



PowerUP

Your Engine



The Company

About us

PowerUP is an energy engineering company that specialises in high-tech products and service solutions for gas engines. With customers in over 40 countries in the world, we are constantly developing cutting edge technology and solutions for the energy industry.

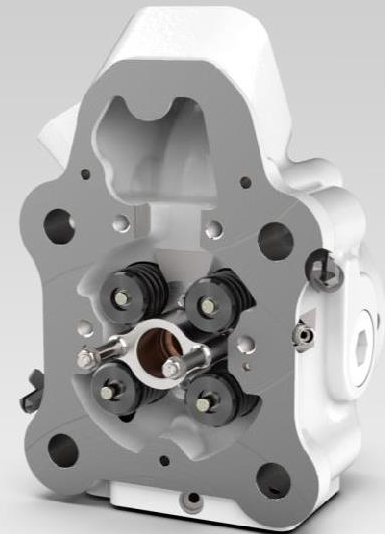
Overview of our Technology Portfolio



Series 3



Series 4

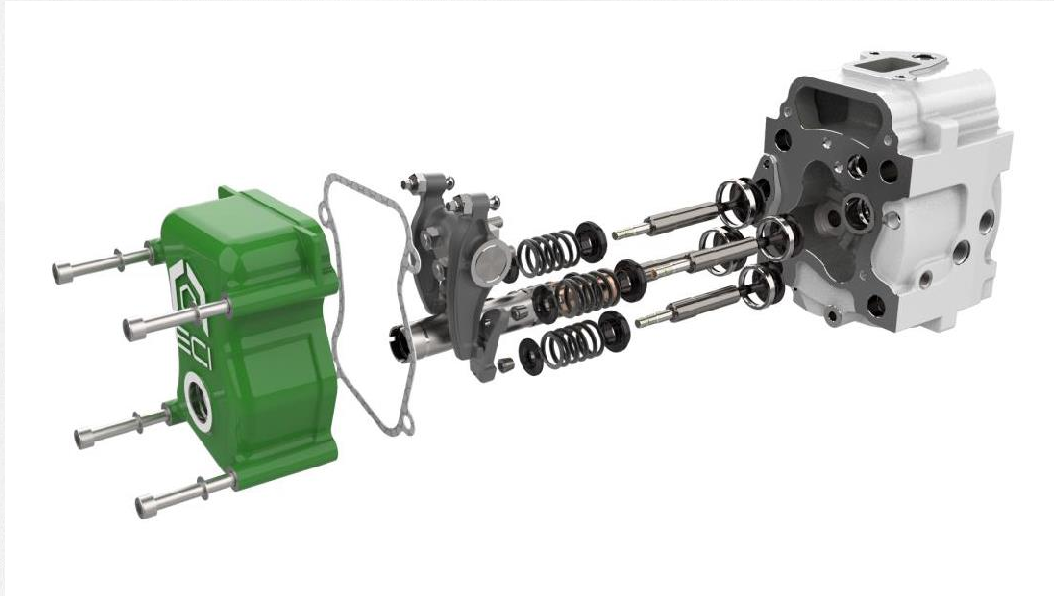


Series 6

Overview of our Technology Portfolio



Series 3 range of products



EVE₃ efficiency upgrade

- Upto 6 % less gas consumption
- Upto 2.5 % higher electrical efficiency rate
- 4-valve-design for improved load-switching
- Central positioned pre-chamber spark plug for homogeneous combustion
- Optimized inlet- and outlet channel geometry
- Reduction of your NO_x emissions down to 250 mg/m³ is possible



Spark plug series 3

- No re-gapping necessary
- Can be operated at 250 mg/NO_x
- Plug and play Design, no adjustment of ignition-timing and boost pressure necessary
- Available for NGS & Biogas, special release available for other gas types

Series 3 range of products



Piston series 3

- Manufactured with an insert brass sleeve in the piston pin bore for maximum reliability due to reduced risk of boss fatigue fracture
- Compatible with all gas engines series 3
- Available in all commonly used compression ratios
- Tailored compression ratios available on demand



Maintenance parts

- An inventory of 100 000 items and a warehouse of 500m³ enables us to provide you with all the necessary parts for daily operation
- Our sales team is dedicated to react fast for emergency delivery with most items on stock or to be sourced quickly from our well-connected global supply chain

