

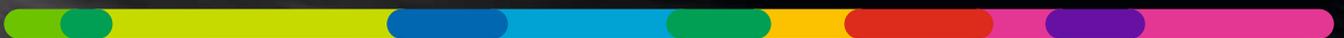


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# Full-service partner for CHP units, gas engines and stationary diesel sets

Advice, services, replacement parts

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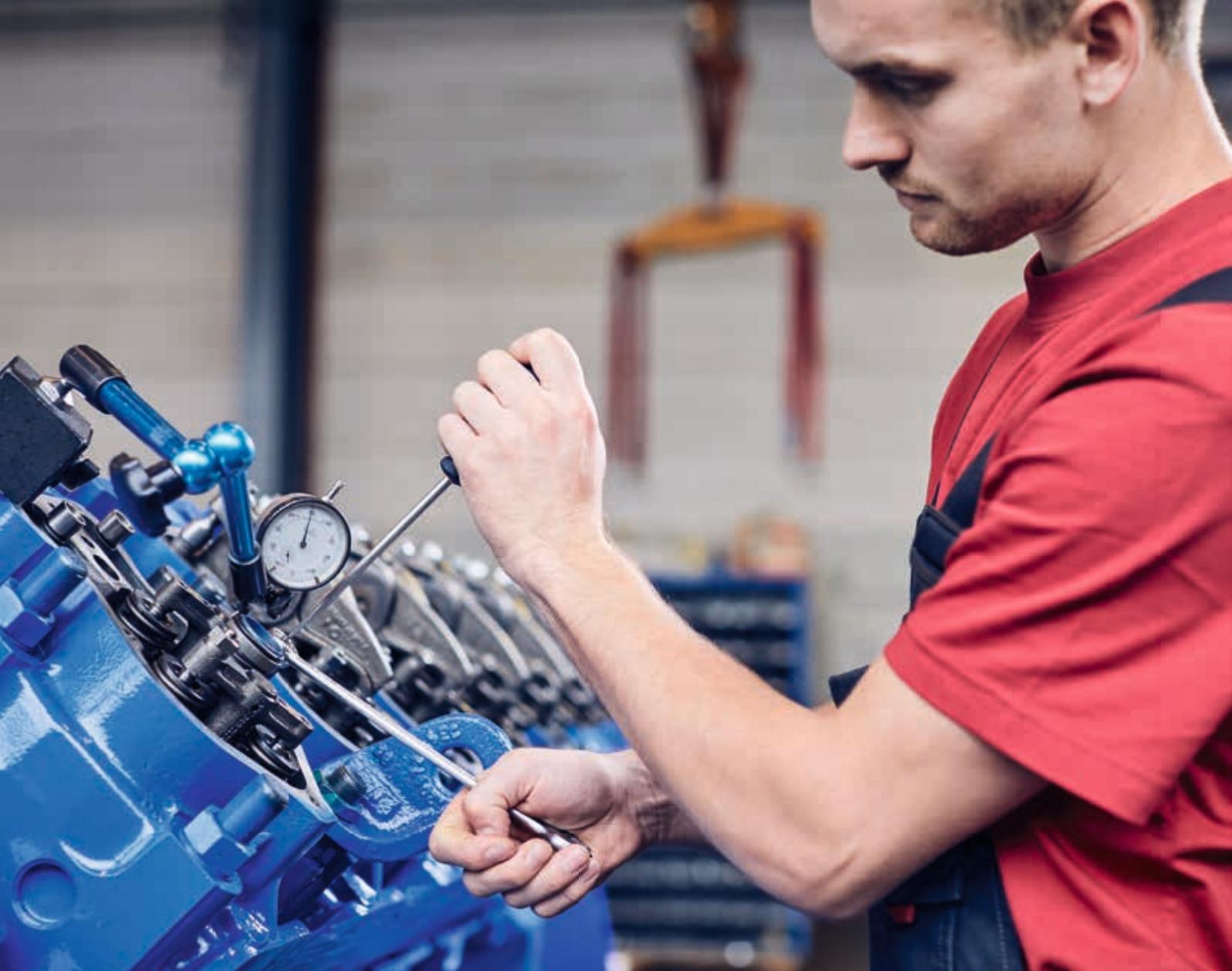
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HGS is the full-service partner for operators of CHP units, gas engines and stationary diesel engines. Backed by 13 locations in Germany and a pan-European network, we rank among the leading engine service providers. We specialise in the care, repair and general overhaul of engines. For about 40 years, our engine specialists have been dedicating themselves to gas engines and stationary diesel sets – directly at your location or in our fully equipped workshop.

