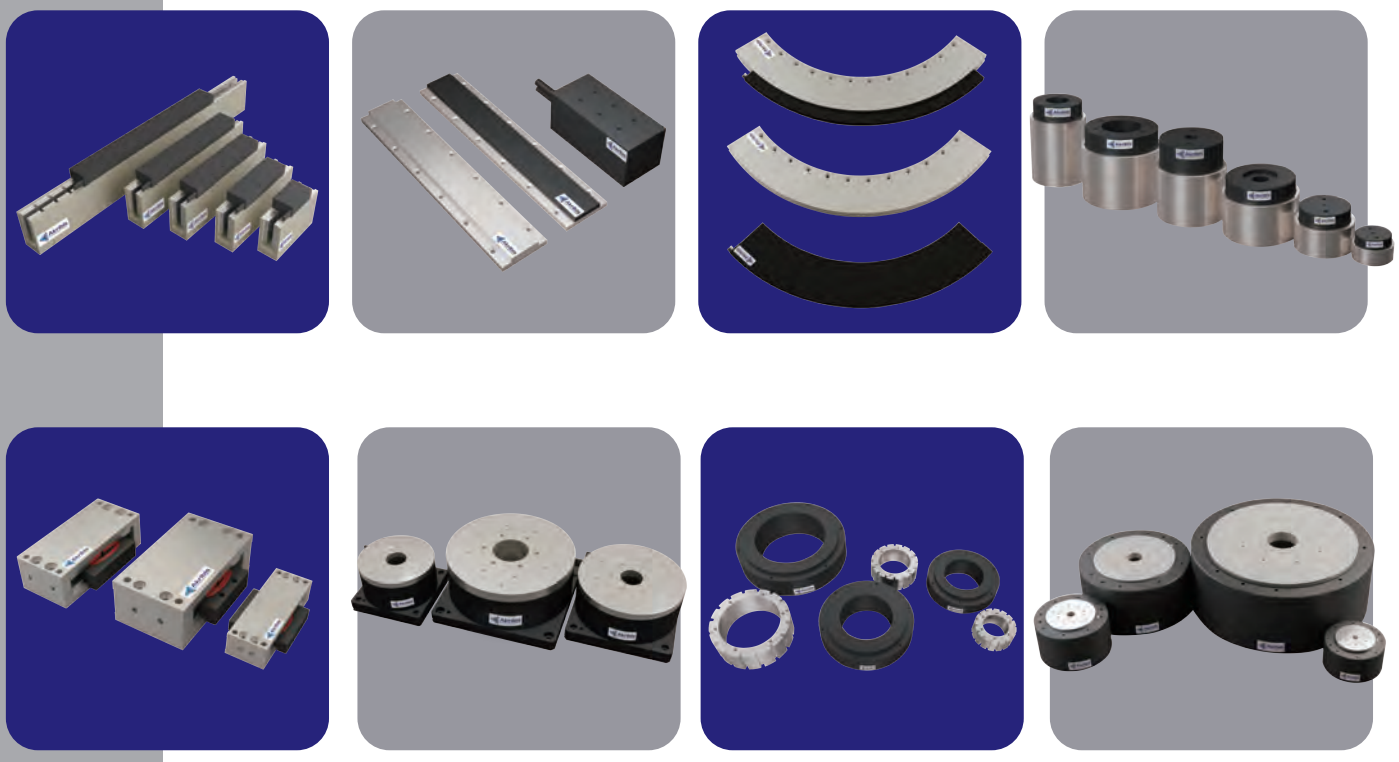
Akribis
where precision matters

Direct Drive Motors

Linear Motors / Voice Coil Motors / Direct Drive Rotary Motors



where precision matters

EN-26.3.1

Akribis is a Latinized Greek word that means “Precision”. On the Akribis logo, the letter “α” is formed by a line and a circle, representing linear and rotary motions. These are supported by a tetrahedron structure, the same structure as the diamond crystal which has many exceptional physical properties.

The logo signifies that Akribis Systems’ sound engineering expertise forms the cornerstone of the company, and this enables us to provide customers with precise, direct drive motion control solutions.

Akribis Systems Pte. Ltd. was founded in 2004. We design and manufacture direct drive motors, stages and precision systems that are used in equipment for manufacturing, inspection and testing. Akribis Systems supports a wide range of industries including semiconductor, solar, flat panel, hard disk, LED, printed circuit board, printing, photonics and biomedical manufacturing.

From the beginning, the company has been focusing on innovation and development of new technologies and solutions in motion control, with more than 134 patents applied. Backed by a very strong and committed engineering team, the company continues to develop custom motors and systems for demanding applications.

We have manufacturing facilities in Singapore; Shanghai, Nantong and Dongguan (China); Selangor (Malaysia); and Siheung (Korea). Our sales network includes our sales offices in USA, Germany, South Korea, India, Thailand, Israel and Malaysia, and is reinforced by our comprehensive distribution channels in Asia, Europe and North America.



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Please refer to Direct Drive Stages for Akribis direct drive modules and stages.

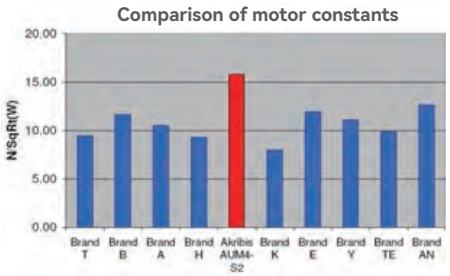
Introduction

Most Complete Range of Linear Motors

Akribis linear motors can be categorized into iron core and ironless series. Consisting of motor coils and magnet tracks, Akribis linear motors provide unparalleled advantages and features to improve system performance and efficiency: high speed, high acceleration, low velocity ripple, low operation noise, superior stability, wear & tear free, maintenance free, and long travel stroke. Akribis offers various models under each category, including: AUM, AWM, AHM, ALM-T, ACR and RDM series ironless linear motors; AJM, AQM, AKM and AKH series iron core linear motors for automation industry. AKM and AKH series iron core motor with water/oil cooling options for CNC industry.

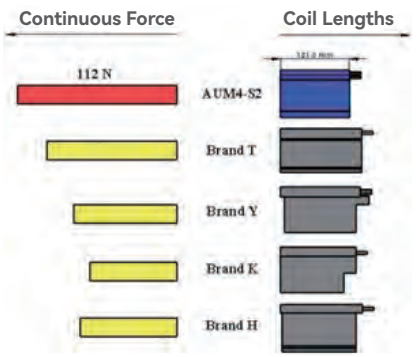
1. High motor constant

Our AUM series motors utilize our patented design to generate high amount of force possible while maintaining a compact form factor. In comparison to other motors in its class, AUM series motors exhibit high motor constant, which is a measure of efficiency of a motor and it also determines the continuous force a motor can produce.



2. Short coil lengths

Our AUM motors are capable of generating high force output even with shorter coil lengths.

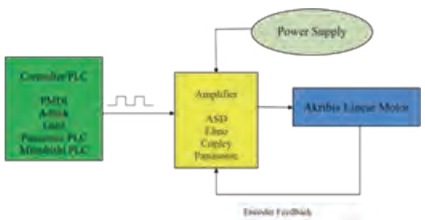


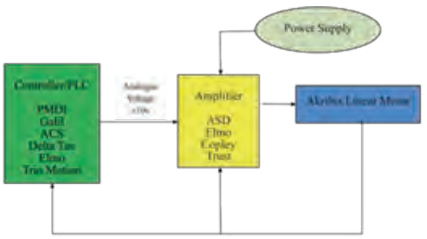
3. Custom design is possible

For applications where none of our standard linear motors fit your requirements. Akribis can offer customized designs. We design custom motors for disk drive, semiconductor front and back end, PCB and other industries. From concept design, prototyping and production, Akribis
engineers have vast experience in helping our customers achieve the performance they need at affordable costs.

4. Flexible control modes

Akribis linear motors are compatible with all well-known motion controllers and drivers.





1. Pulse and direction operating mode
2. Analog current / velocity operating mode
3. Distributed control (EtherCAT, CANopen, RS232, PROFINET)

Voice Coil Motors

Voice coil motors are short stroke actuators that utilize the electromagnetic interaction between permanent magnets and coil windings to generate thrust output. It is a direct drive motor, meaning it drives the load directly without requiring any transmission mechanism.

Akribis offers various types of voice coil motors, including AVM series cylindrical motors and AVA series planar motors.

1. Types of motion control for voice coil motors

1.1 Two postion control



A voice coil motor can be used as a simple two position actuator. Mounted with linear guidance bearings, the coil is typically moved while the core is kept stationary, although the reverse can also be done. A positive current causes the voice coil motor to move in one direction, while a negative current causes it to move in the opposite direction. At both ends, hard stops can be used to stop the motion, very much like a pneumatic actuator, except that a voice coil motor is completely powered by electricity without the need for compressed air.

A two position electronic drive, EOD from Akribis can be used to drive the voice coil motor in the manner described above. The peak current, peak current duration and holding current can be adjusted to control the start of motion and the holding force of the voice coil motor at stationary position.

1.2 Servo control



A voice coil motor can also be used as a servo motor. Other than linear bearings, a feedback device such as a linear encoder can be used for closed loop control. In this way, the acceleration, velocity and stopping position of the voice coil motor can be controlled precisely.
For example, the XMGV is a complete servo controlled voice coil module consisting of AVM voice coil motor, linear bearings and a linear encoder.

2. Advantages of using voice coil actuators

1. Low moving mass inertia
The moving coil typically has low mass inertia, enabling very high acceleration and short settling time with direct drive input.

2. Low inductance
The inductance of a voice coil motor is typically very low. Hence, the electrical time constant is very low, enabling the voice coil motor to have very fast response.

3. Smooth motion
There is no detent force in a voice coil motor. Hence, very smooth motion can be achieved, even at low speed.

4. Reliability
Since there is no contact between the coil and the core of a voice coil motor, there is no wear and tear, making the voice coil motor very reliable.

5. Force control
The force produced by a voice coil motor is linearly proportional to the current applied. This makes it suitable for force control applications.

