

- DC micromotors**
- Brushless DC motors**
- Gearmotors**
- Low profile motors**
- Stepper motors**
- Piezo motors**
- Drive electronics**
- Custom solutions**
- Mechatronics**
- Precision ballscrews**
- Linear actuators**
- Telescopic columns**



EMS

Product Applications

Medical Devices

Laboratory Equipment

Robotics & Automation

Optics

Aerospace & Defence

Industrial Machinery

Security & Surveillance

Industrial Processes

Environmental & Safety

Building Automation

Agriculture

Healthcare

2 - FAULHABER GROUP

Small Brushed and Brushless Motors, Gearheads and Controls



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Precision Bearings and Micro Systems



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Miniature Stepper Motors



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DC Brushed and Brushless Motors, Stepper Motors and Gearheads



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DC Brushed and Brushless Motors and Gearheads



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Linear Actuators and Telescopic Columns



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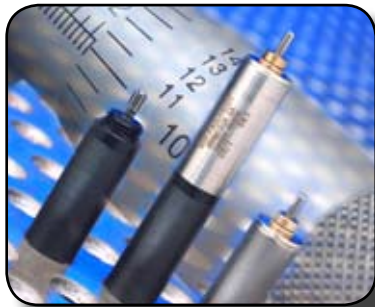
Linear Actuators and Building Automation



16 - BESPOKE SOLUTIONS

EMS Custom Design and Manufacture





The Faulhaber Group

- Micro drives
- DC brushed and brushless motors
- Precision gearheads
- Servo components
- Linear servomotors
- Drive electronics



Founded in the late 1940s Faulhaber is active in the research and development, manufacture and distribution of high-quality drive systems, including high-performance DC micromotors, based on the System FAULHABER® technology. The products are designed and produced to meet the most demanding requirements in all application fields of miniature drive systems.

Thanks to the constant miniaturisation of the products, Faulhaber has a vast know-how in the fields of micromechanics and electronic manufacture. The highly qualified employees are experienced industrial engineers, who constantly

improve the manufacturing processes through innovation and further process developments. The proper utilisation of resources ensures quality-focused, flexible and efficient production, which allows the Faulhaber Group to implement the highest possible quality standards.

The "System FAULHABER®" rotor coil concept is simple yet revolutionary: a lightweight ironless copper coil rotates around a stationary permanent magnet instead of rotating a heavy iron armature wound with copper wire.

Dr. Fritz Faulhaber's invention launched a new era in drive technology. The Faulhaber System provides solutions for the ever more



complex world of miniature drives.

The range comprises brushed DC motors from 6mm in diameter and is complemented by brushless EC microdrives starting at a diameter of just 1.9mm, offering the designer extended lifetime characteristics and enhanced controllability.

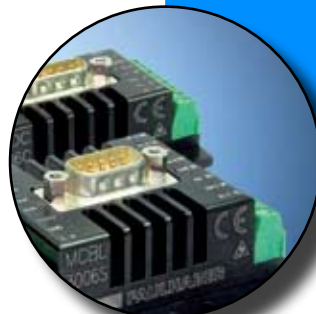
The compact Faulhaber Motion Controllers are now even more efficient and can be optionally operated via a RS232 or CAN interface. The configuration of the electronics is based on a digital signal processor (DSP), which enables a high performance as well as precise positioning and very low speeds. The high degree of efficiency permits a

continuous output current of up to 6 amperes.

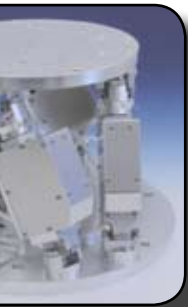
The latest technology from Faulhaber is the unique Quickshaft Linear DC Servomotor. This newly developed motor series is available in two sizes starting from just 12.5 x 47mm and a weight of merely 56g. The Quickshaft can produce a peak force of up to 28N at full power with standard stroke lengths up to 120mm. Precise control of this new linear motor is achieved with the optimised Motion Controller series MCLM 3003/06, resulting in an acceleration of 175m/s^2 , speeds up to 2.7m/s and positional repeatability of 40 microns.