Series 4 range of products



Piston series 4

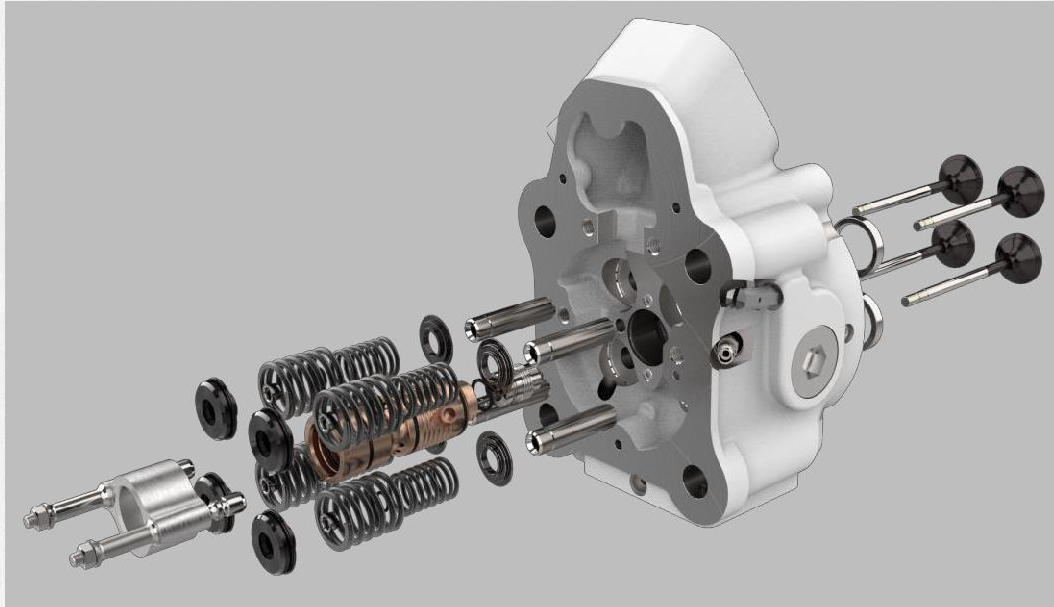
- Mixable with OEM pistons for highest flexibility
- Available as pre-assembled piston with rings or piston-only
- Available in all commonly used compression ratios
- Tailored compression ratios available on demand



Spark plugs series 4

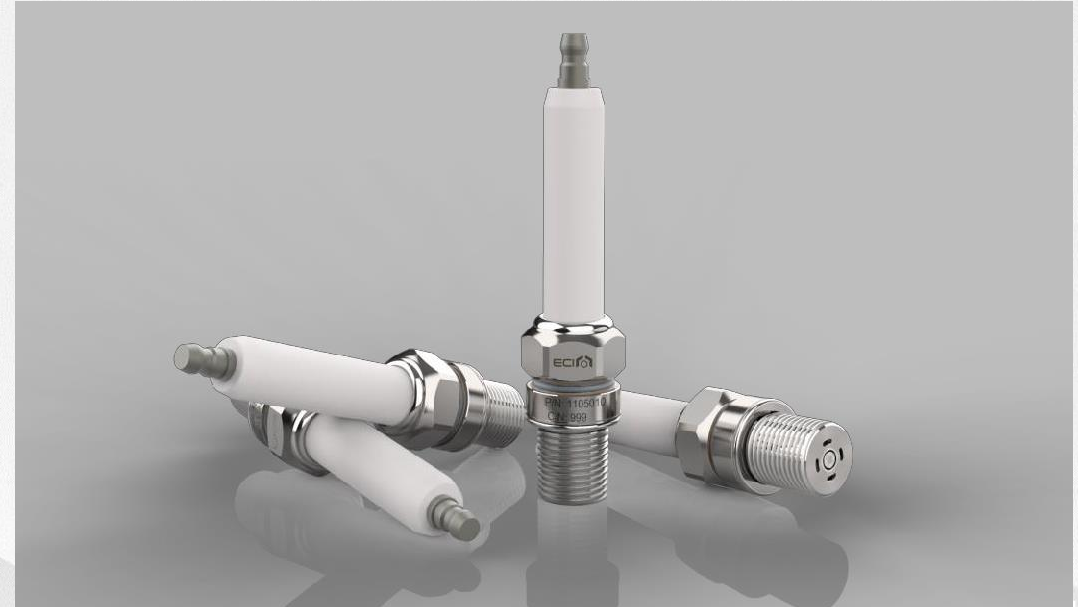
- No regapping necessary
- Can be operated as lean as 250 mg/NOx
- Plug and play Design, no adjustment of ignition-timing and boost pressure necessary
- Available for NGS & Biogas, special release available for other gas types

Series 6 range of products



Cylinderheads series6 E&F

- Optimized water channel geometry for better cooling, avoids valve-sticking and fire deck cracking
- Optimized valveseat geometry to minimize valvewear
- Improved cooling properties of PowerUP cylinder heads in combination with PowerUp pre-combustion system have a positive impact on spark plug life
- Mixable with OEM cylinder heads for highest flexibility
- Ready for use with bio- and special gases by simply adapting the pre-combustion system
- Adapter kit available for easy exchange between E & F engine versions on mixed cogeneration-plants



Spark plug series 6

- Maintenance-free due to annular electrode design
- Long lifetime
- Plug and play Design, no adjustment of ignition-timing and boost pressure necessary
- Available for NGS & Biogas, special release available for other gas-types

