

FAULHABER Market solutions

Drive Systems for Medical & Laboratory Equipment

WE CREATE MOTION



In-vitro Veritas

Robotics and automation have long been standard in production. In the world of the medical industry, they are becoming increasingly important. This is due, on the one hand, to a gain in efficiency and comfort – to say nothing of the cost savings – and, on the other hand, to the innovative drive solutions that ensure trust in the most demanding of applications.

From local, office-based analysis systems to fully automated, large-scale laboratories, from functional prostheses to portable medication dosing units and even surgical robots, FAULHABER drive components are the first choice here.

In addition to the high standards of EN ISO 9001 and 14001, FAULHABER is also specially certified for medical products according to EN ISO 13485.

Other applications in the area of medicine and laboratory devices with FAULHABER drive systems

- Implantable heart pumps
- Medical imaging
- Collimators
- Surgical handtools
- Cosmetic devices
- Ophthalmology
- Veterinary medicine
- Tool monitoring
- Linear positioners / positioning stages





Laboratory analysis systems

Many standard recurring jobs in routine medical laboratory work are being performed through partial automation and additional manual work involving increased staffing levels, e.g. blood group determination or anti-body tests. Massive savings can be achieved by using state-of-the-art laboratory analysis systems. Their special design enables continuous, fast and reliable laboratory work while deploying fewer members of staff and providing an increased level of safety. Analysis units, computers and FAULHABER Drive Systems are adapted to the challenges of long-term medical usage.

MORE INFORMATION

www.faulhaber.com/lab-analysis/en

FAULHABER Drive Solution

Drive System

- Ø 22 mm DC-Motor with precious metal commutation and integrated encoder
- Ø 26 mm DC-Motor with graphite commutation and optical encoder

Benefits

- Accurate and repeatable positioning
- Frequent start-stop operation
- High performance in the smallest possible space

Options

- Special encoder cable
- Accurate alignment between encoder and motor flange

Related Applications

- Liquid handling robots
- Stirrers





Analytical devices

Researchers hope that they will soon be able to fight cancer cells without damaging healthy tissue, thanks to so-called biologicals. These new active components spot specific molecular characteristics of abnormal cells and help to destroy them systematically. A large number of pharmaceutical candidates must be examined to find customised biologicals for various types of cancers. Gyros, a Swedish company, has developed an analytical device which facilitates the search: Gyrolab xPlore™ automatically and quickly runs tests of multiple samples in parallel, saving time, work force and material. FAULHABER motors provide the speed and precision needed for handling the tests.

FAULHABER Drive Solution

Drive System

- Ø 32 mm 4-pole brushless DC-Motor
- Diameter-compliant encoder

Benefits

- Accurate positioning
- Highly dynamic for quick start
- Low torque ripple

Options

- UL-compatible cable with connector
- Line driver

Related Applications

- Point-of-care molecular testing
- Micro-liquid processing



MORE INFORMATION

www.faulhaber.com/gyrolab/en



Sample distribution systems

Using small trolleys, tens of thousands of blood and urine samples are transported fully automatically to individual analysis stations in modern laboratories every day using automated sample distribution systems. Compact microdrives ensure the mobility of the self-propelled autonomously controlled carriers. Speed and reliability have top priority here. For the drive solution, brushless DC-Gearmotors from FAULHABER are the perfect choice.

MORE INFORMATION

www.faulhaber.com/lab-taxi/en

FAULHABER Drive Solution

Drive System

- Ø 15 mm brushless DC-Gearmotor
- DC-Motor with precious metal commutation and integrated encoder

Benefits

- Highly efficient motor and spur gearhead both combined in a compact package
- Long operational time before battery recharging is needed

Options

- Special output shaft, flange, and housing
- Customised housing design
- Assembly of drive wheel
- Speed controller

Related Applications

- Conveyor transporting systems



Anaesthesia and ventilation systems

There are many experiences we would happily do without. Operations under general anaesthetic and with artificial respiration are definitely one of them. Compared with previous generations, we have a crucial advantage as medical technology has been developing at breath-taking speed in the last few years. In this way anaesthesia and ventilation systems make a major contribution to making the anaesthesia that is needed for surgery safer and gentler. A perfectly-tuned drive solution with a FAULHABER brushless DC-Motor for the blower unit plays a key role for these demanding systems.