Key Features

- From 1.9 to 44mm diameter •
- High performance gearheads •
- 4 quadrant motion controllers •
- High resolution encoders •
- Up to 200W power •



 **FAULHABER**



Key Motor Features

- Skew wound ironless rotor coil
- Low cogging
- Low inertia
- High efficiency
- Optimum battery life
- High angular acceleration



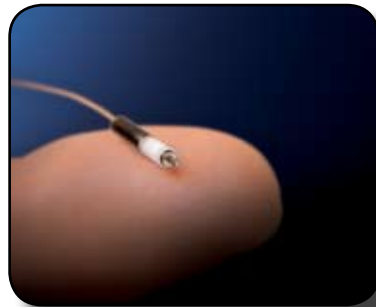
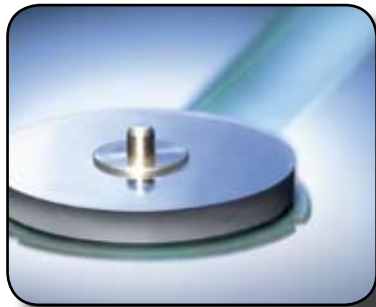
As well as the huge range of System FAULHABER® motors available the Faulhaber Group have integrated a number of other high tech businesses into their portfolio allowing them to offer solutions to any drive challenges you may face.

Originating in the clock and watch industry, FTB have 40 years experience manufacturing miniature and micro drives. As a recent acquisition by the Faulhaber Group they complement the range by offering cost effective, very low profile ironless rotor DC motors, ideal for when mounting depth is at a premium. Key features include ultra flat dimensions, no cogging or preferred rotor position, low current

consumption, low starting voltage as well as low rotor inertia for extremely fast acceleration and braking. They are also available with precision gearboxes in all sizes.

The Penny motor's ultra flat design is made possible by the ironless stator coils that are not wound but rather traced lithographically on the stator board. All Penny motors have brushless commutation and offer the same long operational lifetimes that are characteristic of standard EC drives.

Other key features of this unique motor are no cogging or preferred rotor position, extremely low consumption, extremely light and



compact, ultra flat dimensions, smooth and accurate speed control, speeds up to 60,000 rpm, high power rare earth magnets, electronic commutation for extremely long operational lifetime and autoclavable and vacuum-rated versions. In addition high precision gearboxes are available to suit, together with control electronics.

Smooth motors enhance the miniature drive capabilities with 3 and 5mm diameter brushless motors with gearheads and integrated lead screws providing precision linear systems from micro-dimensions. These precise systems do not suffer from cogging or preferred rotor positions and

offer a remarkably compact solution with low current consumption and exceptional lifetime as a result of high quality bearings and brushless commutation.

Customised solutions are an ever-increasing activity within the Faulhaber Group. Having developed huge experience and a vast knowledge in drives solutions, and the application and industrialisation of complete solutions, they are perfectly placed to assist and support your project from concept to production. Indeed where appropriate they can even become your preferred manufacturing partner for the finished product.

The Faulhaber Group

DC brushed and brushless motors •

Gearmotors •

Miniature linear actuators •

Micro mechanical systems •

Drive electronics •

Precision encoders •

Custom solutions •





Faulhaber BX4

- Brushless DC motor
- Adhesive-free
- 4-pole ironless winding
- Optional integrated speed control
- Choice of encoder resolutions
- 21 gearhead ratios



The Faulhaber BX4 is a new series of high torque Brushless DC Servomotors with up to 60W output power. The modular construction eliminates complex manufacturing processes and delivers a versatile drive system, entirely free from adhesives.

The series is available with a 3-channel magnetic encoder up to 1024 lines per revolution or a 4096 line absolute encoder giving positional information straight after power on. In addition these motors can be equipped with an integrated speed controller for variable speed drive or straight forward two-wire control.