Case Study

Valvesticking



Problem description:

Cooling of the exhaust valve is done via the cooling water channel

If cooling is not sufficient exhaust valve/oil gets too hot (coking), causing increased wear

As a consequence, the valve gets stuck inside its guide

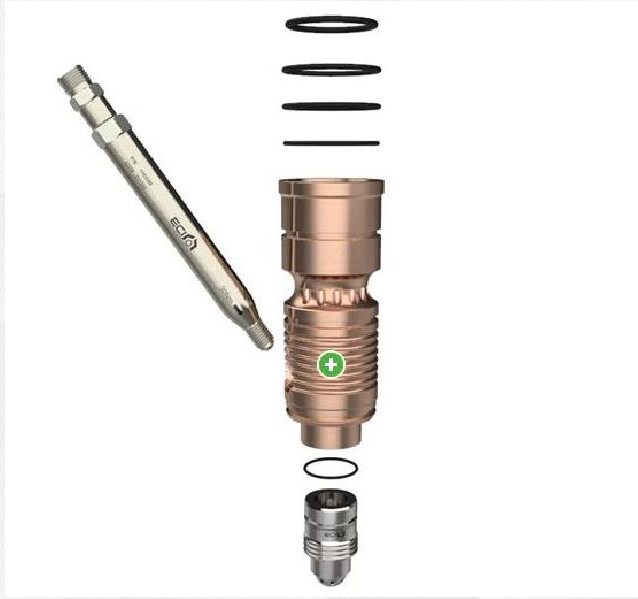
Valve closes too slow and touches the piston

Valve can fall inside the combustion chamber

Solution:

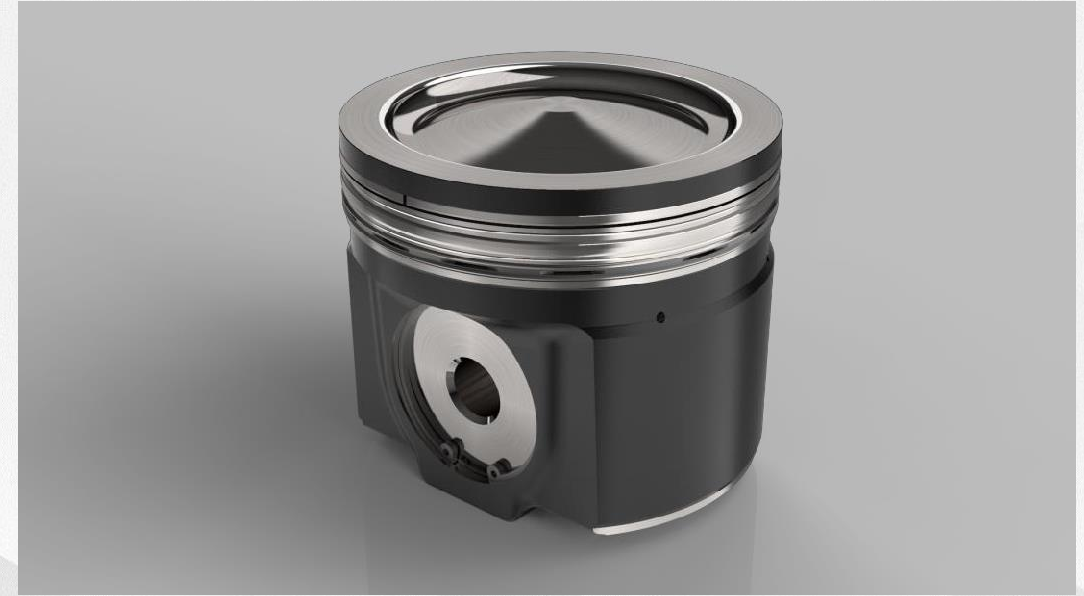
Improve cooling of the complete head

Series 6 range of products



Pre combustion system

- Designed for longer lifetime & less soot production
- High quality materials to minimize wear & avoid cracks
- Optimized cooling properties aid in prolonging spark plug lifetime
- Improved O-rings to avoid leakages and unnecessary downtimes
- Compatible with all series 6 E&F cylinder heads
- “Drop in solution” – each single part is interchangeable / mixable with OEM



Steel-piston series 6

- One-Piece-Design eliminates risk of piston-crown separation
- Increased top-land to reduce temperatures at the compression ring, minimizing oil coke deposits and thus avoiding ring sticking
- Available for all series 6-F engines
- Available for compression ratios 10.5, 11.5 and 12.0