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# HGS – your cogeneration specialist

HGS specialists know the particularities and the potential of the diverse fuels. Our outstanding know-how in the field of special gases guarantees you the optimal use of renewable energies.

HGS ranks among Germany's top companies for the construction, care, repair, and technical operations management of combined heat and power units. Our expertise is based on nearly 40 years of experience as a leading service provider for gas engines and CHP units. Whether natural gas, coal mine gas, landfill gas, biogas or sewage gas, our specialised know-how safeguards the optimal efficiency and operating reliability of your CHP unit.



#### Quality is our pledge

For assured absolute quality, we install exclusively the components of renowned brand manufacturers. Numbering over 130, our personnel are highly trained experts in their field. By attending regular training programmes at these manufacturers, they keep their know-how state-of-the-art at all times.

#### Good services, 1,600 times

In total, HGS now looks after more than 1,600 CHP units with a total capacity exceeding 1,000 megawatts.

## Our seal of quality

- Specialised company as defined under § 19 WHG (Federal Water Act)
- Authorised to switch electrical installations up to 20 kV
- Gas detector certification in compliance with the applicable German safety regulations (§ 56 UVV Gase VBG 61)
- Laser alignments of engine / generator units
- Certifications according to ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007
- Constant training by manufacturers
- Nearly 40 years of experience



### And just in case

If a problem should occur, we are there for you 24/7, 365 days a year. Our remote maintenance or on-site emergency deployment will remedy the malfunction within the shortest of times. We are always in your vicinity, with over 60 fully equipped service vehicles at 15 locations in Germany and Europe.



### Oil management – prevention instead of repair

Thermal, mechanical and chemical stress leave their traces in oil. A laboratory analysis of the used oil reveals the condition of the engine just as precisely as a blood count indicates a person's health. By utilising our professional expertise in interpreting the findings and acting when necessary, we safeguard the fault-free operation and longevity of your plant.

For instance, we can define as a preventive measure the optimal lubrication times and select the oil types in compliance with the manufacturer's specifications and the individual operating conditions.

HGS oil management serves as an early detection system for damage, recommending preventive action before it is too late.



### Electrical maintenance (DGUV 3)

Not only the engine of a CHP unit needs servicing and inspecting regularly. The electrical and electronic components also need to be examined at regular intervals.

DGUV 3 testing is prescribed by law. HGS technicians conduct these tests using the corresponding meters and so safeguard the general conditions for the lawful operation of the electrical installation.

### Are there vibrations?

The measurement of vibrations and the documentation of the findings form an integral part of commissioning according to MWM manufacturer specifications. Specially trained by MWM, our technicians are equipped with the corresponding measuring apparatus. Over 60 points are measured and documented.