The 4-pole ironless winding together with rare earth magnets result in

zero cogging and gives exceptional torque for its size and the combined moulding of the coil, PCB and hall-effect sensors guarantees a reliable, robust construction. The option of an integrated speed controller makes this combination exceptionally user friendly and lends itself in many applications to the direct replacement of conventional DC motors but with the additional benefits of long life and low noise that electronically commutated motors have to offer.

This motor series can be combined with a range of planetary gearheads to deliver a truly dynamic powerful drive solution up to 6Nm for a wide range of applications.

FAULHABER BX4



Micro Precision Systems, now part of the Faulhaber Group, started 70 years ago with the development and manufacture of miniature high-precision ball bearings. Thanks to the reliability and quality of MPS ball bearings, the company has taken part in the conquest of space.

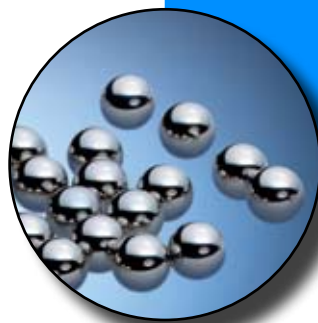
Today they continue to take on the toughest challenges by developing complex microsystems of increasingly minute dimensions while constantly fulfilling the technical requirements of the customer. Standard products consist of precision miniature ballscrews, precision linear bearings, precision balls to 0.2mm and 4-point contact micro bearings. Sub-micron tolerances are achieved with their grade 3 ball production. MPS rely on all these

core competences as they strive to provide industrialised solutions for customers who require microsystems that include linear or rotating movement. Customised solutions realised to date are in the advanced technology fields of aerospace, medical (implantable), optic devices, semiconductors, defence and micro-robotics.

As an integral part of the Faulhaber Group, joint collaboration gives access to the entire range of Faulhaber precision miniature motors and drive solutions, enabling MPS to offer even more complex Microsystems to suit the most demanding applications.

Micro Precision Systems

- Micro bearings
- Sphericity to 0.08µm
- Precision ballscrews
- Dynamic load up to 2544N
- Linear bearings
- From 2mm rod diameter
- Custom mechanisms



mps



Precistep

- Swiss-made
- Precision stepper motors
- Integrated leadscrews
- Optimised drive electronics
- Gearheads
- Encoders



True Swiss precision, in the form of a range of miniature stepping motors, with body diameters from 6 to 22mm. These motors can be combined with integrated leadscrews and gearheads to give a wide range of compact drive systems.

These two-phase stepper motors may be combined with planetary and spur gearheads from the Minimotor range, delivering the high torque essential in small portable devices. For systems requiring enhanced feedback there is a range of optical encoders up to 512 lines depending on motor diameter.

A range of fully optimised drive electronics are available to complement the range and, together with options such as enhanced temperature range and vacuum operation, deliver solutions for a broad spectrum of high-tech applications.

The simple construction using proprietary technology gives these stepper motors extremely high reliability and an outstanding resistance to shock and vibration.

PRECISTEP



Piezo technology is simple and reliable, using very few parts and only elementary motion. Using Piezo motors negates the need for many supplementary components simplifying your design and extending lifetime. The astonishing power and precision of the small Piezo motors offers unique advantages when compared to traditional DC motors of the same size.

Piezo LEGS® utilises a walking motion created by the electrical stimulation of carefully formed piezoelectric material. This material is interfaced with a high friction drive surface which allows a precise transfer of motion.

As the motor relies on friction and the legs remain in contact with the interface at all times, high torques can be achieved without the need for a supplementary gearhead and, as a consequence, no unwanted backlash is introduced into the system. In addition the friction element ensures that the motor remains self-locking with no power applied making them ideal for handheld battery powered devices.

Available in linear and rotary format the Piezo motor offers nanometre precision and is a genuine viable alternative to conventional DC motors in many applications.

