

Allied Motion Technologies

Applications & Products



Allied Motion
Motion Solutions That Raise The Bar
www.alliedmotion.com



Allied Motion Technologies

Why Allied Motion should be your motion solutions provider...

There are reasons our customers do business with Allied Motion, and why they have come to rely on us more as a partner than just a vendor. Here are a few of those reasons:

ALLIED SYSTEMATIC TOOLS (AST)

Allied Systematic Tools is our set of business system tools that drive continuous improvement in all aspects of our business. From strategy development to lean manufacturing to applied marketing, AST insures our customers of quality products and service at the best possible price.



QUALITY SYSTEMS

Allied Motion is dedicated to designing and producing the highest quality products. Our commitment to apply Six Sigma principles and achieve ISO and AS certification are a way of life and a continuous journey at Allied Motion.



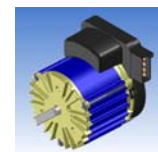
GLOBAL MANUFACTURING — LOCAL ENGINEERING

- Allied Motion's global manufacturing capability and worldwide network of component suppliers ensure consistent product performance, reliability, and quality whether we produce them in Europe, Asia or the U.S.
- Allied Motion Asia (AMA) was established to source materials and produce products to ensure our competitiveness around the world. Today, AMA is rapidly evolving to take advantage of the region's growing market potential and expanding to fulfill the needs of all of our customers.
- Allied Motion works with our customers to achieve optimal utilization of our global and local sourcing, multi-continent manufacturing, Kanban, and logistics capabilities to ensure their requirements are met.
- Allied Motion maintains regional Application and Design Engineering teams to be close to our customers' development teams and to ensure that we always **"Speak Your Language."**



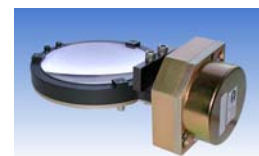
ADVANCED TECHNOLOGY PRODUCTS

Allied Motion focuses on developing products that help "raise the bar" for our customers by utilizing our *eXtreme* design process, which insures that superior performance and quality are designed into our products.



CUSTOM ENGINEERED PRODUCTS

While our products are designed using a standard-platform approach, Allied Motion welcomes the opportunity to custom design the right product to meet the exact needs of our customers' applications.



OUTSTANDING CUSTOMER SERVICE

We value your business, not only before the sale but just as much once you become an Allied Motion customer. We continuously strive to improve our customer service response and efficiency so that your interactions with Allied Motion personnel always exceed expectations.





Allied Motion Technologies

Applications & Products

Allied Motion companies design and manufacture motion control products for a broad range of customers and applications throughout the world in the commercial, industrial, and aerospace and defense markets.

This catalog previews the newest Allied Motion products, then presents some of the applications where Allied Motion products have helped our customers “raise the bar.” In the last section of the catalog, we give you a short form look at our product offerings.

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Exciting New Products From Allied Motion

Allied Motion raises the bar not only with advanced solutions for your motion applications but also with innovative new products that provide you with benefits not found in the product offerings available from others. On this and the next page we preview a few of our newest products. Please contact us, if you would like complete specification details for any of these products.

SL05 MINIATURE SLOTLESS BRUSHLESS DC MOTORS

Intended for use in powered surgical handpieces and similar high performance applications, the new miniature SLH series brushless DC motors provide **double** the power capability of similarly-sized competitive products. Some key characteristics of the SL05 model, shown here, are:

- Size 5 (12.7 mm) diameter stainless steel housing
- Stall torque up to 7.92 oz-in (56 mNm)
- Speed up to 75,000 RPM
- Planetary gearhead and autoclavability options



HOUSED MEGAFLUX BRUSHLESS TORQUE MOTORS

For precision machines, the new Housed Megaflux (HMF) versions of our proven Megaflux brushless torque motors offer a completely integrated solution of high performance torque motor, bearing system, feedback device, and housing, ready for mounting. The HMF 150, shown here, boasts:

- High peak torque (118 Nm) and top speed (1930 RPM)
- High load dual bearing system (227 kg (500 lb) normal)
- Large through bore to accommodate application feeds like optical beams or air or water lines
- Integrated Hall devices for commutation
- High resolution 4096ppr incremental encoder



ENDURAMAX INTEGRATED-DRIVE BRUSHLESS DC MOTORS

The new Enduramax integrated brushless DC motors are a very cost-effective solution for a wide range of commercial applications that require an integrated BLDC motor-drive. The 3-inch (75 mm) diameter model 30 BE, the first series in the Enduramax family, features the following outstanding performance:

- Up to 120 oz-in (846 mNm), 220 W shaft power, and up to 6000 RPM
- Ideal motor for high performance mobile HVAC fans and blowers, condenser units, pumps, and actuators
- Rugged automotive-style connector or cable with connector
- Single- or dual-shaft versions
- Environmental protection options



BL 30 BRUSHLESS MOTOR WITH INTEGRATED ELECTRONICS

The BL 30 is a powerful yet compact 32 mm diameter brushless DC motor. The specially designed heavy-duty bearing system, together with an integrated drive with speed control loop, makes this motor ideal for small pump applications.

- 30 mNm (4.3 oz-in) continuous torque, 7.2 Watt output power at 2300 RPM
- High load bearing system — 30 N at 10 mm from the mounting flange
- Integrated speed loop with 200 to 5000 RPM speed range
- Protection includes thermal overload, reverse polarity, IP54 sealing, and EMI standards compliance



Exciting New Products From Allied Motion

CL25 CORELESS DC SMALL PRECISION MOTOR

A unique coil technology, together with a 4-pole high performance magnet system, gives the 25 mm diameter CL25 coreless DC motor extremely high starting torque for its size. The improved power density also yields high continuous torque at lower temperature. Copper-graphite commutation ensures a long operating life even at high speed and high power.

