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



A World of Motion Solutions from Allied Motion Technologies

Allied Motion products are in use around the globe in a wide range of demanding applications. Our companies possess the expertise, products, and global presence to provide you with the motion solutions you need in today's globally competitive world.

- ▲ Technology Unit
- Production Unit
- ◆ Regional Offices

NORTH AMERICA: 1 (888) EZ ALLIED

• EUROPE

Vehicle Application Solutions

This application solutions catalog presents a selection of vehicle applications in which Allied Motion products helped our customers "raise the bar."

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Why choose Allied Motion to 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:



LEAN ENTERPRISE USING ALLIED SYSTEMATIC TOOLS (AST)

AST is our set of lean enterprise business tools that drive continuous improvement. AST insures our customers of quality products and service at the best possible price.



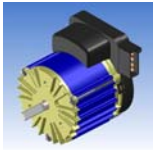
QUALITY SYSTEMS

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

- Consistent product performance, reliability, and quality whether we produce our products in Asia, Europe, or North America
- Regional Application and Design Engineering teams close to our customers to insure we always **"Speak Your Language."**



ADVANCED TECHNOLOGY PRODUCTS

Allied Motion develops products that "raise the bar" for our customers. We use our eXtreme design process to insure superior performance and quality in our products.



OUTSTANDING CUSTOMER SERVICE

We continuously strive to improve our customer service so that your interactions with Allied Motion personnel always exceed expectations.

New Products From Allied Motion

RAF 30 SERIES RIGHT-ANGLE BRUSHLESS DC GEARMOTORS

A complete drive solution, the RAF 30 right-angle **brushless DC gearmotor** includes integral drive electronics, and optional encoder. These rugged units were designed for industrial and commercial battery-powered applications.

- 57 lb-in (6.4 Nm) output torque, 150 RPM no load speed
- Ground worm and oil bath lubrication for longer life and quiet operation
- Brushless DC Enduramax motor with integral drive and optional encoder



DDA SERIES DUAL-DRIVE GEARMOTOR AXLES

The DDA **dual DC gearmotors** are specifically designed to power medical mobility equipment and similar applications that require zero turn radius maneuvering. They also rate high for utility vehicle applications.

- 3/8 HP PMDC motor, choice of 12 to 240 VDC winding voltage
- Enables zero turn radius for tight maneuvering
- For vehicle weights up to 1000 lb (453 kg)



ENDURAMAX INTEGRATED-DRIVE BRUSHLESS DC MOTORS

Enduramax 3-inch (75 mm) **integrated brushless DC motor-drives** are a cost-effective solution for many commercial-duty applications. They are ideal for mobile HVAC fans and blowers, condenser units, pumps, and actuators.

- Up to 120 oz-in (846 mNm), 220 W shaft power, 6000 RPM
- Single- and dual-shaft versions
- Environmental protection options



WHEEL DRIVE GEARMOTORS

Allied Motion's **dependable wheel drives** are available in brush DC and brushless DC versions. Engineered using high quality components, including precision gearing, nitrile seals, permanently lubricated bearings, and cast aluminum gearboxes, they insure long service life under high load.

- Standard voltages from 12 to 48 VDC, custom voltages available
- Brushless DC versions with integrated drive electronics
- Peak output up to 1000 W to handle vehicle weight up to 1500 lb (680 kg)
- Options include class H winding insulation, weather-proof (IP65) design, holding brake, and custom leads and/or connectors



BL 48 BRUSHLESS INTEGRATED MOTOR-DRIVE WITH ENCODER

The proven 1.2-inch (58 mm) **BL 48 EE brushless motor with integrated drive** electronics is now available with encoder for precision speed control applications.

- Accurate speed control from 25 up to 750 RPM
- 40 mNm continuous torque, 60 mNm peak torque
- Thermally protected for safe operation
- Choice of 12 or 24 VDC winding



"ROAD & TRACK" VEHICLES



Heavy-Duty Truck HVAC Air Moving Systems

HVAC systems in "million-mile" trucks are required above all else to be reliable and quiet. The heart of these systems is the motor used to power the blower or fan subsystem, which needs to be unquestionably reliable and provide very long service life.

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



Recreational Vehicle Convenience System Motors

Modern RVs and personal luxury buses pack a lot of "at-home" conveniences into a small space through the use of electrically-powered systems like slide-outs, bed stows and lifts, jacking and awning systems, and heating/cooling and water pumping systems.

To power these RV conveniences, Allied Motion engineers custom design dependable, quiet brush and brushless DC motors, gearmotors, and actuators that meet the demands of bus, RV and mobile convenience system manufacturers.



Platform Door Operator Motors & Gearmotors

Allied Motion is a leading supplier of actuator motors and gearmotors to demanding applications like those for door operators in the light rail and passenger train market. These modern, electrically-powered actuators must possess the ruggedness and long life demanded by transit systems.



