

# Slack & Parr launches high-accuracy flow divider using innovative gear design

Precision metering specialist Slack & Parr has developed a gear-type flow divider capable of metering hydraulic fluids at high pressure with extreme accuracy.

The company's FDRX and FDLX flow dividers are built around an innovative 'floating gear' design to offer divisional accuracy greater than 1% at working pressures of up to 350 bar (5075 psi) – a level that would ordinarily only be associated with transducer and feedback systems.

Slack & Parr's Neil Anderton explains how the technology works and the engineering challenges the company overcame to develop the solution. "Flow divider technologies are designed to split a flow of hydraulic oil from a single source to fill a series of vessels or cylinders to predetermined ratios. The technology is most commonly used to lift and lower loads, with applications in transport and logistics, marine and agriculture, including heavy-duty handling systems, forklifts and loading ramps."

In developing any flow divider solution, the principal engineering challenge is how to split the flow as accurately as possible. "The reason this is

so critical is that it determines how smoothly and evenly the load is lifted or lowered," says Anderton. "In many industries and applications – particularly those handling fragile or valuable loads – this is vital to a successful operation. In this case, accuracy refers to the difference in rate between the first and last cylinder filling with the right amount of hydraulic fluid to reach its final position. Achieving optimum accuracy means each cylinder fills and empties at the same rate or ratio and the load is lifted or lowered evenly, regardless of pressure differential or unequal load distribution."

Anderton adds that even small differences in flow rate can mean the cylinders quickly fall out of sync with each other, which can in turn significantly impact operational performance and, in some cases, safety. "We know that to achieve accurate flow we need to build accuracy into each component, therefore reducing the potential for contact between components and 'slip', which happens when the fluid forces its way backwards through the flow divider under pressure," he explains.

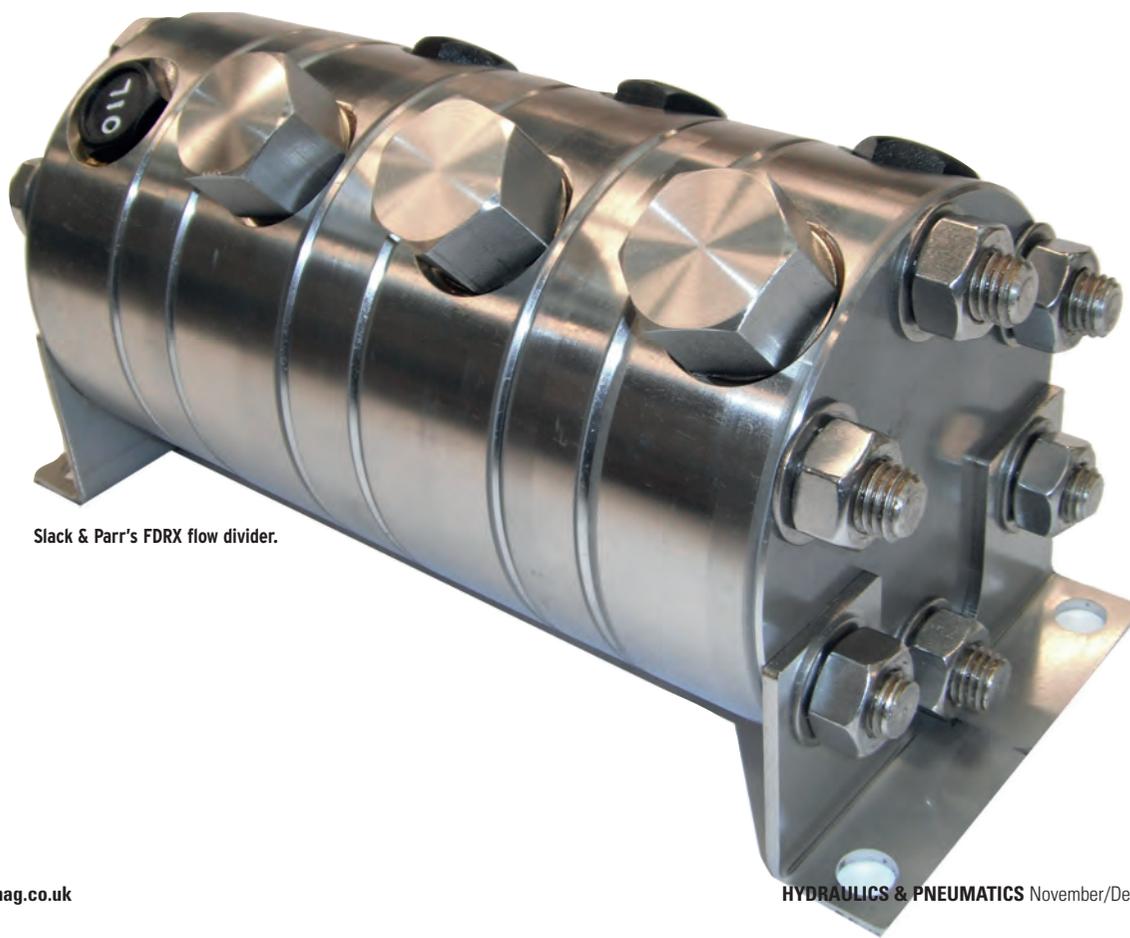
When, almost two decades ago, Slack

& Parr developed its now well-established FDR and FDL model flow dividers, the company's challenge was to make the clearances between the internal gears, plates, dowels and casings as small as possible. This meant engineering clearances of just a few microns – significantly less than a human hair – to reduce the opportunity for slip while still providing enough space and alignment for the gears to rotate correctly.

## 'Floating gear' design

More recently, in Slack & Parr's work to develop the FDRX and FDLX models and increase this level of accuracy even further, the company engineered an innovative 'floating gear' design. This allowed the gear to centralise itself accurately within its housing during operation. According to Slack & Parr, the result is that tooth-to-tooth contact between gears becomes extremely precise, gaps are eliminated, and clearances between the gear plate and the housing are also reduced.

"Extensive trials have shown that the new technology offers accuracy greater than 1%, which is not only significantly



Slack & Parr's FDRX flow divider.

Larrington Trailers' Box Loader trailer.



better than any other flow divider currently available on the market, but also means its performance comparable with other, more expensive technologies," says Anderton.

### Harvesting success

Lincolnshire-based agricultural trailer manufacturer Larrington Trailers has adopted Slack & Parr's FDRX flow divider as part of the hydraulic system used to power its Box Loader trailers. The trailers are used by the farming industry to load harvested crops – in particular, soft root crops such as potatoes, carrots and

onions – into boxes while protecting them from damage. The crop is transferred onto a cushioned platform which sits over a series of boxes. Once a pre-determined load has been reached, the hydraulic system lifts the platform to gently release the crop into the waiting boxes.

"In Slack & Parr's FDRX flow divider, we've found a technology that delivers simple, accurate and reliable movement to achieve a vital part of the box loader's job," says Will John at Larrington Trailers.

"Our customers don't want to have to stop operations to level up an unbalanced

platform. Top of our wish list was a solution that would keep the platform level in one single movement all the way up and despite an uneven load.

"Reliability is also crucial. We sell our trailers all around the world, so we needed technology that is robust and consistent and doesn't need any maintenance or repair."

Slack & Parr has been developing metering technologies including precision gear pumps for over 70 years, and gear-type flow dividers for more than 30 years.

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