- 28 Watt rated output power
- High 400 mNm (57 oz-in) starting torque
- 35 mNm (5 oz-in) continuous torque



ENDURANCE & ENDURAMAX SERIES DIRECT-DRIVE CENTRIFUGAL BLOWERS

The new Endurance/Enduramax series of compact, lightweight motor-blower combinations are ideal for many commercial air-moving applications. Available in either 12 or 24 volt brush or brushless DC versions, these units can be customized to meet specific application requirements. The Endurance 30QX double-scroll model, shown here, boasts these attractive features:

- Delivers up to 275 SCFM
- Rugged, lightweight plastic housing
- Rubber motor isolation mounts minimize vibration
- Industry standard mounting configuration
- IP54 protection level and sealed ball bearings



X- DRIVE ALL-DIGITAL SERVO DRIVES

Allied Motion's new X-Drive series are precision, all-digital DSP-based servo drive amplifiers capable of supplying up to 12 A RMS continuous, 24 A RMS peak current at up to 230 VAC. The X-Drive is designed to accurately control the torque or velocity of a wide range of servo motors, including our Megaflux series of brushless torque motors, with ratings of up to 4.7 kW continuous power.

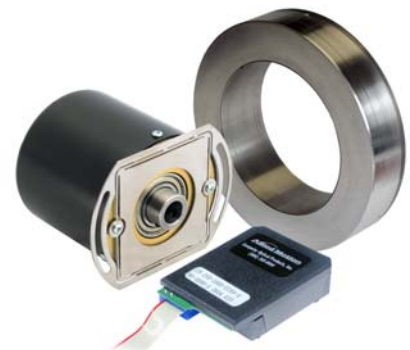
- Three models (4, 8, and 12 A RMS continuous) cover the needs of most servo applications
- All-digital design assures accurate, drift-free control of torque or velocity
- Line-operated (115 - 240 VAC, 50/60 Hz, single-phase)
- Opto isolation of I/O and full protection against faults
- Multiple command choices: +/- 10VDC, PWM, step-direction



ULTRA HIGH RESOLUTION INCREMENTAL ENCODERS

The new HHC series encoders provide high resolution digital signals for applications that require precision position measurement or exact velocity control. The HHC series allows standard motion control systems to be used in applications that require high resolution of less than one arc second.

- Digital incremental output of 25,000 up to 5 million counts/rev
- Frequency response of up to 4 MHz allows high resolution at high speed (e.g. 250,000 counts/rev at 3750 RPM)
- Available as a modular kit encoder, as a size 25 (64 mm) industrial housed encoder, or as a large bore hollow shaft encoder with an ID of 1.0 up to 3.5 inch (25 up to 89 mm)
- Custom shaft, cable, connector, and high-level protection sealing are among the available options.



Allied Motion Customized Application Solutions

MEDICAL DEVICES & EQUIPMENT



Dialysis System Pump Motors & Drives

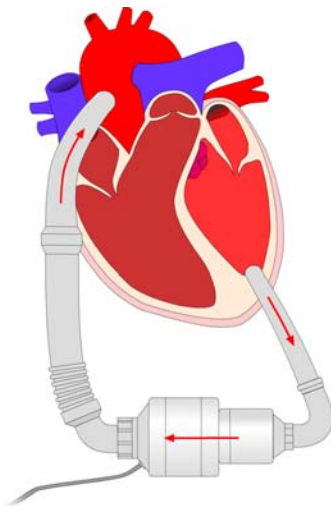
Hemodialysis (HD) therapy systems require reliable peristaltic pumps to accurately control a patient's blood and the dialysis solution through the machine's dialyzer.

HD system manufacturers rely on Allied Motion's precision brushless motors with on-board drive electronics to provide reliable, quiet, long-service life solutions for their HD pump subsystems.

Powered Surgical Handpiece Motors

Small, light, efficient, high-powered, brushless, autoclavable: these are the extremely important requirements of powered surgical handpiece motors.

For the surgical instrument industry Allied Motion's engineers developed miniature precision motors with **twice** the performance of same-size competitive units.



Left Ventricular Heart Assist Device (LVAD)

Left ventricular heart assist devices (LVAD) were developed to help heart transplant candidates while they await the availability of a heart, and also for permanent support for end stage heart failure patients.

Advanced LVAD pumps are implanted in the patient, and use an axial flow pump powered by a compact, highly efficient brushless DC torque motor such as those designed by Allied Motion for LVAD applications.

PAP Respiratory Ventilation

Sleep apnea treatment often involves the assistance of Positive Airway Pressure (PAP) respirators. All PAP systems (APAP, IPAP/EPAP) control a stream of compressed air (4 to 20 cm H₂O) to keep the patient's airway open to assist breathing.

Allied Motion's small, precision brushless DC motors like the BL 21 EE are an ideal choice for PAP systems owing to their compactness, long life, and quiet operation.



Allied Motion Customized Application Solutions

MEDICAL MOBILITY & AUTOMATION



Power Wheelchair Drive Gearmotors

Medical mobility equipment such as power wheelchairs, scooters, stair lifts, and elevators require dependable, quiet DC or brushless DC motors and gearmotors for reliable, long life operation.

That's why manufacturers in the medical mobility industry rely on Allied Motion's proven motors and gearmotors to perform over many years of hard, daily use in their products.



Patient Handling Equipment Motors

Patient comfort is enhanced, especially for children and the elderly, when their movement and transport is augmented by powered handling equipment such as the exam table shown here, where patients sit as in a chair and then are gently oriented for the exam.

Allied Motion's durable, quiet DC brush motors power the linear actuation devices used in this exam table.



Powered Stair Lift Gearmotors

All powered medical access and mobility equipment like the stair lift shown here are expected to operate quietly and reliably over many years of daily use.

