



# **Kern Motors**

## Precision and Quality

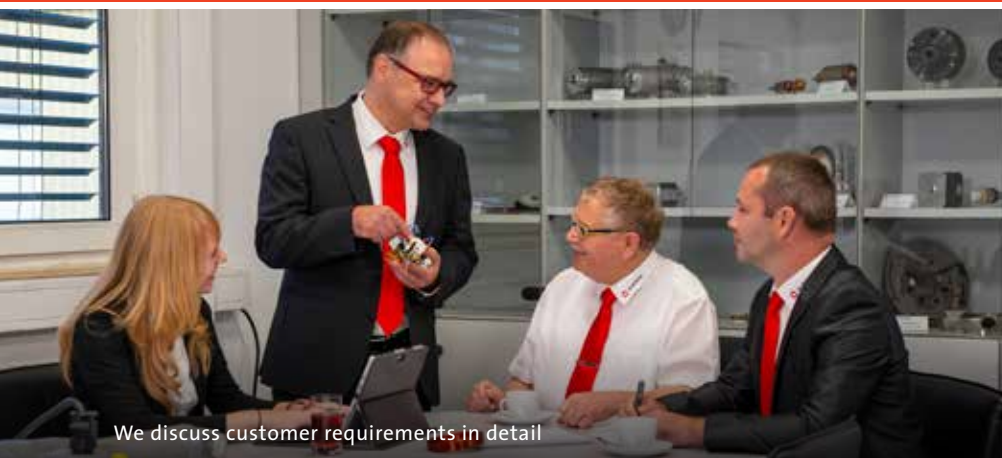
# Motors from Kern – Precision and Quality

## ➤ Individual needs – custom-tailored solutions

**Kern Antriebstechnik has specialised in precise drives in particular. Here we have more than 80 years of experience.**

Our production programme comprises DC servomotors, brushless motors, brake-clutch systems, and friction brakes and clutches. In addition, we have also established ourselves as a specialist in coil winding technology with special know-how.

As system integrators, we offer our customers full-line service, from the design of drive components to the development and design engineering during the development phase, the construction of in-house prototypes and samples right down to series supply.



We discuss customer requirements in detail



Development using modern tools

**Special tasks involving drive systems call for creative ideas**

At Kern Antriebstechnik, each product is tailored to the customer's specific requirements and is thus perfectly optimised for its intended use. Installation dimensions, mounting flanges, seals or plugs: it makes no difference. We precisely adapt motors and brakes, enabling all the drive components in the customer's application to function perfectly, reliably and precisely. Our strengths are the special models, adaptations and further developments of the existing range of products.

**Single parts, small- and large-scale series – we produce what makes sense from a financial point of view**

Since applications vary considerably and standard products do not always fulfil customer requirements, the targeted lot size cannot be satisfied through high-volume production. This is why we have specialised in small-scale production, in combination with a high degree of development. Nevertheless, we are also optimally equipped to process large production volumes. Our products are always custom-built, are neither comparable with mass-produced items nor can they ever be regarded as such. We are also able to supply spare parts for uncommon machines.

**Time-to-market – speed and flexibility win**

From the idea to the finished product – today, the key to success is market readiness. This is why we have specialised in implementing customer wishes quickly and without losses. This can only be achieved through streamlined organization, short decision paths and flexible workplaces. The basis for this is provided by modern development tools, pinpoint communication and employees who are willing to deliver orders flawlessly and on time.

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# BLDC motors

➤ *Standard for many applications*



BLDC motors

## Fields and applications

- General mechanical engineering
- Actuators
- Precision mechanics – optics
- Processing equipment
- Positioning drives
- Robotics

## Advantages and special features

- Large number of poles for precise positioning
- 10° angular resolution for Hall sensors
- Very smooth running even at low speeds
- Compact design
- Special solutions and options upon request

Type	Rated current [A]	Peak current [A]	Rated voltage [V DC]	Ohmic resistance [Ω]	Rated torque [Nm]	Max. torque [Nm]	Rated speed [rpm]	Rated power [W]	Weight [kg]
BLDC 44	14	20	48	0.1	1.3	2	3000	400	1.95
BLDC 43	14	20	36	0.08	1.0	1.8	4000	400	1.95
BLDC 22	11	18	24	0.14	0.8	1.35	3000	250	1.42
BLDC 12	9	16	24	0.16	0.5	0.63	3000	150	1.25