FAULHABER Drive Solution

Drive System

- Customer-specific blower system
- Ø24 mm high-speed brushless DC-Motor

Benefits

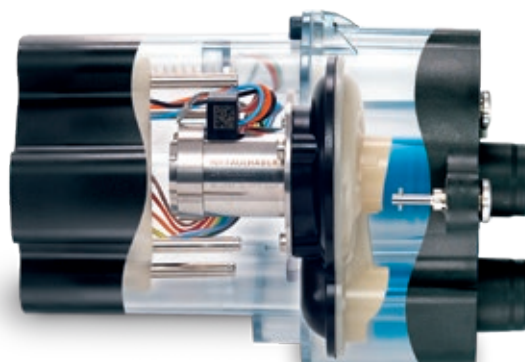
- Customer-specific motor design
- Low noise over the whole speed range
- Extremely dynamic for fast reversing operation

Options

- Biocompatible lubricants and adhesive
- Autoclavability
- Optimised magnetic circuit with a special magnet and stator lamination

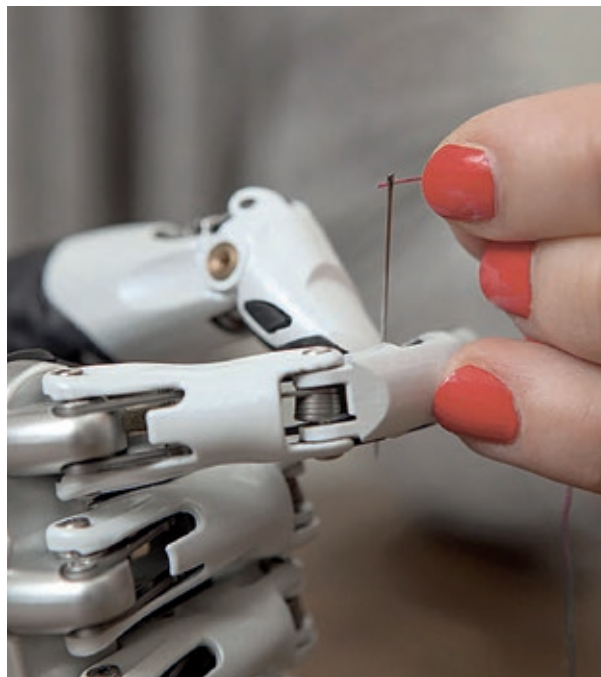
Related Applications

- Apnea devices
- Respiratory and ventilation devices



MORE INFORMATION

www.faulhaber.com/blower/en



Myoelectric prosthesis

Tie shoelaces, fold bed linen, tear open a bag of crisps – the list of things that are difficult to do with one hand goes on and on. People with a congenital amputation or who have lost a hand due to an accident are confronted with such obstacles every day. Helping people manage their daily lives is the most important goal in the field of prosthetics. Modern hand prostheses with highly dynamic drives in all fingers make natural and coordinated movements and gripping possible. An attractive design with realistic proportions, even with delicate hands, offers an extremely limited installation space for the drives. Manufacturers therefore build upon DC-Micromotors from FAULHABER.

MORE INFORMATION

www.faulhaber.com/hand-prosthesis/en

FAULHABER Drive Solution

Drive System

- Ø 12 mm DC-Motor with precious metal commutation
- Planetary gearhead

Benefits

- Very silent and smooth operation
- High power/torque per volume
- Low energy consumption

Options

- Motor with powerful rare-earth magnet
- Special ball bearings
- Customised lead screw with nut

Related Applications

- Exoskeletons
- Rehabilitations



Endodontics

Endodontics or endodontology is a specialist area of dentistry. The most common procedure is the root canal treatment that a tooth receives in the case of inflamed pulp (also known as the “dental nerve”). Many of you will have experienced this procedure at first hand: The dentist removes the “nerve”, cleans the root canal and then fills it. This treatment requires extreme care and is by no means simple because the tooth is to be preserved and the patient must then remain free of pain for as long as possible. New knowledge, methods and systems now ensure that difficult root canal treatment procedures can today be performed successfully and with minimal discomfort for the patient. Modern drive technology has made a significant contribution to this. FAULHABER DC-Microdrives are the driving force of new endodontics systems that are today becoming more common in dental practices.

