

Components by Liebherr



LIEBHERR

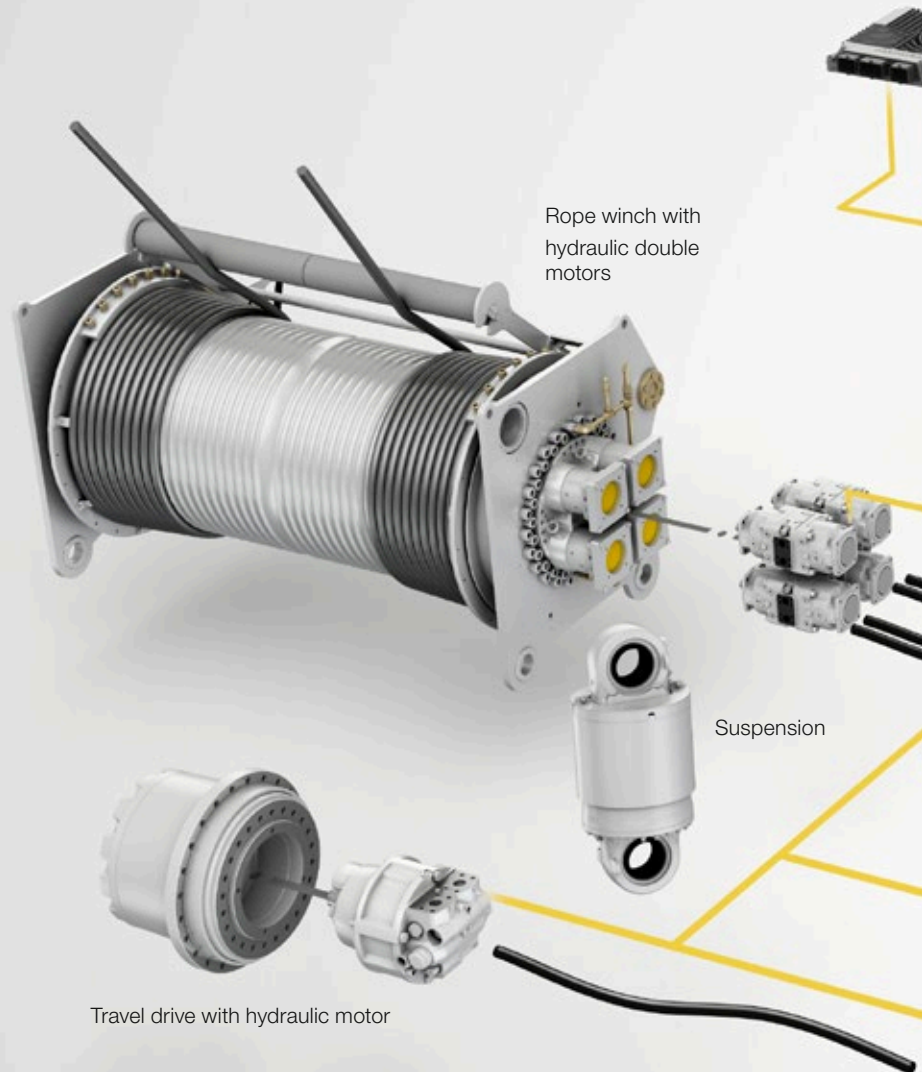
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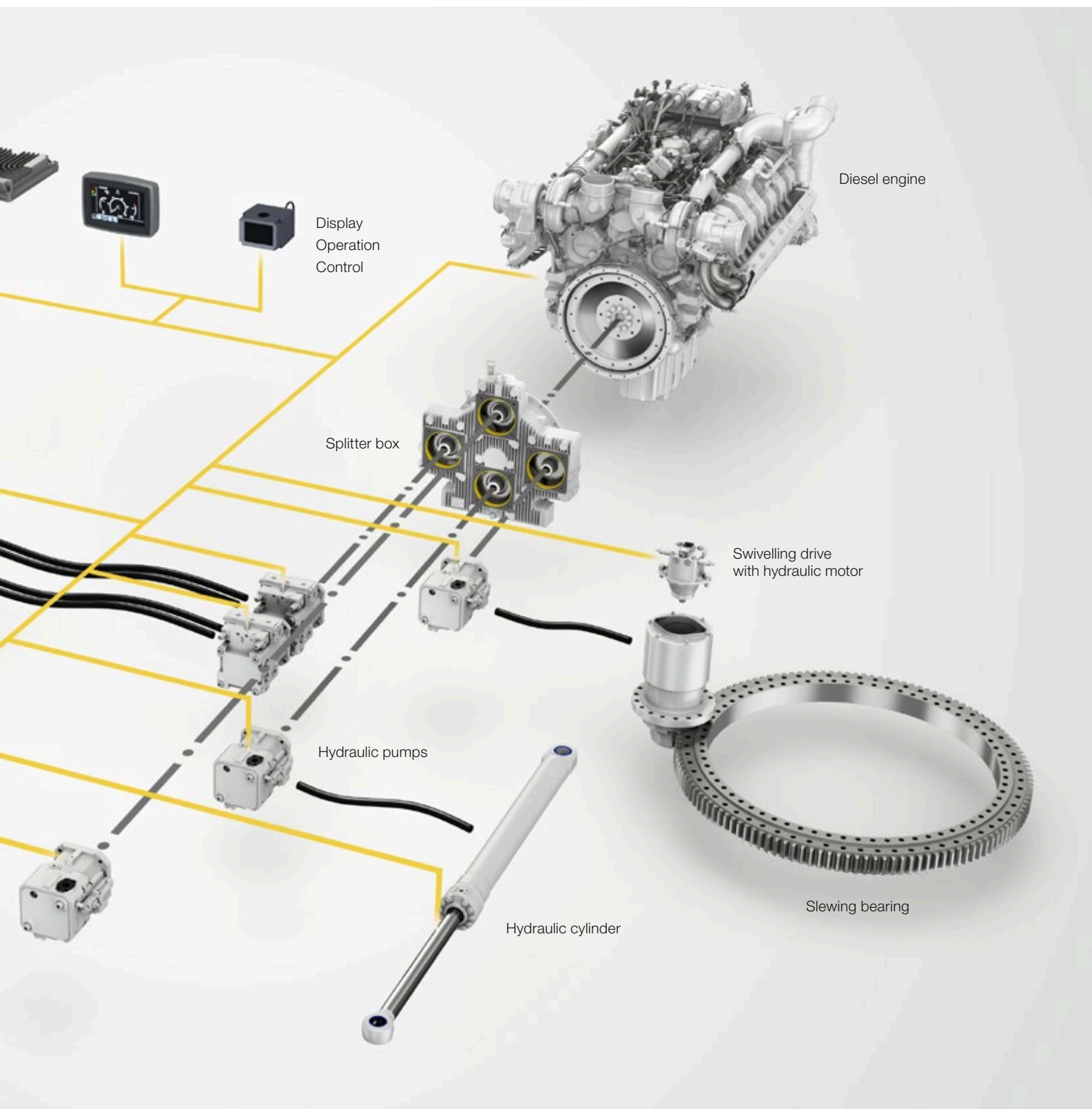
Liebherr develops, designs and manufactures high-performance components for mechanical, hydraulic and electrical drive and control technology.

Liebherr uses advanced production technologies to manufacture its high quality, exceptionally long-serving components. The components are designed for outstanding ruggedness, and withstand even extreme environmental influences like major temperature fluctuations, vibrations, dust or maritime ambient conditions.