# Ultra-flat BLDC motors

## ➤ Power with compact dimensions



### Fields and applications

- General mechanical engineering
- Actuators
- Precision mechanics – optics
- Processing equipment
- Positioning drives
- Robotics

### Advantages and special features

- Large number of poles for precise positioning
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Type	Rated current [A]	Peak current [A]	Rated voltage [V DC]	Ohmic resistance [Ω]	Rated torque [Nm]	Max. torque [Nm]	Rated speed [rpm]	Rated power [W]	Weight [kg]
UF	6	14	24	0.2	0.4	0.7	4000	150	1.15

# Direct-Drive BLDC motors

## ➤ Power at low speeds



### Fields and applications

- Direct drive of wheels and rollers
- Hubs
- Mobile applications

### Advantages and special features

- External rotor for direct drives
- Bearing in the application
- Very compact
- Special solutions and bearings upon request

Type	Rated current [A]	Peak current [A]	Rated voltage [V DC]	Ohmic resistance [Ω]	Rated torque [Nm]	Max. torque [Nm]	Rated speed [rpm]	Rated power [W]	Weight [kg]
Direct-Drive 24 V-ST	3	7	24	2	2	3	180	40	0.855
Direct-Drive 48 V-ST	2.7	8.5	48	2	2	6	500	100	0.855

# DA series

➔ **Precision right down to the  $\mu$  range**



Four sizes and six performance classes



Precision for small installation dimensions

## Fields and applications

- Bridge-type measuring devices
- Laser measuring devices
- Measuring tables
- 3D scanners
- Microscopes
- Coordinate measuring technology
- Glass processing machines

## Advantages and special features

The servomotors of the DA series are characterised by their extreme precision in control tasks and a minimal detent torque making them ideally suited for measurement engineering, where positioning accuracy in the  $\mu$  range is a matter of course.

DA motors are optimised for extremely smooth running and the lowest detent torque and are thus especially sought-after in the sensitive and efficient machines used in precision industries

- High-energy neodymium magnets
- Special armatures with nested winding technology
- Optimised for extremely smooth running

Type	Power (S <sub>1</sub> ) [W]	Voltage [VDC]	Torque [Nm]	Speed [rpm]	Current [A]
4DA04	40	24	0.14	3000	2.9
5DA06	60	75	0.19	3000	1.3
5DA12	120	75	0.39	3000	2.3
7DA20	200	75	0.65	3000	3.6
7DA30	300	75	1.20	2500	5.1
8DA50	500	90	2.00	2500	6.6

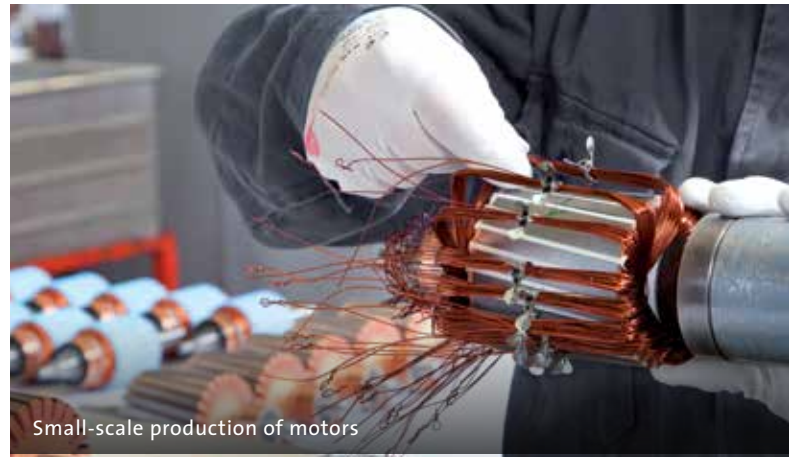
\*\* Accessories and common adaptations from page 9 onwards

# P series

➔ *The most robust amongst the precision motors*



Five sizes and ten performance classes



Small-scale production of motors

## Fields and applications

- Test equipment
- Rotary transfer machines
- Polishing machines
- Equipping of presses
- Grinders
- CNC lathes (axis feed rates)
- Honing machines

## Advantages and special features

The P series is characterised by a high short-term loading capacity and a large control range. Their rotational speeds are particularly precise and are low-vibration.