FAULHABER Drive Solution

Drive System

- Ø 15 mm DC-Motor with precious metal commutation
- Ø 20 mm 2-pole brushless DC-Motor

Benefits

- Smooth running
- Low-noise operation
- High power density
- Low weight
- Easy speed control

Options

- Special shaft configuration
- Special cabling and connector
- Fine-balanced rotor

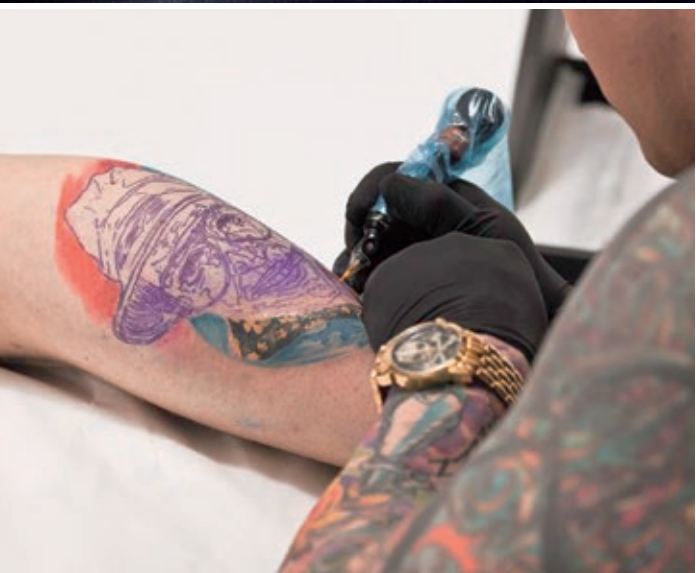
Related Applications

- Dental laboratory instruments
- Surgery implants and prosthodontics



MORE INFORMATION

www.faulhaber.com/endodontics/en



Tattoo machines

Today, the ink for a tattoo is delivered to the skin with up to 7,500 punctures per minute. For large, complex motifs, the artists nevertheless work on their creations for hours on end without a break. They thus place high demands on their tool. In addition to low-vibration and quiet operation, modern tattoo machines are characterised by a compact, ergonomic design with low weight. For the drive solution, rotary tattoo machine manufacturers rely on the know-how from FAULHABER.

FAULHABER Drive Solution

Drive System

- Ø 17 mm DC-Motor with precious metal commutation
- Ø 26 mm brushless flat DC-Motor

Benefits

- Easy speed control with linear voltage control
- Powerful, light-weight motors in compact sizes
- No gearhead required

Options

- Shaft adaptation for eccentric use
- Ball bearings
- Wire harness modification

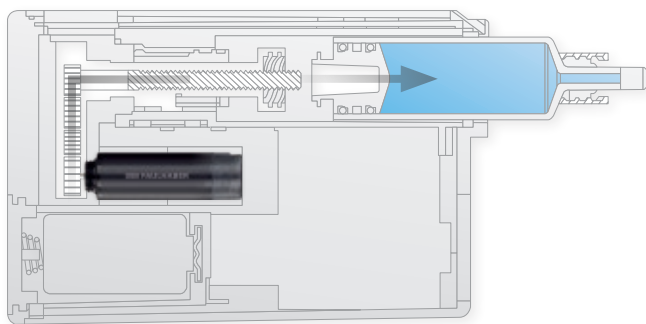
Related Applications

- Permanent make-up devices
- Cosmetic skin treatment



MORE INFORMATION

www.faulhaber.com/tattoo/en



Insulin pumps

Diabetes is among the most common diseases in today's societies. If the disease is not treated in time or if treated incorrectly, important organs, such as heart, eyes and kidneys, could suffer serious damage. Chronically ill patients can optimally control their treatment with an insulin pump – supported by micromotors from FAULHABER.



FAULHABER Drive Solution

Drive System

- Ø 6 mm 2-pole brushless DC-Motor
- Ø 8 mm brushed and brushless DC-Motors
- Stepper motor

Benefits

- Highly efficient motor for low current consumption and long battery life
- Compact size
- Reliability and accuracy

Options

- Special winding
- Special front cover configuration
- Customised inspection process

Related Applications

- Wearable infusion pumps
- Wearable blood pressure measurement devices

MORE INFORMATION

www.faulhaber.com/insulin-pump/en

Drive Systems for Medical & Laboratory Equipment

In the world of medical products, focus is on the life and quality of life of the patient. The significance of the longevity of the micro drive components thereby literally gains a new quality. The highest standards for precision and reliability therefore have been applied here. Another important point is the ability to autoclave without problem. FAULHABER drive components offer all of this.