Direct Drive Rotary Motors

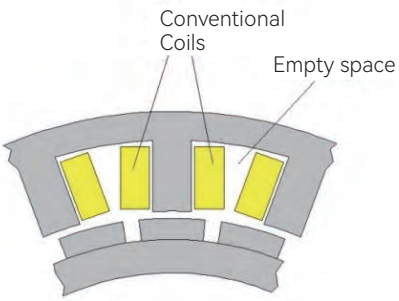
Direct drive rotary motors (DDR) are motors that are designed to drive loads directly without the need of any transmission mechanism, such as gears or belts. These motors are also called torque motors. They use high energy permanent magnets to generate high torque.

Akribis offers various types of DDRs, including ADR-A series, ADR-B series, ADR-P series, ADR-F series, ADR-T series, ACD series, ACW series and AXD series. We also design many customized direct drive motors according to specific applications.

1. ADR-A series

The ADR-A series motors are iron core type of brushless motors. Through our unique winding design, our ADR-A series motors produce very high torque, compared to other motors in the industry. The form factor of our ADR-A series motors is also smaller than competitor products. With low rotor inertia, these motors give better response and settling time. The maximum speed for our motors is also relatively higher than other motors.

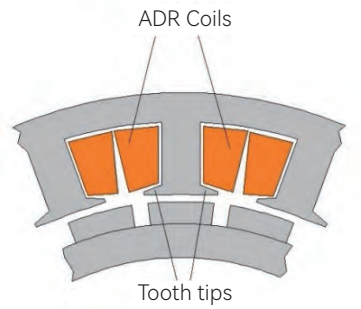
The figure on the right show the windings of a conventional DDR and our ADR-A series.



Conventional DDR

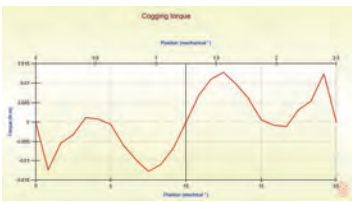
For a conventional DDR, the coils are wound and inserted into the slots, between the teeth of the stator. The coils are rectangular in shape when viewed from the top. Therefore, there is an large empty space in between the the coils. This space is wasted, since the available magnetic flux is not used to produce any torque in this region.

For the ADR-A series, the coils are wound with a special technique, and up to 35% more coils can be wound, fully utilizing the space in the slots. This results in much higher torque compared to the motor with the same form factor.



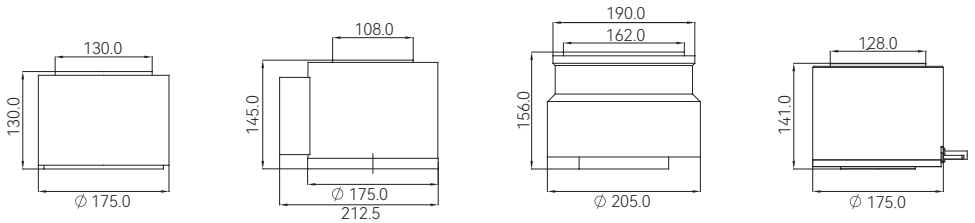
ADR-A Series

The ADR-A series also has tooth tips on the stator teeth. This design minimizes the cogging torque significantly, without compromising the motor performance. Akribis design engineers put in a lot of effort to optimize the performance of the motors, including reducing the cogging torque to a minimum level.



On the right is an example that shows the cogging torque of a motor at different positions.

Below is an illustration that compares our ADR175-A-138, to other motors with similar diameter.



Brand/Models	Unit	Brand 1	Brand 2	Brand 3	Akribis ADR175-A-138	Our Advantages
Outer Diameter	mm	175.0	175.2	190.0 (205.0)	175.0	Low Height
Motor Height	mm	130.0	145.0	156.0	141.0	Low Height
Peak Torque	Nm	42.0	32.8	30.0	98.6	Higher Peak Torque
Continuous Torque	Nm	14.0	9.8	Not published	32.9	Higher Continuous Torque
Max Speed (230VAC)	rpm	300	498	120	470	Higher Speed
Rotor Inertia	Kgm^2	0.022	0.0071	0.072	0.0076	Low Rotor Inertia

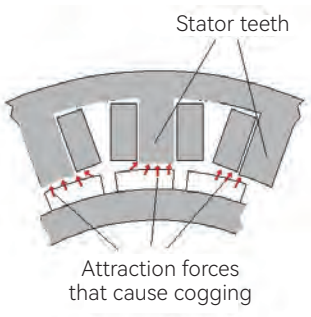
The ADR-A series motors are designed with low cogging torque. They are fully integrated with bearings and different options of encoders, such as optical encoder with digital output, and optical encoder with SINCOS. The motors also come with low and high speed windings (S or P).

2. ADR-P, ADR-F, ADR-T and ACD-P series

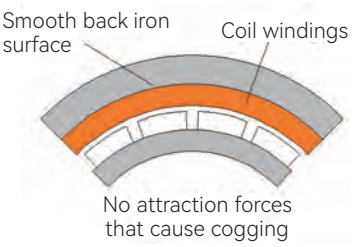
Akribis frameless torque motor ADR-P, ADR-F, ADR-T and ACD-P series consist of only rotors and stators, allowing them to be easily integrated into complex systems. ADR-P series motors are equipped with hall sensors, which easily interface with all types of servo amplifiers and controllers. ADR-F and ADR-T series motors are specifically designed for robot joint applications with low voltage and high speed requirements. The unique coil winding design yields one of the highest torque density in the market. Moreover, ADR-T series are more compact and more cost-effective.

3. ACD series

The ACD series motors are coreless type of brushless motors. These motors do not produce any cogging torque. Consequently, smooth motion can be achieved with low velocity ripple. The unique winding design also gives high torque density, although the output torque is lower than the ADR-A series motors.



Conventional iron core DDR



ACD Series

These motors are also integrated with high precision bearings, which give good radial and axial runout. High resolution optical encoders with digital output and SINCOS are available as options. The motors also come with low and high speed winding connections (D or Y).

4. ACW series

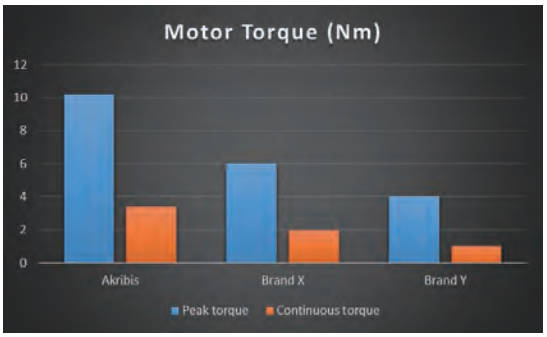
The ACW series are using coreless technology. They are designed with very low profile, and the motors do not produce any cogging torque, which allows smooth motion to be achieved with low velocity ripple.

5. AXD series

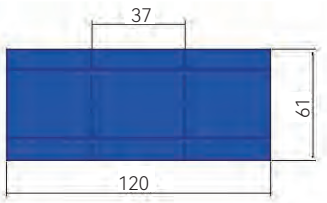
The AXD series are ironcore brushless DC motor. Being similar to ACW series, AXD series adopt flat design, featuring with large centre hole, small volume, high torque density, low moment of inertia and light in mass and combine with high resolution optical encoder with high precision.

Compact size with high torque density

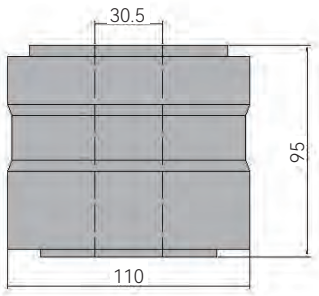
The AXD series direct drive torque motor has very high torque density. The peak torque and continuous torque are high, even though the motor form factor is relatively small. On the right is a graph that shows the comparison with 2 competitors' motors with similar size.



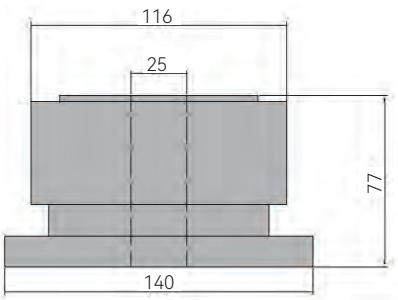
The table below compares the key specifications of AXD motor with 2 competitors' motors of similar size. AXD motors outperform their competitors in all aspects.



Akribis AXD



Brand X



Brand Y

Brand/Models	Akribis AXD 120	Brand X AX200XX	Brand Y DM1C-XXX	AXD vs Competitor
Motor height	61 mm	95 mm	77 mm	AXD is 26%~56% better
Peak torque	10.0 Nm	6 Nm	4 Nm	AXD is 70%~155% better
Continuous torque	3.4 Nm	2 Nm	1 Nm	AXD is 70%~240% better
Centre hole size	37 mm	30.5 mm	25 mm	AXD is 21%~48% better
Max speed	1400 rpm	300 rpm	150 rpm	AXD is 360%~830% better
Rotor inertia	0.00102 kg·m²	0.00575 kg·m²	0.0025 kg·m²	AXD is 145%~464% better
Motor mass	2.7 Kg	4.7 kg	3 Kg	AXD is 11%~74% better
Repeatability	± 3 arcsec	± 5 arcsec	±3 arcsec	AXD is 66% better

Low rotor inertia

In the torque equation T = Jα (where T is torque, J is moment of inertia, α is angular acceleration), much higher acceleration can be achieved if the moment of inertia is smaller. The moment of inertia used in the computation actually comprises 2 parts: the moment of inertia of the motor, and the moment of inertia of the load.

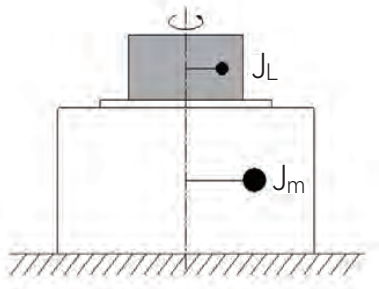


Illustration of motor inertia and load inertia

J = Jm + JL

where

Jm: Motor's rotor inertia

JL: Load inertia

In many cases, the moment of inertia of the motor actually contributes a large percentage of the total moment of inertia. This means that the motor torque is used mainly to rotate itself. Little torque is left for the load moment of inertia.