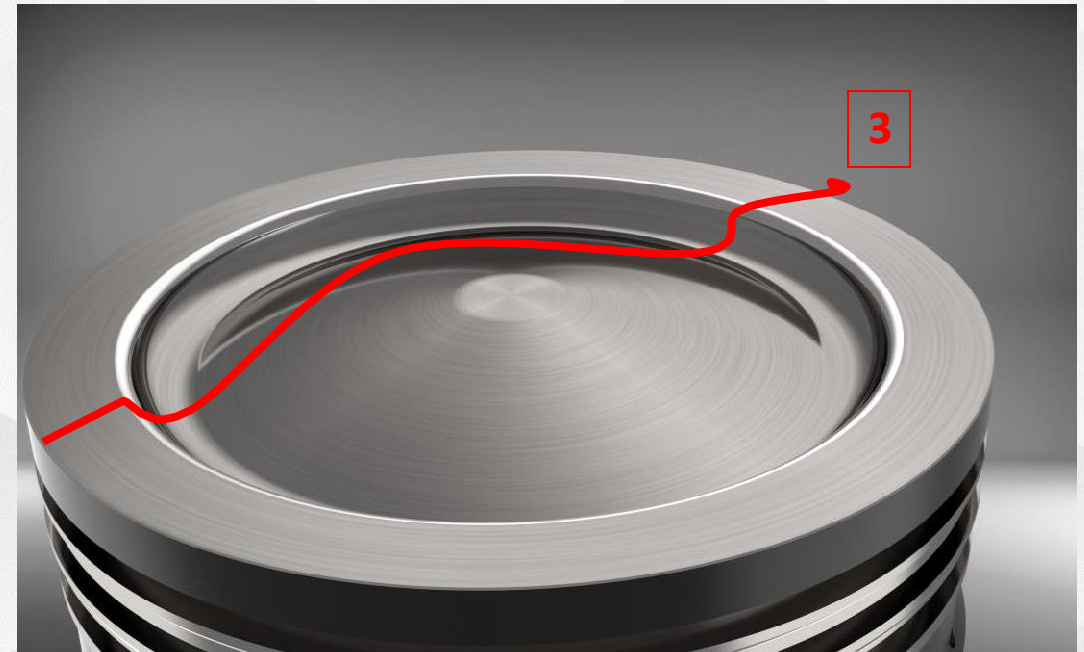
Case Study

Our design



PowerUP“one piece” Design:

- 1: Piston head and piston skirt is one piece
- 2: Bigger top land
- 3: “Mexicanhat” shape

