FAULHABER Market solutions

Drive Systems for Medical & Laboratory Equipment
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 surgery 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 acc. 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
- Medical robots
- Cosmetic devices
- Ophthalmology
- Veterinary medicine
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.

FAULHABER Drive Solution

Drive System
- Ø 22mm DC-Motor with precious metal commutation and integrated encoder
- Ø 26mm 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 robot
- Stirrer

MORE INFORMATION

www.faulhaber.com/lab-analysis/en
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 TM 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 32mm 4-pole brushless DC-Servomotor
- 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.

FAULHABER Drive Solution

Drive System
- Ø 15mm 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 system

MORE INFORMATION
www.faulhaber.com/lab-taxi/en
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
- Ø 24mm high-speed brushless 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 device
- Respiratory and ventilation device

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 possible natural and coordinated movements and gripping. 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
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 15mm DC-Motor with precious metal commutation
- Ø 20mm 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
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 17mm DC-Motor with precious metal commutation
- Ø 26mm 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 6mm 2-pole brushless DC-Motor
- Ø 8mm 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 pump
- Wearable blood pressure measurement device

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 apply 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 … 22 mm
- Steps per revolution: up to 24⁺
- Cont. output torque: 0.17 … 224 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

FAULHABER’s standard range consists of more than 25 million possibilities for assembling an optimum drive solution for a given application. At the same time, this technological construction kit is the basis for modifications which allow 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 specially 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
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