The rotor inertia of AXD is small. This means that more torque can be used to rotate the load, resulting in a more dynamic performance. Higher acceleration and shorter settling time can be achieved.

Low overall mass

The overall mass of an AXD motor is also smaller, compared to competitor's motors with similar size. Newton's second law (F = ma) tells us that for higher acceleration, either the force has to be larger or the mass has to be smaller.

The trend for the automotive industry is to make cars with lower body mass. Instead of using only steel, aluminum and carbon fiber are used to reinforce the car structure, to reduce mass. This results in better performance and higher fuel efficiency.

Similarly, for motors used in motion control, lower motor mass is an advantage, especially when you need to mount the torque motor on a XY table. The dynamics of the XY table is affected by how much load it has to carry. Lower applied force and higher accelerations can be achieved with lower moving mass.



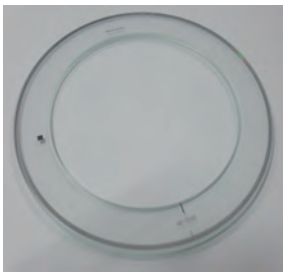
Torque motor on a linear motor stage

High resolution optical encoder

The AXD torque motor uses a high resolution optical encoder for feedback. Optical encoders provide much better accuracy, repeatability and higher resolution, compared to resolvers.
The working principle of resolvers is based on rotating transformers. Other than the signal processing errors by converters, the inconsistencies in the construction of the windings affect the accuracy of the resolver.
For optical encoders, the divisions on the disk are etched with photographic and semiconductor techniques. The gratings can be made with fine pitch, such as 4, 20, 40 or 80 microns. This results in much higher accuracy.



Resolver construction



Encoder grafting

Large center hole

AXD torque motors are designed with a large center hole. The center hole is sometimes needed for optics design, wiring or pneumatic/vacuum tubing.

Higher speed

AXD torque motors are designed for higher speeds. This means that even for indexing motions, the AXD can perform the motion in a shorter time, compared to a motor with limited maximum speed.

Stages & Systems

The Akribis precision linear motor driven stage features the patented AUM series ironless linear motor in a neat, ready to use solution. Being directly driven, the linear motor stage eliminates intermediate transmission mechanism which translates directly into many benefits, including

Fast response in the form of faster acceleration (up to 25 g) and settling time, which increase the throughput

High speed up to 5 m/s result in shorter cycle time.

High stiffness as no mechanical transmission such as gears, belt, ball-screw, etc., are required. The driving force is directly coupled to the load.

High precision by using direct measurement systems. Distance/angle conversion is not needed.

Zero backlash as a result of direct coupling of the driving force to the load.

The structural frame of the linear motor stage is extruded aluminum, offering good structural strength and cost effective. These stages can be constructed in single piece up to 3 metres without the need for joining.

The geometrical accuracy of the stage is achieved with the use of a preloaded dual-rails-quad-runner blocks or single-rail-dual-runner blocks re-circulating linear motion ball bearing system. The runner blocks are preloaded for better stiffness, and only the ball cage types are selected to deliver a smooth and low noise motion.

The displacement accuracy is achieved with the use of a direct measurement system, consisting of a linear scale (with scale linearity controlled at +/- 3 micron/metre) and a linear encoder. The electrical resolution can achieve sub-micron level accuracy.

Thanks to the wide range of sizes, force ranges and travel strokes, linear motor modules find application in a variety of fields as per below:

Pick and place
Laser marking/machining/spot welding
Dispensing
Inspection
Printing

Sizing Guide

Linear Motor Sizing Guide

1. Sizing of a linear motor includes calculating the peak force and Root-Mean-Square (RMS) force requirement.

2. Peak force is determined by the moving mass and maximum acceleration required.

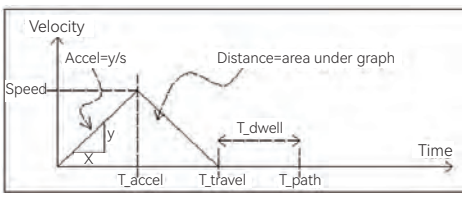
Force = Mass * Acceleration + Friction Force + External Opposing Force

For example, if moving mass is 2.5 kg (including coil assembly) and required acceleration is 30 m/s^2, the motor needs to exert a force of 2.5 x 30 =75 N. This is assuming Friction and Opposing Forces are negligible.

3. Very often, we do not know the actual required acceleration, but we have the motion time requirement. We can calculate the required acceleration if we know the travel distance and the travel time. Usually for short travel distance application, a Triangle-Shape Velocity Profile is used whereas for long travel distances, it is more efficient to use Trapezoidal-Shape Velocity Profile. In a Triangle profile, the motor does not cruise at any velocity.

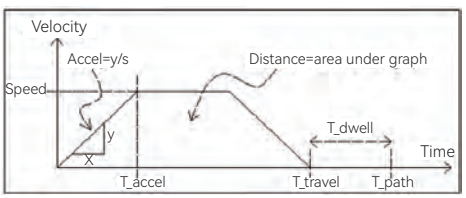
4. For Triangle Profile:

Acceleration = 4 * Distance/Travel Time^2



5. For Trapezoidal Profile, a desired cruising speed will help to determine the required acceleration.

Acceleration = Cruise Speed/(Travel Time - Distance/Cruise Speed)



6. Basically, the calculation of the deceleration is similar to the acceleration, unless there is an unbalanced force (E.g. gravitational force) acting on the motor.

7. Force required by the motor during cruising (against friction and opposing forces) and dwelling (against opposing force) may also be calculated.

Note: In order to maintain a constant speed, the motor will resist friction and external force. When the motor is stationary and enabled by a driver, it will resist the external force.

8. Compute the RMS force using the formula below.

$$F_{cont} = \sqrt{\frac{F_a^2 \cdot t_a + F_c^2 \cdot t_c + F_d^2 \cdot t_d + F_w^2 \cdot t_w}{t_a + t_c + t_d + t_w}}$$

F_{cont}= Continuous Force

F_a = Acceleration Force
F_c = Cruise Force
F_d = Deceleration Force
F_w = Dwell Force

t_a = Acceleration Time
t_c = Cruise Time
t_d = Deceleration Time
t_w = Dwell Time

9. Select a motor according to the computed peak force and RMS force requirement. User should factor in a safety factor of at least 20-30% especially when the friction and external opposing forces are assumed to be zero.

10. For example, an application requires the motor to move a 4 kg load for 0.3 m in 0.2 s using Triangle Profile. The motor will dwell 0.15 s before moving the same cycle again. Assume friction is negllgible and no presence of any unbalanced force.

Acceleration = Deceleration = 4 * 0.3 / $(0.2)^2$ = 30m/s^2

Peak Force = Fa = Fd = mass * acceleration = 4 * 30 = 120 N

$$F_{cont} = \sqrt{\frac{(120)^2 \cdot (0.1) + (120)^2 \cdot (0.1)}{0.1 + 0.1 + 0.15}} = 90.7\text{N}$$

Giving an additional 30% safety factor, a suitable motor will be AUM3-S4.

11. Motor selection software is available to automate the calculation process.
Please contact cust-service@akribis-sys.com for the software.

Voice Coil Motors

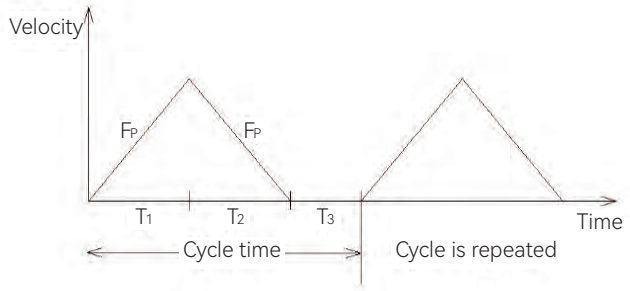
1. Peak force

In an application, it is important to determine the peak force and RMS force required. In order to select the right voice coil motor, the peak force is calculated by Newton's second law, F = ma. With a known moving mass, and the acceleration required for the motion profile, we can calculate the peak force required.

For example, with a moving mass of 100 g, and an acceleration of 40 m/s^2 , the peak force required during acceleration will be 4 N.

2. RMS force

The RMS force is calculated with the equation:



$$F_{cont} = \sqrt{\frac{F_p^2 \cdot t_1 + F_p^2 \cdot t_2}{t_1 + t_2 + t_3}}$$

where

F_{cont}= Continuous Force

F_p= Peak Force

t_1= Acceleration Time

t_2= Deceleration Time

t_3= Dwell Time

Using the example described above, if the stroke is 4 mm and if the time to complete motion is 0.02 s, then the velocity will be 400 mm/s, with an acceleration of 40 m/s^2. The peak force will be 4 N. If the dwell time is 0.05 s. then

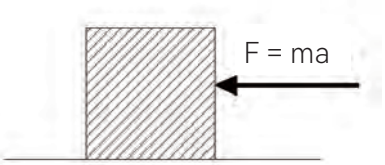
$$F_{cont} = \sqrt{\frac{F_p^2 \cdot t_1 + F_p^2 \cdot t_2}{t_1 + t_2 + t_3}} = \sqrt{\frac{4^2 \cdot 0.01 + 4^2 \cdot 0.01}{0.01 + 0.01 + 0.05}} = 2.14\text{N}$$

Hence, we can select a voice coil motor with a peak force that exceeds 4 N and with a continuous force that exceeds 2.14 N.

Direct Drive Rotary Motors

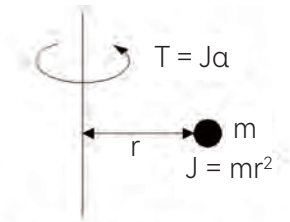
1. Peak torque and continuous torque

The torque ratings of a DDR motor must meet the torque requirements of the application. In other words, the peak torque and continuous torque of the motor must be higher than the peak torque and RMS (root mean square) torque of the application. Otherwise, the motor will not be able to accelerate as fast as needed, or the motor will over heat after some time.



