KBB TURBOCHARGERS

Boost Your Power. Boost Your Efficiency.

KBB swap programme brings predictability to turbocharger servicing

Whitepaper

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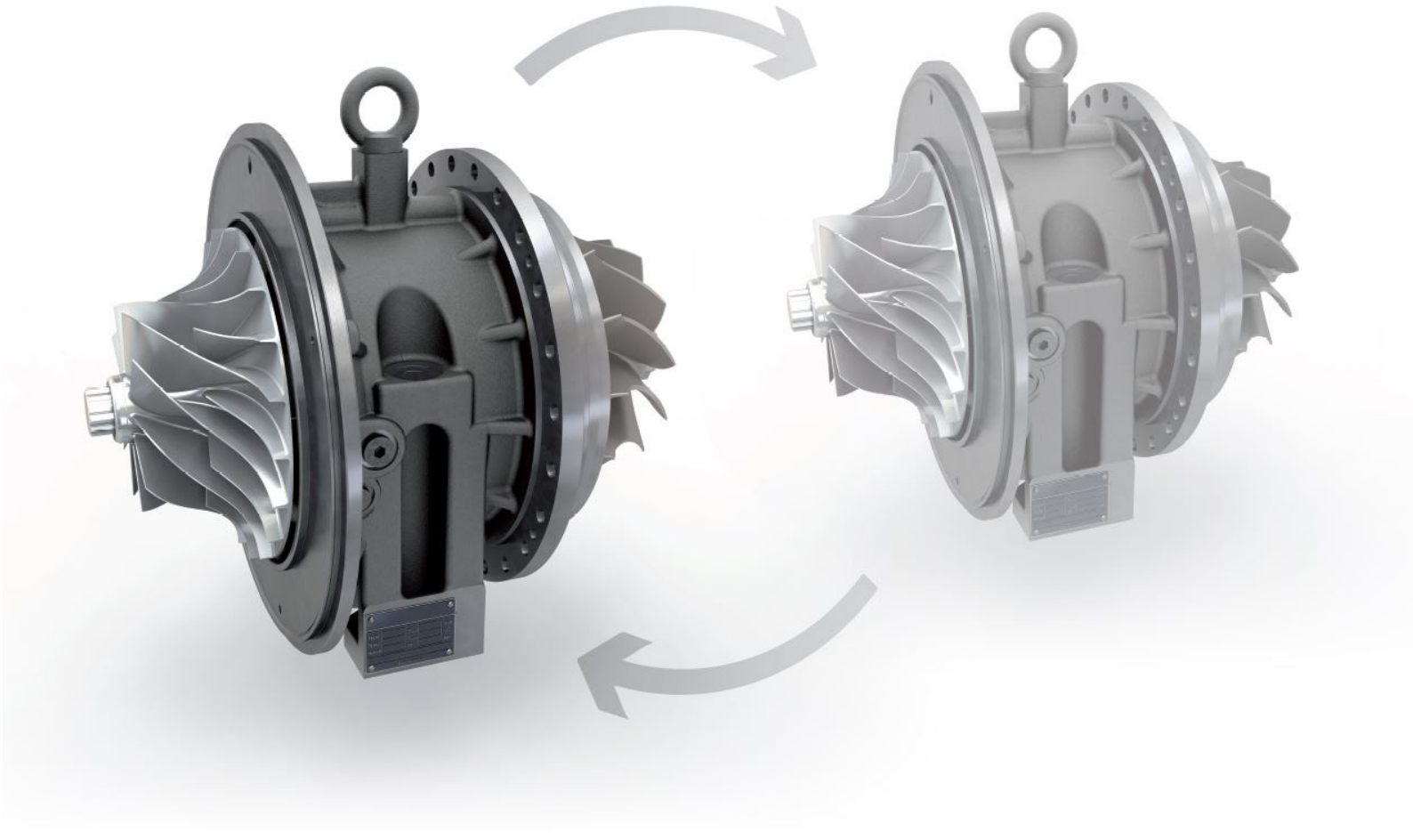
Introducing Knowledge 2 Swap

Turbocharger specialist Kompressorenbau Bannewitz GmbH (KBB) has launched a new service that allows ship owners and operators to manage the risk of planned and emergency maintenance. The Knowledge 2 Swap (K2S) programme ensures the rapid availability of genuine parts using specially designed cartridges delivered from KBB and or its service partners. These cartridges can be installed quickly by onboard crew rather than taking the vessel out of service to have new components or a new turbocharger installed.

K2S was designed in conjunction with KBB's service partner PJ Diesel Engineering following a comprehensive analysis of KBB's inventory and installed base. By understanding the flow of parts and the capacity for overhauling and reconditioning, KBB and PJ Diesel Engineering were able to design a cartridge programme that covers the most popular KBB turbocharger models while offering a level of flexibility in the components included.

In this whitepaper KBB outlines the rationale, development and structure of its K2S programme.



Why is K2S needed?

The swap programme is an important development for KBB, driven both by the company's recent development as well as the evolving needs of its customers.