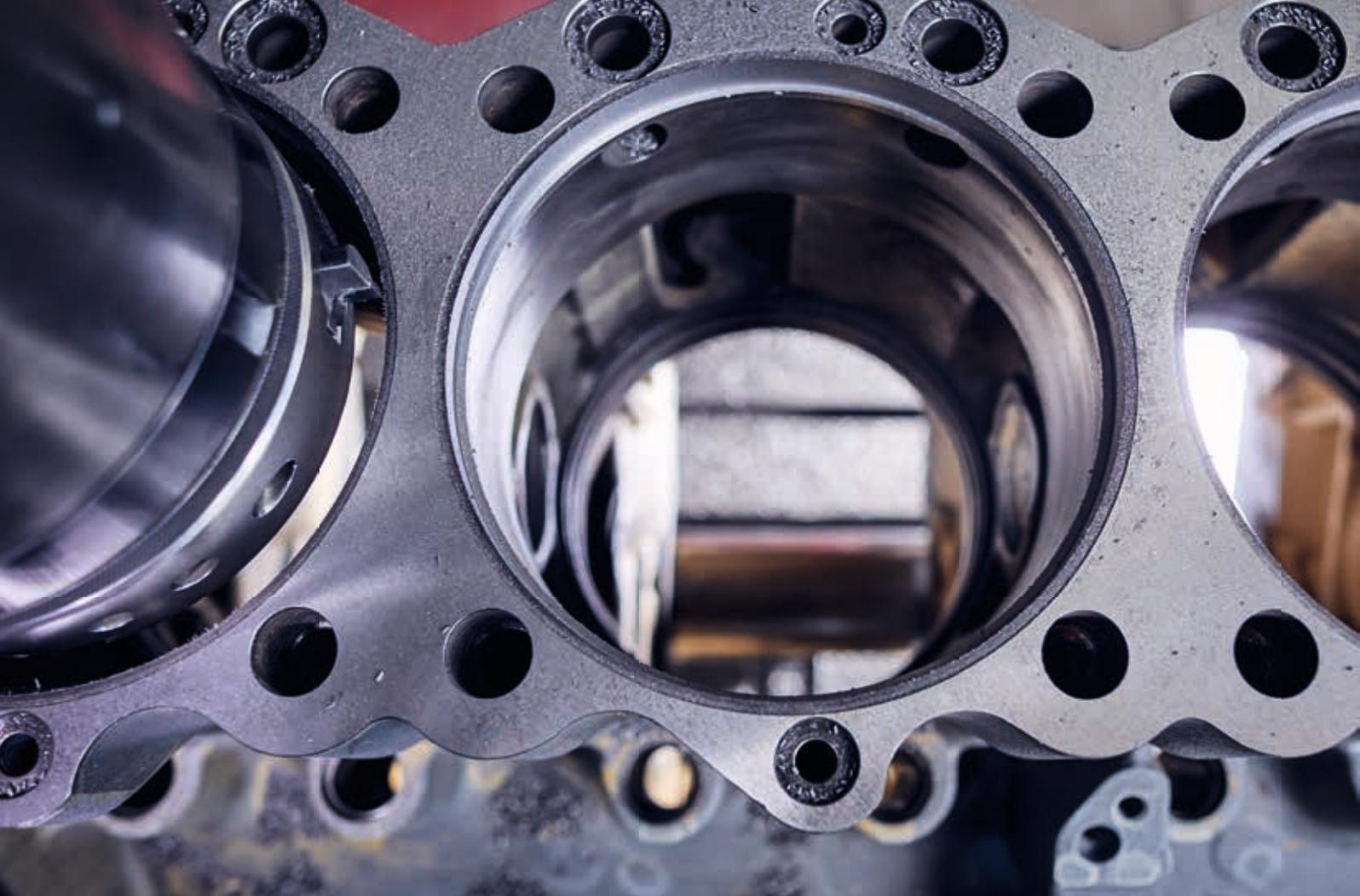
The following higher maintenance levels for the GenSet (gas engine and generator) prescribe repeated vibration measurements.

Comparisons with the commissioning measurements reveal whether and when values change. If the measurements return differing values, a fault diagnosis should be implemented immediately for identifying the cause.

Undesirable vibrations indicate system faults. These faults must be identified and remedied. This helps to avoid costly damage and downtimes.

## Our services portfolio at a glance

- Care
- Maintenance
- Troubleshooting
- Oil management
- Electrical maintenance (DGUV 3)
- Cooling water management
- Vibration measurements
- Replacement parts supply and support
- General overhauls in own workshop
- Remotorisation
- Modernisation
- Standby and 24/7 emergency services
- Remote supervision and monitoring, automatic alerts
- Warranty services for renowned engine and CHP unit brands