Linear motion

For linear motion, by Newton's second law, F = ma, where F is the force needed to move an object in N, m is the moving mass in Kg, a is the acceleration in m/s^2.



Rotary motion

Similarly, for rotary motion, T = Jα, where T is the torque needed to rotate an object in Nm, J is the moment of inertia in Kgm^2, and α is the angular acceleration, in radians/s^2.

For an application, we can compute the peak torque and RMS torque required:

Peak torque during acceleration/deceleration, T = Jα

$$T_{\text{cont}} = \sqrt{\frac{T_a^2 \cdot t_a + T_c^2 \cdot t_c + T_d^2 \cdot t_d + T_w^2 \cdot t_w}{t_a + t_c + t_d + t_w}}$$

T_a = Acceleration Torque — t_a = Acceleration Time
T_c = Cruise Torque — t_c = Cruise Time
T_d = Deceleration Torque — t_d = Deceleration Time
T_w = Dwell Torque — t_w = Dwell Time

A motor should be selected based on the computed peak torque and RMS torque required. A safety factor of 20–30% may be used, especially if friction and external opposing torque are assumed to be zero in the calculation.

Akribis provides motor selection software, where the peak torque and RMS torque are computed automatically, and a motor is recommended after you key in the application parameters.

Akribis DDR motors are designed with very high torque density, providing higher peak torque and continuous torque compared to conventional motors design.



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2. Motor inertia – the smaller the better

In the torque equation, T = Jα, much higher acceleration can be achieved if the moment of inertia is smaller. The moment of inertia used in the computation actually comprises 2 parts: the moment of inertia of the motor and the moment of inertia of the load.

In many cases, the moment of inertia of the motor actually contributes a large percentage of the total moment of inertia. This means that the motor torque is used mainly to rotate itself. Little torque is left for the moment of inertia of the load.

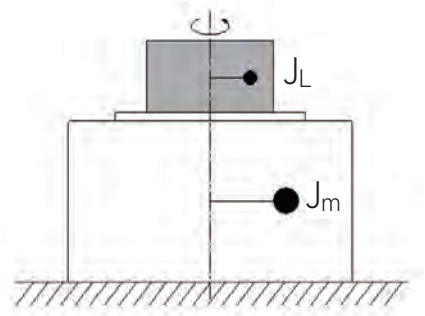


Illustration of motor inertia and load inertia

This often creates a dilemma for design engineers. The objective is to achieve a higher target performance, with higher acceleration, to reduce cycle time. Hence, higher torque is needed. In order to get higher torque, engineers need to select bigger motors with higher torque ratings. However, the bigger motor also comes with a larger motor inertia, and this result in higher torque is needed. The bigger motor may not meet the objective of achieving higher target performance after all.

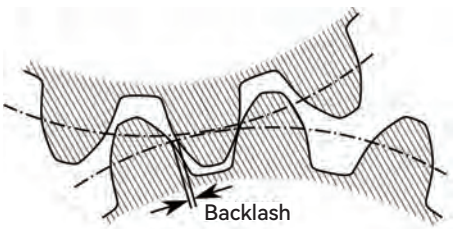
Therefore, a DDR motor with a smaller moment of inertia is an advantage. It should be noted that DDR motors with an outer rotor design will naturally have much higher moment of inertia.

Akribis ADR-A series motors are designed with optimal moment of inertia. The torque density to motor inertia ratio is excellent.

3. Does the moment of inertia of the motor have to match the moment of inertia of the load?

When using conventional servo motors with mechanical transmission systems, it is a common practice to match the motor inertia to the load inertia. Ratios of 1:5, or up to 1:10 are used. For DDR motors, it is not necessary to match the motor inertia to the load inertia.

In conventional servo motor applications, mechanical transmissions such as belts, pulleys, rack and pinion etc introduce backlash. Hence, during very small rapid motions when reversing direction of motion, the load may be decoupled from the motor for a short period of time. This creates instability in the control system. Inertia matching is used to solve this problem, so that the controller can operate in a stable manner.

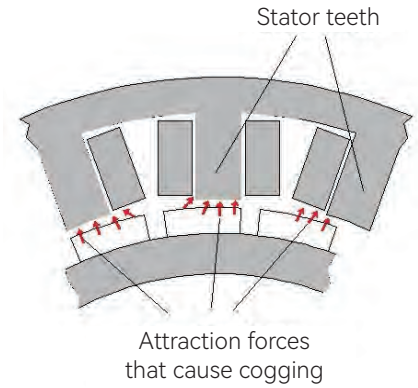


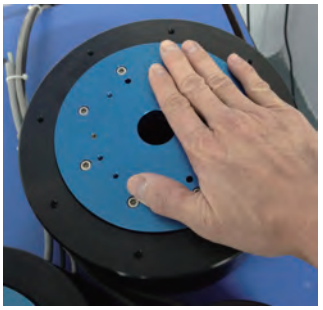
In a DDR application, the load is directly coupled to the motor without any transmission device, so there is no backlash. Consequently, there is no need for inertia matching.

4. Cogging or detent torque

DDR motors with teeth on the iron core laminations will have a cogging effect. The figure below illustrates cogging torque caused by the attraction force between the stator teeth and the magnets.

Cogging torque can be felt when you try to rotate a motor with your hand. You will feel some opposing force at certain positions.




Rotate motor by hand to feel cogging effect

The disadvantage of cogging torque is that it causes torque ripple during motion, which causes velocity ripple as well. Motion controllers can compensate the effect to a certain extent, but for slow speed applications where constant velocity is required, the effect of cogging will be detrimental.

Another disadvantage of cogging is that it affects motion settling performance, and jittering at target position.

Akribis ADR motor is designed with minimal cogging torque, due to the optimized slot/pole configuration, and the introduction of tooth tips in the stator laminations. The maximum cogging torque, peak to peak is published in our data specifications.

The ACD and ACW series motors are using coreless design, which means that they do not have any cogging torque.

5. Maximum speed

In fast motion application, the speed of the motor can be very high. Therefore, it is important to consider the type of windings required for the application, and ensure that the bus voltage from the amplifier is sufficient to overcome the back EMF voltage.

To put it simply, the bus voltage should be greater than the sum of the voltage generated by the back EMF, and the peak current multiplied by the terminal resistance of the motor:

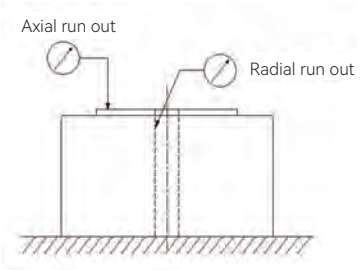
$$U_{bus(dc)} > \sqrt{6}\sqrt{\left(\frac{K_e \cdot n_{max}}{\sqrt{6}} + \frac{i \cdot R_{hot}}{2}\right)^2 + \left(\frac{\pi \cdot i \cdot L \cdot p \cdot n_{max}}{120000}\right)^2}$$

Symbol	Definition	Unit
$U_{bus(dc)}$	DC bus voltage	Vdc
K_e	Back EMF constant (line, peak value)	Vpeak/rpm
n_{max}	Max. angular speed	rpm
i	Peak current (rms value)	Arms
R_{hot}	Resistance (@working temperature, line)	Ω
L	Inductance (line)	mH

6. Axial and radial run out

The axial and radial run out of a DDR motor is determined by the precision of the bearing used, precision of the machined components and the assembly of the components. The axial and radial run out need to be considered for applications that require higher accuracy.

The axial and radial run out specifications of Akribis DDR motors are shown in the specifications sheet. Standard motors come with normal axial and radial run out values, while higher grade options are available for selection with precision level up to 5 µm.



7. Feedback

Akribis DDR motors typically use optical incremental encoders for feedback. However, other options are available, such as resolvers, absolute encoders and inductive encoders. Optical incremental encoders offer better accuracy and higher resolution compared to resolvers.

All Akribis direct drive rotary motors are equipped with optical encoders. With higher encoder resolution after interpolation, Akribis rotary motors can satisfy your need of precision in any type of demanding applications.

For example, Akribis ADR135 motors are equipped with circular optical encoder scale. With 400X interpolation digital output, the motor can achieve 1202000 counts per revolution. With SINCOS (analog) output and 4096X interpolation rate from servo drive, the motor can achieve 12308480 counts per revolution.

Stages & Systems

1. Accuracy, repeatability and resolution

There are many ways to define the three confusing terms for accuracy, repeatability and resolution. Professor Slocum of Massachusetts Institute of Technology in his book "Precision Machine Design" [1], defines them in a very interesting manner namely:
"Accuracy is the ability to tell the truth"
"Repeatability is the ability to tell the same story over and over again"
"Resolution is how detailed your story is"
[1] A.H. Slocum. Precision Machine Design. Prentice Hall, Englewood Cliffs, New Jersey, 1992.

Typically, a servo positioning system consists of the mechanics (Main structural element and bearing guidance), power system (Motor and electronic components), feedback device and the controller. In short, accuracy has a dual meaning for a positioning system, namely:

Accuracy of the motion is contributed mainly by the bearings and it is the lateral deviation from the ideal motion path or the straight-line accuracy or parallelism of motion accuracy.

Accuracy is the ability of the servo system to reach the target position in which determined by the maximum error between any two points (The target position point and the actual target point) fall within the specified positioning system tolerance.

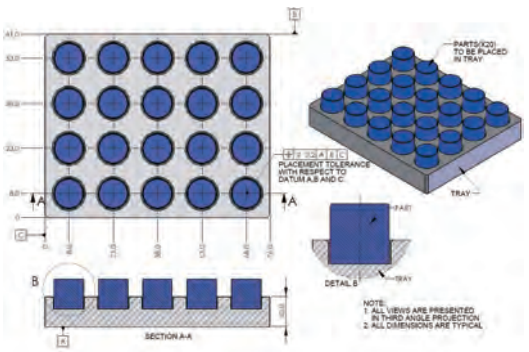
Like accuracy, repeatability has a dual meaning for a positioning system,namely:

Repeatability of the motion is the ability of the bearing to repeat its motion. For linear motion bearings, this is often referred to as the straight-line repeatability or repeatability parallelism of motion.

