



Electric Evolution

E-mobility with passion



MOLABO

With the ARIES 50 electric drive, MOLABO produces the world's first electric motors with Safe-To-Touch technology, which provide particularly high performance at 48 volts.

ARIES 50 can be installed easily and quickly without high-voltage safety measures because its design is compact, the weight is low and the voltage is safe to touch. These features are a great advantage in the marine boat propulsion market and provide safety.

ARIES 50 is ideal for motorboats up to 12 m and sailboats up to 15 m or 12 tons.



Company founders: Adrian Patzak and Florian Bachheibl

History

The groundbreaking idea for this electric motor originated at the University of the Federal Armed Forces in Munich, specifically at Professor Dieter Gerling's Chair of Electrical Drive Technology and Actuators. There, Adrian Patzak, Florian Bachheibl and Prof. Dieter Gerling designed and built two prototypes. After successfully demonstrating the functionality of the innovative technology, the three founded MOLABO GmbH in 2016. Adrian Patzak and Florian Bachheibl were appointed managing directors. Today, their staff includes a highly qualified 30-person team united by a common goal: to enable sustainable e-mobility worldwide.

Awards

For its groundbreaking innovations, MOLABO has won numerous awards, including the Electric & Hybrid Marine Award „New Propulsion Technology of the Year 2023“, the „German Mobility Award 2018“ from the German Federal Ministry of Transport and the „Create the Future Design Award 2018“ from the renowned Tech Briefs. MOLABO also convinced its industry partner ZF, the second largest automotive supplier worldwide, in the „ZF Electric Innovation Challenge 2018“.

Since its founding in 2016, MOLABO had been working entirely self-financed, then at the end of 2019, MOLABO successfully closed a seven-figure Series A financing round. The investor is the family-owned Hechinger Group, based in Villingen-Schwenningen. As a strategic partner and investor, the Hechinger Group contributes its many years of experience in production, logistics and quality management. The cooperation enables MOLABO to concentrate on its core competencies and develop innovative products, while the Hechinger Group takes over the production and quality assurance of the drives. The simplified design of the motors means that they are developed and industrially produced entirely in Germany.

MISSION

We develop, produce and market safe-to-touch low-voltage solutions to enable sustainable e-mobility worldwide.

VISION

We will play a decisive role in shaping the change to simple e-mobility.

THE WORLD'S MOST
POWERFUL
48 V
ELECTRIC DRIVE
SAFE TO TOUCH

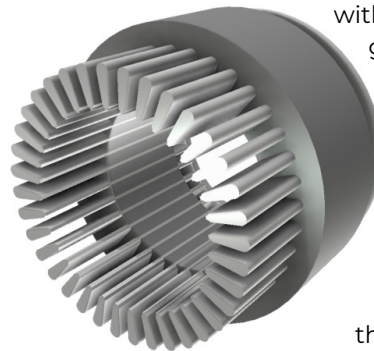


Technology

MOLABO's 48-volt concept differs from conventional electric drives in many ways. As a rule, all powerful electric drive systems are operated with battery voltages of up to 800 volts in order to be in no way inferior to combustion engines in terms of acceleration and comfort. With the ARIES 50 electric drive developed by MOLABO, high performance is now achieved for the first time even at safe-to-touch voltages of 48 volts.

Advantages of ISCAD technology

The core of the innovative technology is the new stator of the electric motor. Instead of complicated windings, simple rods are used, which form a kind of cage. The rod-based stator-cage design makes ARIES 50 more robust and fail-safe than conventional electric drives. ISCAD technology is a highly parallel system from the battery to the motor. Energy currents are divided among many phases by the stator-cage design, which is what makes the high traction performance at 48 volts possible in the first place.



ARIES 50 combines motor and controller in one unit. This compact solution is easy and - thanks to the MOLACONNECT Box - quick to install, requires no complicated wiring, reduces and saves installation space.

Advantages of the low-voltage system

The voltage of 48 volts in the low-voltage system is so low that the system can in principle be touched without risk (safe-to-touch technology). This greatly facilitates integration and maintenance. With the high-voltage system, such touching is life-threatening without appropriate safety precautions and training.

Due to the low induced voltage, ARIES 50 uses low-voltage semiconductors that work much more efficiently than high-voltage components, especially in partial-load operation. The battery is also conserved and operation is much more economical. ISCAD technology stands for simpler and more powerful electric drives and also offers emerging countries with lower technical standards the opportunity to use electromobility efficiently.

ARIES 50

With a safe-to-touch voltage of 48 volts, the drive produces a rated power of 50 kW.

ARIES 50 is approved for boating according to protection class IP67 and can be optimally used in motor boats, sailing yachts or houseboats. The length of only 265.5 mm and the diameter of 254 mm underline the compactness of the drive including controller. At 44 kg, it is also lighter than comparable models.

ARIES 50 reached a top speed of 28 kn (52 km/h) in the test. The drive accelerates to 10.8 kn (20 km/h) in 1.7 seconds and to 16.2 kn (30 km/h) in 3.7 seconds. These values were measured in a boat from My-Electro-boat (length: 7 m, weight: 1 t) with a 30 kWh battery.

Efficiency more than 95 %

ARIES 50 has a measured (not simulated!) system efficiency (motor and controller together) of more than 95 % at the optimum operating point. This corresponds to an efficiency of 97 % for the motor and 98 % for the inverter. The efficiency is over 90 % in almost the entire operating range of the drive.