Piezomotor AB

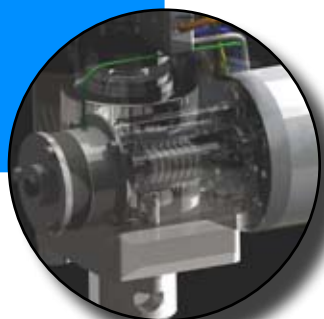
- Few moving parts •
- Linear or rotary motion •
- High torque without gearhead •
- No backlash •
- Self-locking without power •
- Control Electronics •





Nidec Motors & Actuators GmbH

- High torque
- Spur & worm gearboxes
- Linear actuators
- Integrated encoders
- Cost effective



The Nidec portfolio comprises DC motors, geared motors and linear actuators. This reliable yet cost effective range is available in 12 and 24 volts DC and delivers high torque performance ideally suited for use in health care products such as patient hoists, bath lifters and operating tables. Their versatility extends to many industrial applications including door openers for pedestrian and vehicular access, domestic garage door openers; food processing, labelling and conveying systems.

The latest additions to the DC range, DCK31 and 35 are manufactured at Nidec's dedicated production facility

in Germany. A fully-automated production line ensures consistently high quality and in-process controls guarantee that every motor leaves the line 100% tested.

Developed for the automotive industry, the GMPS series of DC linear actuators offer extremely cost effective linear motion. With exposed leadscrew and integrated thrust bearing as well as Hall-effect encoders these actuators provide the ideal solution where cost effective, high performance actuation is required.





Brushless motor technology for the cost of a brushed DC motor.

Nidec are the largest manufacturer of brushless motors in the world. The NEW Nidec range of Brushless 12 or 24V DC three-phase motors provide an exceptionally cost effective, higher performance alternative to conventional brushed and stepper motors commonly used in home appliances, office equipment and industrial applications.

They offer compact frame sizes from 24.2 to 48.9mm diameter, up to 17.5W continuous output power and no load speed options from 2150 to 17,800 rpm.

Nidec brushless DC motors offer many advantages over standard brushed DC motors

including: quieter operation, long life, high energy efficiency and locked rotor protection.

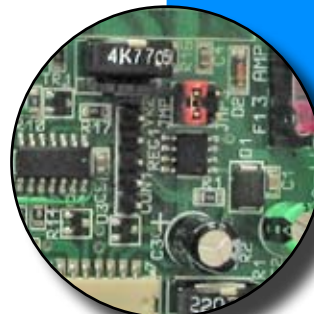
In addition to the standard features offered by the CMC range of motors, you can also optionally speed control the motor via an external PWM signal, have directional and stop start inputs and, if required, a tachopulse output.

Available in a simple two-wire version they can be used as a direct replacement for a standard DC motor, but with all the benefits described above.

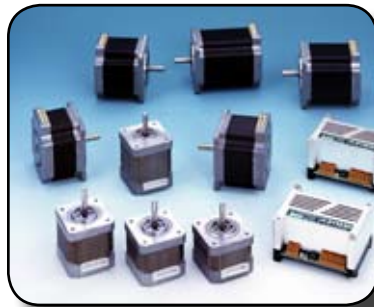
To simplify installation and testing in your applications, EMS can also offer a fully featured PCB which provides control of all motor functions and allows you to be operational within minutes.

Nidec CMC Motor

- Quiet operation •
- Long life •
- High efficiency •
- Integrated control electronics •
- Locked rotor protection •
- Low inertia •



Nidec



Nidec Servo Corporation

- 2 & 3 Phase
- 35-86mm frame size
- High torque
- Silent operation
- Low vibration
- Cost effective



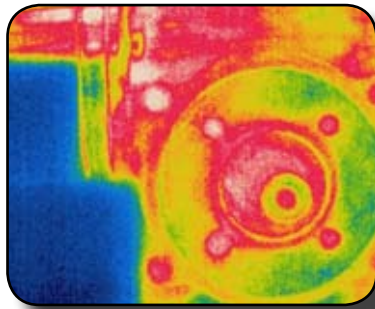
SERVO

Established as a manufacturer of small motors over 40 years ago, Nidec Servo offer a comprehensive range of low cost stepper motors and brushed DC motors to suit applications ranging from office automation to medical devices.