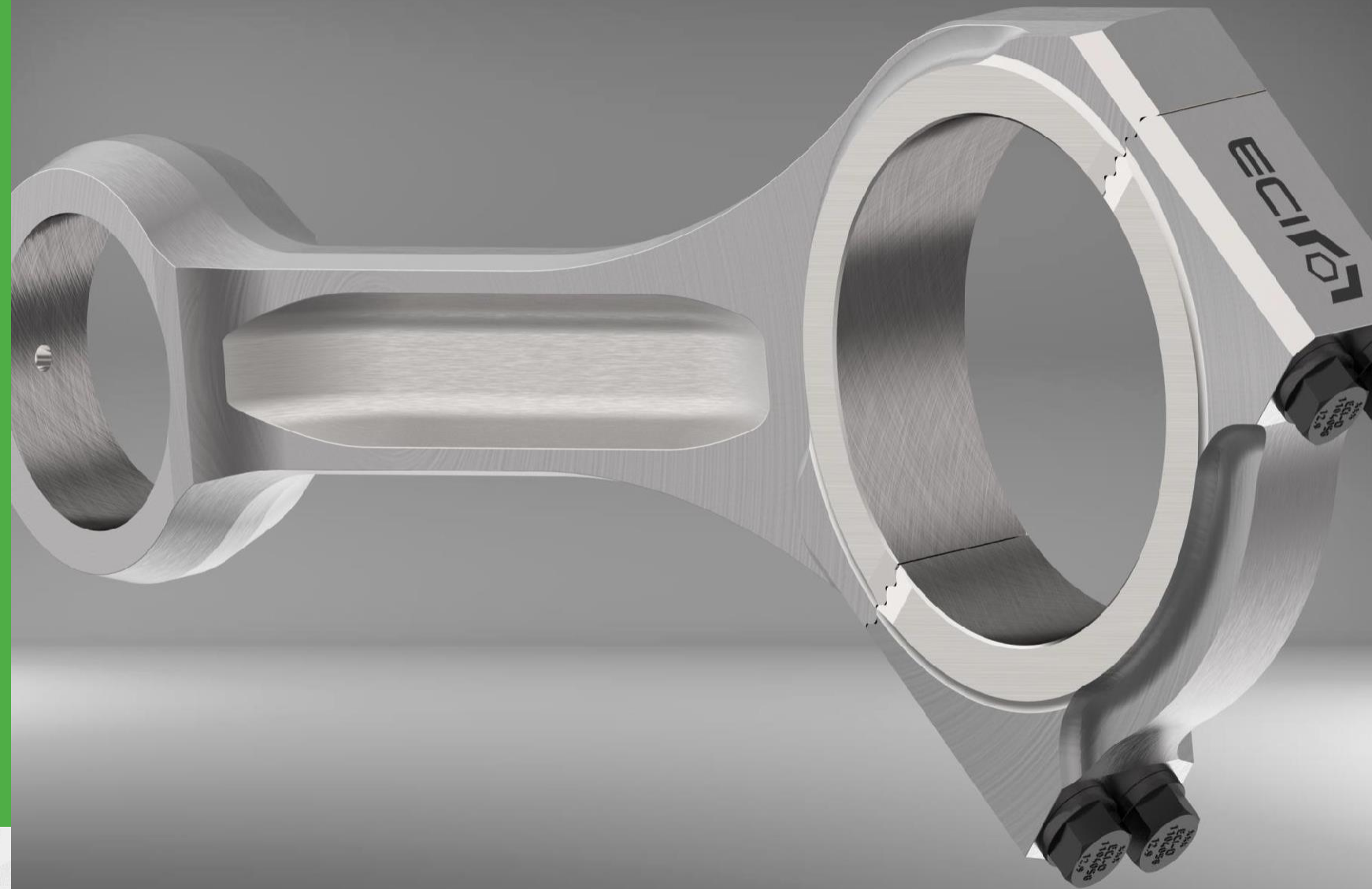


Features

- “One piece” design is much more difficult to produce but eliminates the risk of “piston split”
- Mexican hat shape to slightly increase efficiency
- Bigger top land to reduce temperature at compression ring to avoid oil coking and ring sticking as a consequence

Connecting rods series 6

With a planned launch-date end of 2020, the PowerUP connecting rods for series 6 E, F, G & H are already some of the most anticipated products in our company's history. Our aim is nothing less than significantly improving the mechanical reliability and economical efficiency of this product for our customers. Through optimized geometry and forging material, as well as state of the art in-house processing, the PowerUP connecting rods, increase engine reliability compared to OEM-spare parts by strongly reducing the likelihood of bearing-shell rotation and optimizing rotary-mass distribution across all cylinders.



Series 3,4 & 6 range of products



Blowby filter

- Expected lifetime of up to 30.000 operating hours
- Guaranteed oil separation rate of 99,98%
- No thermal insulation required
- Compact and vibration resistant filter design
- Easy to assemble and maintenance free
- Plug and play design for easy, direct exchanges of the filter-unit on most series 3 engines
- Retrofitting kits for special versions ensure compatibility with all series 3 engines