Repeatability is the ability of the servo system to reach the same position in which determined by the error when moving the load to the same position for multiple attempts within the specified positioning system tolerance.

Resolution in a position system currently is determined by the ability of the bearing to allow for a small increment of motion. It is the smallest mechanical step that the positioning system is capable of making during point to point motion. In other words, it will be meaningless to put an encoder with nanometer resolution on a positioning system with contact type bearing and hoping to achieve nanometer accuracy level for mechanical resolution. For contact type of bearings, 0.1 micron is by far the best achievable results.

The three terms are best illustrated with a pick and place example below. The objective is to place the cylinder into a tray as shown on the right.
The specifications indicate that we have to place the cylinder such that the centre of the cylinder is accurate to within a diameter of 0.2 millimetre, with respect to the three datums marked A, B and C.



In order to meet the specification, it is important that we select a position system with adequate resolution to achieve the require repeatability. The Table below shows a typical example on deciding the positioning resolution.

Description	Value
Tolerance (+/- 3 sigma)	= 0.2 mm
Required repeatability	= 0.2 mm/6 = 0.033 mm
Required resolution	= 0.033 mm/10 = 0.003 mm

Therefore, we should use an encoder with at least 3 microns resolution.

Now, if we successfully move the cylinder instead to the same position, we can note down the actual position ot the cylinder's centre via an independent measurement system. The centre of the cylinder can be plotted as in Figure 2 on the right.

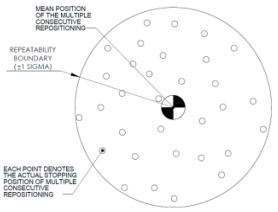


Figure 2: Actual stopping position of cylinder centre

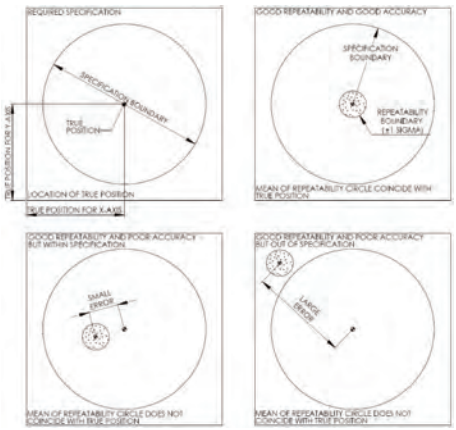


Figure 3: Specifications, Accuracy and Repeatability

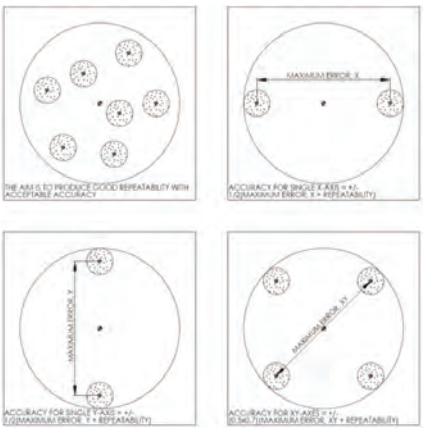


Figure 4: The aim is to produce good repeatability with acceptable accuracy

The mean position of the consecutive repositioning is marked by the centre of a circle which enclose all the points. The boundary of the big circle is the repeatability of the positioning system. Now if we superimpose the repeatability circle onto the given specifications as shown in Figure 3. In positioning system, it is much easier to achieve good repeatability than good accuracy. In many cases, the positioning is not required to be very accurate, repeatable positioning systems are capable to positioning within the required specifications given the proper positioning resolution as shown in Figure 4. It is economical to build a system which is repeatable and correct the accuracy using calibration and error compensation in the controller.

2. The relationship between force and speed

To relate the terms force and speed, let's take a look at the 7 common terms in physics when dealing with positioning systems, namely:

Description	Units	Symbol
Force	N	F
Load or mass	kg	m
Time	s	t
Acceleration	m/s^2	a
Velocity	m/s	v
Displacement	m	s
Torque	Nm	W
Power	Nm/s, Watt	P

This equation is known as the equation of motion and it gives the instantaneous value of the acceleration corresponding to the instantaneous values of the forces that are acting.

If an object starts moving from rest, its initial velocity is zero, the relationship between velocity and acceleration is given by the equation, $v = at$

Likewise, the relationship between displacement, velocity and acceleration is given by equation, $s = ½ at^2$

When force is applied to an object or load and displaced (moved) it over a distance, the work done by the force during the displacement is related by the equation, $W = Fs$

When time comes into the equation, we have power which is the rate of doing work and it is related to velocity by the equation, $P = Fv$

Now, let's relate all these terms back to positioning systems. The objective of a positioning system is to position a tool (which is the load) with respect to a workpiece. We are always concerned over how fast (which is related to time) we can perform this task of moving (which is displacement) the tool to the workpiece (which is the work to be done). To do this work, there are many types of motors available.

The capacity of a motor is measured by the rate in which it can do work or deliver energy. The total work done or energy output is not a standard measurement of the motor capacity. A motor no matter how big or small can deliver a large amount of energy if given sufficient time. On the other hand, a large and powerful motor can deliver a large amount of energy in a short period of time. In other words, if we want to travel from one point to another, we can reach that place travelling either in a small car or a big car. The only different is how long to reach the place when the same route is used. Similarly, a sport car can reach a speed of 100 km/h in 5 seconds and within a very short distance. A family car can also reach 100 km/h, but maybe in 12 seconds and need a longer distance. The different is in the capacity of the engine which can produce more power to accelerate the mass of the car in a very short time, thus over a very short distance.

Given the same load and travel distance, a bigger motor will be able to accelerate its load in a shorter time and at a higher velocity when compared to a smaller motor.

Motors Drive and Control Solutions Recommendation

Akribis CASD		AC/DC power supply Pulse, velocity simulation or current mode EtherCAT
Agito AGM800		Real-time synchronized control for up to 8 axes with 61 µs servo sampling time. 16 kHz servo sampling rate, less than 8 ns synchronization jitter.
Agito AGD155/AGD101		AC/DC power supply EtherCAT 16kHz servo sampling rate
Agito AGD301		High performance 3-axis centralized motion servo driver, up to 90 Vdc, 9 Arms continuous current per axis. 16 kHz servo sampling rate, ideal for highly coordinated applications.
Akribis SASD		DC power supply The smallest size is 56 × 53 × 32 mm (Greater power density). High EMC performance, compliant with medical industry requirements.
Mitsubishi MR-J4/MR-J5		AC power supply Pulse, SSCNETIII/H network mode/EtherCAT Power rating up to 22 KW
Panasonic A5L/A6L		AC/DC power supply Pulse, velocity simulation or current mode/EtherCAT
Copley Xenus/Plus/Accelnet		AC/DC power supply Pulse, velocity simulation or current mode/EtherCAT
Trust Automation TA115/TA310/TA330		Linear amplifier Velocity simulation or current mode Low current ripple
ACS CMhp/xa		AC power supply Driver and multi-axis controller integrated Optional configuration Excellent servo performance
ACS SPiiPlusEC		Programmable motion controller EtherCAT network control Maximum support 64 axes Special motion trajectory planning function
ACS UDMmc		Maximum support 4 axes, 20 A current PWM output 12 V-80 VDC input Support voice coil motors, brushless motors, and stepper motors Collaborate with ACS network controller

Linear Encoder Product Recommendation

Akribis ABA50/ABA20		Absolute encoder Support Biss-C, Endat 2.2 optional Resolution from 50 nm
Akribis ABI51/ABI52/ABI54		Optical incremental encoder Optional resolution of 0.1 µm, 0.05 µm, SINCOS Wide alignment tolerance
Akribis NBA2000		True Dual-Track Absolute Magnetic Grating Encoder Support serial communication protocols: BISS-C, SSI, Tamagawa, Panasonic, RS-485, etc. Resolution up to 0.1 µm
Renishaw RGH/ATOM/Quantic		Metal/glass/stainless steel encoder scales Resolution from 10 µm to 1 nm

*Please contact Akribis Sales engineers for more details (cust-service@akribis-sys.com).

Questions and Answers

1. What is the maximum payload that the motor can drive?

From Newton's law F = ma, the force applied is proportional to mass and acceleration. Hence, as long as the force can overcome fiction force, a heavy mass can be moved with relatively small force except that the acceleration of this mass will be small. For example, a AUM 2-S2 motor with peak force of 88N can move a 10Kg load with maximum acceleration of 8.8m/s^2 when moving horizontally.

2. How about the maximum payload in vertical orientaiton?

In vertical movements, the motor needs to overcome gravity in addition to providing force for upward vertical motion (F = mg + ma). In this case, the maximum load is determined by the maximum force divided by 9.81 m/s^2. If the vertical force has to be sustained continuously, the maximum load will be the continuous force of the motor. For example, the maximum vertical load for AUM2-S2 motor will be 2.2 Kg, since the continuous force for this motor is 22 N. If the load is supported by a counterbalance (such as a spring), then the AUM2-S2 motor can move a heavier load in a vertical position.

3. What is the maximum speed of a motor or module?

There is no theoretical limit for the speed of a linear motor because there is no contact. However, the speed is typically limited by the mechanical bearings. For example, for linear guidance system using rails and runner blocks, the maximum speed is typically limited to 5 m/s. This is why in most applications, the speed for linear motors is limited to 5 m/s. An option of using ceramic ball bearings allow speeds of up to 10 m/s. Using air bearings also enable higher speeds to be possible.

4. How about the maximum acceleration?

For acceleration, as explained by Newton's law (F = ma), it is dependent on the maximum force (peak force) of the motor as well as the mass to be moved.