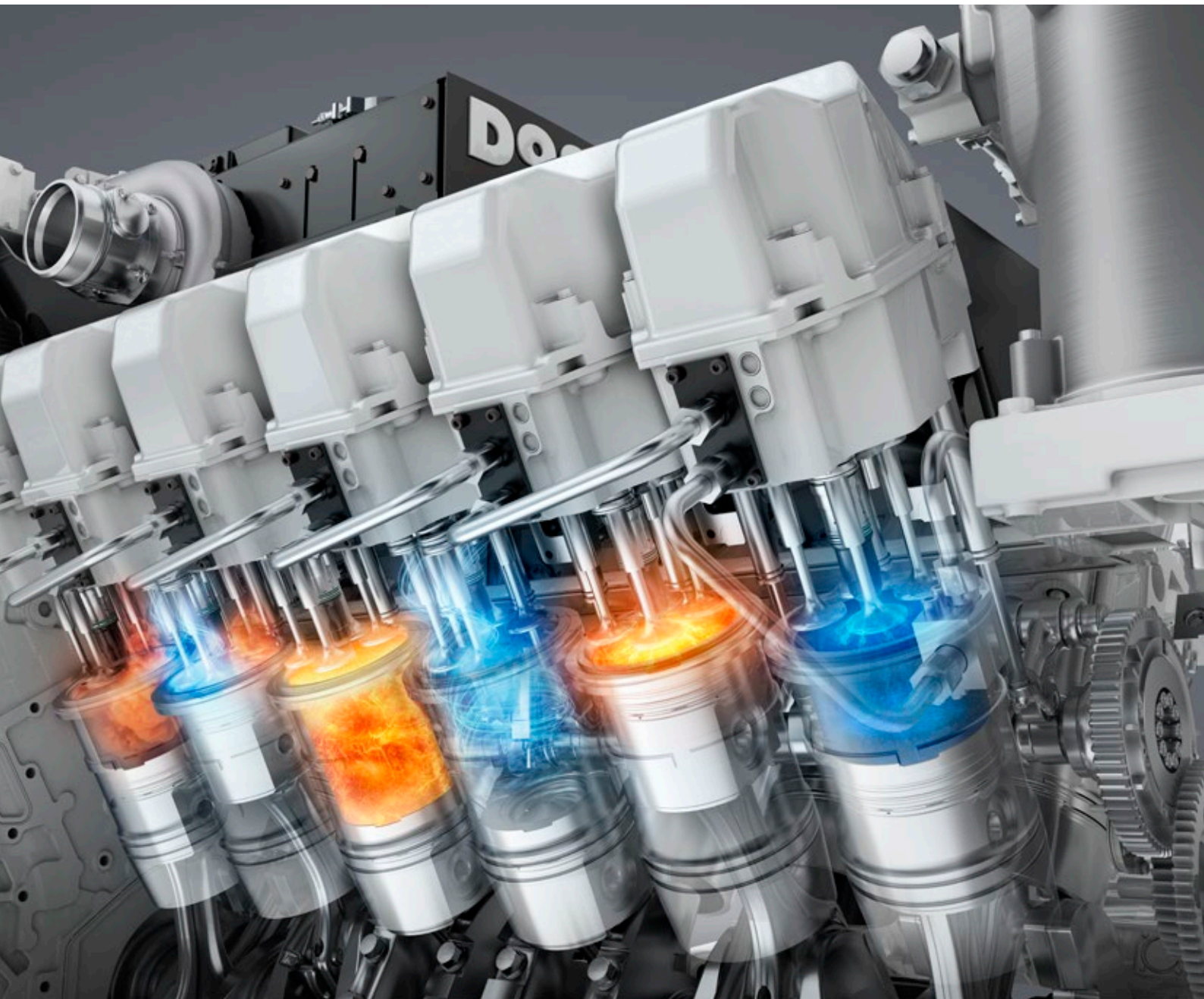
The extensive portfolio of Liebherr components includes the following products:

- Diesel engines
- Gas engines
- Common Rail injection systems
- Axial piston pumps and motors
- Hydraulic cylinders and power units
- Slewing bearings
- Gearboxes and rope winches
- Electric machines
- Human-machine interfaces and gateways
- Control electronics and sensor technology
- Power electronics
- Control cabinets
- Subsystems and complete systems





Diesel engines



At the sites in Bulle (Switzerland) and Colmar (France), Liebherr develops and manufactures high-performance and robust combustion engines for diverse applications in building construction, mining, in special vehicles, stationary applications, as well as agriculture and forestry machinery. Liebherr engines can be adapted precisely to the respective requirements as not only the engine block is from in-house development and production, but also the Common Rail system and the engine control system.

Efficiency and reliability

Liebherr diesel engines have a high specific power and high torques in a wide speed range while retaining very good operating values. They can withstand the toughest requirements such as extreme outside temperatures, and can be used at very high altitudes.

Smooth running

State-of-the-art analysis methods and design procedures are used to minimize vibration and noise emissions, and to improve rigidity and material distribution. This ensures that engines run absolutely quietly and reliably even when used continuously with fluctuating loads.

Modular engine design

Thanks to an innovative modular system, engines have identical performances, cooling system requirements and the same interfaces during installation for regulated and unregulated markets (Tier 0, Stage IIIA, Stage IV and Stage V). This allows the customer to use the same machine design for various emission standards.

Environmental protection

All Liebherr engines comply with statutory emission standards and thus ensure that less nitrogen oxide and particulate matter is discharged. In addition, optimum engine tuning reduces fuel consumption.

Series		D93	D94	D95	D96	D97	D98
Cylinder configuration		4/6	4/6	6/8/12	4/6/12/16/20	6	12/16/20
Max. power per liter	kW	28.57	28.75	31.17	37.77	34.44	43.68
Displacement per cylinder	dm ³	1.75	2.00	2.03	2.25	3.00	5.17
EU 2016/1628 Stage V		•	•	•	(•)	•	
97/68 EC Stage IV		•	•	•			
USA EPA CARB Tier 4f		•	•	•	•	•	•
ECE R96, H (IIIA compliant)		•	•	•	(•)		
IMO III		•	•	•			
IMO II		•	•	•			
Tier 2					•		•
Fuel-optimised (Tier 0)		•	•	•	•	•	•