Furthermore, with their compact design and quiet operation, they provide a high level of comfort and acceptance with patients and doctors – with portable medication dosing units and medical handpieces or functional prostheses alike. Another plus is the high efficiency of the FAULHABER products. For battery-operated applications in particular, high efficiency with minimal space requirements brings decisive runtime advantages.

Features and benefits

Compact size and high power

- Highly accurate positioning
- High efficiency
- Reliability
- Customisation possible
- EN ISO 13485 certificate

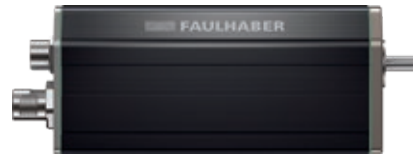


FAULHABER Drive Systems at a glance



DC-Motors

Outer diameter	6 ... 38 mm
No-load speed	up to 20 200 min ⁻¹
Cont. output torque	0.17 ... 224 mNm



Motors with integrated electronics

Outer diameter	15 ... 40 x 54 mm
No-load speed	up to 16 300 min ⁻¹
Cont. output torque	1.8 ... 160 mNm



Brushless DC-Motors

Outer diameter	3 ... 44 mm
No-load speed	up to 61 000 min ⁻¹
Cont. output torque	0.01 ... 217 mNm



Stepper Motors

Outer diameter	6 ... 52 mm
Steps per revolution	up to 24*
Cont. output torque	0.25 ... 450 mNm

* Full step per revolution



Linear DC-Servomotors

Stroke length	15 ... 220 mm
Speed	1.8 ... 3.2 m/s
Continuous force	1.03 ... 9.2 N



Precision Gearheads

Outer diameter	3.4 ... 44 mm
Reduction ratio	from 4:1 to 983 447 : 1
Cont. output torque	0,88 mNm ... 16 Nm



Encoders

Principle	optical, magnetic
Channels	2 ... 3 / absolute
Lines per revolution	16 ... 10 000 / 4 096 absolute



Drive Electronics

Power supply	4 ... 50 V
Cont. output current	up to 10 A
Interfaces	RS232, CANopen, EtherCAT

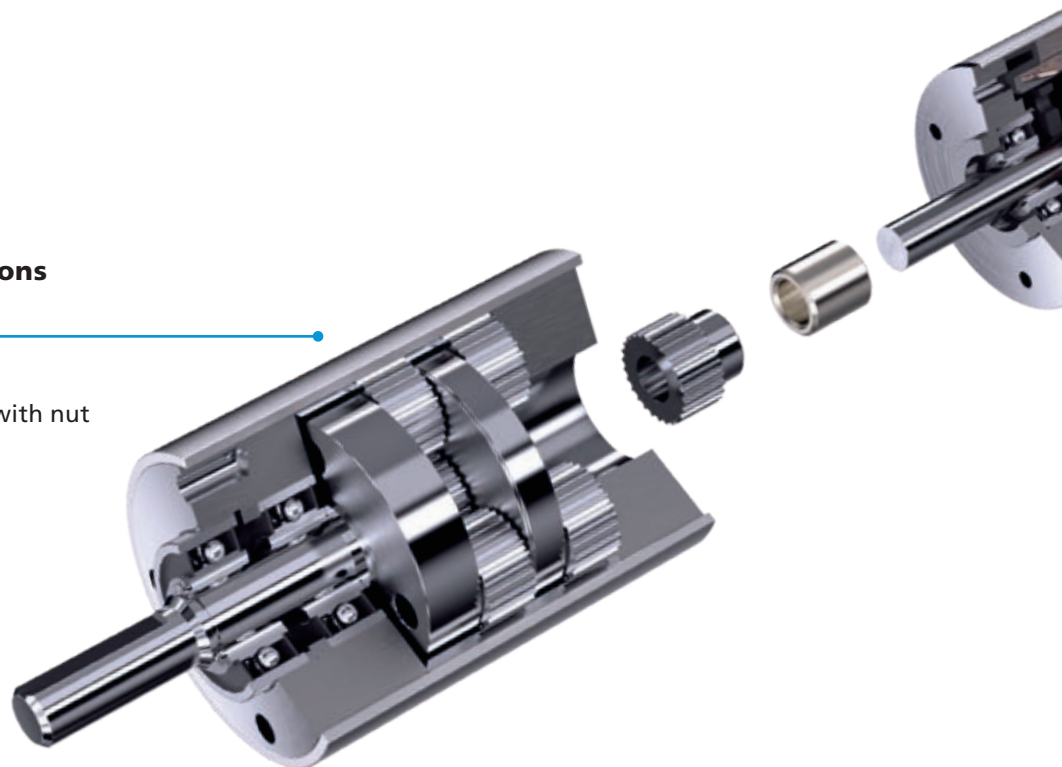
From Standard to Custom Solution

The FAULHABER standard range can be combined in more than 25 million different ways to create the optimum drive system for a particular application. At the same time, this technological „construction kit“ is the basis for modifications which allow us to configure special versions to meet the specific needs of customers.