That's why the manufacturers of this type of equipment demand rugged, reliable gearmotor drives like those manufactured by Allied Motion specifically for such mobility applications.



Pharmacy Automation

Estimates are that yearly over 700,000 people are injured or die from adverse drug events in North America. Many of those are from medication dispensing errors. Hence, the accuracy and efficiency afforded by automated prescription dispensing systems are real benefits to pharmacies, hospitals and patients.

Allied Motion's high performance servo motor and drive systems, and small coreless DC and BLDC motors are well-suited for powering automated medication retrieval and dispensing systems.



Allied Motion Customized Application Solutions

VEHICLES: UTILITY & ON/OFF ROAD



Powered Pusher/Puller Gearmotors

Small powered pusher/puller vehicles are being used increasingly in industrial and commercial settings for the productivity gains, and worker safety and injury reduction they afford.

Allied Motion's custom-designed transaxles and gearmotors provide manufacturers of these types of vehicles with the highly reliable and durable motor products they demand.



Heavy-Duty Truck HVAC Air Moving Systems

HVAC systems in million-mile trucks (and in larger farm and construction vehicles) are required above all else to be reliable and quiet.

Allied Motion custom-designs and manufactures fan and blower systems, and brush and brushless DC motors specifically to meet the demands of the air-moving and condenser subsystems in these vehicles.



Commercial Cleaning Equipment Actuators & Motors

The commercial equipment industry demands motors and drives that are not only able to stand up to hard daily use but that are also very cost-effective to apply.

Allied Motion's engineers met this challenge with motors, gearmotors, and transaxles of uncompromising ruggedness, and long-life, yet were competitive with second-tier supplier products of lesser quality and durability.



Construction Equipment Cab HVAC Blowers & Motors

Off-road vehicles like construction equipment require the highest level of reliability and durability. Equipment downtime is a very costly event for machines that oftentimes must run 16 hours per day, seven days per week.

Allied Motion developed motor and blower product lines that met these extreme operating requirements while also providing extended life, improved noise suppression, excellent shock and vibration resistance, and improved moisture sealing.



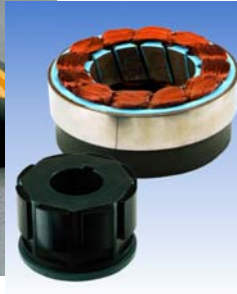
Allied Motion Customized Application Solutions

VEHICLES: PERFORMANCE & ENERGY SAVING



High Performance Racing Motorcycle Alternator

In racing motorcycles, engine response is of paramount importance. Every extra ounce reduces acceleration, and hence, designers are keen to shed unnecessary mass.



Allied Motion engineers helped by redesigning one of their torque motors for use as a racing motorcycle alternator. The new design enabled a reduction in mass of nearly 90% and inertia of about 80%, resulting in a substantially more compact and lighter generator.

High Performance Racing Fuel Pump Motor

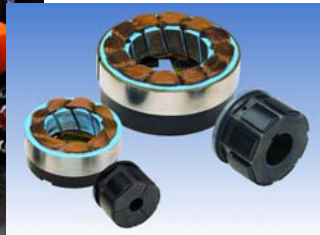
High performance drag racers require consistent high rates of fuel delivery to avoid mid-track "lay down" due to lack of sufficient fuel. An 800-HP engine, for example, needs more than 0.1 gallon every second of a run.

Allied Motion developed custom DC motors for high performance electric fuel pumps that meet the stringent demands of high performance dragsters.



Drive-by-Wire Control System Motors

Drive-by-wire technology, such as used in the Novanta concept car shown here, replaces the heavy, cumbersome traditional mechanical and hydraulic components with accurate, efficient electro-mechanical control systems.



Allied Motion supplied customized brushless torque motors for integration into the steering and braking systems of this car.

Automotive LPG System Pump Motors

As environmental concerns rise and the use of alternative fuels is encouraged, Liquid Petroleum Gas (LPG) systems are increasingly being deployed in taxis, transit buses, and similar vehicle fleets. The pump, internal to the LPG tank, is a key element in LPG (Autogas) systems.

Allied Motion engineers developed custom versions of our small brushless DC motors with integrated drive electronics specifically to meet the unique demands of Autogas systems. These systems are deployed widely around the globe helping to reduce vehicle emissions.



Allied Motion Customized Application Solutions

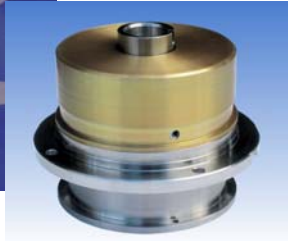
AEROSPACE & DEFENSE



Guided Missile Seeker Head Motor-Encoder

Allied Motion engineers designed a high resolution motor-encoder limited-angle actuator to meet the extremely demanding requirements of modern standoff weapons. The CM-900 positions an infrared imaging seeker, a critical part of the weapon's precision autonomous guidance system.

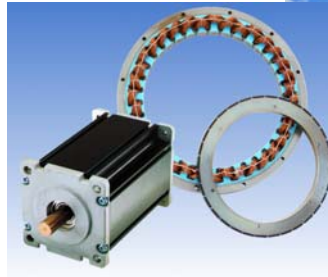
The CM-900 includes an 18-bit absolute encoder and limited-angle torque motor. The encoder has a high bandwidth 2000Hz (word rate) serial interface for high resolution and high speed positioning.



Remotely Operated Weapons System Motors

The CROWS (Common Remote Operated Weapons Station) weapons turret allows a gunner to remain protected inside the vehicle while accurately operating a computer-stabilized, laser-aimed weapon.

Allied Motion's Megaflux torque motors power three sets of azimuth and elevation axes in the system, while a Quantum housed servo motor powers the weapon's cocking actuator.