Over the past decade KBB's business has grown rapidly, both in the number of new units on the market and the demand on its service functions. This trend reflects the increasing uptake of KBB turbochargers as well as developments in the markets KBB serves. For example, the company's products now cover more than 1,100 engine types and applications, compared to around 600 in 2013. This has led to a 20.5% increase in the number of different stock parts the company needs.

The growth has been accompanied by a corresponding increase in the complexity of KBB's service operation and the challenge of making the right parts available to customers at the right time. The review that accompanied the development of K2S will ensure that KBB's service programme can accommodate recent and future growth.

Ship operators have traditionally faced a dilemma when dealing with turbocharger breakdowns. A complete overhaul requires the turbocharger to be re-balanced in a workshop, with time off hire for the vessel. Even when parts could be replaced on board, the availability of parts and engineering capability mean that it can take longer than anticipated to get a turbocharger back into service. Meanwhile re-engineered or third-party parts may be more accessible but could invalidate any warranty and add another element of uncertainty to operations.

By using K2S, ship owners can get the best of both worlds; rapid and reasonably priced access to manufacturer-assured components. As KBB and its service partners are responsible for all warranties and liabilities, a strong cooperation is assured and a joint, condition-based service programme can be implemented - optimising scheduled maintenance and emergency response, enabling good value repairs and competitive total cost of ownership as well as ensuring that units in service are of the newest standard.

How does K2S work?

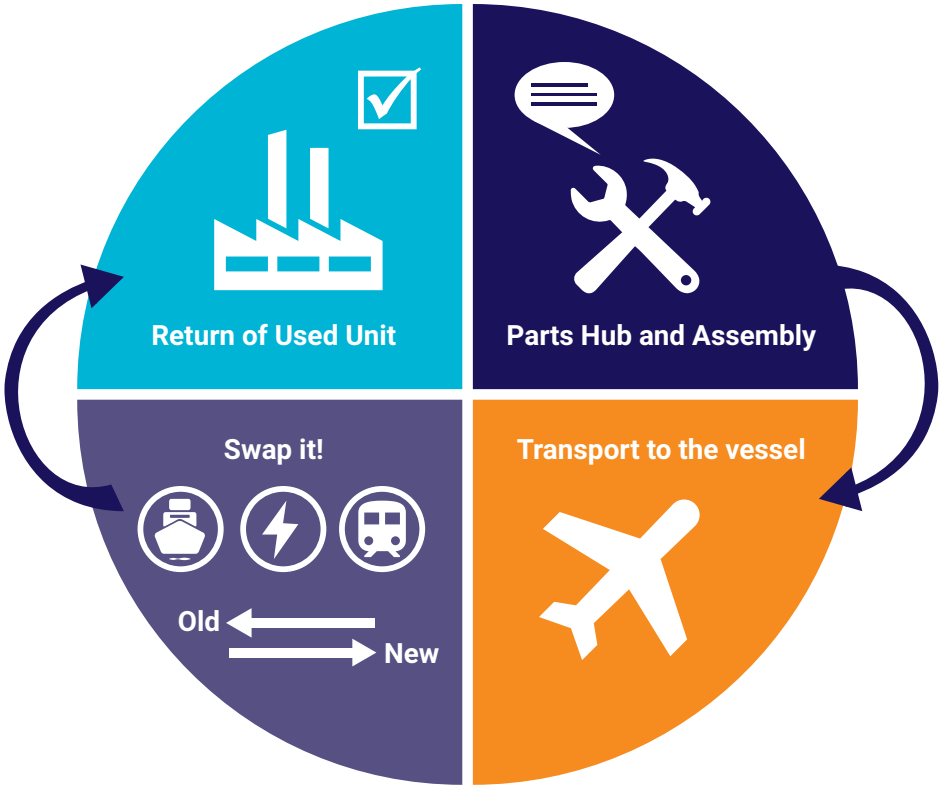
The service is currently available for the most widely used specifications of KBB's HPR series of turbochargers – single-stage, high-pressure turbochargers for medium-speed engines with a power output of 500-3,000kW – as well as the ST series for engines up to 6,000kW. In the marine market, these units are applied on Wärtsilä, Hyundai Himsen, Yanmar and MaK engines.

The cartridge is a true 'plug and play' solution as there is no need for the vessel to be drydocked or the engine or turbocharger brought ashore for cleaning and balancing. It includes the core components of the turbocharger, including the bearing housing, the rotor and all bearing systems parts. The nozzle ring and diffuser are not typically included but can be on request.

An extended cartridge option with diffuser and complete compressor casing can also be used to for an adjustment-free installation. This further simplifies the installation for crew, who only need to check the gap on the turbine side after switching the units. The extended cartridge provides further safety against damage to the compressor impeller, which is made of an aluminium alloy to the highest requirements on accuracy.

Customers are initially charged the full price of the swap unit and a 30% deposit is refunded if the old unit is returned within 60 days. The swap units include new or reconditioned parts protected under a two-year guarantee.