The range includes 2 and 3 phase hybrid stepper motors giving very quiet running and long life, and as a consequence they are already used extensively by many of the world's key OEMs. These motors offer high torque and low noise, compared to similar sized motors and are available in six basic frame sizes ranging from 20mm square, up to 86mm and in a range of stack lengths to increase the choice

of performance. Typical step angles are 0.6 to 15 degrees and each motor can be supplied with a driver, also manufactured by Nidec Servo, enabling the optimisation of the motor performance and noise level to suit your application.

In addition Nidec Servo has a range of low cost iron-core DC motors with output powers up to 26W. This diverse range of motors is available from just 30mm diameter and provides a cost effective solution to applications in the mid to high volumes. To complement the motors a comprehensive range of gearboxes delivering torques up to 6Nm are available.



With their headquarters in Hannover, KAG produce brushed and brushless DC drives in the range 2.5 to 340 Watt output power. The company focuses on developing and producing small and powerful drives for use in a wide range of application areas including medical technology, domestic services, engineering, fluid mechanics, the automotive industry, office communications, automatic machines and mechanical engineering.

Utilising traditional DC motor technology, but designed to give up to 3000 hours life at nominal rating, the Kählig DC range satisfies many applications. To meet higher torque applications there is a comprehensive range of spur and planetary gearheads

available.

Applications demanding longer lifetime can be fulfilled with their comprehensive range of brushless EC motors offering up to 20,000 hours service.

Options include tachogenerators and optical encoders to give feedback for speed and positional control. To further enhance their products and develop new higher performance motors, KAG have recently opened a new laboratory equipped with a 3-D X-ray imaging system, an electron scanning microscope, environmental test chambers and a 3-D laser sintering system. The latter allows rapid prototyping of new components.

Kählig Antriebstechnik GmbH

Up to 340W•

DC & EC Motors•

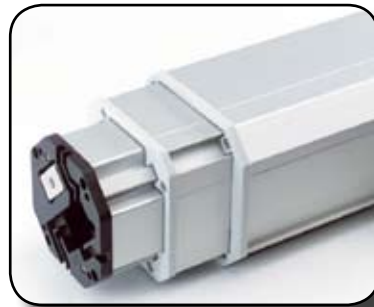
Gearheads•

Advanced prototyping capability•

User specific drive solutions•



Alles außer Stillstand.



SKF

- AC and DC Linear actuators
- Telescopic columns
- Control electronics
- Up to 30KN force
- Condition monitoring
- Protection up to IP66



EMS provide a comprehensive range of electric linear actuators and telescopic columns for a wide range of applications. We have provided actuation systems to the UK market for over 20 years and have vast experience in specifying and supplying the right product for your application. Operating as sole UK distributor for Magnetic Elektromotoren since 1985 and more recently, following their acquisition by SKF, their Specialist Distributor, we have the benefit of an extensive product range, as well as the experience and product knowledge to assist you in your

selection. The range comprises actuators and telescopic columns suitable for use with power supplies ranging from 12/24V DC through to 120/230/380V AC. Thrust forces are available from 200N and reach as high as 30KN for the most robust industrial designs. Stroke lengths up to 1m can be achieved depending on the load and its direction, at speeds up to 174mm/s. As the operating environment for each application can be so different, each actuator has a specific protection rating which determines its suitability in damp or dusty environments. To satisfy the

SKF



more demanding applications, and those in the medical sector where autoclaving is needed, a protection rating of IP66 on the actuators and IP67 (submersible) on the auxiliary operating devices can be achieved. The operating devices consist of a range of ergonomic handheld switches with up to 10 functions, as well as foot switches and discreet desk mounted switches.