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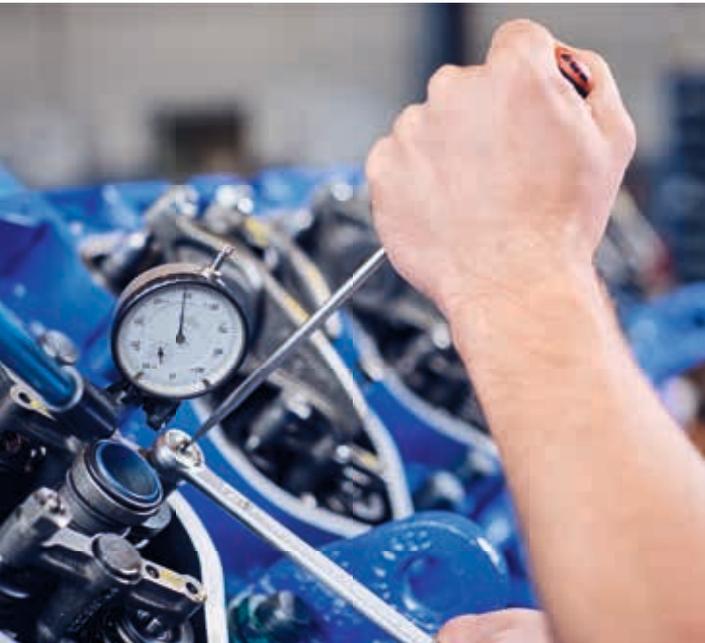
# General overhauls of gas engines

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Depending on the maintenance schedule and operating conditions, a general overhaul becomes necessary after 48,000 to 64,000 operating hours for the purpose of preventing serious machine damage and failure. This involves cleaning, overhauling and, if necessary, replacing all components with original parts.

We perform general overhauls in our own workshop. Following precise examination, we consult with you on the measures. To limit the time and costs involved, we can offer you one of four tried and tested solution concepts. And of course, these can be adapted to your own, specific situation.

Components that must be machined are overhauled in the HGS workshop. Whether this involves polishing or grinding a crankshaft or machining engine blocks or peripherals, the right machines and experienced technicians are available for all requirements. We'll be pleased to draw up the concepts tailored to your needs.



## Classic

### The classical general overhaul

The existing engine is generally overhauled and refitted. The times and costs this measure involves are defined according to the level of dismantling and the findings. As a rule, the downtime is three to four weeks.

## Classic+

### Saving time with Xchange

Instead of overhauling your engine, we can replace it with an Xchange engine of the same MWM brand type or a rebuilt engine from renowned manufacturers, e.g. MAN. We then fit the peripherals from your engine to this generally overhauled original. As a rule, the downtime is only one to two weeks for E70 Classic Plus!



## RePower

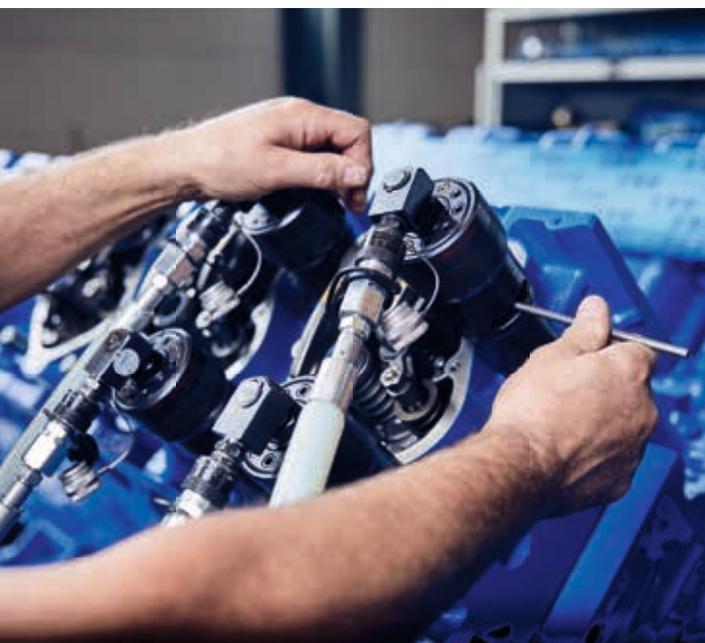
### Greater flexibility, fewer downtimes

We replace your module with a generally overhauled GenSet, a unit consisting of an engine and generator mounted on a base frame from our used equipment pool. If you wish, you can choose an engine variant of greater efficiency, and so increase the overall cost-effectiveness of your plant. A cost limit can be defined in advance, and the downtime is only three to five days.