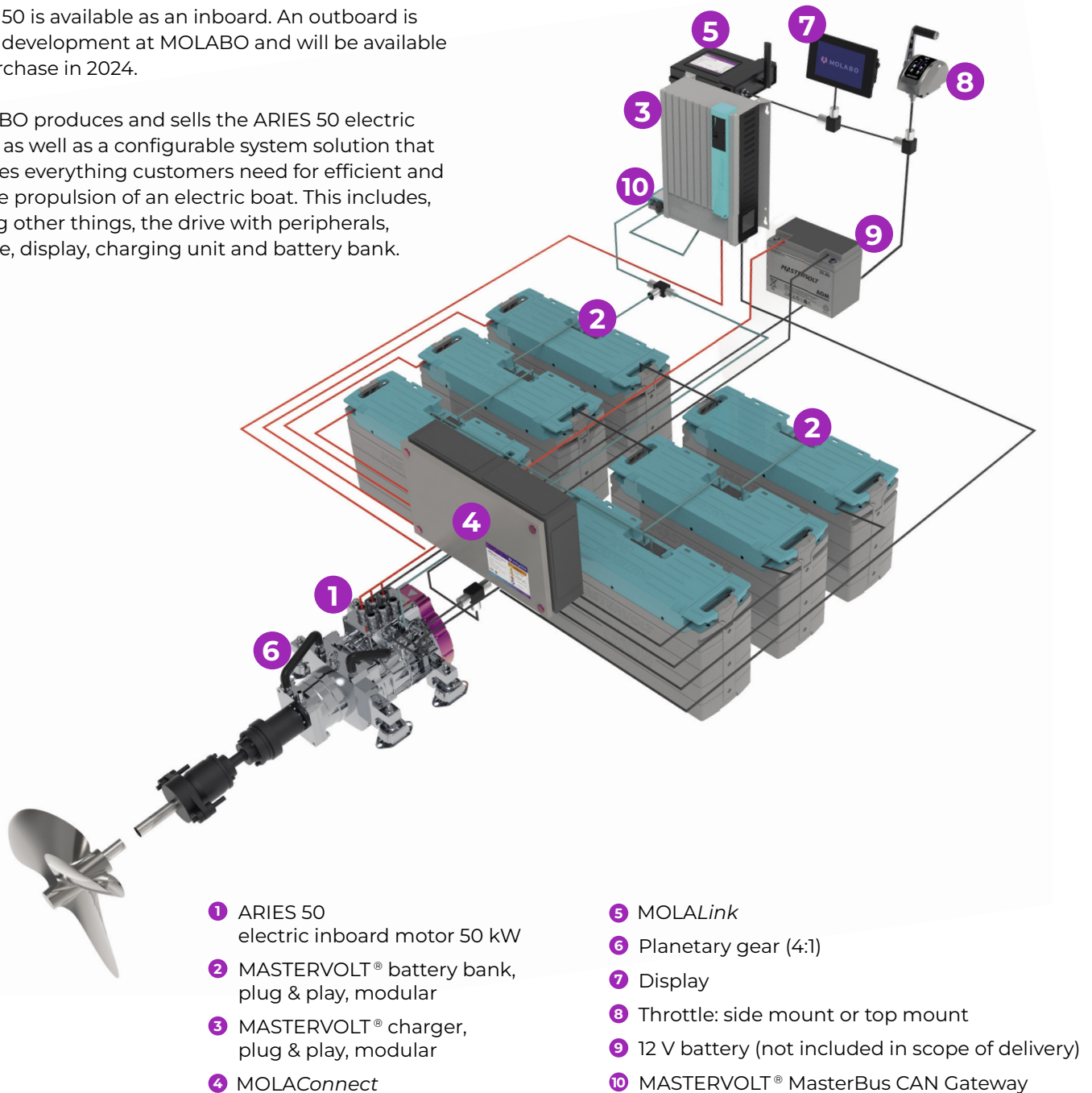


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|---|---|
| Rated power | 50 kW |
| Power supply voltage | 48 V (44 V – 54 V full operation) |
| Max. voltage | 58 V |
| Logic supply voltage | 14 V |
| Weight motor incl. controller | 44 kg |
| Weight gearbox 4:1 | 15 kg |
| Motor speed | 4,350 – 6,500 rpm |
| Shaft speed with gearbox 4:1 | 1,087 – 1,625 rpm |
| Dimension motor incl. controller | Ø 254 mm; L: 265.5 mm |
| Dimension with gearbox 4:1 | Ø 254 mm; L: 457.5 mm |
| Motor type | PM-assisted synchronous reluctance motor |
| Communication | CAN |
| Protection type | IP67 |
| Max. system efficiency | 95.6 % (motor: 97 %, controller: 98 %) |
| Water cooling | Dual-circuit cooling, 7 l/min, max. 45° C |

ARIES 50 is the heart of a SYSTEM SOLUTION

ARIES 50 is available as an inboard. An outboard is under development at MOLABO and will be available for purchase in 2024.

MOLABO produces and sells the ARIES 50 electric motor as well as a configurable system solution that includes everything customers need for efficient and reliable propulsion of an electric boat. This includes, among other things, the drive with peripherals, throttle, display, charging unit and battery bank.





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