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fluid & gas handling
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Wind Power

Accumulator and Cooler Products for
Wind Power Applications



ENGINEERING YOUR SUCCESS.



Accumulators and Coolers are used for many applications in the wind turbine. The demands that are placed on the product are distinctly different depending on the location and the application requirements, which heavily influence the product selection process.

One thing is common to both however, and that is the criticality of reliability and product lifetime, as unscheduled maintenance is normally very expensive due to the costs associated with system downtime, the need for skilled technicians, the location of the turbine itself and the fact that the nacelles can be up to 100 meter high!

Extreme Forces

Accumulators

When accumulators of any type are mounted in the hub of the turbine, they are subjected to extreme forces and vibration due to the forces generated as the hub is turning. Also, when used in pitch control, the accumulators are working 100% of the time whilst the hub is turning, adjusting the blades many times per minute. Regardless of the technology used, these factors can lead to premature failure of

components, if they have not been adequately designed & tested for these conditions. Furthermore, the accumulators can also be used to supply power for an emergency stop situation where the criticality of being available for use is high.

Continuous Development

We have developed a special rilsan coating on the accumulator shell, which has the purpose of drastically reducing the friction between bladder and shell surface in a very cost effective way. This also has the primary goal of increasing product life, but also has additional benefits of providing excellent corrosion protection, whilst minimising any future contamination of the system hydraulic oil as there is extremely little abrasion between the working components to produce particles in the hydraulic system. Once more, the process of applying this coating

is technically complex and provides a high level of confidence to our customers, as any non adhesion of coating can cause early system failure and damage to some of the more expensive items within the hydraulic system.

Advanced Technology

We work with our customers to develop specific rubber compounds for our bladder, which meet the needs of this application in an optimum way.

Our latest bladder with E2 bladder mix has been specifically designed for the rigours of the hub and has extended product lifetime by 3 times longer.



Applications

Wind Turbines

- Pitch Systems
- Pitch Gear Box
- Shaft Brake
- Yaw Brake
- Yaw Drive

Coolers

We are a trusted partner for coolers to some of the world's leading producers of hydraulic power packs. We believe that this is due to our "best in class" product range, that has been developed over many years for industrial applications but is highly appropriate for use here.

tools at our disposal to be your ideal development partner. Cooling of the generator and electrical cabinet are other fields of application.

We have also built up a wealth of experience supplying coolers within the gearbox hydraulic circuit. This is a demanding application due to the high viscosity and flow rates that are required for the cooler to withstand. Whether the purchasing decision is made by the wind turbine manufacturer or the producer of the gearbox, we have the

Applications

Wind Turbines

- Power Packs
- Gear Box
- Generator and Electrical Cabinet



Closed Loop System

Accumulator maintenance can be a significant issue in applications where the product is working in severe conditions and/or difficult to access. Field maintenance is expensive and generates health & safety concerns.

Parker Olaer has developed an automated nitrogen top-up system for gas charging of accumulators. This ensures accumulators are pre-charged to an accurate level and reduces human intervention on site, providing a virtually maintenance free solution.

Diaphragm Accumulators (ELM Series)

Diaphragm accumulators are used on hydraulic powerpacks within the nacelle for pitch control and brake applications.