5. What is the maximum length that a linear motor can reach?

There is no length limitation for AUM, ALM and AKM linear motors as both their motor tracks and the linear rails can be extended by joining sections together. Additionally, the linear scale for encoder feedback is available in long lengths enabling motor setups of 20 meters or more. In contrast, RDM rod motor uses a single piece magnet track enclosed by end caps which prevents track extension. Therefore, the required length must be defined during design phase.

6. What happens to a linear motor when power is cut off suddenly?

In the event of a sudden power failure, the linear motor will continue to move forward due to inertia until it collides with the end or stops due to friction. Usually, this is not a problem, but there may be safety concerns in some applications.

In general, a braking device can be installed to activate when the power is cut off, so that the motor can stop immediately. This type of braking device is usually mounted on the guide rail of a linear guide system.

7. Is linear motor suitable for clean room applications?

Yes, linear motors can be used in clean room environement. In fact, many front-end semiconductor applications have been using linear motors. For example, in wafer fabrication plants, high precision lithography machines use linear motors for very high precision XY position stage, with nanometer resolutions and sub-micron accuracy, in clean room class 10 facilities.

With linear motor gaining popularity in more applications, linear motors are now also used in other applications, such as semiconductor back end packaging, testing, pick and place, hard disk assembly and testing etc. Such applications are also being applied in a clean room environment.

The advantages of linear motor over traditional ball screw drives in clean room environment are:

- No contact in the drive actuator. Hence there is no wear and tear which causes particle generation
- No lubricant needed on the linear motor. Lubricants are a source of contamination

8. What is the effect of magnetic field from linear motors?

In some applications, there may be concerns about magnetic fields from linear motors affecting sensitive components. For such cases, ironless linear motors like AUM or ALM series are recommended as their closed magnetic circuit ensures the magnetic field outside the magnet track is negligible. In contrast, iron core linear motors (like AKM) and rod motor (RDM) do emit magnetic field within approximately 50-60mm of the magnet track. However, this field decays as the distance increases and remain constant and does not generate any RFI.

9.Ferrite bead

Ferrite beads (FB) are connected to the terminals of electric motors to filter the voltage spikes from the motor driver. Voltage spikes will cause insulation failure of electric motors. When the output voltage of the driver is not stable, the ferrite bead can protect the motor from being damaged by the voltage spikes.
In addition to ferrite beads, Akribis provides high quality cables with shielding layer and motor driver with high SNR (signal-noise ratio) to guarantee the high-performance of the motors.

10.Hall sensor

Hall sensors use the Hall Effect to output voltage signal indicating the position information of the motor mover. The motor driver can implement commutation of the motor based on this information. The combination of Hall sensor and high-resolution encoder can improve the accuracy of commutation. Akribis provides professional solutions of encoder commutation.

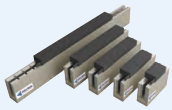
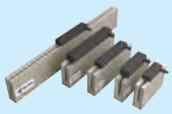
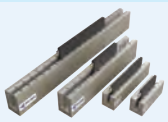
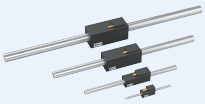
LINEAR MOTORS

LINEAR MOTORS

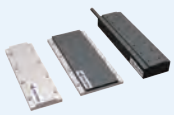
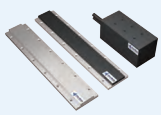
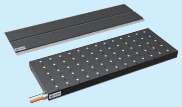
Overview

Akribis linear motors can be categorized into iron core and ironless series. Consisting of motor coils and magnet tracks, Akribis linear motors provide unparalleled advantages and features to improve system performance and efficiency: high speed, high acceleration, low velocity ripple, low operation noise, superior stability, wear & tear free, maintenance free and long travel stroke. Akribis offers various sizes and types of linear motors with force range from 3N to 16000N, as well as different cooling options like natural convection, air cooling and water cooling.

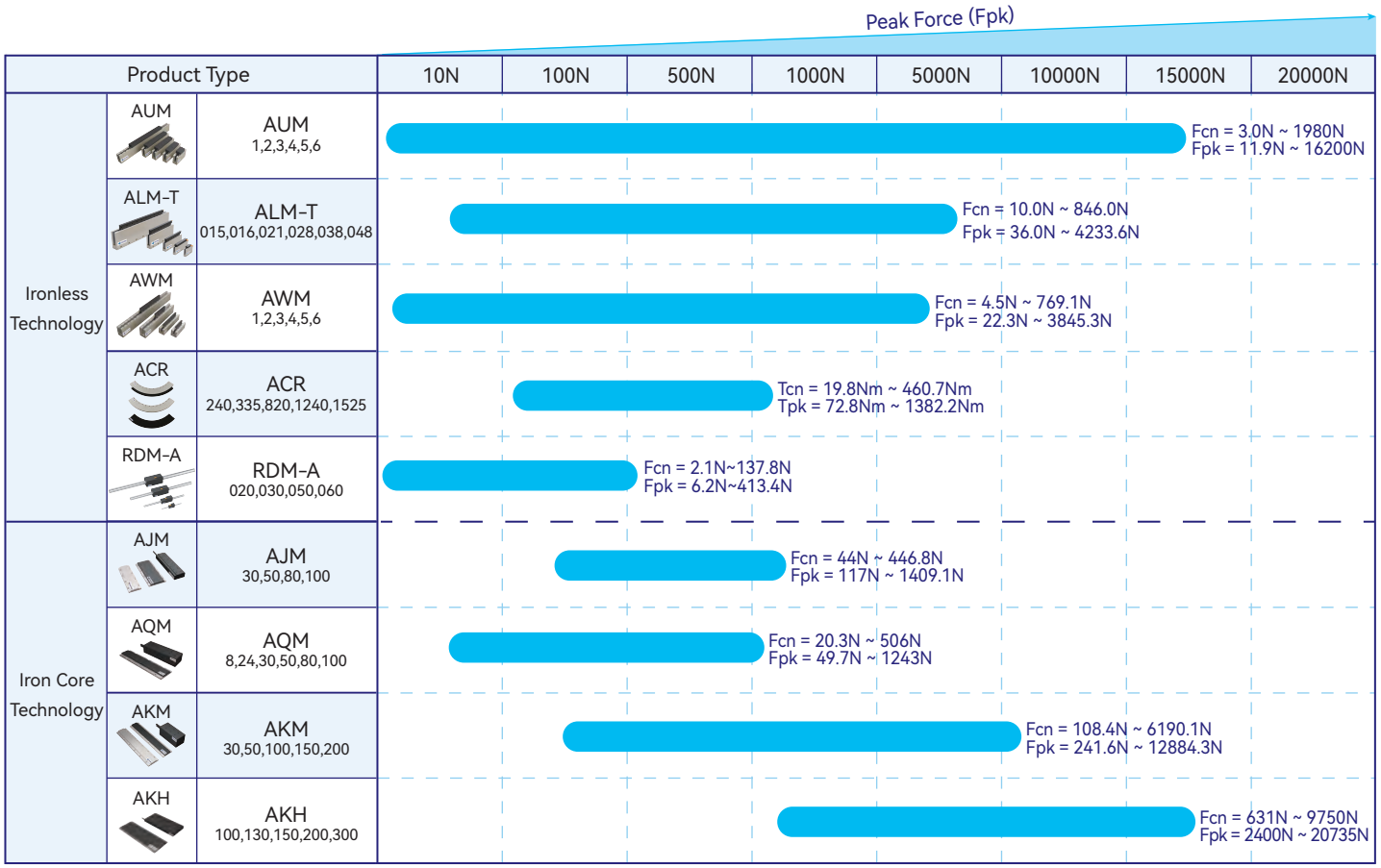
Ironless Technology

 AUM Series	• High force and stiffness • High motor constant • Efficiency • Low energy consumption	▶Applicable to: • Point-to-point micron/nanometer level positioning • High/low speed applications with demanding velocity ripple or motion profile requirements • Precise force control	★Applications: Wafer/LCD/PV/battery handling, testing, inspection and assembly, laser processing machines, metrology equipment and gene sequencing machines and other medical equipment
 ALM-T Series	• Small thickness, light weight and high force density • Zero cogging force and smooth operation • High dynamic response • Optional digital hall modules	▶Applicable to: • Point-to-point micron/nanometer level positioning • High/low speed applications with demanding velocity ripple or motion profile requirements • Precise force control	★Applications: Semiconductor, flat panel display, ultra-precision stages, biomedicine/ lab automation, optics
 AWM Series	• High force and stiffness • High motor constant • Efficiency • Low energy consumption • Shorter coil	▶Applicable to: • Submicron/nanometer level positioning in vacuum environment	★Applications: Vacuum inspection equipment in both front-end and back-end semiconductor industries
 ACR Series	• Zero cogging force • Large center hole • Thin and compact coil with low motor mass • Configurable angle of rotation by attaching multiple magnet tracks	▶Applicable to: • Point-to-point micron/nanometer level positioning • High/low speed applications with demanding velocity ripple or motion profile requirements	★Applications: Wafer/LCD inspection equipment, laser processing machines and metrology equipment
 RDM-A Series	• Compact size • Full utilization of flux lines • Ironless, no cogging force • Convenient replacement of lead screw upgrade • Multi-mover on one track available	▶Applicable to: • Point-to-point micron/nanometer level positioning • High/low speed applications with demanding velocity ripple or motion profile requirements • Precise force control	★Applications: High-speed printer, biomedical equipment, semiconductor equipment, CNC (wire cut EDM machine, etc.), single/multi-axis module platform, counterpoint platform, Z-axis pick-and-place module