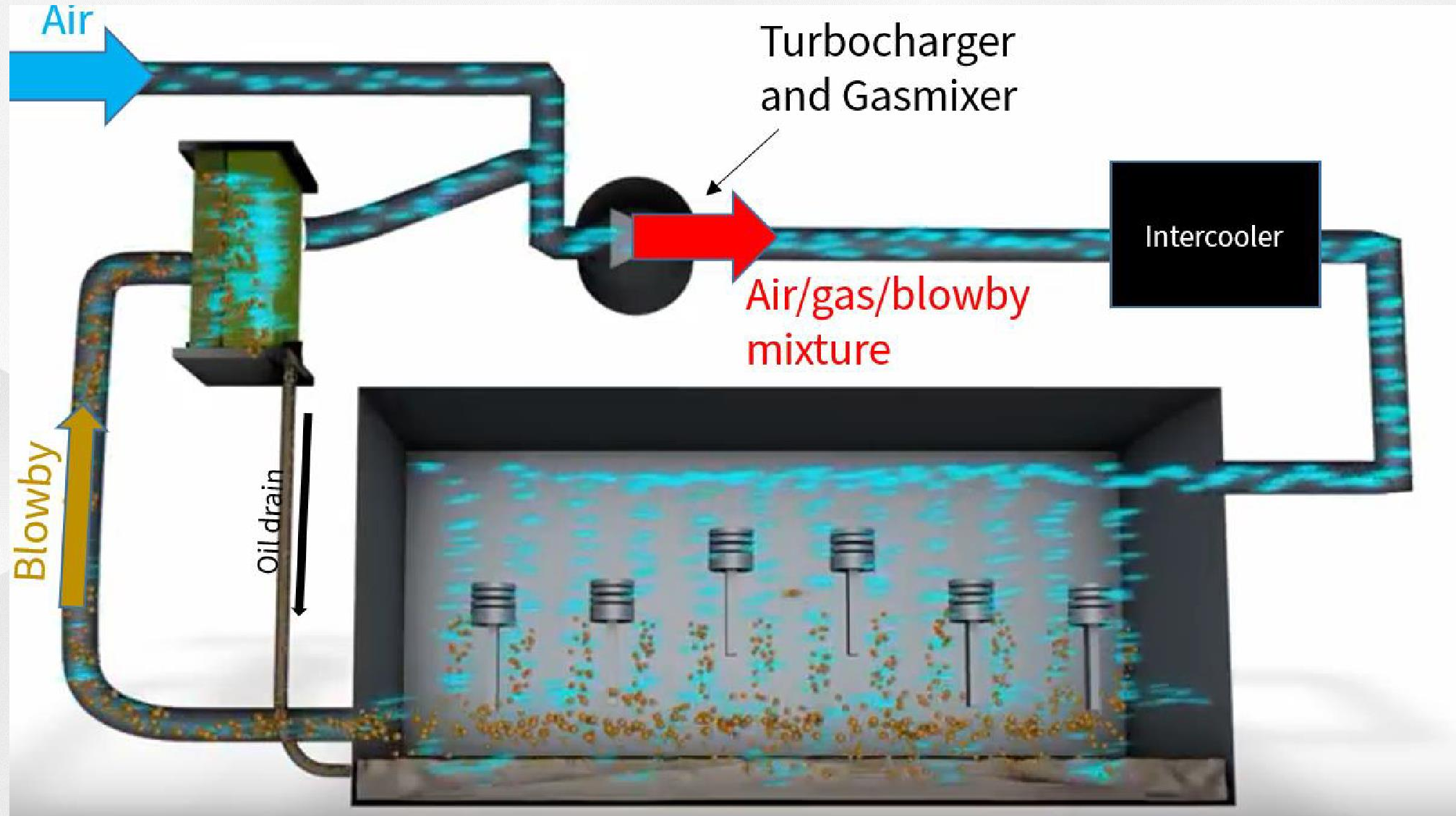


Cylinder head overhaul

- Economical alternative to replacing the entire cylinder head
- Expected lifetime > 30.000 hours
- Reduced valve-wear due to high-quality valves and seat-rings
- Highest reliability standards due to crack-check and full inspection by experts
- Highest cleanliness standards due to inhouse vacuum-washing process
- Valves, seat rings, springs & guides are usually always available on PowerUP's stock.

Case Study

Blowby Filtration System



Case Study

Insufficient blowby oil separation Impacts and Results



Compression impeller:

Diffusor:

Impact: Oil coke deposits on impeller as well as diffusor

Results:

- Less turbocharger efficiency
- Power loss

Impact to the gas mixture inlet line:
Accumulation of oil in the inlet line

Result:

- Increased danger of auto ignition or knocking



In tercooler:

Impact: Tar deposits are built up, clogging the intercooler causing following impacts

Results:

- Less heat transfer resulting in higher gas mixture temperature
- Increased differential pressure via intercooler resulting in higher boost pressure requirement and turbocharger stress
- This results in higher engine stress because of knocking, higher maintenance cost, more sensitive engine and less reliability



Inlet valve:

Impact: Oil coke deposits

Results:

- Less charging efficiency
- Power loss
- Less engine efficiency



Piston:

Impact: Oil ash deposits

Results:

- Knocking
- Auto ignition
- High engine stress
- Less reliability
- Increased maintenance cost
- Power loss
- Torched valves



Torched valve:

Caused by oil ashes which flake off and is squeezed between valve and valve seat

MWM



With our expertise in gas engines, having previously developed a complete range of products for Series 3, 4 and 6, PowerUP is using its technical knowledge to expand its portfolio to include MWM engines type 2016 and 2020.

Apart from the existing range of available parts and the well-received PowerUP spark plugs for MWM engines, we are constantly expanding our portfolio and encourage you to contact our technical sales team to understand your needs and provide a solution.

Spark plug MWM for 2016

PowerUP's spark plug developed for MWM takes advantage of known issues with sudden breakdowns and aims to cut the life-cycle costs of this product.

Through higher flexibility due to our modular design and our extensive knowledge of gas engines and spark plug development we can offer a better choice for our MWM customers.