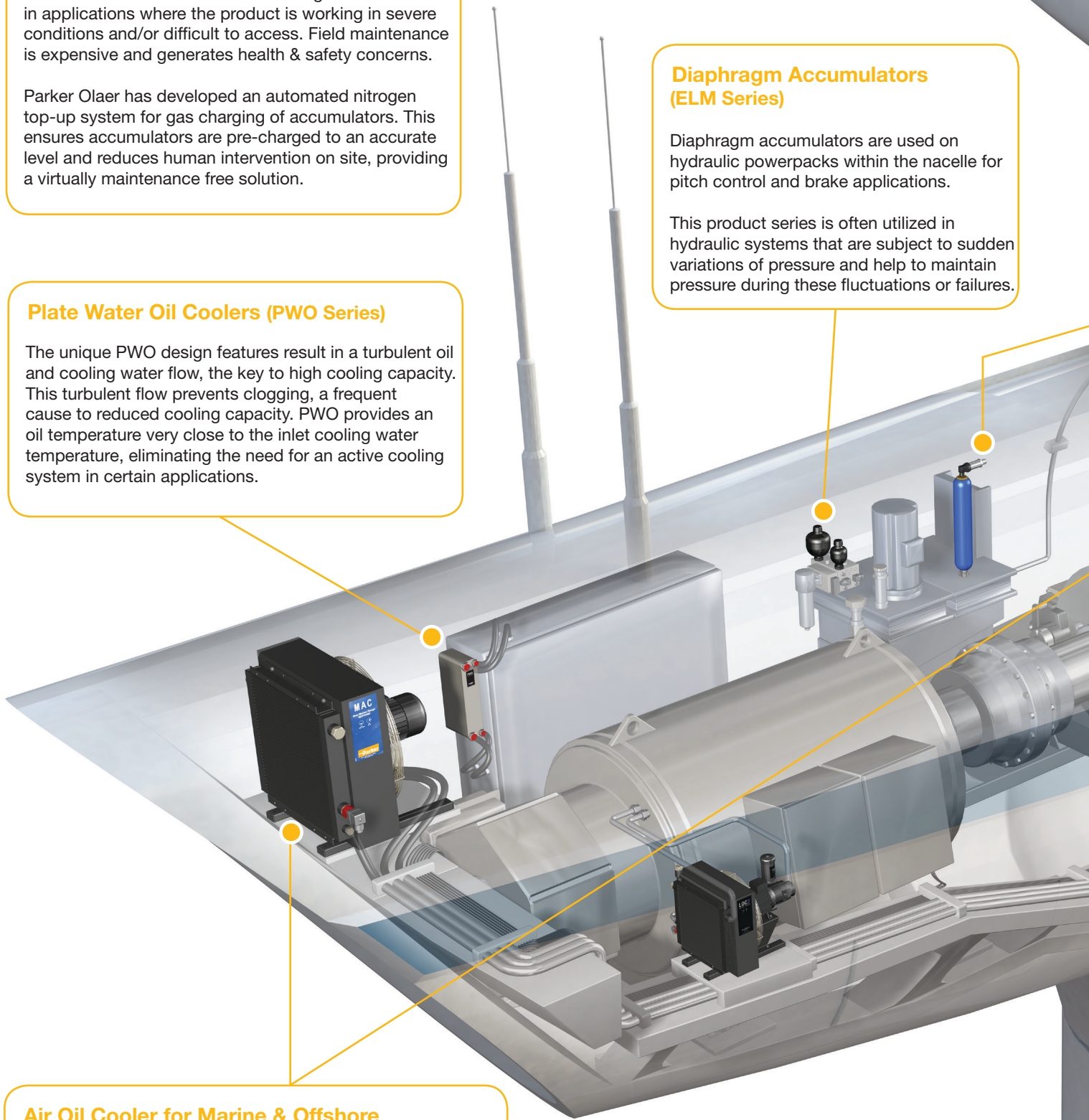
This product series is often utilized in hydraulic systems that are subject to sudden variations of pressure and help to maintain pressure during these fluctuations or failures.