## RePower+

### New efficiency from remotorisation

You receive a new, state-of-the-art module. The lower consumption and the higher efficiency enhance the overall cost-effectiveness of your plant. The costs of remotorisation can be defined precisely in the run-up. Downtimes are virtually negligible.



## Rebuilt engines on call



- Various gas engines stocked on call in the event of damage
- Sets generally overhauled in our workshop
- Fast “Plug&Play” replacement
- Possible trade-in for your defect engine

Just in case an unexpected incident damages your gas engine and fast repairs are not possible, we stock on call a range of generally overhauled and tested, rebuilt HGS sets for many standard MWM and MAN engines. Just call, and we'll quickly consult with you on the general conditions for a fast engine replacement.

This replacement of your installed engine model with an identical one does away with any adjustment work on the peripherals, and your plant is again ready to operate within the shortest of times. This way we help you to minimise

downtimes and hence economic losses. Of course, we shall be pleased to remove the defect set for you. We shall then see to the whole logistics, fit the rebuilt engine professionally, and safeguard proper commissioning by our service technicians.



## Blanket 24/7 replacement parts supply

The HGS central warehouse stocks over 6,000 items – all without exception original parts from renowned manufacturers. In addition, we can access online the stocks of manufacturers. Our efficient logistics also safeguard fast parts deliveries to your location.

- Central replacement parts warehouse for engines and CHP units in Krefeld / Germany
- Local warehouses for enhanced regional availability
- Over 6,000 items
- Online access to replacement parts stocks of manufacturers
- Xchange engines and Xchange replacement parts – in-house repaired MWM replaceable parts
- 24-hour delivery within Germany
- Replaceable parts and components



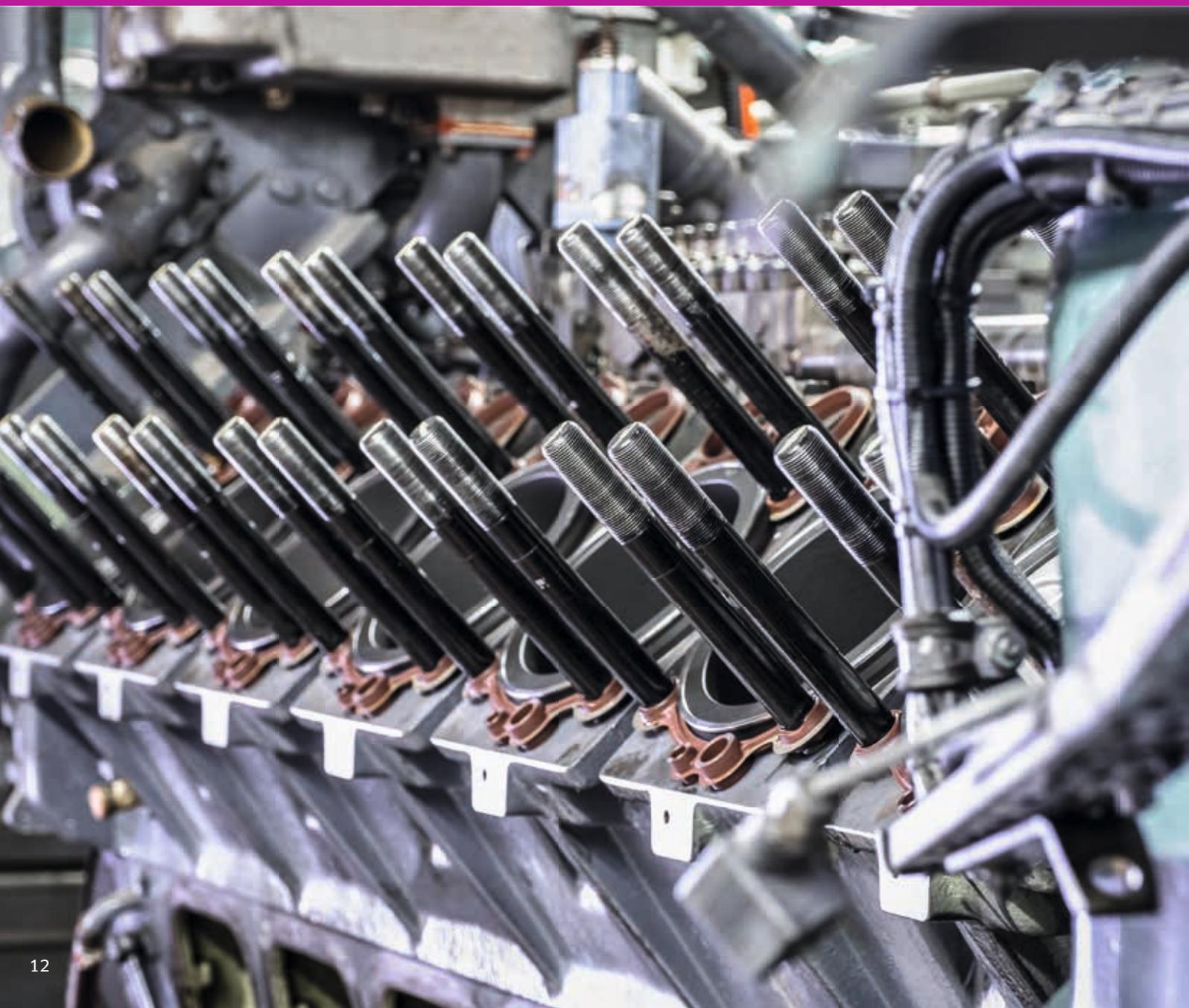
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Stationary diesel sets serviced,  
overhauled and repaired by  
engine specialists