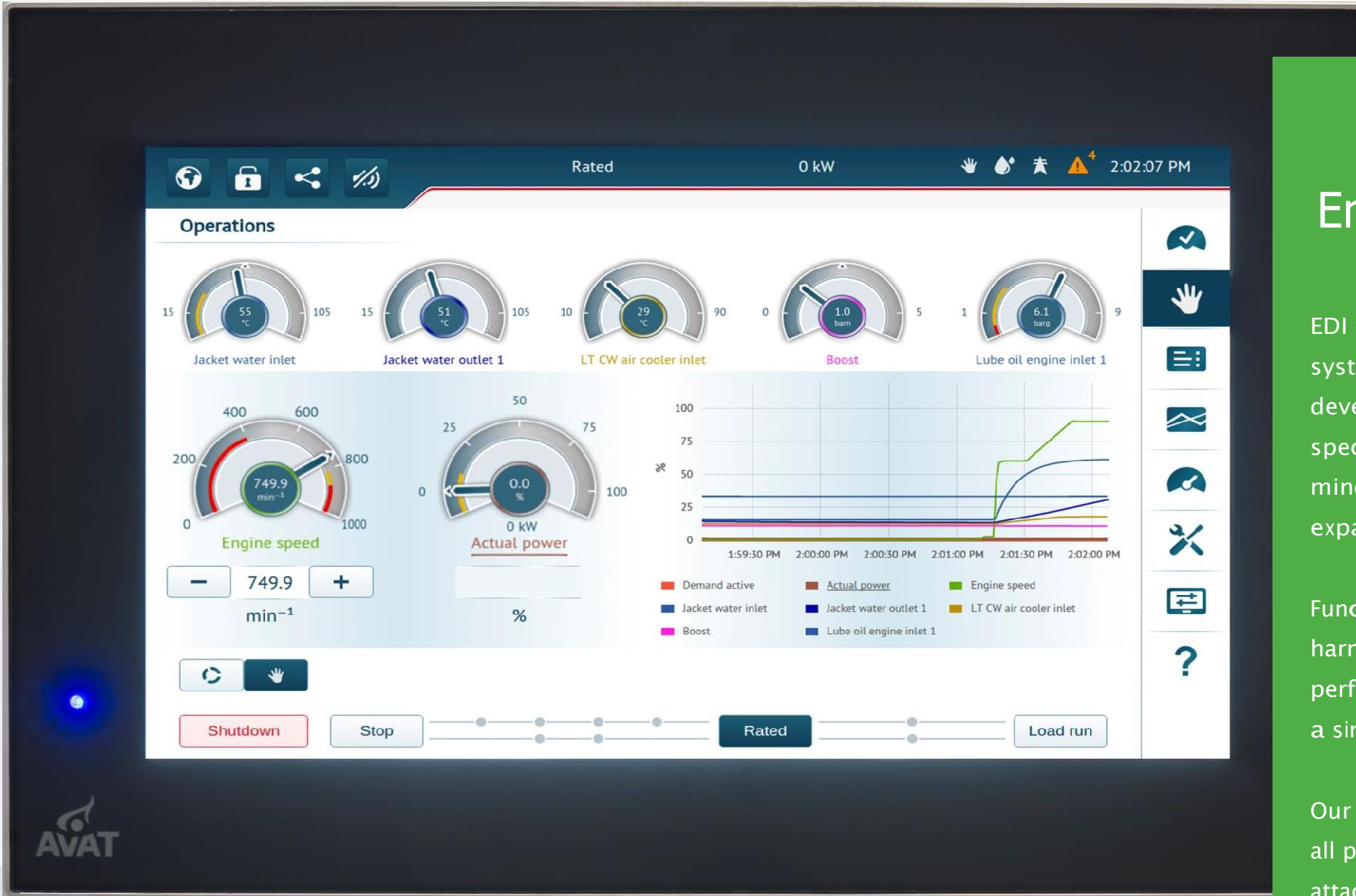
Maintenance parts for 2016 & 2020

PowerUP is covering the full range of products for preventive maintenance of MWM engines TCG2016 & TCG2020.

All the products for daily operation, such as filters and gaskets, as well as parts for corrective maintenance are selected and specified for highest quality.

Overhaul packages for 2016

PowerUP can offer a full range of MWM spare parts for minor and major overhauls of TCG2016 engines



Engine controller

EDI – our tailor-made control system for gas engines was developed with our customers and specialists needs and wishes in mind and is open for all types of expansion.

Functions, modules and subsystems harmonize with a high-performance user interface to form a single, intuitive unit.

Our EDI-system grants full access to all parameters with no strings attached and is available for retrofit on all gas engines series 3, 4 and 6.

Our Services

Our customers are our focus – their engines are our companions.



Competencecentre

- customer support
- special measurement service (e.g. efficiency-measurement)