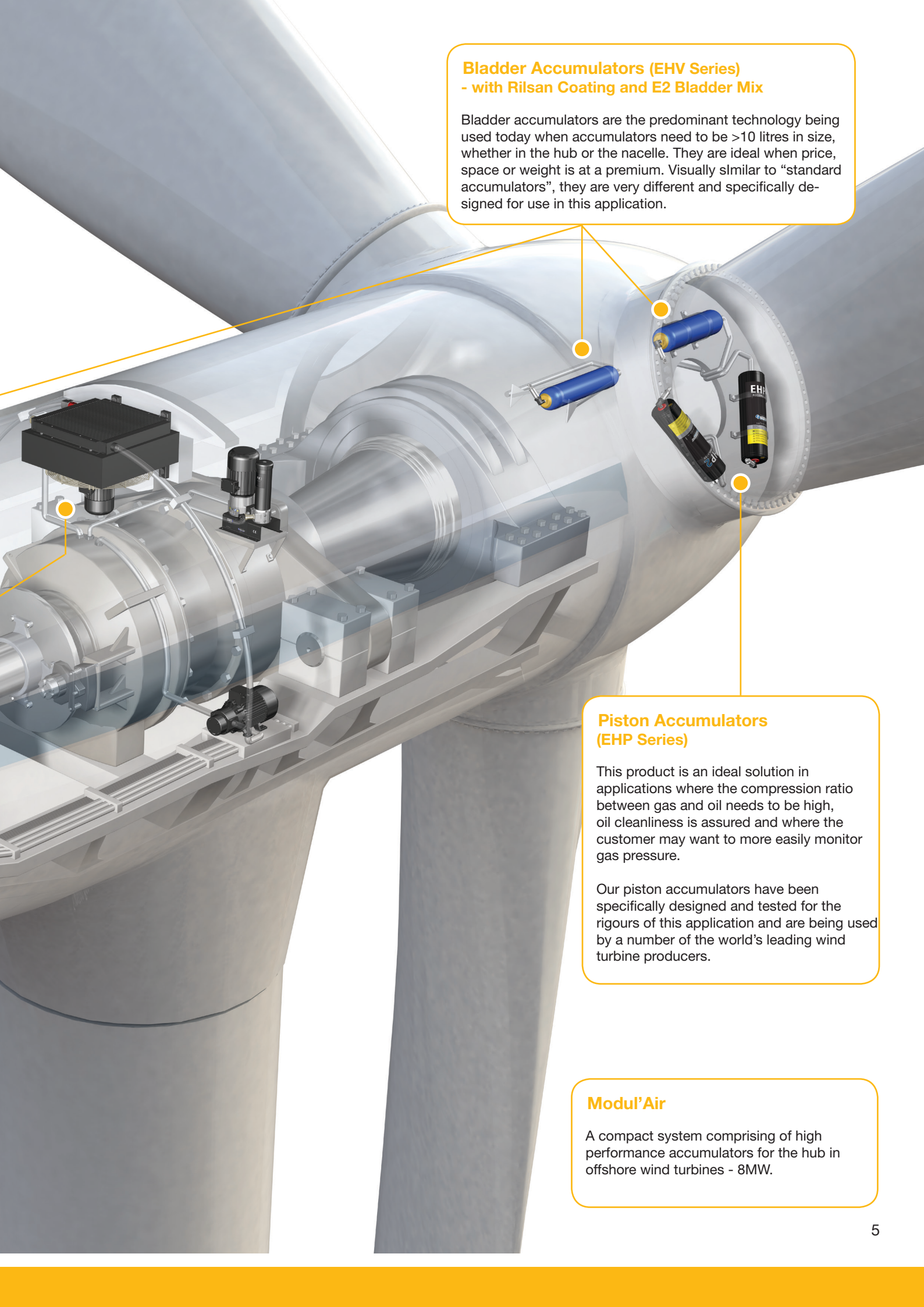
Plate Water Oil Coolers (PWO Series)

The unique PWO design features result in a turbulent oil and cooling water flow, the key to high cooling capacity. This turbulent flow prevents clogging, a frequent cause to reduced cooling capacity. PWO provides an oil temperature very close to the inlet cooling water temperature, eliminating the need for an active cooling system in certain applications.

Air Oil Cooler for Marine & Offshore Applications (MAC Series)

The MAC series is engineered for Marine nearshore and offshore applications and provides cooling capacity up to 300 kW. Corrosion resistance meets C4-M and C5M-M requirements in accordance with ISO 12944.





Bladder Accumulators (EHV Series) - with Rilsan Coating and E2 Bladder Mix

Bladder accumulators are the predominant technology being used today when accumulators need to be >10 litres in size, whether in the hub or the nacelle. They are ideal when price, space or weight is at a premium. Visually similar to “standard accumulators”, they are very different and specifically designed for use in this application.

Piston Accumulators (EHP Series)

This product is an ideal solution in applications where the compression ratio between gas and oil needs to be high, oil cleanliness is assured and where the customer may want to more easily monitor gas pressure.

Our piston accumulators have been specifically designed and tested for the rigours of this application and are being used by a number of the world's leading wind turbine producers.

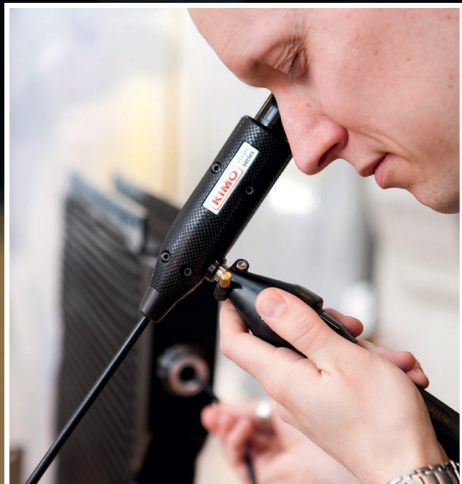
Modul'Air

A compact system comprising of high performance accumulators for the hub in offshore wind turbines - 8MW.



We have invested heavily in our expert team of people who have a unique set of experience, hardware and software to be the leading development partner.

Working closely with our customers, we are able to accurately model the behaviour of the product in the field. Both by computer simulation and by physical product testing, we can ensure the best possible functionality.





Regulations

Accumulators

Due to our vast experience in demanding markets such as renewable energy, we are offering an unmatched range of rubber compounds to meet the most difficult applications.