IED Disposal Military Robot Motors

Improvised Explosive Device (IED) disposal robots need to be rugged and reliable yet easy to maintain.

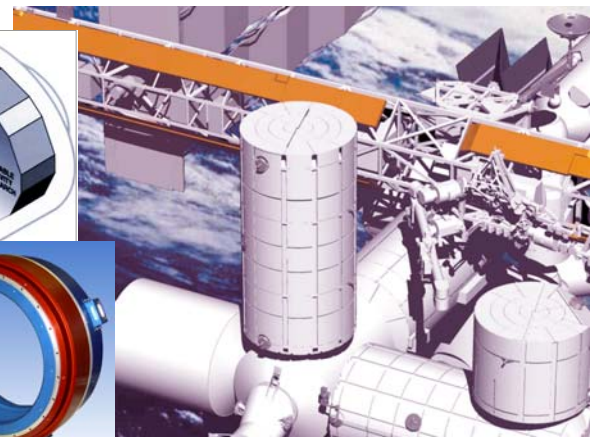
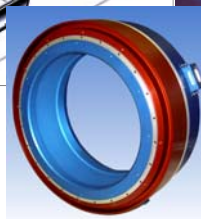
Allied Motion's engineers developed versions of Allied's Quantum and High Torque servo motors for the propulsion and arm axes of this IED robot. Allied Motion optimized the motors to maximize torque production at lower speed to give the robots additional power for climbing uneven terrains.



Space Station Torque Motor

Allied Motion engineered a large 560 mm (22") housed torque motor-encoder for the International Space Station.

The motor will power a 2.5 m (8.2 ft) diameter Centrifuge Rotor capable of providing artificial gravity levels ranging from 0.001 to 2G. The 1875 kg (2 ton) centrifuge will be used in microgravity tests.



Allied Motion Customized Application Solutions

SEMICONDUCTOR MANUFACTURING EQUIPMENT



300mm Wafer Handling Torque Motors

Robotic wafer handling has become a necessity in the closed environments used in advanced semiconductor wafer fabrication. Robotic handlers transfer and load/unload wafers within a cluster of processing tools.

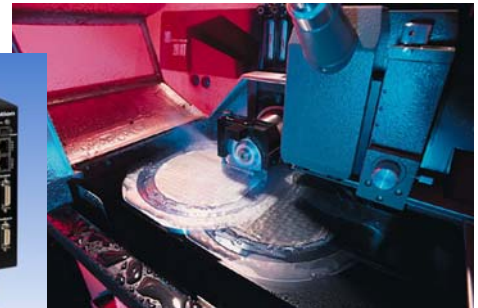


Allied Motion supplies our Megaflux brushless torque motors in both housed and frameless versions that are integrated into semiconductor processing tools to smoothly and precisely power the wafer handlers.

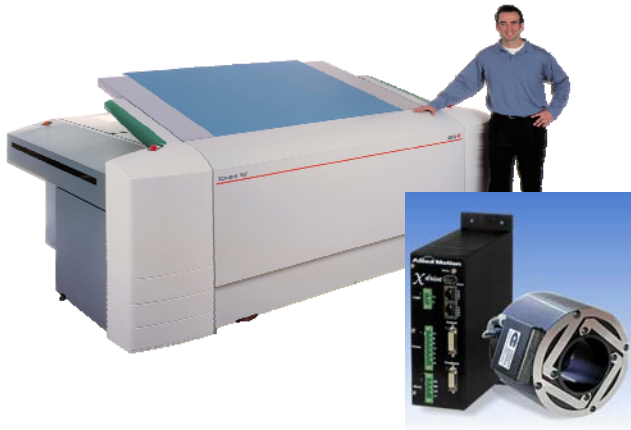
Wafer Dicing System Motors & Drives

Accurately and precisely dicing semi wafers into discrete die requires high response servo motors for the X, Y and Z axes and a high speed brushless spindle motor for the diamond saw.

Allied Motion's Quantum series BLDC servo motors, X-Drive series digital drives, and frameless Megaflux torque motors provide an optimum motion package for advanced wafer dicing.



INSTRUMENTATION & GRAPHICS



Computer-to-Plate Laser Focus System Motor & Drive

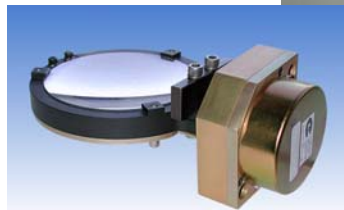
Constant correction of the writing laser in a fast, high resolution (2400 DPI, 340 LPI) direct computer-to-printing plate system requires a laser optics focusing system with very high dynamic response capability.

Allied Motion responded with the CM-2000 brushless linear motor actuator featuring a 1.52 mm focus range and very high 150Hz dynamic rate capability.

Chemical Analysis Instrument Actuator

Near Infrared Transmittance (NIT) is an accurate analysis method for grain (and other products) to quickly determine characteristics such as protein and moisture content.

Allied Motion developed a high performance limited-angle motor with integral sine/cosine encoder to drive the analyzer's scanning mirror. The required system accuracy of less than one arc second helps ensure the reliability and uniformity of the analysis.



Allied Motion Customized Application Solutions

INDUSTRIAL TOOLS & AUTOMATION



Industrial Welding Wirefeeder Gearmotors

Industrial tools such as welding wirefeeders require rugged, compact, and ultra reliable gearmotors. These tools must take the abuse of harsh job sites like fabrication shops, shipyards, and oil fields, yet remain dependable to insure no downtime.

Allied Motion's gearmotors and DC motors have been proven through years of trouble-free service in wirefeeders as well as other job-site industrial power tools.

Industrial Barcode Scanner Motors

Quickly identifying items in high throughput environments like production lines, or luggage or parcel handling systems, is usually done with barcode scanners.