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Back-up sets must be top fit. Immediately on power outage, they must be ready to operate and deliver their full performance. Our specialists take care of the technical requirements that your set also needs to start operating reliably.

Our service technicians perform all of the work your diesel set needs, reliably and to the defined care and maintenance schedules. Wearing parts and operating auxiliaries are replaced and replenished and disposed of properly in accordance with the manufacturer's specifications. We thus ensure that your installation can start and run without a hitch whenever necessary.

### From servicing to the general overhaul

If possible on site, we perform the required general overhaul directly at your location. This eliminates the time-consuming removal and transport of the engine. Here you benefit from our nearly 40 years of experience with diesel engines.

If a general overhaul is not possible on site, we shall remove the engine professionally and overhaul it in our engine workshop according to the manufacturer's specifications. And of course, we see to its proper return transport. After the overhaul, we ensure that the set is properly and professionally installed and commissioned.

### Repairs in the event of damage

If your set should fail unexpectedly, our technicians draw up a thoroughly detailed damage report and consult with you on the further procedure. We either remedy the damage directly on site or offer you an extensive overhaul in our workshop.

If you wish, our repair workshop technicians can examine and machine engine components, for example: machining con rods, grinding cam- and crankshafts, drilling and grinding crankcases, etc. These reworked components present cost-benefits up to about 60% of the price of a new part.

## Overview of our services for stationary diesel sets

- Care
- Maintenance
- Troubleshooting
- General overhauls on site
- Repairs and general overhauls in own workshop
- Grinding of cam- and crankshafts
- Drilling and grinding of crankcases
- Planing of seal faces



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# Overhauls instead of costly new parts – machining of engine components

New parts for engines (e.g. crankshafts, camshafts, cases or con rods) are high quality and costly components that can compromise the cost-effectiveness of a general overhaul or repair. Having your engine components overhauled in the fully equipped HGS workshop offers you cost benefits up to 60% of the price for new.

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## Cleaning, examining, reworking – saving costs



Depending on the manufacturer's specifications, a general overhaul may also involve the reuse of engine components. Our workshop technicians dismantle the engine, clean all components, examine them for damage, and measure them for wear according to the manufacturer's specifications. If the parts are undamaged, still within the manufacturer's tolerances, and therefore suitable

for overhauling, we shall consult with you on the extent of the work in detail.

Having your engine damage repaired offers an excellent opportunity for the professional overhaul of your engine components by our specialists, setting a limit to the repair costs for your set. Engine damage is an unexpected incident and compromises the cost-effectiveness of your plant. The virtually unlimited possibilities presented by our engine workshop help you to minimise the adverse effects on cost-effectiveness.