4-cylinder in-line engine D934



6-cylinder in-line engine D946



6-cylinder in-line engine D966



8-cylinder V-engine D9508

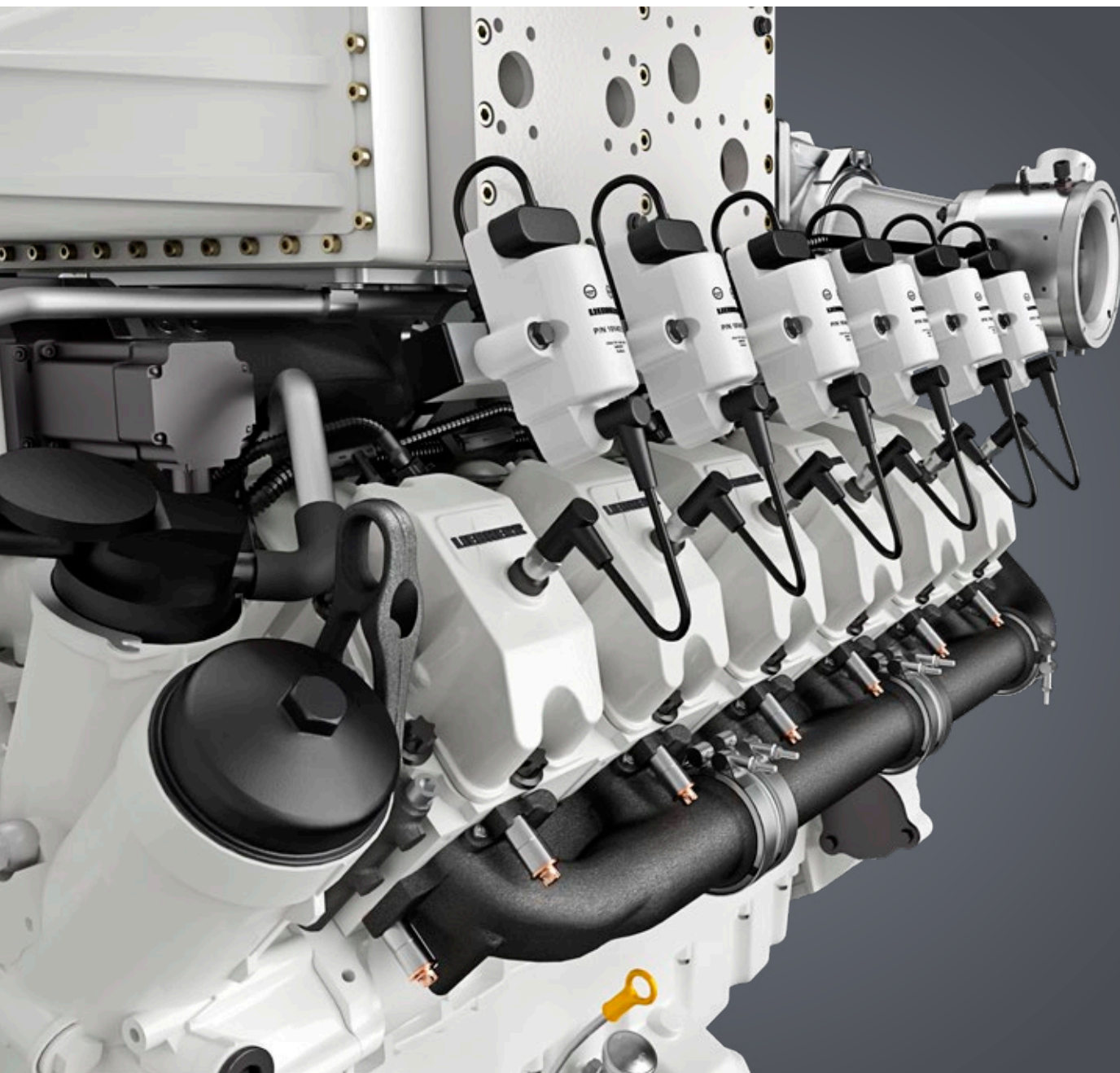


12-cylinder V-engine D9812



20-cylinder V-engine D9620

Gas engines



The high-performance Liebherr gas engines impress with their high level of efficiency and reliability. Optimised for operation with natural gas, biogas and special gases, they are suitable for diverse applications. Customers particularly appreciate that Liebherr supplies the units ready for installation.

High availability

Thanks to the high availability of gas engines, short downtimes and low maintenance as well as operating costs are guaranteed. The key contributor being the accurate dimensioning of the engines, their sophisticated control system and engine peripherals, high mechanical strength and high resistance to wear. The operating status of the engine, ignition system and Lambda control is continuously monitored by the engine control system.

Performance and efficiency

Liebherr gas engines are particularly impressive due to their performance, a favourable ratio between electrical and thermal power, and high mechanical efficiency of more than

41 %. To achieve these optimum values, Liebherr has optimised the entire combustion process. Quick and complete combustion allows these high levels of efficiency even with a lean gas mixture. The engines comply with the provisions of the Technical Instructions on Air Quality Control (TA Luft).

Ready for installation

The gas engines are manufactured as basic engines as well as complete engines ready for installation. A gas engine with the complete equipment consists of a tuned turbocharger, two-stage intercooler in stainless steel, an ignition system developed specially for Liebherr, gas mixer and engine control unit are included as standard.

Basis engine

		G924		G926	
Power	kW	59.8	98.1	90.1	147.6
Displacement	dm ³	6.64		9.96	
Weight	kg	740		930	
Mechanical efficiency	%	34	37	34	37

Komplettmotor

		G934		G944		G946		G9508		G9512		G9620	
Power	kW	145	169	164	190	246	286	344	400	516	600	1,070	1,070
Displacement	dm ³	7.0		8.0		12.0		16.7		25.0		48.7	
Weight	kg	950		950		1,250		1,700		2,150		4,500	
Mechanical efficiency	%	41.5		41.5		41.5		41.5		41.5		44.0	



Base gas engine G926



4-cylinder in-line engine G934/G944



6-cylinder in-line engine G946



8-cylinder V-engine G9508

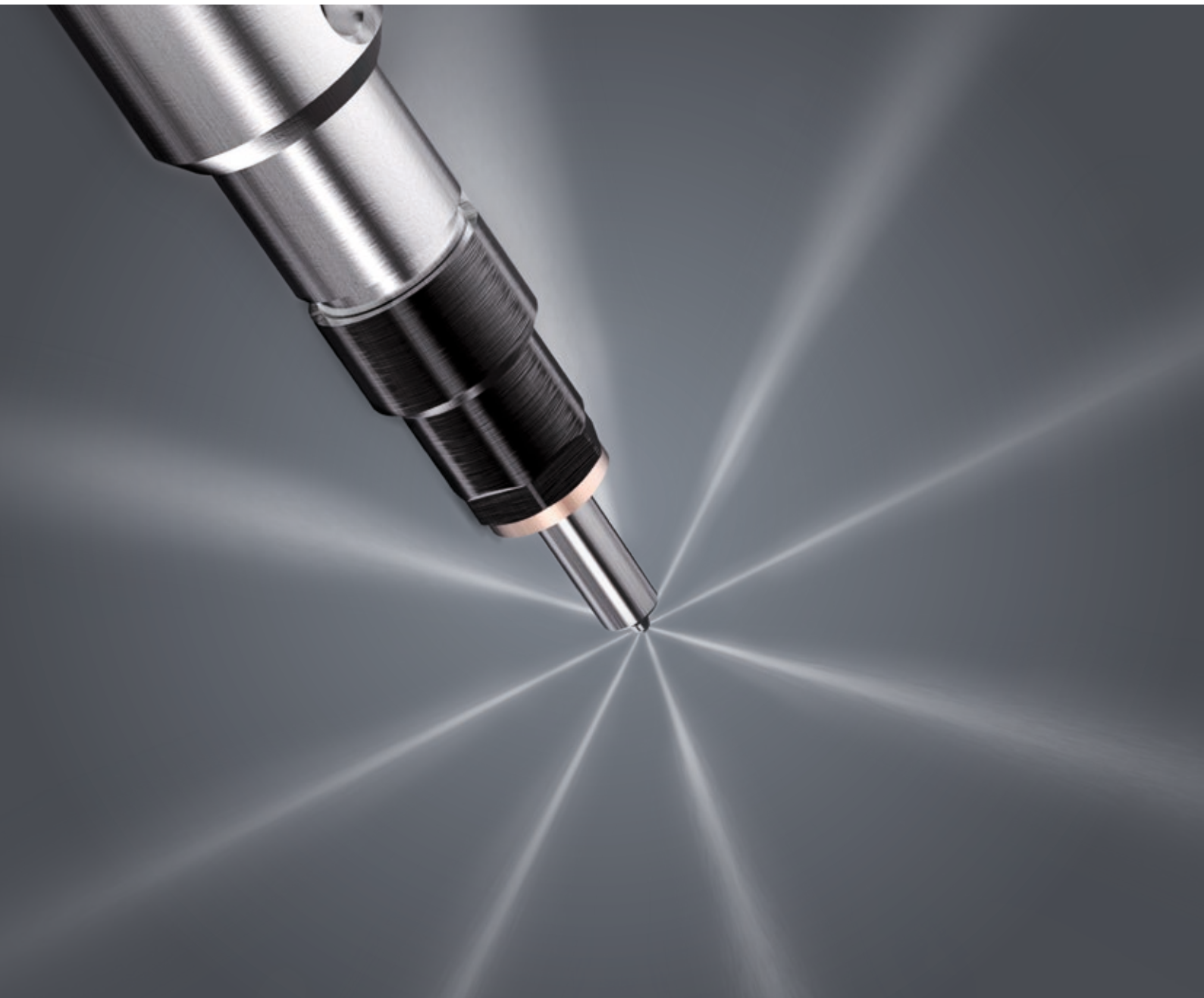


12-cylinder V-engine G9512



20-cylinder V-engine G9620

Fuel injection systems and engine control units



The operational spectrum of Liebherr Common Rail systems extends from onroad and offroad machines right up to stationary applications and includes the medium and heavy duty ranges. The highly flexible system is equally reliable for in-line as well as V-engines and supports compliance with current and future emission standards. The Liebherr injection technology has already been integrated successfully in many engine applications in diesel engines by Liebherr as well as in units from other manufacturers.

Optimal control and monitoring

Comprehensive functions and configuration options of the engine control unit ensure optimal control of the fuel injection system for reliable engine operation. The fuel injection timing and the fuel amount are calculated individually for each cylinder, so that the injector's solenoid valve can be correspondingly actuated. The control signal and number of injections are adapted to the requirements of each engine and application.

Efficiency and performance

Liebherr Common Rail systems deliver as well a high injection pressure of 2,200 bar, as a stable multiple injection per combustion cycle. The very small amount of switching leakage not only leads to a higher degree of efficiency and therefore lower fuel consumption, but also results in a good tolerance of various fuel qualities.