The key scanner component is the motor that rotates the polygon mirror that deflects the scanner beam. Allied motion custom designs these long-life miniature precision BLDC motors for high performance barcode scanner/readers.



Material Handling Motors and Gearmotors

The U.S. Postal Service processes over a billion packages a year, and virtually every one is sorted and sent on its way using Allied Motion motors and gearmotors.



Durability and reliable 24/7 service life are prime requirements of motors used in material handling systems like conveyors, pickers, sweep actuators, and similar material handling equipment. Allied Motion's products meet and usually exceed the demands of material handling equipment manufacturers.

High Speed Electronics Assembly Motors & Drives

Advanced surface-mount (SMT) and through-hole component placement in the electronics assembly industry requires motor and drive systems with exceptional dynamic performance in order to achieve high throughput of up to nearly 100,000 CPH.

For their machine's placement heads, component feeders, and positioning axes, manufacturers demand the performance and precision provided by Allied Motion's high performance servo motors and drives.



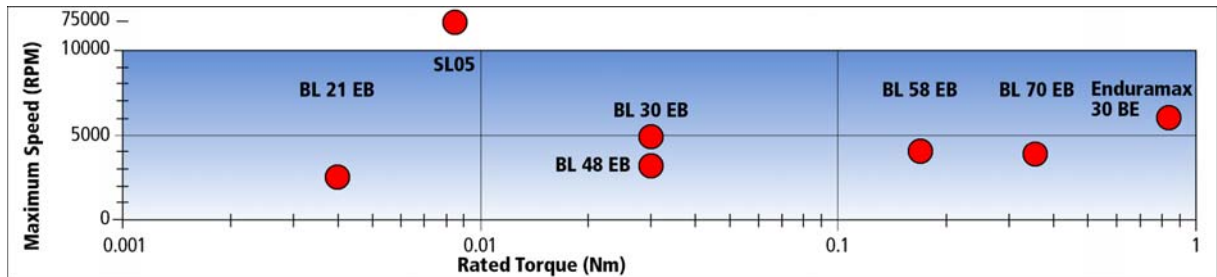
Allied Motion Motors: With or Without Electronic Drives...



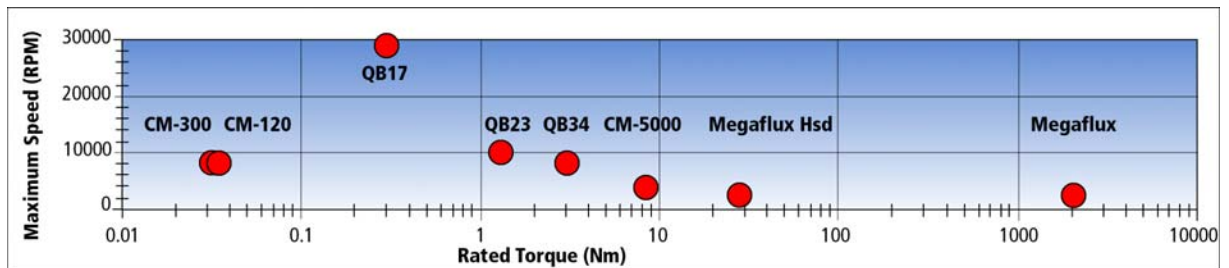
Allied Motion's know-how, experience, and products have been meeting the motion challenges of Industry for over 50 years.

MOTOR QUICK SELECT GUIDES

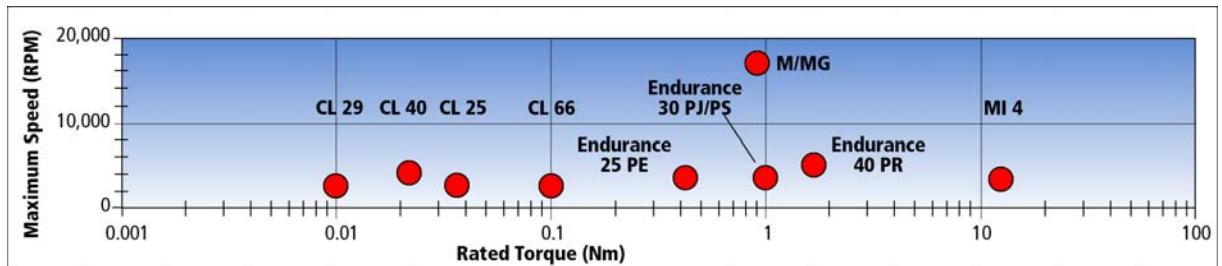
Brushless DC Motors



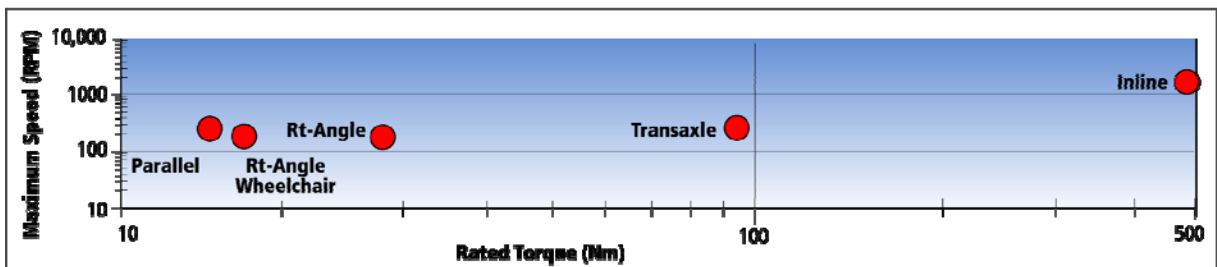
Brushless Servo & Torque Motors



PM Brush & Coreless DC Motors



Gearmotors & Transaxles



* Charts indicate maximum speed and maximum rated torque points for each motor or motor series.