Iron Core Technology

 AJM Series	• High force and stiffness • High temperature tolerance • Low cogging force • Max bus voltage 600Vdc	▶Applicable to: • Point to point micron meter level positioning • Applications with high force, speed and acceleration requirements • Higher cost-effectiveness in long stroke applications	★Applications: Wafer/LCD/PV/battery handling, testing, dispensing and assembly, laser processing machines, packaging machines and printing equipment
 AQM Series	• High force and stiffness • High temperature tolerance • Low cogging force • Max bus voltage 600Vdc • Narrow width • Cost-effective	▶Applicable to: • Point to point micron meter level positioning • Applications with high force, speed and acceleration requirements • Higher cost-effectiveness in long stroke applications	★Applications: Wafer/LCD/PV/battery handling, testing, dispensing and assembly, laser processing machines, packaging machines and printing equipment
 AKM Series	• High force and stiffness • High temperature tolerance • Low cogging force • Max bus voltage 600Vdc • Patented water cooling design	▶Applicable to: • Point to point micron meter level positioning • Applications with high force, speed and acceleration requirements • Higher cost-effectiveness in long stroke applications	★Applications: Wafer/LCD/PV/battery handling, testing, dispensing and assembly, laser processing machines, packaging machines, printing equipment and machining centers
 AKH Series	• Natural cooling, water cooling optional • Small size and high thrust force • High response and bandwidth • High motor constants • Patented water cooling design • Max bus voltage 600Vdc	▶Applicable to: • Suitable for applications with strict requirements of speed, accuracy, and response performance • Also, applicable to point-to-point micron level positioning with max speed of 5m/s or faster	★Applications: CNC machines， including laser processing machines, mold machines, lathes, grinders, etc; high-speed positioning system for handling applications; semiconductor, PV, lithium battery, glass and LCD

Overview

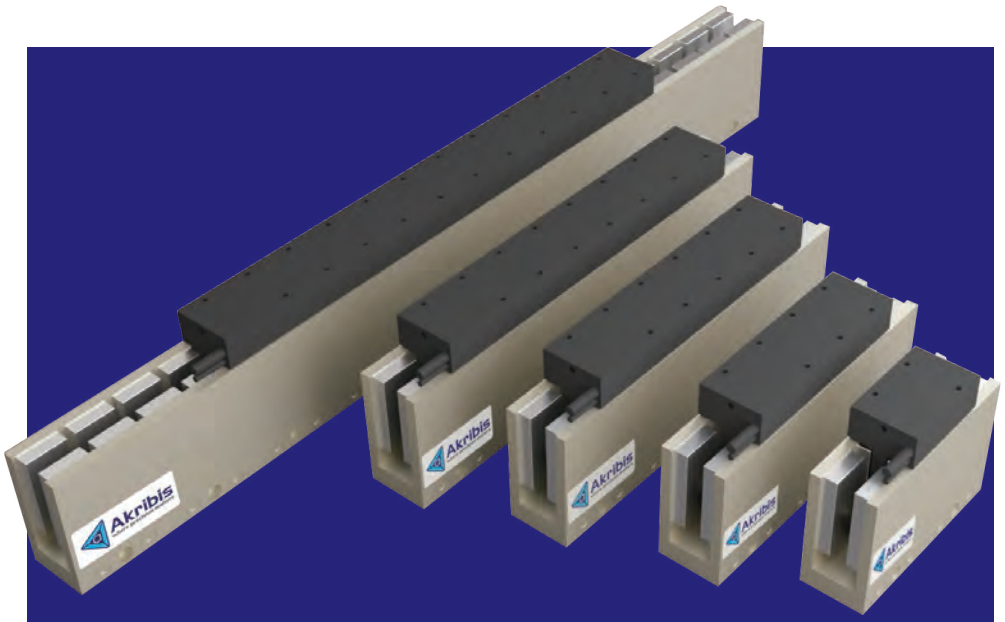


Flexible structure design contributes to excellent and simple high-precision control system:

- Multi-carriage structure
- Optional moving track design instead of moving coil, eliminating cable management and potential cable damage
- Multiple coils can be connected in series or parallel to generate higher force and faster speed while maintaining compact size

Please contact Akribis Sales engineers for more details （cust-service@akribis-sys.com）.

Applications & Industries: electronics, semiconductor, solar energy, lithium battery, PCB, FPD, HDD, LED, lathe, vehicle electronics, packaging, printing, optics, biomedical and many more.



AUM SERIES

- Ironless technology
- Zero cogging force
- Patented technology
- Small electrical and mechanical constant
- High continuous force and peak force

EN-26.3.1

Akribis systems

AUM Series

Introduction

AUM series Ironless brushless linear motors are compact in size but high in force density, achieving larger thrust force.

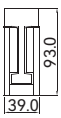
Continuous Force Fcn = 3N ~ 1980N
Peak Force Fpk = 11.9N ~ 16200N

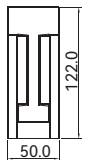
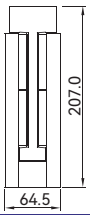
Applications

- Ironless technology and no cogging force
- High continuous and peak force
- Optional hall sensors
- High motor constant
- Wide range of forces and sizes to choose from
- Optional air cooling and water cooling configurations

Features

Applicable to point-to-point micron/nanometer level positioning; unlimited travel stroke with top speed of 5m/s or faster; low velocity ripple during both fast and low speed scanning; precise force control with fine resolution.
Applications & Industries: high speed and precision machines for positioning, motion profile tracking, velocity controlling used in front-end & back-end wafer handling and inspection, photovoltaic and lithium battery systems, glass and LCD applications, biomedical equipment, printing machines and laser processing machines.

	Model	Coil Length[1] (mm)	● Continuous Force (Fcn) / ■ PeakForce (Fpk)[2] Unit: N 10 50 100 500 1000 1500 2000 ....
	AUM1-S1	22	● 3 / ■ 11.9
	AUM1-S2	43	● 6 / ■ 23.8
	AUM1-S3	64	● 8.9 / ■ 35.7
	AUM1-S4	85	● 11.9 / ■ 47.6
	AUM1-S5	106	● 14.9 / ■ 59.5
	AUM2-S1	31	● 8.8 / ■ 44
	AUM2-S2	61	● 17.6 / ■ 88
	AUM2-S3	91	● 26.4 / ■ 132
	AUM2-S4	121	● 35.2 / ■ 176
	AUM2-S6	181	● 52.8 / ■ 264
	AUM2-S8	241	● 70.4 / ■ 352
	AUM3-S1	61	● 28 / ■ 144
	AUM3-S2	121	● 57 / ■ 289
	AUM3-S3	181	● 85 / ■ 433
	AUM3-S4	241	● 113 / ■ 578
	AUM3-S5	301	● 141 / ■ 722
	AUM3-S6	361	● 170 / ■ 867
	AUM4-S1	61	● 55 / ■ 312
	AUM4-S2	121	● 110 / ■ 624
	AUM4-S3	181	● 166 / ■ 936
	AUM4-S4	241	● 221 / ■ 1248
	AUM4-S5	301	● 276 / ■ 1560
	AUM4-S6	361	● 331 / ■ 1872
	AUM4-S8	481	● 442 / ■ 2496

	Model	Coil Length[1] (mm)	● Continuous Force (F_{cn}) / ■ PeakForce (F_{pk})[2] Unit: N 10 50 100 500 1000 1500 2000 ....
	AUM5-S1	85	●98 / ■707
	AUM5-S2	169	●197 / ■1415
	AUM5-S3	253	●295 / ■2112
	AUM5-S4	337	●393 / ■2830
	AUM5-S5	421	●491 / ■3537
	AUM5-S6	505	●590 / ■4244
	AUM5-S8-V107	673	●786 / ■5659
	AUM5-S9-V80	757	●884 / ■6367
	AUM5-S10-V107	841	●983 / ■7078
	AUM5-S12-V107	1009	●1179 / ■8489
	AUM6-P5-S4	337	●660 / ■5400
	AUM6-P8-S6	505	●990 / ■8100
	AUM6-P5-S8	673	●1320 / ■10800
	AUM6-P8-S9	757	●1485 / ■12150
	AUM6-P7-S10	841	●1650 / ■13500
	AUM6-P8-S12	1009	●1980 / ■16200

[1] AUM1 Series Coil Length is based on the No Hall Module Option.

[2] Continuous force is measured under the condition of natural cooling. Please refer to the detail parameters for the continuous under the condition of air cooling or water cooling.

AUM1

			AUM1-S1	AUM1-S2	AUM1-S3	AUM1-S4	AUM1-S5
Performance Parameters	**Symbol**	**Unit**	**Series**	**Series**	**Series**	**Series**	**Series**
Continuous Force (NC) @100°C ❶	F_{cn}	N	3.0	6.0	8.9	11.9	14.9
Peak Force	F_{pk}	N	11.9	23.8	35.7	47.6	59.5
Force Constant ±10%	K_f	N/Arms	1.75	3.50	5.25	7.00	8.75
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	1.4	2.9	4.3	5.7	7.1
Motor Constant @25°C	K_m	N/Sqrt(W)	1.4	2.0	2.4	2.8	3.2
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	1.11	2.18	3.18	4.18	5.18
Inductance (L-L) ±50% ❸	L	mH	0.15	0.30	0.44	0.59	0.72
Electrical Time Constant	τ_e	ms	0.14	0.14	0.14	0.14	0.14
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	1.7	1.7	1.7	1.7	1.7
Peak Current	I_{pk}	Arms	6.8	6.8	6.8	6.8	6.8
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	6.20	12.18	17.77	23.32	28.94
Max. Coil Temperature	t_{max}	°C	100	100	100	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	0.1	0.2	0.2	0.3	0.4
Max. Bus Voltage	U_{bus}	Vdc	60	60	60	60	60
Magnetic Period	τ_{NN}	mm	21.0	21.0	21.0	21.0	21.0
Attraction Force	F_a	kN	0	0	0	0	0
Mechanical Parameters							
Coil Mass (NC)	m_{cn}	kg	0.03	0.05	0.08	0.10	0.13
Coil Length (NC)	L_{cn}	mm	22.0	43.0	64.0	85.0	106.0
Track Mass Per Meter	m_{track}	kg/m	2.37	2.37	2.37	2.37	2.37
Other Information							
Insulation Class			Class B (130°C)				
Protection Grade			IP00				
Compliance with Global Standards			RoHS, CE				
Ambient Temperature	Operation		0°C to 40°C (non-freezing)				
	Storage		-15°C to 70°C (non-freezing)				
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)				
	Storage		10%RH to 90%RH (non-condensing)				
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.				