### Machining of cam- and crankshafts

On our magnetic test bench, we apply magnetic crack detection methods to cam- and crankshafts. We measure the shafts' accuracy to size within the manufacturer's specifications. Our technicians analyse the crankshaft's concentricity and the camshaft's correct stroke movements. The shafts' bearing and sliding faces are polished and/or ground. After a final check, the shafts are again ready for fitting in the engine – at a fraction of the costs for a new part.

Our high quality, special purpose machines know virtually no bounds when it comes to cam- and crankshaft sizes. Our machinists can overhaul the shafts for all of the customary engine ranges from all renowned manufacturers.

### Overhauling of crankcases

In addition to the usual planing work, our shaping and drilling machines can also remove the not uncommon pitting damage on cases. This type of damage may be remedied only by an experienced workshop specialist with the appropriate tools. For this we have the best equipment and the experience to use it in order to make your set fit again for the next lifecycle.

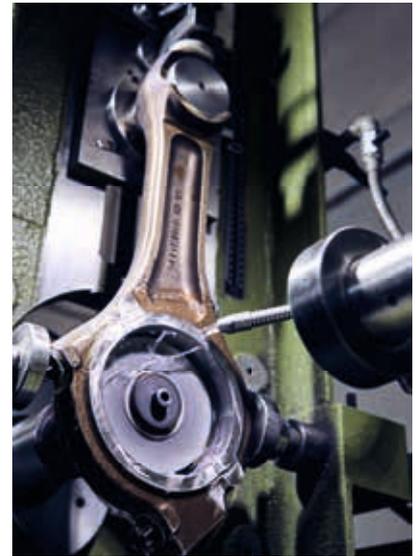
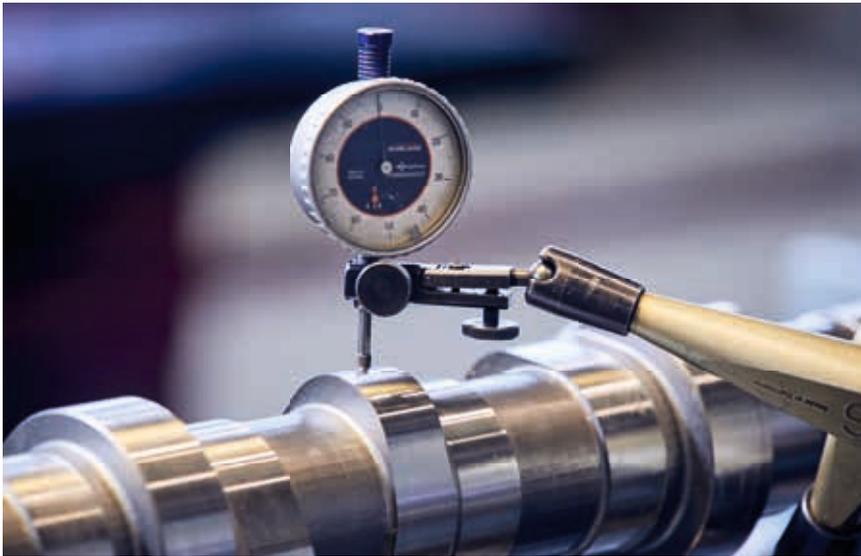
If you wish, we can offer you special solutions for enhanced cylinder liner seals. Your set can then deliver greater running performance for greater cost-effectiveness.

### Overhauling of con rods

The overhauling of con rods commences with the crack test with magnetic particles, so-called "fluxing". A special liquid makes cracks visible under ultraviolet light. If a con rod exhibits cracking, it is useless and must be replaced with a new one. Con rods without cracking are overhauled by our professional technicians. After analysing the parallel alignment of con rod bearing bore and bushing and measuring the nominal sizes, we grind new surfaces on the teeth. Then the bearing surfaces are reworked and precisely ground. The con rod is now as good as "new" and can be reused in the engine without further ado.