Allied Motion Motors: With or Without Electronic Drives...

BRUSHLESS DC MOTORS

	Torque / Power ¹	Speed	Sizes	Voltages	Description
SL05 	1.2 oz-in (8.45 mNm) Stall: Up to 7.92 oz-in (56 mNm)	Up to 75000 RPM	Size 5 (0.5 in., 12.7 mm) dia.	24, 48 VDC	<ul style="list-style-type: none"> Size 5 BLDC motors specifically designed for surgical hand pieces Double the performance of equivalently-sized competitive units Options include planetary gearhead and autoclavability
BL 21 EE/EB 	0.42 oz-in (3 mNm) (EE) 0.57 oz-in (4 mNm) (EB) 1.5 - 2 W	Up to 10000 RPM (EE) Up to 2500 RPM (EB)	0.827 in. (21 mm) (EE); 0.945 in. (24 mm) (EB) dia.	6 to 24 VDC	<ul style="list-style-type: none"> Small, high performance brushless DC motors EB models with integrated drive electronics EE models without integrated drive electronics Custom shaft, flange, and protection class Ideal for gearpumps, membrane pumps, peristaltic pumps, laser scanners, high performance fans and blowers, and document handling applications
BL 30 EB 	4.3 oz-in (30 mNm) 7.2 W	5000 RPM	1.26 in. (32 mm) dia.	12, 24 VDC	
BL 48 EB 	3.1, 4.25 oz-in (22, 30 mNm); 8 - 12 W	3200 RPM	2.13 in. (54 mm) dia.	12, 24 VDC	
BL 58 EB 	10.6, 24 oz-in (75, 170 mNm); 35 - 50 W	2800 - 4000 RPM	2.68 in. (68 mm) dia.	12, 24 VDC	
BL 70 EE/EB 	30.5, 40.4, 50.3 oz-in (215, 285, 355 mNm); 85, 95, 110 W	3000 - 3800 RPM	2.72 in. (69 mm) dia.	24, 42 VDC	
EnduraMax 30 BE 	120 oz-in (846 mNm); 220 W	600 - 6000 RPM	3 in. (75 mm) dia.	12, 24 VDC	<ul style="list-style-type: none"> High performance brushless DC motors with integrated drive Ideal motor for high performance mobile HVAC fans and blowers, cooling units, pumps, and actuators Integrated Hall-effect commutation sensors Customizable single- or dual-shaft models Environmental protection options

1. Continuous rating unless otherwise stated.

Allied Motion Motors: With or Without Electronic Drives...





BRUSHLESS SERVO & TORQUE MOTORS

	Torque ¹	Speed	Sizes	Voltages ²	Description
Megaflux (Frameless) 	1 oz-in to 1490 lb-ft (7 mNm to 2020 Nm)	Up to 2660 RPM (no load)	6.7 to 31.2 in. (170 to 792 mm) dia.	150, 300 V	<ul style="list-style-type: none"> Design optimization produces motors with industry-leading torque density High pole count maximizes torque output and rotational smoothness Up to 5-times the maximum speed of competitive units Up to twice the power density of competitive motors (measured by K_m) for maximum torque in the minimum space
Megaflux (Housed) 	2.5 to 20.3 lb-ft (3.4 to 27.5 Nm)	Up to 2663 RPM	7.332 in. (186 mm) dia.; (5.6 / 7.6 / 8.6 in. axial length)	150, 300 V	<ul style="list-style-type: none"> Integrated brushless torque motor, bearings, feedback, and housing Dual bearings for high load capacities: 227 kg (500 lb) normal load at 500 PRM with 5 yr. life Large through bore for air, water, or vacuum lines, optical beams, or electrical/signal wiring Options include up to 8192 PPR encoder, sealed housing to IP65, air bearing system
CM Series 	<u>CM-120</u> : 1.6 - 4.8 oz-in (12 - 34 mNm)	Up to 8000 RPM	1.1 in. sq. x 1.0 in. (28 mm sq. x 25.4 mm)	12 - 48 V	<ul style="list-style-type: none"> Ultra compact slim brushless DC servo motors with integral encoder Designed for high precision positioning applications Precision direct-drive actuator with BLDC motor, optical encoder and solid or through hollow shaft. Integral digital, sine/cosine, absolute or high resolution encoder Custom designs available
	<u>CM-300</u> : 3.7 - 4.4 oz-in (26 - 31 mNm)	Up to 8000 RPM	1.5 in. sq x 1.0 in. (38 mm sq. x 32 mm)	12 - 48 V	
	<u>CM-900</u> : 3.7 - 4.4 oz-in (26 - 31 mNm)	Up to 8000 RPM	2.5 in. OD x 2.53 in. (63.5 x 64.26 mm) ID max: 0.39 in. (10mm)	12 - 48 V	
	<u>CM-2600</u> : 7 oz-in (49 mNm)	Up to 4500 RPM	2.625 in. OD x 1.76 in. (66.67 mm x 44.70 mm) ID max: 0.748 in. (19 mm)	12 - 300 V	
	<u>CM-5000</u> : 201 - 1192 oz-in (1.41 - 8.41 Nm)	Up to 4000 RPM	5.5 in. OD x 2.5 in. (140 mm OD x 65 mm) ID max: 2 in. (50.8 mm)	12 - 300 V	
	<u>CM-7000</u> : 240 - 600 oz-in (1.6 - 4.0 Nm)	Up to 3500 RPM	7.2 in. OD x 3.14 in. (182.9 mm x 79.76 mm) ID max: 3.5 in. (88.9 mm)	12 - 300 V	
Quantum 	<u>QB17</u> : 11.5 - 43.5 oz-in (0.08 - 0.3 Nm)	Up to 29000 RPM	1.64 in. (41.7 mm) sq.	24, 40, 130 V	<ul style="list-style-type: none"> Standard NEMA 17, 23 and 34 sizes 6-pole high-strength neodymium magnet rotor structure Custom winding, shaft, and connector designs to suit specific needs Frameless versions available for direct-drive applications
	<u>QB23</u> : 51 - 182 oz-in (0.36 - 1.28 Nm)	Up to 10000 RPM	2.3 in. (58.4 mm) sq.	24, 40, 130 V	
	<u>QB34</u> : 115 - 429 oz-in (0.81 - 3.03 Nm)	Up to 8000 RPM	3.42 in. (86.9 mm) sq.	24, 40, 130 V	

1. Continuous rating unless otherwise stated.
2. Peak winding (bus) voltage


Allied Motion Motors: With or Without Electronic Drives...