Thanks to the integrated tachogenerators, the motors are extremely robust and durable. As they are also especially temperature-stable, they are employed in processing equipment requiring high-precision results even under the most demanding conditions.

- Available up to 1,000 W
- Increases in performance of between 20 and 30% through additional air-cooling
- Special version up to IP68

Type	Power (S1) [W]	Voltage [VDC]	Torque [Nm]	Speed [rpm]	Current [A]
P 50	50	30	0.13	4,000	2.8
P 100	80	30	0.20	4,000	4.0
P 140	94	37	0.30	3,000	3.0
P 310	170	50	0.55	3,000	4.8
P 510	235	50	0.75	3,000	5.8
P 610	350	50	1.20	3,000	9.0
P 810	520	80	1.70	3,000	8.5
P 1000	520	69	3.00	1,700	8.4
P 910	750	132	2.50	3,000	7.1
P 1510	1,000	140	3.50	3,000	10.0

Standard version: plug connection, protection class IP 40, insulation class F, quartz grey finish, ball bearings with a 2Z design, available with or without a second shaft end as required

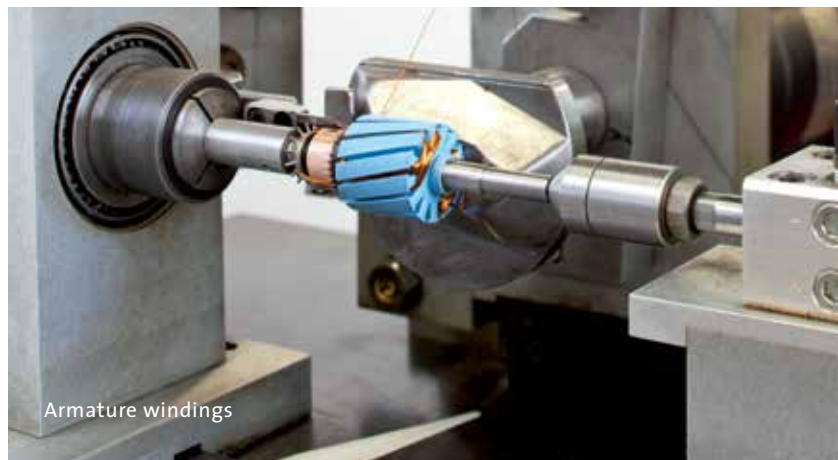
- Further technical data upon request
- Accessories and common adaptations from page 9 onwards

# GM series

➔ *True running even at low speeds*



Servomotor GM series



Armature windings

## Fields and applications

- Industrial trucks (control)
- Tool plotters
- Printer plotters
- Pharmaceutical reaction containers (stirrer vessels)
- Lift doors
- Ultrasound test engineering

## Advantages and special features

The motors of the GM series are characterised by especially precise true running, even at the lowest speeds. Their highly flexible performance spectrum makes them predestined for applications with an extremely wide range of requirements.

They are especially reliable and long lasting and therefore are employed in applications with longer service life and minimal maintenance.

- Ferrite magnets
- Special armatures with nested winding technology
- Wire thermal class H (temperature stability up to 180 °C)

Type	Power (S1) [W]	Voltage [VDC]	Torque [Nm]	Speed [rpm]	Current [A]
GM 55 K	60	30	0.16	4,000	3.7
GM 55 M	80	30	0.20	4,000	4.5
GM 55 L	110	48	0.30	4,000	3.6
GM 68 K	100	48	0.33	3,000	3.0
GM 68 M	130	48	0.42	3,000	4.3
GM 68 L	170	48	0.54	3,000	5.4
GM 82 K	130	50	0.42	3,000	4.0
GM 82 M	200	50	0.64	3,000	5.8
GM 82 L	240	50	0.75	3,000	6.5
GM 92 M	340	50	1.10	3,000	9.8
GM 92 L	430	50	1.40	3,000	10.0
GM 110 K	450	120	1.63	2,500	5.4
GM 110 L	500	48	1.90	2,500	14.0



# Accessories and add-on parts

## ➤ *Different versions of accessories and add-ons*



Planetary gear systems 96%



Bevel gear systems 94%

### Gear units

PLE planetary gear trains are available in four versions and in transmission ratios of between 3 and 512 with output torques of between 5 and 260 Nm. Bevel gear trains are especially suited for installations where space is at a premium in right-angled arrangements involving motor/gear unit combinations.