Quality and reliability

All components are specifically designed for the highly dynamic loads in on- and off-highway applications. A detailed product validation plan is worked through in the development and application process. Prior to injection system delivery the high pressure pumps, injectors and high pressure connectors are tested for 100 % function and life-cycle quality characteristics on highly efficient test benches

	CRS 11.2	CRS 11.5
System pressure	250–2,200 bar	400–2,200 bar
Number of injections	5	4
Hydraulic flow rate	600–2,200 ml/30 sec	1,400–4,000 ml/30 sec
Nozzle diameter	7 mm/9 mm	13 mm
Max. injection quantity	420 mm ³ (370 mg)/700 mm ³ (600 mg)	1,200 mm ³ (1,000 mg)
Max. pump speed	4,500 rpm	4,500 rpm
Max. hydraulic flow (pump)	320 l/h	825 l/h
Displacement	1.5–3 l/cyl	4–6 l/cyl
Engine power / displacement	85 kW/cyl/ 145 kW/cyl	250 kW / cyl
Emissions compliance	US EPA Tier 4f/ EU Stufe V/ Euro V/ Euro VI	IMO III/ TA Luft/ US EPA Tier 4f
Control leakage / injector	< 30 ml/ min at 2,200 bar	< 50 ml/ min at 2,200 bar
Injector configuration	Side feed/ top feed	Top feed
Engine control unit	ECU2-HD/ ECU3	ECU2-HD/ ECU3



Common Rail system 11.2
as top feed version



Common Rail system 11.2
as side feed version



Common Rail system 11.5

Axial piston pumps and motors



Liebherr designs and manufactures axial piston pumps and motors in swashplate design for open and closed circuits. Available as constant or variable units, the components offer a wide variety of control functions and drive through options. Valve or control oil pumps can be integrated. These compact units thus permit a very flexible machine design.

Long service life and reliability

All components are machined with high precision and quality on state of the art production plants. The optimum design of the individual parts and special materials guarantee the virtually wear-free reliable operation of pumps and motors in continuous operation under pressures of up to 450 bar.

Optimised efficiency and quiet operation

Modern design and simulation programs (FEM and CFD) are used in the design and calculation of hydraulic pumps and motors, resulting in the optimization of the housing construction design, flow paths and commutation. These, in turn,

lead to top efficiency levels and low pressure pulsations. The noise levels thus reduced are further optimized on Liebherr's own acoustic test stand, and in the end devices.

Pilot control devices and valves

As a components supplier for hydraulic systems Liebherr offers in-house designed and manufactured hydraulic and electrical pilot control devices and valves in addition to pumps and motors. The valves, which are designed primarily for mobile applications, offer various functions for open and closed circuits.

		Pumps			Motors			Double motors
		DPVO DPVD DPVP	DPVG	LH30	DMVA DMFA	CMVE	LMF FMF FMV	DMVA D
Power / unit	kW	151–375	201–508	65	259–564	199–299	71–368	593–744
Displacement volume / unit	cm ³ /U	108–217	85–283	47	356–891	85–165	25–257	168–217
Circuit		open	closed	open	open / closed	open	open / closed	open / closed
Nominal pressure	bar	400	450	280	450	380	350	450



Variable pump
DPVG 108



Variable pump
DPVO 165



Variable double pump
DPVD 108



Variable pump
LH30VO



Hydraulic motor
FMF 45



Plug-in motor
CMVE 108



Flange-mounted motor
DMVA 165



Flange-mounted double motor
DMVA 165/165

Hydraulic cylinders and power units



Since 1958 the Liebherr Group has been developing and producing hydraulic cylinders at the site in Kirchdorf an der Iller, Germany. The product portfolio reaches from standard cylinders to large heavy duty cylinders and suspensions through to high-stress lightweight and special cylinders. In addition to hydraulic cylinders for mobile and stationary applications, as well as shock absorbers, Liebherr also offers tailor-made hydraulic power units and other components for hydraulic system solutions.

Quality and economy

State of the art production facilities enable variable batch sizes, swift delivery and short reaction times. Consistent production focusing on the core competencies of piston rods, cylinder tubes, assembly, painting and inspection at each stage in the production process ensures a high level of quality, economic efficiency and reliability of the products.

High availability and longevity

Liebherr hydraulic cylinders are noted for careful material selection, high manufacturing precision of components, customised sealing systems and top surface finishing quality. The resulting optimum sliding action permits virtually wear-free operation of the hydraulic cylinder.

Hydraulic power units and sensor technology

The customised hydraulic power units are suitable for various applications. Different pump types, monitoring elements and accessories such as control and accumulators are available.

For each task the optimal sensor technology solution is also developed. Here Liebherr uses tried and tested sensor technology components from well-known manufacturers and complements these with innovative in-house developments if needed.

Technical data hydraulic cylinders:

- Stroke lengths up to 8,000 millimetres
- Nominal diameters up to 500 millimetres
- Operating pressures up to 630 bar
- Lifting speeds up to 1 m/s
- Operating temperatures from -40°C to +80°C
- Chrome coatings, nickel-chrome, HVOF and many others
- Corrosion protection for continental and maritime environments
- End of stroke cushioning (the piston side and/or the rod side)



Luffing cylinder with application-specific coating



Mining suspension for constant operation



Ballast cylinder in lightweight design



Telescopic cylinder for large strokes and compact installation space



Hydraulic power unit for mobile and stationary applications



Attachment cylinder for dynamic loads

Slewing bearings



Liebherr manufactures ball bearing and roller bearing slewing rings in various dimensions and versions. Decades of experience, comprehensive engineering know-how and expertise, together with state-of-the-art manufacturing plants, ensure top-quality products. The large diameter bearings from factories in Germany, Mexico and Brazil are used not only in construction machines and cranes, but also in wind turbines and maritime applications.

Large range of dimensions

State-of-the-art production facilities provide for efficient manufacture of all design sizes, both in small and large batch production. Slewing bearings by Liebherr are available in a diameter range from 800 to 7,500 mm. Larger sizes are possible in a segmented design. The internal and external gear teeth of the bearings, which weigh up to 25 t, can be designed with a gear module of up to 50. Other gear versions are available on request. Balls, cylinder rollers or tapered rollers are used as rolling elements. All slewing bearings are carried out with induction hardened, finely machined raceways and, depending on the application, also with induction hardened gear teeth. They have a sealed raceway system with grease lubrication.

The most varied of designs

The current product range includes ball bearing slewing rings, which can be designed as single-row or double-row, triple-row roller bearing slewing rings, combined ball and roller bearing slewing rings as well as tapered roller bearings with or without internal or external gear teeth. Besides standard designs, a large variety of special customer and application-based models have already been made. In addition to anti-friction bearings, geared rings and ring segments as well as high-precision worm gears for machine tools, made from composite materials, are also available.

Slewing drives product line

The slewing drives product line includes worm, spur gear and belt drives. The range is notable for its particularly compact design and high power density. The slewing drives are powered by a hydraulic or electric motor.



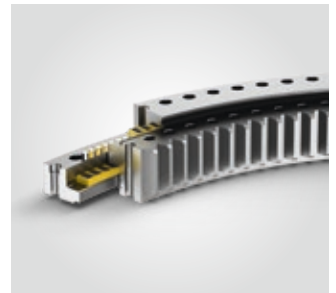
Single-row four-point bearing, with internal gear with through holes



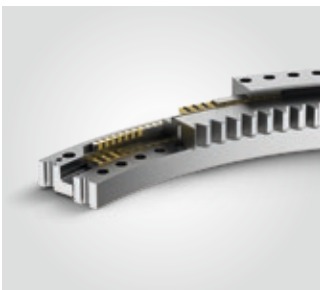
Double-row ball bearing without gear



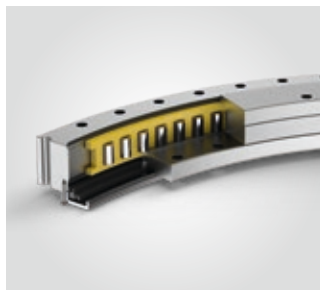
Double-row four-point bearing with external gear



Triple-row roller bearing with internal gear



Segmented roller bearing with internal gear



Radial roller bearing without gear



Combined roller-ball bearing with external gear



Tapered roller bearing without gear

Gearboxes and rope winches



Every year Liebherr manufactures tens of thousands of gearboxes and rope winches in Biberach an der Riss (Germany), in Dalian (China) and in Bulle (Switzerland) with the utmost reliability and quality. Customers particularly value the large product range and the application-specific design. Liebherr offers perfectly dimensioned gearbox versions up to large-scale gearboxes. The scope of performance also comprises individual customer developments.