PERMANENT-MAGNET BRUSH DC MOTORS

	Torque / Power ¹	Speed	Sizes	Voltages	Description
Endurance 25 PE 	10 - 60 oz-in (0.07 - 0.42 Nm); 22 - 150 W (1/4 HP)	Up to 3500 RPM	2.5 in. (64 mm) dia.	12 - 48 VDC (fixed brush); 12 - 115 VDC (replaceable brush)	<ul style="list-style-type: none"> • Cost-effective solution for commercial applications like mobile HVAC systems, pumps, and electric actuators • Reliable, custom-designed 2.5", 3.0", and 4.0" diameter PMDC models rated up to 1 HP • Computer-aided design and testing (environmental, noise, vibration) ensure optimum performance • Long-life fixed brushes or replaceable brushes (PE series) • Self-aligning bronze sleeve bearings or sealed ball bearings • Options include EMI/RFI suppression, thermal overload, stainless shaft, class H winding, wash-down (IP56) rating, special-coated housing • Custom shaft, flange, and mounting
Endurance 30 PJ / PS 	20 - 140 oz-in (0.14 - 1 Nm); 44 - 181 W (1/3 HP)	Up to 3600 RPM	3.0 in. (76 mm) dia.	12 - 48 VDC	
Endurance 40 PR 	80 - 240 oz-in (0.56 - 1.69 Nm); 186 - 373 W (1/2 HP)	Up to 5000 RPM	4.0 in. (101 mm) dia	12 - 48 VDC	
MI 4 	Up to 110 lb-in (peak) (12.5 Nm)	Up to 3300 RPM	4 in. (102 mm) dia.	Up to 100 V	<ul style="list-style-type: none"> • Rugged high torque DC motor • High slot count assures smooth operation and high power density • 33-bar commutator minimizes torque ripple • Optional encoder for position /speed feedback data

1. Continuous rating unless otherwise stated.






CORELESS DC MOTORS

	Torque / Power ¹	Speed	Sizes	Voltages	Description
CL 25 	5 oz-in (35 mNm); 56.7 oz-in (400 mNm) peak; 28 W	Up to 10000 RPM	1 in. (25 mm) dia.	Up to 36 VDC	<ul style="list-style-type: none"> • Coreless PMDC motors ideal for medical devices, small pumps, mirror/prism drives, and ticket/currency dispensers • Coreless design for smooth, cog-free operation, no iron loss, and high efficiency • Precious metal commutation system in CL29 and CL40 models for low starting voltage • Low inertia rotor for rapid response • Optional spur or planetary gearhead with ratios up to 900:1 • Options include incremental or absolute encoder, tachometer, ball bearings (CL29, CL40), custom windings and leads/connectors
CL 29 	1.42 oz-in (10.1 mNm); 3 W	2400 - 2700 RPM	1.14 in. (29 mm) dia.	6 - 24 VDC	
CL 40 	3.12 oz-in (22 mNm); 7 W 3.68 oz-in (26 mNm); 12 W	2600 - 3050 RPM 4100 RPM	1.57 in. (40 mm) dia.	6 - 30 VDC	
CL 66 	14.2 oz-in (100 mNm); 25 W	1800 - 2540 RPM	2.6 in. (66 mm) dia.	12 - 36 VDC	

1. Continuous rating unless otherwise stated.


Allied Motion Motors: With or Without Electronic Drives...

GEARMOTORS & TRANSAXLES

	Torque / Power ¹	Speed	Sizes	Voltages	Description
IL (Inline) 	Up to 350 lb-ft (475 Nm); up to 1.5 kW (2 HP)	Up to 1300 RPM; up to 500:1	4.75 in. (121 mm) dia.	12 - 230 VDC	<ul style="list-style-type: none"> 2- or 4-pole brush PMDC or universal motor inline planetary gearmotor Hardened steel gearing capable of handling extreme loads Replaceable brush design eases field service Custom mounting plates available to meet specific application needs
PL (Parallel) 	Up to 124 lb-in (14 Nm); up to 297 W (3/8 HP)	Up to 255 RPM; up to 208:1	3.6 in. (91 mm) dia.	12 - 230 VDC, 230 VAC/VDC (universal)	<ul style="list-style-type: none"> 2- or 4-pole brush PMDC or universal motor parallel-shaft gearmotor rated up to 3/8 HP Multi-stage gearbox configurations enable a wide range of gear ratios Die cast aluminum gearbox maximizes strength, minimizes weight Custom shaft, leads, connectors to meet
RA (Right Angle) 	Up to 250 lb-in (28 Nm); up to 142 W (3/16 HP)	Up to 119 RPM; up to 62:1	3 in. (76 mm) dia.	12 - 230 VDC, 115 VAC (rect.)	<ul style="list-style-type: none"> 2- or 4-pole brush PMDC right-angle gearmotor rated up to 3/16 HP Light weight, high strength die cast gearbox with multiple mounting options Fully sealed motor and gearbox for leak-free operation
RA (Wheelchair) 	155 lb-in (17.5 Nm); up to 280 W (3/8 HP)	Up to 170 RPM (177 RPM no-load); up to 12 mph	3.6 in. (91 mm) dia.	Up to 230 VDC	<ul style="list-style-type: none"> 4-pole PMDC 3/4 HP gearmotor expressly designed for power wheelchairs (2-pole version available) Fully sealed motor and gearbox for leak-free operation Designed for long, quiet service life Holding brake and release, connection, and mounting for specific chair designs
TA (Transaxle) 	Up to 836 lb-in (94.5 Nm); up to 769 W (1 HP)	Up to 233 RPM (250 RPM no-load); up to 15 mph	Up to 2000 lb (907 kg) axle weight	Up to 230 VDC	<ul style="list-style-type: none"> 2- or 4-pole brush PMDC transaxle rated up to 1 HP Die cast aluminum components minimize weight Hardened steel and powdered metal gears increase durability and life Differential action insures smooth cornering capability