They have efficiency factors of 94 or 96% and are otherwise comparable with PLE gear trains.

- Low torsional backlash
- High output torques
- High efficiency factor (94%/96%)
- Low-noise
- High-quality (ISO 9001)
- Can be installed anywhere
- Easy mounting
- Lifelong lubrication



### Tachogenerators

Our high-precision tachogenerators are designed for measuring rotational speed devices. Their differing design variants are attached to the motors.

#### DA series

- 4DA: 5V / 1,000 rpm
- 1,000 rpm

#### P series

- 14V / 1,000 rpm · 5DA – 8DA: 7V /
- Other voltages upon request

#### GM series

- Standard without tachogenerator
- Special tachogenerator upon request



### Brakes

The brakes are holding brakes that hold the motor in position in a de-energised state.

This is required whenever the machine must enter a predefined idle state.



## Encoders

The combination of motor and encoder is employed in those cases when the positions must be adjusted with extreme precision. Encoders with 1,000 and 2,000 impulses/revolution are available.

Other impulse rates upon request.



## Kern Drive DC servo regulators

The Kern Drive servo regulators are ideal for controlling all Kern DC servomotors. Their field of application spans from the simple regulation of rotational speed with and without a tachogenerator to the regulation of torques right up to positioning regulation with higher-level PLC or CNC controller.



- Small size
- Low amount of stray radiation
- Operating temperature from 0 – 40 °C
- Speeds can be regulated through an encoder by using a special circuit board
- Integrated gentle start-up
- Modular system with accessories
- With optional back plate for quick connection/installation



## BLDC controllers

The BLDC controllers are suitable for controlling our BLDC motors. In some cases, it is possible to directly integrate the controller in the motor. The controllers always have a CAN interface. Interfaces such as EtherCAT, PROFIBUS or PROFINET are optionally available. Hall sensors and encoders are used as feedback system. For many positioning tasks, positioning via Hall sensors is sufficient. With the integrated solutions, the magnetic sensor is integrated on the circuit board.



- Small design
- Configurable via USB interface (with adapter)
- Easy to use
- Controllers for speed applications and positioning applications
- Fast commissioning
- Position setpoints via fieldbus

# Full-line service from Kern

## ➤ *Understanding customer relationships as a process*

Manufacturing tailor-made products goes far beyond the actual production process. It involves an entire process that extends from the first meeting with the customer and continues through production and delivery all the way to the end of the service life of the application. Accompanying the customer along this path from the beginning, recording and implementing the questions that arise, adapting products to take into account changes in requirements. Ongoing quality control in the plant and tracking the function of the installed parts is another important part of our work. This leads to long-lasting customer relationships that we greatly value, some of which have been going strong for several decades.

The entire spectrum of drive technology

Individual components that make up drive technology, modules or complete drive systems; even the complexity of the products varies greatly. Magnetic coils are, for example, required as individual parts, fitted to electric brakes, combined as brake motors or used in combination with fitted gear units, tachogenerators or control units.



Careful production and assembly



Advanced manufacturing centres

### Development – from the customer's wish to the prototype

Our customers expect us to provide drive system solutions from specific details right up to the complete system. Our strength lies in our ability to understand the needs of customers and to transform these into creative ideas. Regardless of whether in the form of a completely new design or an adaptation to a standard version. This can only be achieved through the use of technology that is always state-of-the-art, whether the software used to design the motors or a 3D printer for rapid prototyping.

### Production – flexibility and production depth

Since the tasks set by the customer may vary considerably, flexibility and a high degree of production depth are the basis of our success. Machining, injection moulding, coil winding machines and assembly centres, everything is performed at our own plants enabling us to react quickly and accurately. Our very own tool shop adds to our know-how.

### Quality – testing and experience

Since most core components are manufactured in-house, we produce within a seamless and integrated quality chain. Complete testing of motors and a brake test bench ensure that only products that are perfectly suited to their application leave our plants. The outgoing goods inspection facility with its strict quality control plan and long-standing logistics partners ensure that customers receive their drive components on time and without any hitches.



Kern Antriebstechnik GmbH

Gutenbergstraße 11  
88046 Friedrichshafen (Germany)

Phone +49 (0)7541/5016-0

Fax +49 (0)7541/5016-28

[info@kern-motion.com](mailto:info@kern-motion.com)

[www.kern-motion.com](http://www.kern-motion.com)