Allied's brush and brushless DC motors and gearmotors are cost-effective, yet offer the durability required by door system designers. They are also prized for their high performance and compact size, making them especially suited for use in space-restricted door system applications.

Allied Motion Vehicle Application Solutions

OFF-ROAD & MARINE VEHICLES

Construction Equipment 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 up to 16 hours per day, or more, seven days per week.

Allied Motion's design teams developed brush and brushless DC motors and air-moving products to meet these extreme operating requirements by providing extended life, improved noise suppression, excellent shock and vibration resistance, and improved sealing characteristics.



Agriculture Equipment Motors & Gearmotors

Agriculture equipment like the windrower shown here are becoming increasingly electrified with the incorporation of brush and brushless electric motor-powered accessories. Benefits in increased efficiency of power usage and equipment uptime can be significant.

An example is a rotating wand device built into this windrower and powered by an Allied Motion gearmotor. The wand helps keep field debris from accumulating and clogging the radiator screen. It's one example of how Allied Motion solutions keep downtime to a minimum in agriculture equipment.



Boat Stabilization System Motor & Drive

Vessel roll caused by rough seas is an experience that can take the fun out of boating. With a dynamic gyro stabilization system on board, however, skippers and passengers can focus on pleasant pursuits on the water.

Allied Motion engineers developed a custom Megaflux torque motor and servo drive system to drive the control-moment gyroscope of the unique Seakeeper Gyro stabilization system. The motor spins the gyro flywheel, contained in a vacuum chamber, at 10,000 RPM. A custom Allied Motion X-Drive servo drive provides up to 3 kW to the motor from a 230VAC source.



MILITARY & DEFENSE VEHICLES



IED Disposal Military Robot Motors

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

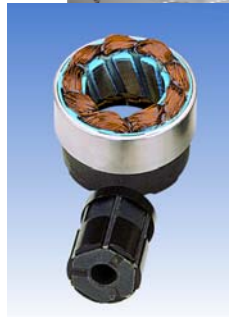
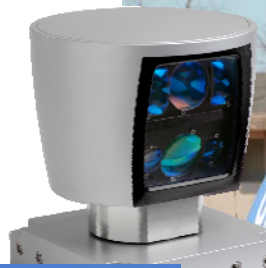
In just two weeks, Allied Motion's engineers developed versions of Allied Motion's Quantum and HT servo motors for the propulsion and arm axes of this application. Our engineers optimized the motors to maximize torque production at lower speed to give the robots reserve power for climbing uneven terrains and rock strewn slopes.



Autonomous Vehicle Laser Sensor Motors

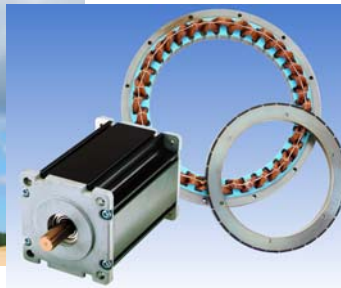
DARPA's annual "Urban Challenge" is a vehicle race to spur development of autonomous robotic vehicle technology. The goal is to have by 2015 one-third of all military operational vehicles unmanned and able to autonomously perform hazardous missions. Five of the top six finishers, including the winner, in the 2007 Challenge used the 64-element Velodyne LIDAR sensor shown here that generates more than 1.3 million distance points per second.

Allied Motion engineers worked closely with the LIDAR maker to provide the custom torque motors used in the sensor system.



Mobile Weapons Platform Motors

The CROWS (Common Remote Operated Weapons Station) weapons turret platform enables a gunner to remain protected inside his or her vehicle while accurately operating a computer-stabilized, laser-aimed, roof-mounted weapon.



Allied Motion's Megaflux torque motors power three sets of azimuth and elevation axes in the CROWS system, while a Quantum servo motor powers the weapon's cocking actuator. The result is fast, accurate firing without endangering the operator.

Allied Motion Vehicle Application *Solutions*

MEDICAL MOBILITY VEHICLES & ACCESSORIES

Wheelchair & Scooter Auto Lift Gearmotors

Transporting and handling medical equipment is eased through the use of specialized equipment designed for the purpose. An example is the mobile power wheelchair/scooter lift shown here.

Allied Motion's motors and gearmotors, such as the RAB30 DC gearmotor shown here, are used in medical mobility equipment like this lift to provide trouble-free long-life service for durable medical equipment OEMs.



Power Wheelchair Drive Gearmotors

Medical mobility equipment such as power wheelchairs, scooters, stair lifts, and residential 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 such as the manufacturer of the power wheelchair shown here rely on Allied Motion's proven motors, gearmotors, and transaxles to perform in their products over many years of hard, daily use.



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 numerous daily cycles.