Trainings

- Operator-Training
- Enginecontrol system Training
- MaintenanceTraining



Minor & Major overhaul

- condition-based
- on-site
- in workshop



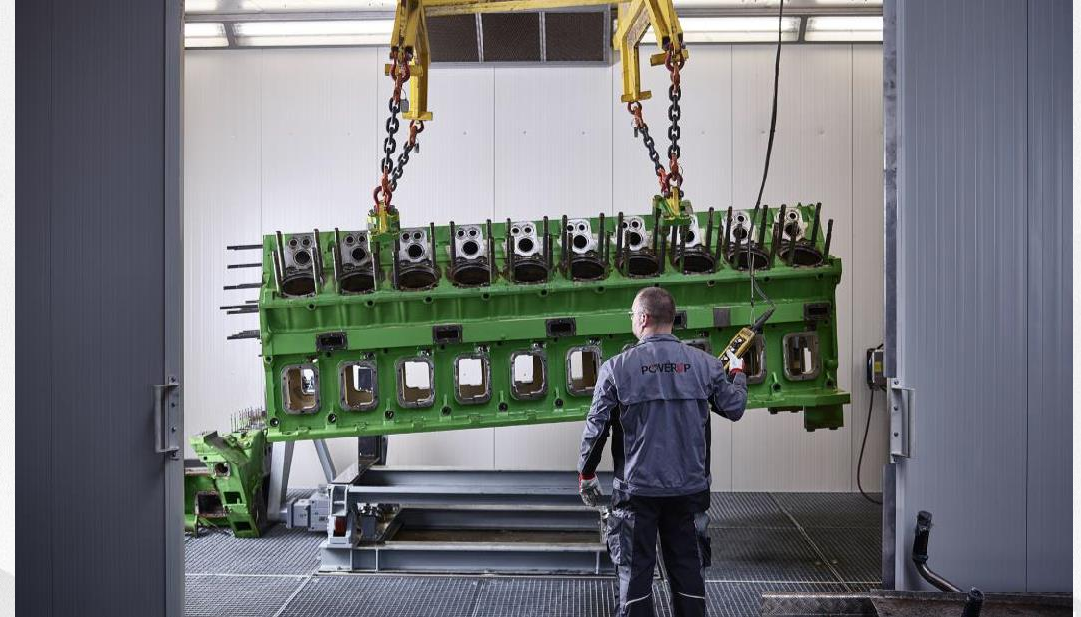
Optimized maintenance

- Optimization of existing schedules
- Special schedules with PowerUP products



Maintenance and Servicing

Maintenance is a crucial part which helps extend the life and keep high energy output of your gas engine. As part of our efforts to be the partner of choice for our customers, we offer bespoke maintenance solutions that help increase the reliability of gas engines. We offer onsite maintenance solutions for our customers all in collaboration with our worldwide partner PowerUP GmbH.



Engine overhaul onsite and in our workshop

Our team of service technicians are on standby around the clock to help you and guarantee you high standard repairs with replacement parts you need. We carry out repairs on-site for customers operating stationary plants such as cogeneration plants. Many of our customers rely on the fact that they will not have to suffer expensive downtime. In partnership with PowerUP GmbH we have a fully equipped state of the art workshop at our headquarters in Austria. Here we carry out overhauls using diagnostics software, required high-tech tools, all done by highly skilled in-house service technicians.

Our Services

PowerUPreconditioned engines

Short Block

- Measure & realign crankcase & crankshaft
- New or overhauled engine components
 - Pistons
 - Liner
 - Cylinder heads
 - Connecting rods
 - Main & con rod bearings
 - Vibration damper
 - Spark plugs
 - Gear drive
- New painting of short block engine

Long Block

- Measure & realign crankcase & crankshaft
- New or overhauled engine components
 - Pistons
 - Liner
 - Cylinder liners
 - Connecting rods
 - Main & con rod bearings
 - Vibration damper
 - Spark plugs
 - Gear drive
- New painting of short block engine
- Check & change / overhaul of following components
 - Turbo charger
 - Actuator
 - Inter cooler
 - Blow-by filer
 - Gas mixer
 - Air inlet duct
 - Ignition system
 - Elastomer parts
 - Compensators & sensors
- New cabling on the engine
- New painting of long block engine

Genset

- Measure & realign crankcase & crankshaft
- New or overhauled engine components
 - Pistons
 - Liner
 - Cylinder liners
 - Connecting rods
 - Main & con rod bearings
 - Vibration damper
 - Spark plugs
 - Gear drive
- New painting of short block engine
- Check & change / overhaul of following components
 - Turbo charger
 - Actuator
 - Inter cooler
 - Blow-by filer
 - Gas mixer
 - Air inlet duct
 - Ignition system
 - Elastomer parts
 - Compensators & sensors
- New cabling on the engine
- New painting of long block engine

- Overhauled Engine & generator mounted on base frame
- Engine control panel & interface panel
- Genset accessories & assembly
- Gas train

World Map

Sales and service locations



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Case studies.





PowerUP awarded contract for Kuvaniga power plant in Mozambique

PowerUP and its partner ADC Projects were awarded a full maintenance contract for the Kuvaniga power plant in Mozambique. The partnership will operate and maintain all of the plants gas engines under a 9-year operation & maintenance service agreement (O&M).



The plant which is located in Southern Mozambique (Chókwé) operates with 10 Jenbacher 24 cylinder gas engines running on domestic natural gas and together they produce a total installed capacity of 40.35MW and declared net capacity of 38.52MW.

Containerised Engine

PowerUP and ADC are supplied a containerised Jenbacher 620 engine, providing an additional capacity of 3MW to stabilise plant availability during engine services and upgrade.





We are proud to be a trusted partner of Kuvaninga Energia, this contract secures our position within the gas engine service market. It gives us a solid foundation for further growth and development.

thank you