## Overview of machining services

- Testing, measuring, grinding / polishing camshafts
- Testing, measuring, grinding / polishing crankshafts
- Testing, measuring, retoothing, grinding con rods
- Planing, remilling crankcases
- Removing pitting damage
- Repairing crankcases
- Special solutions for enhanced cylinder bore seals
- Manufacturing crankcase support rings
- Turning work
- Machining as a service for third parties



### Machining as a service

Thanks to the many years of experience embodied by the HGS workshop experts and our professional and wide-ranging equipment, we have become an attractive service provider for the machining of engine components. We shall be pleased to offer our services to other workshops that do not have the corresponding machinery and know-how.

For engine manufacturers that are planning to have their sets examined and overhauled by specialists, we can offer tailored component overhaul concepts.

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# Whether planning a new or modernising an old installation: always the best solution for your needs

As a member of the ENGIE Group, we and our strong network partners see to the planning, project details, and construction of your CHP unit tailored to your specific requirements.

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Industrial plant, office complex, hospital, swimming pool, or residential building: HGS as a member of the ENGIE Group offers plants for every need. We offer you the full service range from planning to commissioning. We configure the flexible, modular CHP technology according to the planned use, adjusted to the general legal requirements, and optimised to the spatial conditions.

## **New plants**

You have decided to plan a new power installation? Cogeneration with your own combined heat and power (CHP) unit is an excellent opportunity for the efficient use of primary energy sources. No matter whether your new CHP unit is fuelled with natural gas, biomethane or biogas. Delivering the same power, it has far lower fuel needs than conventional energy generation technologies.

## **Retrofitting - the clever alternative**

It doesn't always have to be a new set every time. Modernisations in the form of retrofits offer a more economical solution. We replace obsolete components with new, modern technology and so raise the efficiency of your plant – and that at considerably reduced costs.

## **Retrofits desired**

The cogeneration laws subsidise new investments, modernisations, and retrofits in heat and cold supply from cogeneration. We shall be pleased to advise you on a practicable conversion of your power installation to make it eligible for subsidisation.

## **Lifecycle management**

By analysing the project details and adjusting your plant to its environment, we eliminate unnecessary retrofits at the very outset. For its maintenance, we can offer you extensive lifecycle management services.

## Top performance by specialists

- CHP modules from 4.5 to 4,500 kWel
- Components exclusively from renowned manufacturers
- New, modernised and optimised plants
- Container design or integration in buildings
- Cost-efficient planning
- Lifecycle analysis
- Custom designs based on requirements and local conditions
- Perfect fits to peripherals
- Smooth implementation
- Planning, project details and construction with our reliable network partners



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# HGS – the specialist in a strong Group

As a member of the ENGIE Group, HGS is the versatile specialist backed by a strong Group. Our versatility provides our customers with reliable frameworks for professional care and maintenance concepts – tailored specifically to your general economic conditions and technical requirements. With our strong Group partners, we are your contact – from the initial plant planning to the technical services and the funding for your power installation.

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## **H.G.S. GmbH**

Kleinewefersstraße 1  
47803 Krefeld  
Germany

Phone +49 (0) 21 51 / 52 55-600

Fax +49 (0) 21 51 / 52 55-720

Web [www.hgs.eu](http://www.hgs.eu)

E-mail [info@hgs.eu](mailto:info@hgs.eu)

Emergency calls

+49 (0) 21 51 / 52 55-699

## **Service Center North**

Wöstendöllen 24  
49429 Visbek  
Germany

Phone +49 (0) 21 51 / 52 55-600

Fax +49 (0) 21 51 / 52 55-731

## **Service Point North**

Uelvesbüller Straße 4  
25840 Friedrichstadt  
Germany

Phone +49 (0) 21 51 / 52 55-600

Fax +49 (0) 21 51 / 52 55-786

## **Service Center East**

Stendaler Straße 5  
39326 Hohenwarsleben  
Germany

Phone +49 (0) 21 51 / 52 55-600

Fax +49 (0) 21 51 / 52 55-780

## **Service Center South**

Hermann-Köhl-Str. 3 - 5  
89160 Dornstadt  
Germany

Phone +49 (0) 21 51 / 52 55-600

Fax +49 (0) 21 51 / 52 55-751

HGS is a company of the ENGIE Group.