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

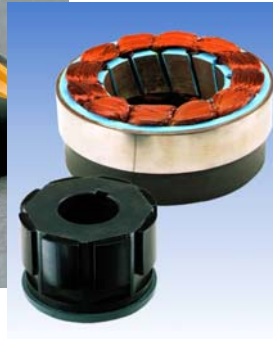


PERFORMANCE & ENERGY SAVING VEHICLES



High Performance Racing Motorcycle Alternator

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



Allied Motion engineers helped by redesigned one of their torque motors for use as an alternator in a racing motorcycle. 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

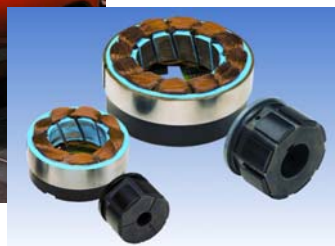
High performance vehicles such as drag racers require consistent high rates of fuel delivery to avoid mid-track "lay down" due to a lack of sufficient fuel. For example, an 800-HP engine needs more than 0.1 gallon every second of a run.

Allied Motion works with fuel pump manufacturers to provide DC motors for their high performance electric fuel pumps that meet the stringent demands of high performance racing vehicles.



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 a set of customized brushless torque motors for integration into the drive-by-wire steering and braking systems of the Novanta concept car.

Allied Motion Vehicle Application Solutions

"GREEN" VEHICLES

CO₂ & NO_x Emission Reduction Pump Motors

Strict emission regulations like Euro 6 and US Tier 2 Bin 5 have lead to the deployment of Selective Catalytic Reduction (SCR) technology for heavy duty, and even passenger, diesel-powered vehicles. SCR dramatically reduces CO₂, NO_x and particulate matter in exhaust gases. SCR technology transforms harmful vehicle exhaust gases into harmless nitrogen and water.

Allied Motion engineers worked closely with pump manufacturer Micropump to develop specialized compact brushless DC motors like the one shown here to drive Micropump's highly integrated motor-pumps used in SCR systems.



Fuel Cell Cooling System Pump Motor & Drive

Allied Motion is helping to develop advanced vehicle propulsion systems, such as Ford's Focus FCV (Fuel Cell

Vehicle) shown here. The Focus FCV uses our digital drives and brushless motors in the cooling pump and fan systems.

Allied Motion companies are also involved in a number of other next-generation automotive applications including drive-by-wire and hybrid vehicle systems.



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 fleet vehicles. 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 Vehicle Application *Solutions*

COMMERCIAL & UTILITY VEHICLES



Commercial Cleaning Equipment Actuators & Motors

The commercial equipment industry demands motors, gearmotors, transaxles, and actuators that are rugged enough to stand up to very hard daily use but that are also customized to the application and very cost-effective to apply.



Allied Motion's engineers have met the challenge time and again with brush and brushless DC motor, gearmotor, and transaxle solutions of uncompromising ruggedness, and long-life, yet are competitive with second-tier supplier products of lesser quality.

Powered Pusher and Tugger Gearmotors

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

Allied Motion's custom-designed gearmotors provide manufacturers of these types of vehicles with the highly reliable and durable motor drive



Power-Assisted Material Carts & AGV Gearmotors

Material movement in factories and warehouses is becoming easier and safer with the advent of power-assist devices that help start and stop the material carts used to transport heavier loads like vehicle engines and car and truck body components.

Automatic Guided Vehicles (AGVs) have also become increasingly popular, especially in automated warehouses, as their control and drive systems have advanced in capability.

Allied Motion engineers have developed several wheel drive systems, including powered casters and transaxles in both brush and brushless DC versions that are used for both primary drive and power assist service in pushers, tuggers, material handling carts, and AGVs.



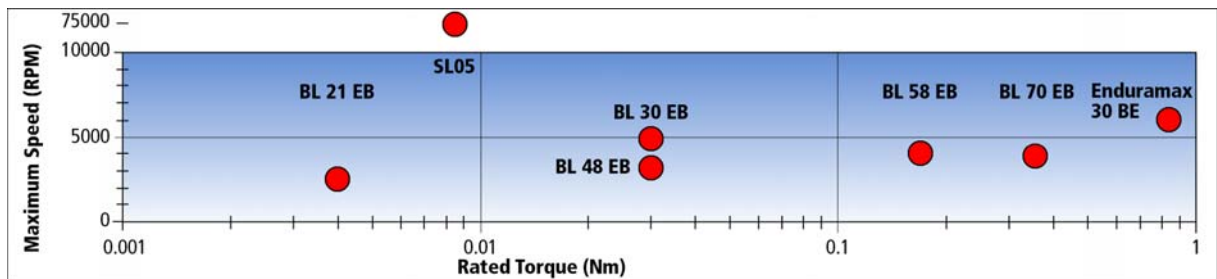
Allied Motion Motors: With or Without Electronic Drives...