1. Continuous rating unless otherwise stated.

GEARBOX SOLUTIONS

	Gearbox Types	Gear Ratios	Speed Ranges	Description
	Parallel Shaft (spur/helical)	5:1 up to 1103:1	1.5 up to 800 RPM	<ul style="list-style-type: none"> Custom-designed gearboxes to exactly fit application needs Up to 10000 lb-in (1130 Nm) output torque Custom shaft designs including thru shaft Hardened alloy steel gearing designs insure long service life Durable plastic gearing designs for smooth quiet operation Hardened precision ground worm (right angle models)
	Planetary (spur/helical)	3:1 up to 800:1	2 to 1300 RPM	
	Right-Angle (precision worm)	5:1 up to 120:1	10 up to 800 RPM	

Allied Motion Drive and Encoder Solutions

DRIVES

	Power	Current	Voltage	Type	Description
Brushless DC 	Up to 4.4 kW cont., 9.6 kW peak	4, 8, 12 Arms cont, 10, 20, 30 Arms peak	55 up to 330 VDC; 40 up to 240 VAC (BDH series)	BDI: Torque control; BDV: Velocity control; BDE: gear follower up to 4096:1 BDH: Torque or velocity control; VAC fed X-Drive: Fully digital torque or velocity control; VAC or DC fed	<ul style="list-style-type: none"> Four-quadrant, brushless DC (trapezoidal) servo drives for torque, velocity, or (geared) follower control of brushless DC motors High rated bandwidth and conversion efficiency Fully protected Integral regeneration control (33 W) Isolated signal stage (BDH) Fully digital (X-Drive)
Integrated Motor-Drives 	Up to 220 W cont. (custom designs with power level to requirements)	Up to 15 Arms cont, 20 Arms peak (custom designs with current level to torque/power requirements)	1.5 up to 300 VDC as required by application	Brushless DC; Hall-effect or sensorless commutation	<ul style="list-style-type: none"> Motors with integrated drive electronics minimize application wiring and component count Single- and four-quadrant, brushless DC drive designs Choice of Hall-effect or sensorless commutation Optional encoder for speed and positioning applications

1. Continuous rating unless otherwise stated.

ENCODERS

	Model	CPR ¹	Type	Size	Description
Incremental 	CP-200	Up to 1024	Sine-cosine	1.8 in. (45 mm) sq. modular/kit	<ul style="list-style-type: none"> Cost-effective kit encoder with A, B, index in sine or digital formats HHC model extends resolution to as great as to 500000 lines per rev
	CP-250/270	Up to 1024/2048	Sq. wave		
	CP-250-HHC	Up to 125000	Sq. wave		
	CP-300/500	Up to 2500	Sine-cosine	1.5 in. (39 mm) sq.	<ul style="list-style-type: none"> 300 series: shaft + bearing 500 series: 0.5 in. (12.7 mm) hollow shaft
	CP-350/360/550/560	Up to 4096	Sq. wave		
	CP-800/900	Up to 6000	Sine-cosine	2.5 in. (64 mm) dia.	<ul style="list-style-type: none"> 800 series: 3/8 in. (9.53 mm) shaft + bearing 900 series: 0.5 in. (12.7 mm) hollow shaft
	CP-850/870/950/970	Up to 16384	Sq. wave		
	CP-850-HHC/950-HHC	Up to 1.25 M	Sq. wave	2.5 in. (64 mm) dia.	
	CP-3700	Up to 9000 Up to 36000	Sine-cosine Sq. wave	3.75 in. (95 mm) dia.	<ul style="list-style-type: none"> Large-bore high resolution encoder 2.0 in. (50.8 mm) hollow thru shaft
	CP-3750-HHC	Up to 2.250 M	Sq. wave		
Absolute 	CP-350-08/550-08GC	8-bit absolute	Gray code	1.5 in. (39 mm) sq.	<ul style="list-style-type: none"> 300 series: shaft + bearing 500 series: 0.5 in. (12.7 mm) hollow shaft
	CP-350-10/550-10GC	10-bit absolute	Gray code		
	CP-850-12GC/ CP-950-12GC	12-bit absolute	Gray code	2.5 in. (64 mm) dia.	<ul style="list-style-type: none"> 800 series: 3/8 in. (9.53 mm) shaft + bearing 900 series: 0.5 in (12.7 mm) hollow shaft
	CP-850-14GC/ CP-950-14GC	14-bit absolute	Gray code		

1. CPR: Cycles Per Revolution; quadrature multiplication can be applied to increase effective line count by 4-times (not applicable to absolute models).

Customer Assistance – Allied Motion “Speaks Your Language”



Allied Motion's application engineering and customer service teams are available to assist you with all aspects of the selection and purchase of our products, including:

- Detailed product information and documentation
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- Standard product selection
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- Specification development for special-designed products
- Price quotations
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- Logistics assistance

For assistance with all of your motion applications, call or email us using the contact information below.

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