Our comprehensive range of smooth and quiet telescopic columns comes in versions comprising 230V/120V AC and 24V DC with direct drive or integrated power supply. Standard columns

are available with push and pull forces up to 4000N and in stroke lengths from 200 up to 700 mm. Constructed with anodised extruded aluminium profiles, they are available in 2 or 3 stages depending on the installation length required.

To extend our actuator portfolio we also have a comprehensive range of aesthetically pleasing in-line AC and DC actuators from MINGARDI. Originally designed to satisfy the building automation industry, these very versatile actuators and chain drives can provide solutions for a range of industrial applications.

Mingardi SRL

AC and DC Linear actuators •

Chain drives •

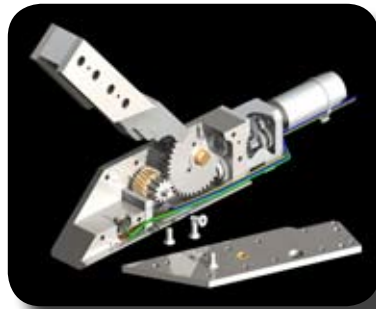
Rack actuators •

Building automation hardware •

Ideal for industrial applications •

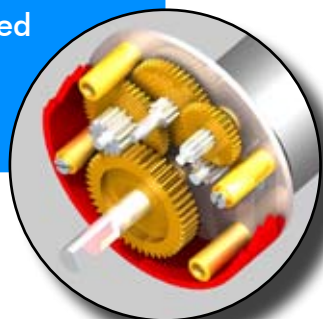


 **MINGARDI**®



EMS Design

- Bespoke drive mechanisms
- Complete solutions
- Free design service
- Comprehensive Solidworks design capability
- ISO 9001:2008 accredited



Based in Poole in Dorset, EMS manufacturing has expanded to become a key strategic part of the portfolio of products and services offered by EMS. With this facility it affords us the opportunity to modify or add value to the standard products traditionally offered, such as pinions, pulleys, mounting brackets, shaft extensions and wiring looms etc. however where appropriate to develop complete bespoke solutions. Whilst standard products can often fulfil the customer's needs directly, sometimes the optimisation that comes with a custom design can

result in a better overall solution both technically and commercially.

With a wealth of experience gained over the last 30 years, the design and manufacturing team at EMS Poole work closely with the customer's engineers. EMS now supplies custom mechanisms to many industries which include: automotive; medical; metrology; aerospace; instrumentation; mobility aids; petrochemical; defence and health & safety.

EMS uses the latest 3D solid modelling and 2D design tools to provide CAD models to



the customer for approval. This rapid exchange of information ensures that, long before metal is cut, the customer can integrate and evaluate the EMS proposal within their design. This process allows rapid visualisation of the complete system and greatly reduces time to market.

EMS has recently expanded their UK facilities and now boasts a dedicated manufacturing facility of 22,500 sq/ft. We are equipped with a suite of CNC machining centres and lathes as well as a dedicated gear cutting section producing spur, helical and worm gears. We have

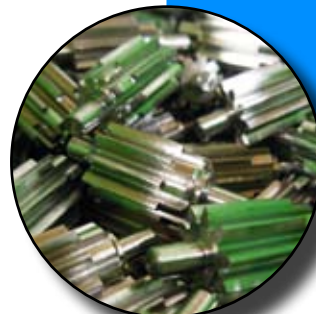
7,500 sq/ft of open plan assembly space giving us huge assembly capacity with maximum flexibility.

Quality is designed in at the concept stage of any project and our continued capital investment programme ensures that this is reflected in the finished product.

Comprehensive quality control and a dedicated inspection area together with our latest addition of a CNC CMM reflects our commitment and determination to offer the highest quality possible; a point demonstrated by our accreditation to ISO9001:2008.

EMS Manufacture

- Dedicated gear cutting centre •
- CNC milling and turning • capability
- Highly skilled assembly team •
- CNC servo press with SPC •



EMSmanufacture

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