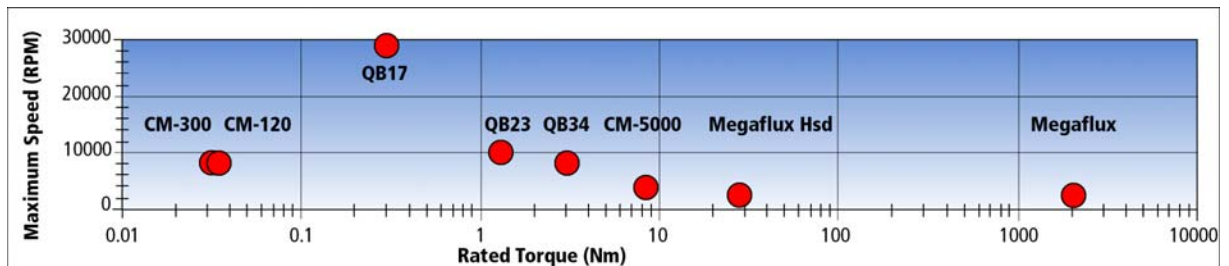
Allied Motion's know-how, experience, and products have been meeting the motion challenges of Industry for over 50 years.

MOTOR QUICK SELECT GUIDES

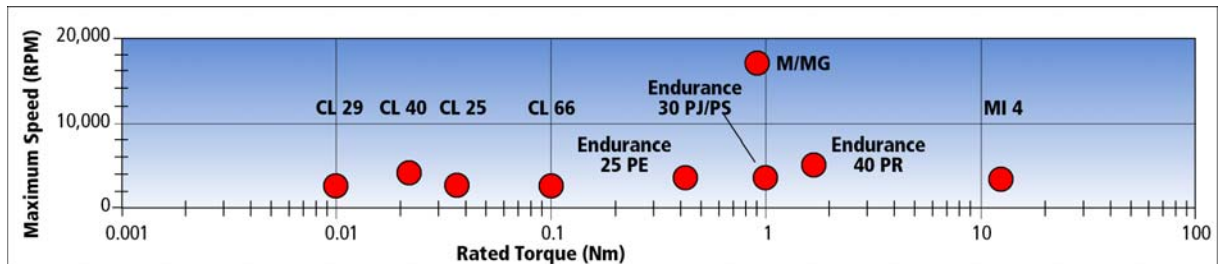
Brushless DC Motors



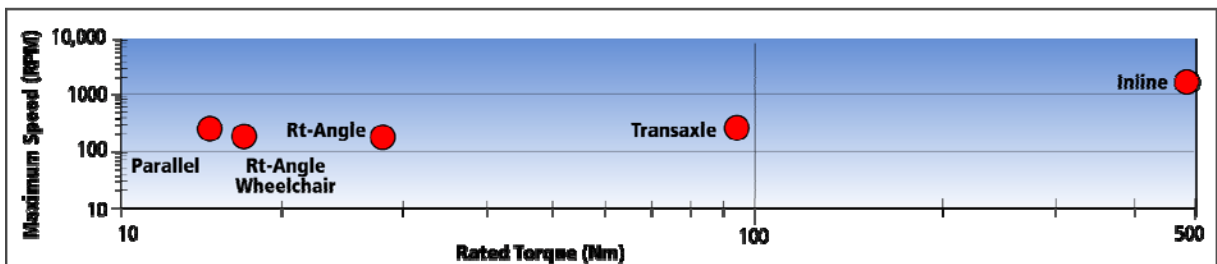
Brushless Servo & Torque Motors



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
Miniature High Performance Models					
 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 piecesDouble the performance of equivalently-sized competitive unitsOptions include planetary gearhead and autoclavability
Outer Rotor Small Precision Models					
 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 outer rotor brushless DC motorsEB models with integrated drive electronicsEE models without integrated drive electronicsCustom shaft, flange, and protection classIdeal for gearpumps, membrane pumps, peristaltic pumps, laser scanners, high performance fans and blowers, and document handling applications
 BL 30 EB	4.3 oz-n (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	
Inner Rotor Models					
 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	<ul style="list-style-type: none">High performance brushless DC motors with or without integrated driveIntegrated Hall-effect commutation sensorsCustomizable single- or dual-shaft modelsEnvironmental protection optionsIdeal motors for pumps, actuators, high performance mobile HVAC fans, blowers, and cooling units
 EnduraMax 30 BE	120 oz-in (846 mNm); 220 W	600 - 6000 RPM	3 in. (75 mm) dia.	12, 24 VDC	

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
	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
- Application analysis assistance
- Standard product selection
- Product customization and options guidance
- Specification development for special-designed products
- Price quotations
- Ordering and order status information
- Logistics assistance

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

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