Variety of sizes and designs

The product range extends from slewing and swivelling drives, wheel and travel drives as well as compact and heavy duty winches to splitter boxes, drilling drives, cyclone drives, mixer drives and other special solutions. Gearboxes are available in a large range of sizes and transmit drive torques from 2,000 to 2,500,000 Nm. Standard gearboxes are designed as two- to four-stage planetary gears and can be extended with spur gear drives or bevel gears. Depending on gearbox design and number of planetary stages, a torque ratio of the driving electric or hydraulic motors is possible between $i=15$ and $i=1,400$.

High performance density

The integral design of Liebherr's gearboxes allows for compact installation spaces and the best weight to performance ratio. The sun and planetary wheels are optimised for a low circumferential backlash. Well thought-out construction principles ensure an even load distribution of the individual stages and therefore a high performance density. Liebherr's gearboxes and rope winches are characterised by their optimised design that uses few components, with a minimum number of seal surfaces and a high level of functionality.

		Slewing and swivelling drives	Travel drives	Planetary plug-in gearb.	Splitter boxes
Output torque	Nm	4,000–620,000	24,000–2,300,000	6,000–1,250,000	-
Output shaft module		8–51	-	-	2-6
Connection diameter	mm	210–850	375–1,700	295–1,200	SAE 0 - SAE 4
Weight	kg	71–5,600	200–16,000	100–4,800	60–2,800

		Compact rope winches	Heavy duty rope winches	Gear ring rope winches
Abtriebsmoment	Nm	6,000–944,000	50,000–944,000	390,000–2,500,000
Cable diameter	mm	13–52	20–76	50–100
Drum diameter	mm	340–1,500	470–1,650	1,000–3,600
Weight	kg	200–22,000	2,000–11,000	7,000–175,000



Swivelling drive with long output shaft



Slewing drive with short output shaft



Electric travel drive



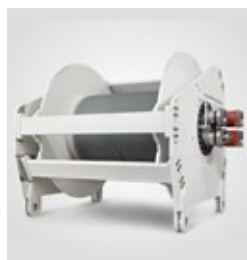
Hydraulic travel drive



Splitter box



Planetary plug-in gearbox



Compact rope winch with frame

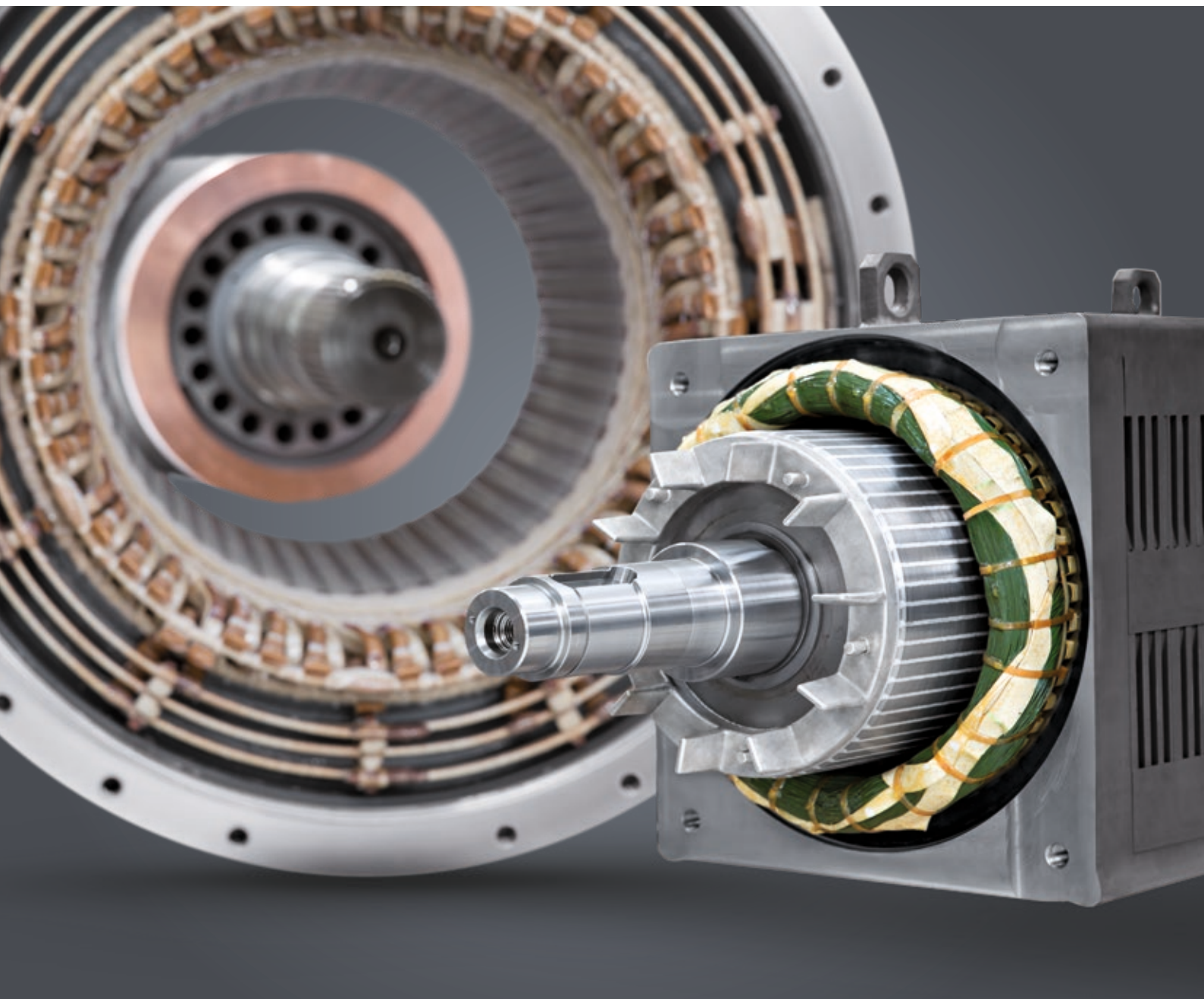


Heavy duty rope winch with plug-in gearbox



Gear ring rope winch with external slewing drives

Electric machines



As an ideal supplement to gearboxes and control systems Liebherr develops and manufactures compact air-cooled asynchronous squirrel-cage motors, liquid-cooled permanent magnet machines and synchronous generators. The performance of the motors ranges from 4 kW to 2,000 kW, of the generators up to 3,500 kW. The electric machines are used under toughest conditions – such as in diesel-electric mining trucks, construction machinery, tower cranes and container cranes.

Power density and flexibility

Electric motors by Liebherr are designed as compact, robust and maintenance-free three-phase squirrel cage motors, synchronous generators and permanent magnet motors, and are noted for their high power density. The motors were primarily designed for use in variable-speed drives with frequency converters, and for high dynamic applications. They are designed for a constant rated torque from standstill to the rated speed, and in addition for speeds for constant rates up to 4,500 rpm.

Modular system

Except for the smallest size (BG 132) and permanent magnet motors – all electric motors are designed with a self-supporting stator core, which supports the housing in addition to the active electrical functions.

All models are based on a modular system and can be upgraded with additional components to cover a wide range of applications.

Economy and quiet operation

The electrical design and the construction principle offers a low volume-performance ratio in combination with effective cooling. The compact design permits a low noise level and very quiet operation.

Name	Design	Power [kW]
Electric motor BG 132	Asynchronous squirrel cage motor, conventional design	4–6 (6-pole), 7.5–11 (4-pole)
Electric motors BG 160–250	Permanent magnet machine, motor and alternator	80–250 (6-pole)
Electric motor BG 132	Asynchronous squirrel cage motor, without housing	7.5–37 (4-pole)
Electric motors BG 180–315	Asynchronous squirrel cage motor, without housing	24–230 (4-pole), (25–100 Hz) 300–500 (4-pole), (25 Hz)
Electric motor BG 450	Asynchronous squirrel cage motor, without housing	750–2,000 (4-pole), 1,100 (6-pole)
Synchronous generators BG 450–530	Separately excited synchronous generator, without housing	900–3,500 (8-pole)



Asynchronous motor BG 132



Permanent magnet machine BG 225



Asynchronous motor BG 315



Asynchronous motor BG 450



Synchronous generator BG 515

Human-machine interfaces and gateways



Besides display-controller units, the Liebherr portfolio in the field of human-machine interfaces comprises digital cameras and keyboards. The ergonomic display and control units are also suitable for use in modern assistance systems. Our telematics units provide most diverse application possibilities for the secure interconnection of mobile machinery, thanks to their powerful hardware and open software environment.