The cartridges can be shipped as airfreight to almost anywhere in the world within two days. After receiving the shipment of the new unit, the customer only needs to install it, put the old unit in the box and send it back. The operational downtime of the engine can be as little as a few hours.



Designing the programme

The aim of the K2S service was to leverage KBB's growing inventory in order to provide a faster and better service for its customers. More turbochargers in service naturally means that more repairs need to be carried out. This means that at any time there are more units and components coming back to KBB and its partners for servicing. A swap programme makes this work more predictable and helps to ensure good responses times; KBB designs the swap and emergency stock for each client based on service agreements and information about how the customer uses the turbochargers.

For customers, a shared response programme unlocks the value of unused assets and saves them from stockpiling components for urgent repairs. This offers a simplification of their inventory and means that the risks associated with stock are effectively outsourced to KBB and its partners.

To design the cartridge programme, KBB conducted an internal investigation to match data from its sales history with technical data. This analysis was essential because a cartridge for one type of turbocharger can have many specifications depending on the engine model and specification as well as its fuel and application, for example. Sometimes the same engine model can demand different turbocharger specifications just because the exhaust emission standard is different.

KBB worked with experienced turbocharger service specialists PJ Diesel Engineering in Denmark and TruMarine in Singapore to develop the service. Both companies bring extensive experience with swap programmes. They are certified and approved to match KBB data with the demands of their own customers in order to prepare the appropriate swap units.

The work is done by service partners includes providing the swap unit from stock or creating it as well as overhauling the replaced unit in their workshops and (if agreed) taking care of transporting the units. Because of their different regional coverage and customer bases, the service partners will enable KBB to cover a wide range of units and to scale the service easily when required.

Thanks to its robust, data-based design and the involvement of key service partners, the K2S service can easily be extended – both to different KBB turbocharger models and to more customers or in-service units as the installed base grows.

KBB can also envision adapting the service to the requirements of individual customers. For example, in the future the service could be evolved to add different service levels (to include all scheduled maintenance parts, wear parts or even comprehensive cover for equipment failure).

Key benefits

- ☑ **Exchange your existing KBB-turbochargers with minimized downtime**
- ☑ **Suitable for scheduled and unscheduled events**
- ☑ **Perfect for fleets with same or similar units**
- ☑ **Risk mitigation and fixed costs**
- ☑ **Easy handling: no detailed training or engineering knowledge needed on board**
- ☑ **Environmentally friendly**

Adding value for KBB customers

Danish ship owner TORM has used an exchange programme covering four-stroke engine turbochargers across its fleet of around 80 product tankers for more than five years. It has also established a 100% planned maintenance programme with PJ Diesel Engineering covering its radial turbochargers.

According to Jesper Jensen, head of TORM's technical division, the ship owner has reduced the number of turbocharger breakdowns by 95% over the past five years. The introduction of full planned maintenance has meant that TORM is no longer dependent on shore-based repairs for its radial turbochargers, nearly eliminating the costly downtime associated with these repairs.

> **"The collaboration between TORM and PJ Diesel Engineering really show us the benefits of skills and experience as well as the importance of 24/7 support, access and availability - based on fixed prices"**

Jesper Jensen
Head of TORM's technical division

For customers, the main advantages of K2S are greater predictability of servicing, faster delivery and installation times as well as reduced service and lifecycle costs. However, there are other advantages that make K2S a winning proposition.

First is the reliability benefit that comes from having exactly the right, up-to-date parts to fit your application. Buying new components will guarantee the reliability of the part in isolation, but often parts can change specification. For example, the latest version of components can include security updates that are missing on earlier versions. Relying on guidance from engine manufacturers will ensure the part fits, but not necessarily that it is the latest version. By passing liability to KBB and its service partners, customers can rest assured that whenever they replace a swap cartridge it will feature the very latest component versions – helping to keep KBB turbocharger users up to date with the latest technology designed to improve safety, reliability and performance.

Using swap cartridges that include reconditioned and overhauled components also helps to reduce the environmental impact of your business by minimising the manufacturing of new parts. By making best use of its pool of parts, KBB's Knowledge 2 Swap programme offers a service solution that follows the ideas of circular and sharing economies, based on the principle of 'waste less, lose less'. As such it can be a valuable addition to your company's environmental, social and governance agenda.

Focusing on critical resources is a must not only for the environment. In order to minimise time off-hire either due to mechanical failure or planned service overhauls, ship operators need to know their options regarding repairs and spare parts. With K2S, customers gain a partner that takes responsibility for investigating the value chain and providing business cases for optimising your operations.

Summary

With K2S, customers of KBB can benefit from fixed prices on exchange units, offering them easy budget planning for emergency and scheduled repairs. Customers can achieve this predictability without incurring traditional stock expenses, shedding the risk of holding stock while maintaining full flexibility.

As well as enabling companies to manage their supply chains responsibly and sustainable, K2S positions KBB as a trusted business partner – ensuring that ship owners and operators, backed by a a two-year liability for shortages and deficiencies, have access to the most up-to-date parts wherever and whenever they need them.