuation and control system for that customer's unique requirements.

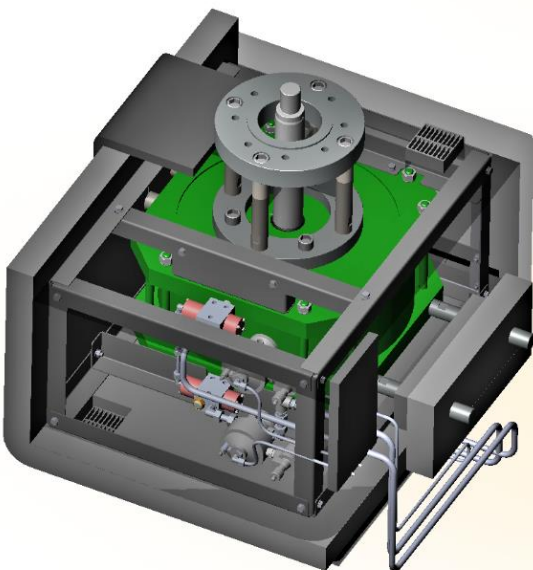
No two process are exactly the same and SchuF UK will use their long-established know-how together with trustworthy components and designs to build innovative and highly-specialised systems which will in turn bring supreme reliability, longevity and economy to their customer's operations.



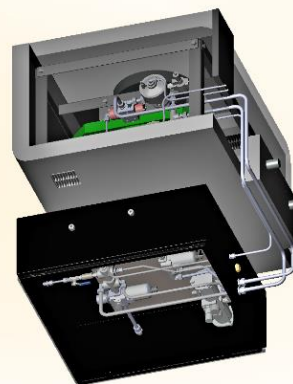
PKD 160, linear and rotary actuator with three-stop positioning, end-of-stroke sensors, adjustable stroke stop and separate locking actuator



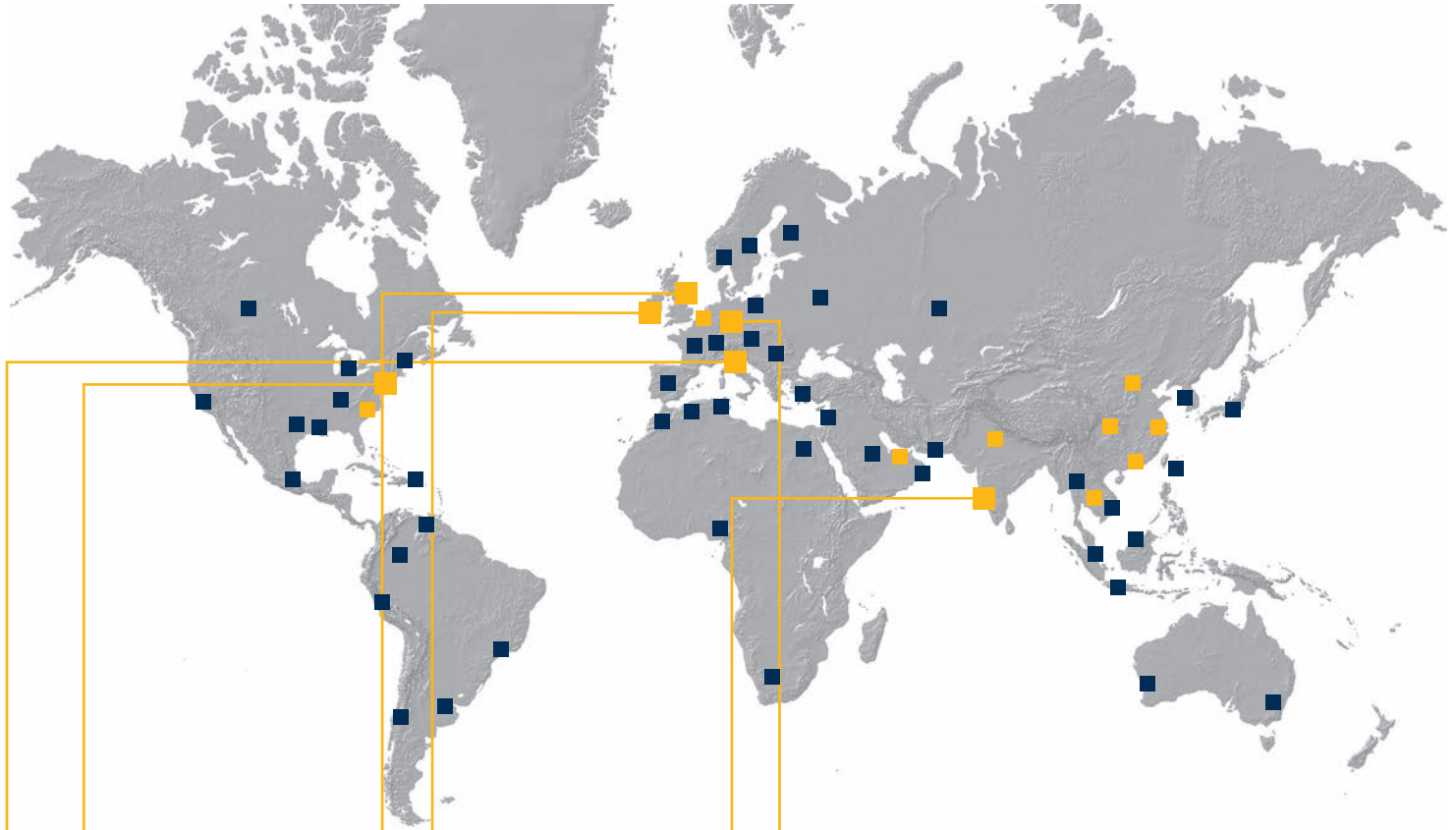
PKE 400 with three-stop positioning using internal spring-centred balancing



PKD 750 with fireproof surround and separate control panel enclosure



# SchuF Worldwide



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