Display controller with touchscreen

Our displays are control devices with integrated display especially developed for the requirements of mobile machinery in rough off-road conditions. Aside from state-of-the-art technology the emphasis during design of the products was placed above all on ergonomic aspects. The industrial quality TFT display with laminated PCAP touchscreen guarantees legibility even in strong sunlight. The audio system with integrated speaker facilitates the output of precise frequencies up to audio files.

Digital cameras

High resolution cameras are perfect for monitoring areas that are difficult to see by the operator. The integrated image-processing of the cameras is an ideal basis for the implementation of image-based assistance systems. The camera is connected via an Ethernet interface with a visualization system and provides a continuous stream of configurable images. A built-in glass heater reliably prevents icing and fogging on the front screen. Due to an integrated Ethernet switch and an additional port other devices can be cascaded, e.g. another camera.

Assistance systems and automation

Modern technologies for smart systems: Liebherr develops and manufactures electronics for mobile machinery. Our components enable the realisation of modern assistance systems, with solutions for accident avoidance being a focus. Precise sensor data is the basis for the automation of motion sequences – for more efficiency in operation.

Telematics units

More than telematics: equipped with powerful hardware, our portfolio enables far more application possibilities compared to conventional telematics products.

Even under extreme environmental conditions our telematics units allow for a safe interconnection of mobile working machines as well as their integration into the Internet of Things. Ready-to-code software facilitates development of process-orientated applications, thereby increasing machine productivity. Additionally, standardized interfaces ensure easy and fast integration.

A secure transfer of sensitive data is guaranteed by strong hardware encryption. Our telematics units are also suitable for safety-relevant applications.



Display and control units



Keyboard units



Digital cameras

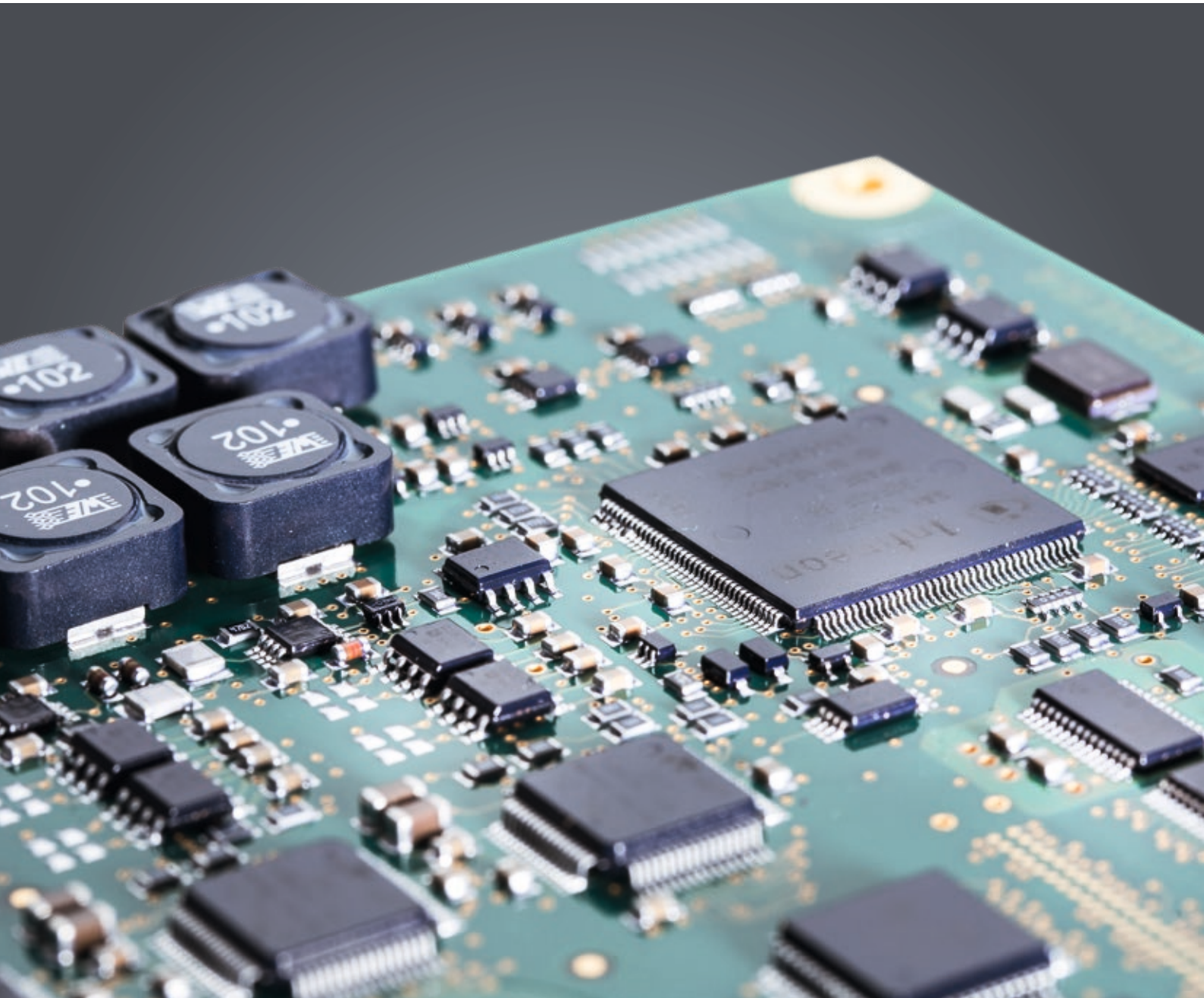


Assistance systems



Telematics

Control electronics and sensor technology



Liebherr manufactures control electronics in the competence centre for electronics in Lindau. Customer-specific control technology convinces, for example, in mobile machinery. In aviation and rail technology individually designed assemblies have been tried and tested in ventilation and cooling systems, among others. In the field of sensor technology, our position transducer for hydraulic cylinders LiView determines the exact piston position and speed through a unique measuring principle.

Products for industrial applications

100% customized: concerning functionality and mechanical system, our customer-specific control technology is optimized for the respective application. The robust design guarantees the reliability of the control technology even under the most extreme environmental conditions.

Products for aviation applications

For years, our assemblies have been proving themselves successfully in diverse aviation programmes. Our experience and know-how contribute day after day to the development, production and qualification of our electronic solutions.

Products for railway applications

In modern trains, air conditioning systems provide additional comfort for passengers. Our electronic units control and regulate air or steam cycle cooling systems in different types of trains.

Developed for harshest conditions

During the established development process for safety-related electronics components are optimised through the use of advanced inspection and simulation tests, and equipped to withstand the toughest conditions. Aside from electronic hardware, Liebherr also offers the equally necessary software development to run the electronics.

Position transducer for hydraulic cylinders

The intelligent position transducer LiView determines the exact piston position and speed of hydraulic cylinders, independent of cylinder length or diameter. The highly robust system convinces by easy mechanical integration, without weakening of the piston rod. LiView is certified for safety-relevant applications and ideal for the automation of mobile machinery.

Customer service for the complete life cycle

Optimized production processes in line with customer demands ensures delivery reliability and fast reactions to changing needs. Extensive production tests guarantee the high quality of our components. Liebherr provides reliable technical and logistic support also for especially long product life cycles. This includes, for example, management of cancelled components and component shortages, an ongoing product redesign service as well as guaranteed spare parts supply.



Compact control unit



Air management systems



Flight control systems



Landing gear systems



Railway controller



Position transducer for cylinders

Power electronics



Liebherr power electronics for industrial applications were developed for use in harsh environmental conditions. The frequency converter systems, power modules, energy storage devices and DC/DC converters impress primarily because of their high availability and efficiency. Power electronics for aviation are used in flight control systems, refuelling systems and ventilation and cooling systems.

Products for industrial applications

The performance portfolio comprises rectifier units, DC/DC converters, brake choppers, high-power inverter units, as well as complete frequency converter systems for mobile applications in the off-highway and maritime sector, as well as industrial applications. Energy storage units and Active-Front-End units (AFE), offered by Liebherr up to 4.5 MW, have proven their worth in many applications by reducing energy consumption and overall operating costs (total cost of ownership).