High-performance engineering and extensive application expertise also make us a valued partner for the development and production of customer-specific drive solutions. The solutions range from special components specifically or custom-designed for the application to system partnership with automated production for complex mechatronic assemblies.

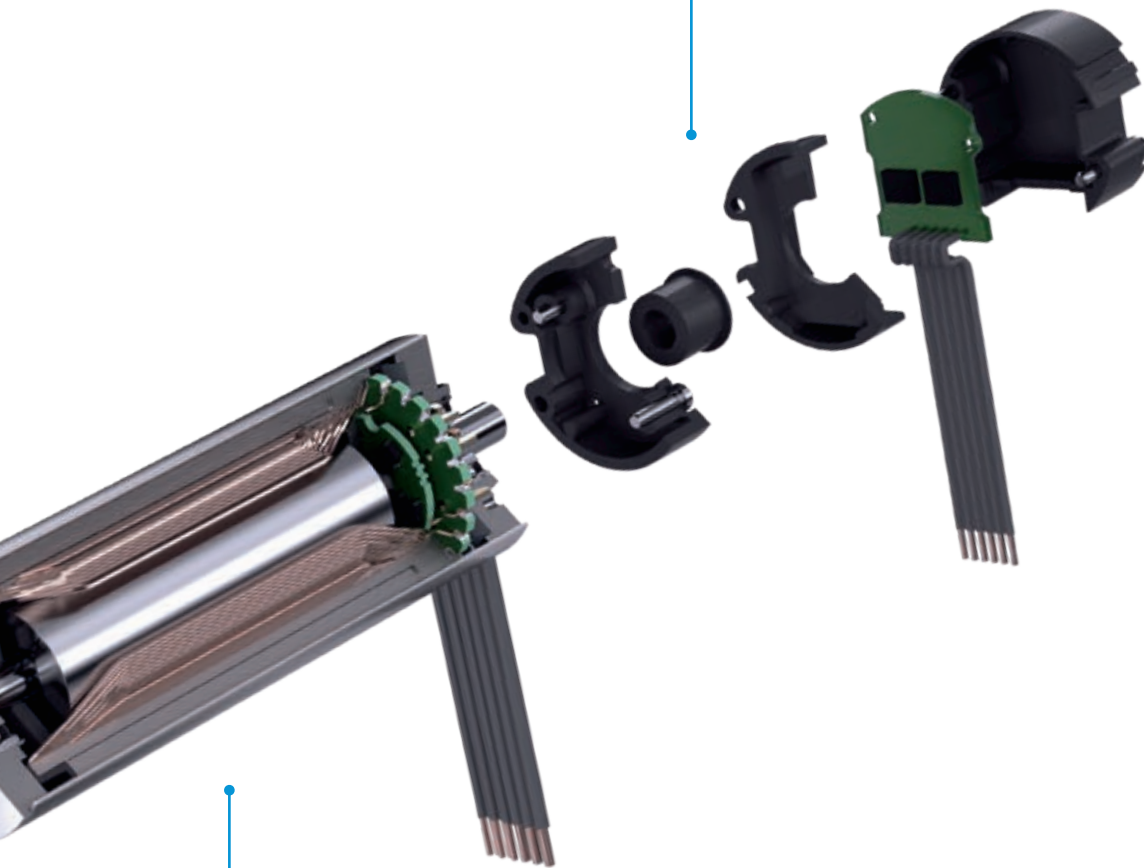
Gearhead modifications

- Special output shaft
- Special ball bearing
- Customised lead screw with nut
- Customised pinion
- Zero-backlash version



Encoder modifications

- Encoder cable
- Line driver
- Customised firmware
- Alignment between encoder and motor/gearbox flange



Motor modifications

- Customised housing design
- Bio-compatible lubricant and adhesive
- Autoclavable
- Optimised magnet and sheets
- Special winding
- Fine balanced rotor

MORE INFORMATION

www.faulhaber.com/products

More information



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