Parker Olaer products are supported all over the globe, and we will meet customer requirements wherever needed.

approvals (BV, DNV, ABS, LR, ...), over and above all country specific approvals (PED, ASME, SELO, CRN, ARH, CUTR, ...).

We therefore offer the complete range of approvals, such as all key Marine

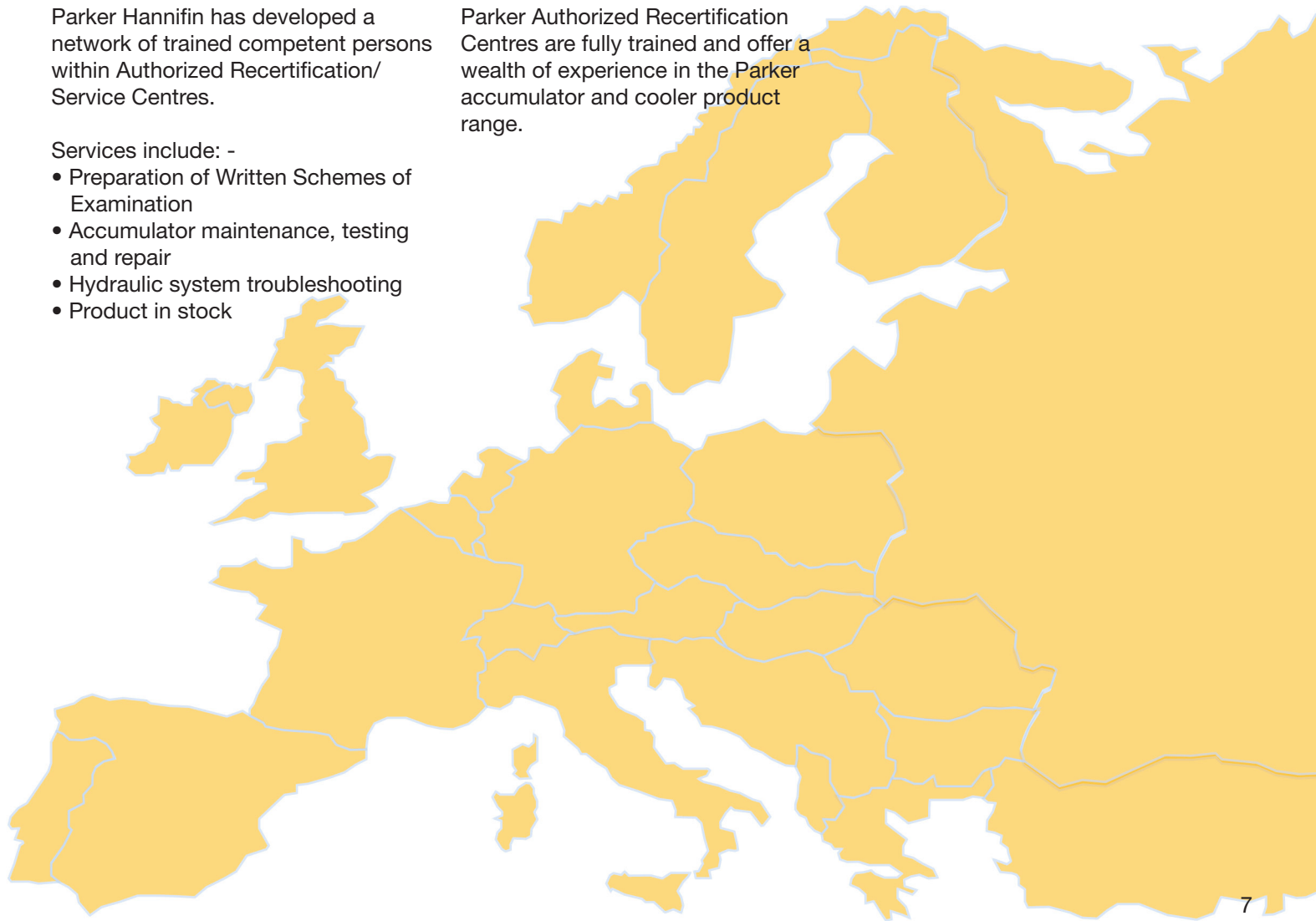
Service Centre Network

Parker Hannifin has developed a network of trained competent persons within Authorized Recertification/ Service Centres.

Parker Authorized Recertification Centres are fully trained and offer a wealth of experience in the Parker accumulator and cooler product range.

Services include: -

- Preparation of Written Schemes of Examination
- Accumulator maintenance, testing and repair
- Hydraulic system troubleshooting
- Product in stock



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