Products for aviation applications

A major development focus in aerospace is the "More Electric Aircraft (MEA)" for which Liebherr's broad product range in power electronics offers mature and field proven solutions. Motor-control electronics for electrical 4-quadrant drive systems in different power ranges support a wide range of different applications. Besides electrical actuation in the field of "high-lift systems" and "primary flight controls", these also include electrically powered compressors for air conditioning. Many different drive and power electronics applications from Liebherr have accumulated in-service experience in recent aircraft programs.

Products for railway applications

For use in high voltage railway applications, Liebherr offers energy converters, which convert alternating current (AC) to direct current (DC). Highly efficient, silent AC/DC and DC/DC converters with power of up to 50 kW are also available for the auxiliary power supply in trains.

Long service life and reliability

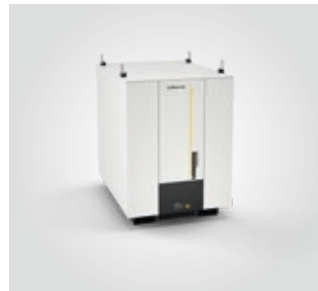
Power electronics, particularly in the aviation sector, is generally located externally and is exposed to very high temperatures and permanent fluctuations in pressure. In the aviation sector and on most processing machinery vibration levels tend to be very high. Liebherr's power electronics are therefore mostly noted for their long lifetime and high availability even in the toughest conditions thanks to the special design of their components.



Frequency converter system



Frequency converter power module



Energy storage unit



Application-specific frequency converter



Cooling compressor drive power unit



Primary flight control electronic unit



Slat PCU motor control electronic unit



High-voltage module railway engineering

Control cabinets



The product portfolio extends from control cabinets for tower cranes, systems for mobile equipment in the mining and in the earth-moving sectors, to control cabinets for machine tools, air conditioning and automation engineering, rail vehicles and test benches. The power inside the control cabinet ranges from a few kW to the MW range, both in alternating current and direct current technology. For this Liebherr draws on its long-standing experience of the low- and medium voltage sector.

Wide range of services

The built-in control technology covers the entire spectrum from simple contactor control systems to the most sophisticated PLC controls according to EN ISO 13849. A wide variety of field bus systems like Interbus-S, ASI, CAN, CA, Ethercat, Profibus, and Profinet are used. Control cabinet is adapted to customers' individual needs, for instance to particular ambient conditions, higher protection classes or special dimensions.

Maintenance friendliness and practical component arrangement

Special importance is placed on the practical and clear arrangement of the components in the control cabinet, this in turn enables a high level of maintenance friendliness.

Maximum safety and reliability

Throughout the entire design and manufacturing process requirements related to the safety and reliability of the control cabinet are strictly observed. Among others, requirements concern the clearance and creepage distance, protection class and cooling.

Observance of standards and guidelines

Liebherr has an intimate knowledge of the respective national requirements regarding control cabinet, and ensures that regulations are observed in relation to electrical and operational safety and EMC. Liebherr offers control cabinets for the European market with CE certification, and with UL approval for the North American market.



Electric supply for hydraulic excavator



Mining truck control cabinet



Straddle carrier control cabinet



Tower crane control cabinet



Container bridge control cabinet



Container crane control cabinet

System solutions



Liebherr supplies system solutions for a wide range of electric or hydraulic drive applications. To ensure this, Liebherr coordinates the components for a very wide range of (diesel) electric and hydraulic drive-trains perfectly, using diesel engines, generators, power electronics, electric motors, distributor gears, hydraulic pumps and motors and the appropriate gearboxes, cable winches and hydraulic cylinders, all of which are also developed and manufactured by Liebherr.

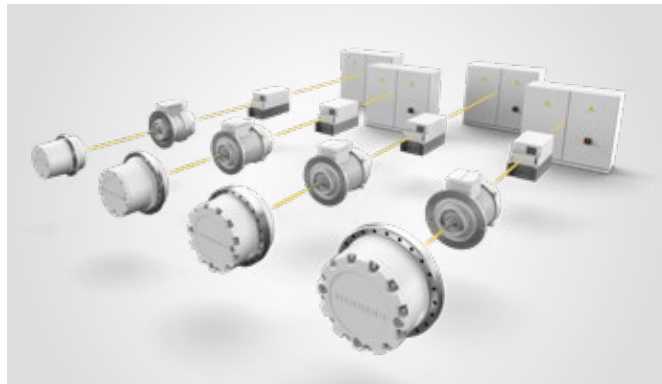
Furthermore, Liebherr develops control systems with functions for specific applications whose aim is to improve performance, handling and energy efficiency for every application.

Liebherr uses its enormous application experience and system competence from devices in many sectors of mechanical and plant engineering as well as the offshore and wind industries. This enables the company to design, simulate and supply highly efficient system solutions requiring low package space and offering excellent value for money, from a single source and then also to validate them, for example by taking measurements on prototype devices in the field.



Modular winch systems.

Based on its long term experience as a component manufacturer, Liebherr supplies winch systems for various applications for hoisting and transport equipment and also adjustment systems. The winch systems have been developed using the modular element principle to cover a wide range of customer needs, thus enabling a system to be supplied which requires minimal development times.



Modular electric chain drive systems

Modular solutions for electric chain drive systems have the advantage that the various electric and mechanical components are perfectly tailored to each other.

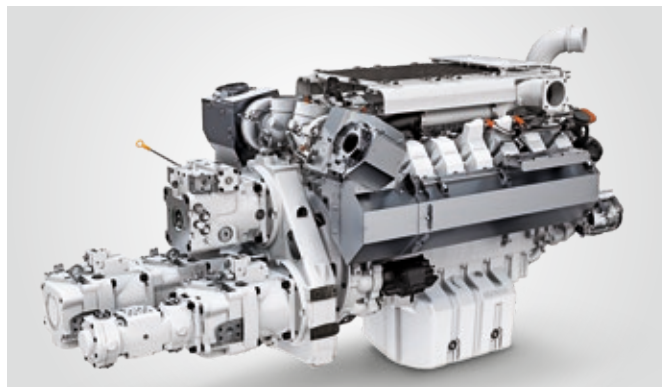
These systems can particularly replace hydraulic chain drives in applications which to date have required an additional hydraulic system on the device for the drive function.



System solutions for specific applications

Liebherr develops electric and hydraulic drivetrain solutions for specific applications which improve performance, handling and energy efficiency.

In this respect, Liebherr can supply everything from a single source, from field measurements and simulation of the existing system, creating a concept up to the delivery of the system and its validation.



Drivetrain

Liebherr also offers splitter boxes and axial piston pumps that can supplement the diesel engines to create a customer-specific drivetrain. All the components are developed and manufactured at Liebherr sites. They are therefore adapted optimally to each other and form a compact, powerful system with a high degree of overall efficiency.

Customer Service



Aside from high performing components, Liebherr also supports customers with comprehensive services. Customers profit from short response times, original spare parts with fast availability and an extensive range of training courses. In this way, Liebherr assures the performance of the components throughout the entire lifecycle.

Service

Competent specialist personnel can be at the site quickly if required. This helps to minimise downtimes. Furthermore, our customers can take advantage of technical advice and support from specialists at our production sites.

Training courses

Professional maintenance and repair make a significant contribution towards maximum exploitation of Liebherr components' lasting character. Our experienced staff are happy to pass on their specialist knowledge to customers and sales partners in the course of training. The company has its own training centres at the production facilities for this purpose. If necessary, we can also run training courses directly on-site.

Spare parts

Original spare parts are available for all components from Liebherr. The extensive internal quality assurance system checks assure, along with our components themselves, that these meet the highest demands in terms of perfection and performance. The use of original parts makes it possible to assure the cost effectiveness and value retention of Liebherr components.

Spare parts logistics

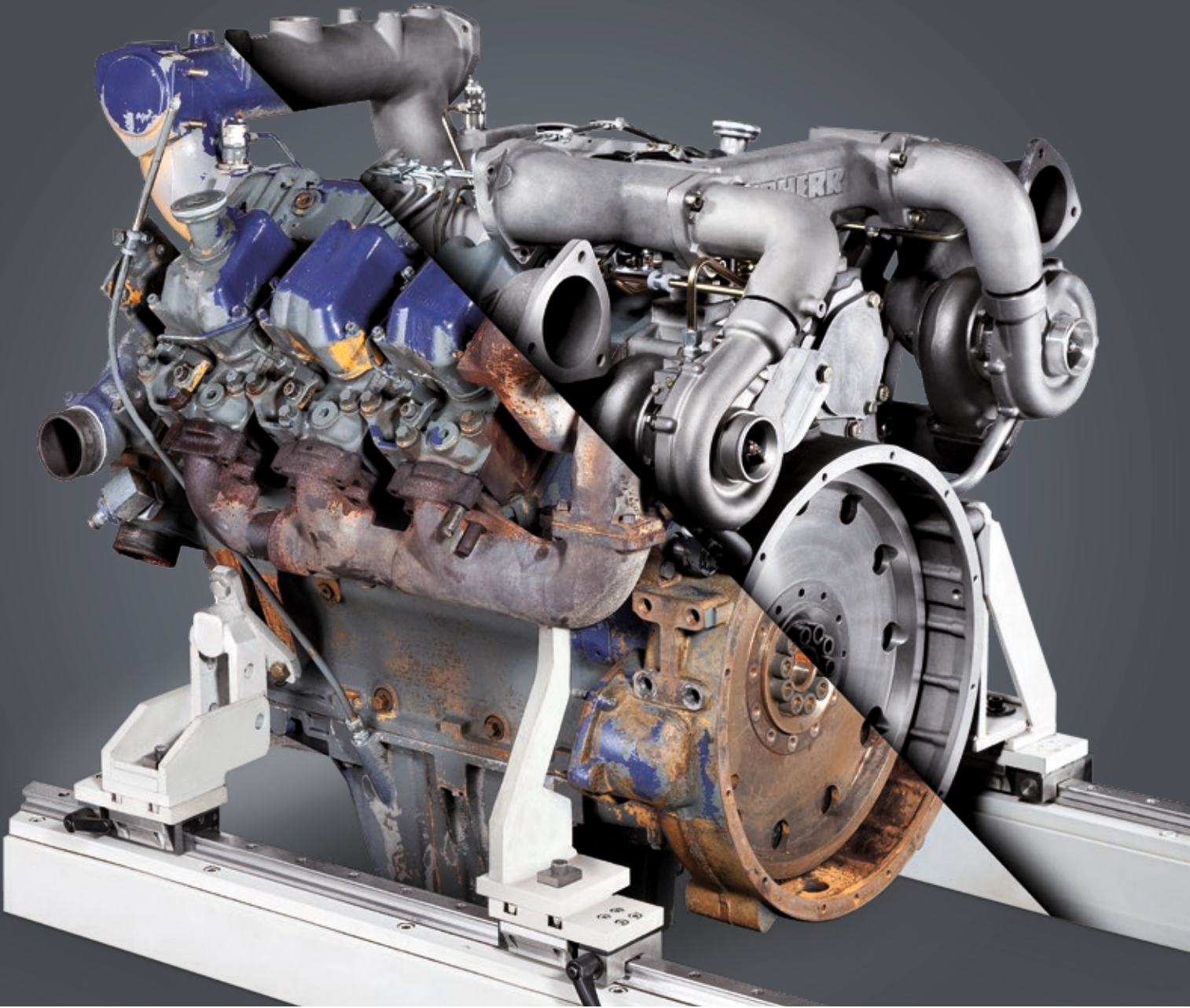
The highly modern spare parts centre in Oberopfingen (Germany) assures fast dispatch of spare parts to any location. A comprehensive parts spectrum for all components is available here for use around the world at any time. Central handling by the Liebherr sales organisations enables efficient and reliable processing of spare parts.

Training centre in Bulle

At the training centre in Bulle (Switzerland), customers and sales partners are taught by professional trainers how to work with combustion engines, hydraulic pumps and motors as well as injection systems.



The Reman program



At the Reman competence centres in Ettlingen (Germany), Nizhny Novgorod (Russia), Guaratingueta (Brazil) and Burlington (Canada) used components are refurbished. Depending on the location, the portfolio includes diesel engines, hydraulic cylinders, pumps and motors, travel and swivelling drives, as well as rope winches, splitter boxes and axles. Depending on their budget, residual value of the machine, and potential downtime, customers can choose between three different levels of remanufacturing.

Exchange components

Customers receive an anonymous state-of-the-art component with a new part guarantee. In the case of preventive orders, the machine downtime is less than 24 hours. The used component is completely disassembled. Individual parts that can be refurbished are stripped of paint, cleaned, adjudged according to strict guidelines, and then reconditioned. Customers receive attractive refunds for used components.

General overhaul

The customers' own components are restored to their original technical condition at a fixed price. Components are also completely disassembled and cleaned during general overhaul. All wear parts are replaced, and a guarantee is issued for the entire component.

Repair

Repairs are performed on approval by the customer of an individual quotation. In the event of repair, a guarantee is also issued for the entire component.

Environmental benefit

Compared to the production of a new part, Reman saves an average of 70% energy, and can reuse up to 75% of the existing material. Precious resources are thus saved, and the impact on the environment considerably reduced.

Diesel engine reconditioning



Travel drive reconditioning



Examples of use

Liebherr develops and manufactures high-quality components for customers from diverse industries. As an experienced partner, we boast extensive know-how and expertise and optimise our components for specific applications. Customer benefit from customised solutions with compatible components.

The areas of application are manifold and include besides machines for construction and civil engineering, agriculture and mining equipment as well as decentralised energy systems and special vehicles. Customers from the maritime industry, machinery and plant construction, aerospace and wind industry value Liebherr's wide product range.

All components are characterised by high reliability and high performance capability also in adverse environmental conditions. They are developed and produced with high quality standards and comply with the required safety regulations of the various industries.



Agriculture and forestry

Liebherr components contribute to the fuel-efficient operation of agricultural and forestry machinery. Electronic solutions provide comfort in the cab.



Decentralised energy systems

Energy is produced where it is needed: Our gas engines are designed for decentralised energy supply in continuous operation.



Aerospace

Liebherr develops reliable electronic solutions for aviation. These meet the high safety standards of the industry.



Building construction and civil engineering

Liebherr offers robust components for building construction and civil engineering. These components cope with dust, dirt and mechanical loads.



Special vehicles

Whether it is for fore engines or aircraft tugs:
We develop components for various special vehicles specific
to the application.



Machinery and plant construction

In machinery and plant construction Liebherr components make a
decisive contribution towards resource-friendly production.



Maritime applications

Certified components from Liebherr prove themselves near coastlines,
as well as under extreme conditions on the high seas.



Mining

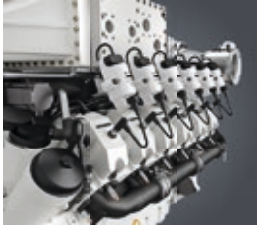
Liebherr components defy the harsh conditions in mining.
The high availability ensures the efficient extraction of raw materials.



Wind energy

For wind turbines we supply individual components and complete
systems. These are used for the electromechanical and hydraulic rotor
blade and yaw adjustment.

Liebherr Components



Gas engines



Diesel engines



Fuel injection systems



Axial piston hydraulics



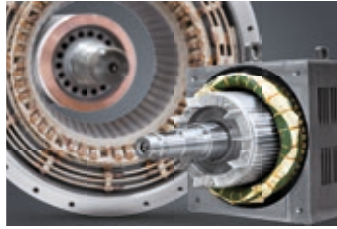
Hydraulic cylinders



Slewing bearings



Gearboxes and winches



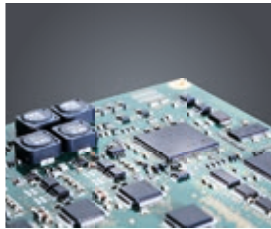
Electric machines



Remanufacturing



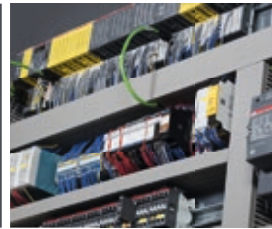
Human-machine interfaces
and gateways



Control electronics and
sensor technology



Power electronics



Control cabinets



Software

From A to Z – the components division of the Liebherr Group offers a broad range of solutions in the area of mechanical, hydraulic, electric and electronic drive system and control technology. The efficient components and systems are produced at a total of ten production sites around the world to the highest standards of quality. Central contact persons for all product lines are available to our customers at Liebherr-

Components AG and the regional sales and distribution branches.

Liebherr is your partner for joint success: from the product idea to development, manufacture and commissioning right through to customer service solutions like remanufacturing.

components.liebherr.com