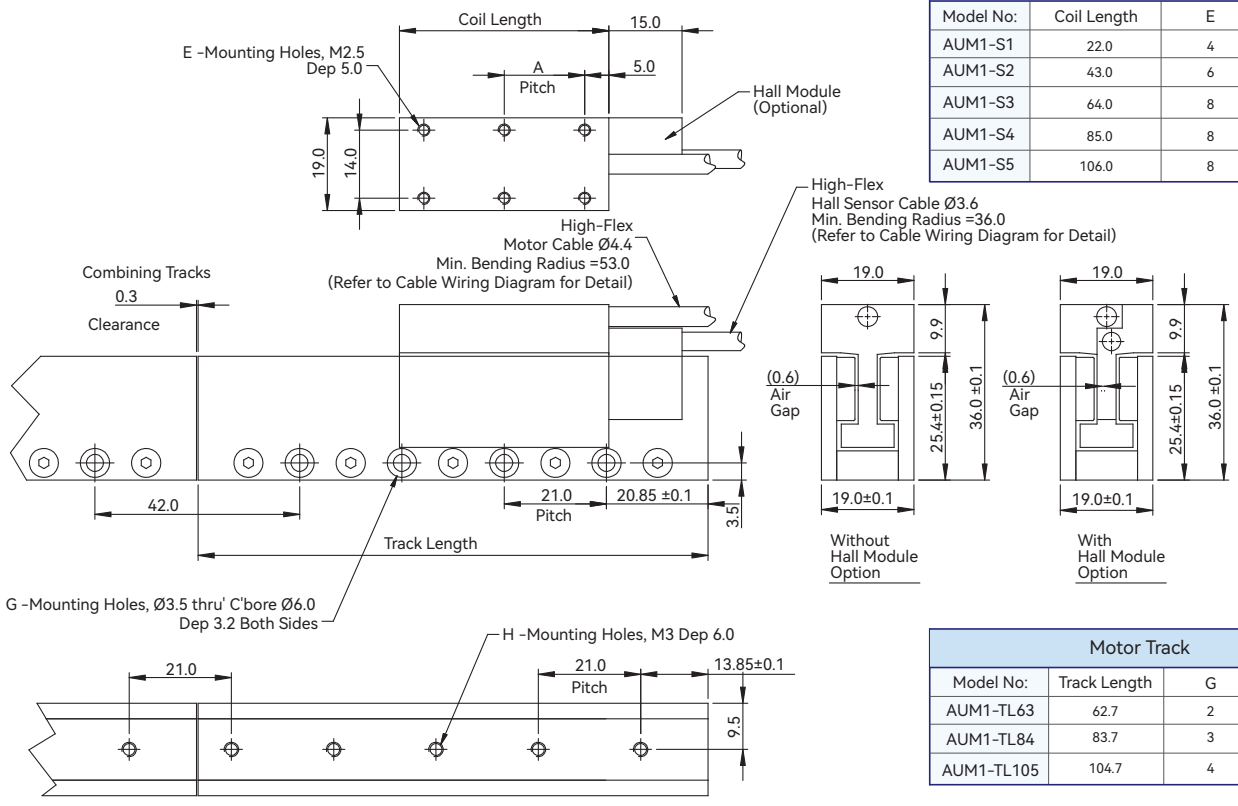
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling, AC-Air Cooling, WC-Water Cooling.

❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz. The variation range of AUM inductance is ±50% because three phase inductances are different. The value in the catalog is the average between the maximum and minimum values. For each phase, the variation range is ±25%.

The contents of datasheet are subject to change without prior notice.

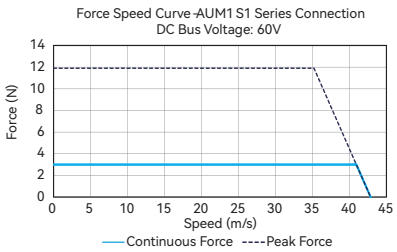
■ Dimension

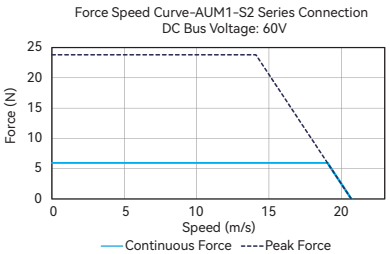


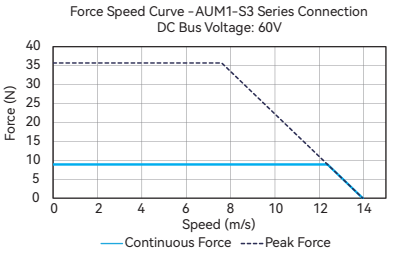
Motor Coil			
Model No:	Coil Length	E	A
AUM1-S1	22.0	4	12.0
AUM1-S2	43.0	6	16.5
AUM1-S3	64.0	8	18.0
AUM1-S4	85.0	8	25.0
AUM1-S5	106.0	8	32.0

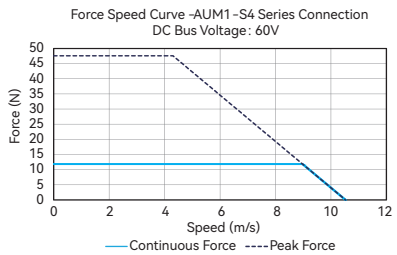
Motor Track			
Model No:	Track Length	G	H
AUM1-TL63	62.7	2	3
AUM1-TL84	83.7	3	4
AUM1-TL105	104.7	4	5

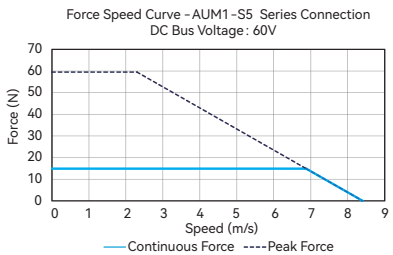
Force-Speed Curve











Part Numbering

Motor Coil

AUM1-S-S3-HF-0.5-FB

- Motor: AUM1
- Connection: S = Series
- Size: S1 / S2 / S3 / S4 / S5
- Hall Cable Option: NH[1] / HF[2] / H9D[3]
- Cable Length (m): 0.5 / 3.0
- Motor Cable Options: FB[4] / NFB[5]

1. NH = Without Built- in Hall Cable
2. HF = With Hall Module, Hall Cable C/W Flying Leads
3. H9D = With Hall Module C/W 9-Pins D-Sub Connector
4. FB = With Ferrite Bead C/W Flying Leads
5. NFB = Without Ferrite Bead C/W Flying Leads

Motor Track

AUM1-TL63

- Model: AUM1
- Track Length: TL63 / TL84 / TL105

AUM2

			AUM2-S1	AUM2-S2		AUM2-S3		AUM2-S4		AUM2-S6		AUM2-S8	
Performance Parameters	Symbol	Unit	Series	Series	Parallel	Series	Parallel	Series	Parallel	Series	Parallel	Series	Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	8.8	17.6	17.6	26.4	26.4	35.2	35.2	52.8	52.8	70.4	70.4
Peak Force	F_{pk}	N	44.0	88.0	88.0	132.0	132.0	176.0	176.0	264.0	264.0	352.0	352.0
Force Constant ±10%	K_f	N/Arms	5.5	11.0	5.5	16.5	8.3	22.0	11.0	33.0	16.5	44.0	22.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	4.5	9.0	4.5	13.5	6.7	18.0	9.0	26.94	13.47	35.9	18.0
Motor Constant @25°C	K_m	N/Sqrt(W)	2.5	3.5	3.5	4.3	4.2	5.0	4.9	6.1	6.0	7.1	7.1
Resistance (L-L) 25°C ±10%[2]	R_{25}	Ω	3.25	6.64	1.71	9.95	2.63	13.17	3.35	19.75	5.00	25.76	6.51
Inductance (L-L) ±40%[3]	L	mH	1.03	1.96	0.51	2.94	0.73	3.88	0.97	5.88	1.55	7.83	1.96
Electrical Time Constant	τ_e	ms	0.32	0.30	0.30	0.30	0.28	0.29	0.29	0.30	0.31	0.30	0.30
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	1.6	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2	1.6	3.2
Peak Current	I_{pk}	Arms	8.0	8.0	16.0	8.0	16.0	8.0	16.0	8.0	16.0	8.0	16.0
Continuous Power Dissipation (NC) @100°C[1]	P_{cn}	W	16.1	32.9	33.8	49.2	52.1	65.2	66.3	97.7	99.0	127.5	128.9
Max. Coil Temperature	t_{max}	°C	100	100	100	100	100	100	100	100	100	100	100
Thermal Dissipation Constant (NC)[1]	K_{thn}	W/°C	0.2	0.4	0.5	0.7	0.7	0.9	0.9	1.3	1.3	1.7	1.7
Max. Bus Voltage[4]	U_{bus}	Vdc	330	330	330	330	330	330	330	330	330	330	330
Magnetic Period	τ_{NN}	mm	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Attraction Force	F_a	kN	0	0	0	0	0	0	0	0	0	0	0
Mechanical Parameters													
Coil Mass (NC)	m_{cn}	kg	0.06	0.12	0.12	0.18	0.18	0.24	0.24	0.35	0.35	0.47	0.47
Coil Length (NC)	L_{cn}	mm	31.0	61.0	61.0	91.0	91.0	121.0	121.0	181.0	181.0	241.0	241.0
Track Mass Per Meter	m_{track}	kg/m	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
Other Information													
Insulation Class			Class B (130°C)										
Protection Grade			IP00										
Compliance with Global Standards			RoHS, CE, NTRL(option)										
Ambient Temperature	Operation		0°C to 40°C (non-freezing)										
	Storage		-15°C to 70°C (non-freezing)										
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)										
	Storage		10%RH to 90%RH (non-condensing)										
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.										

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling, AC-Air Cooling, WC-Water Cooling.

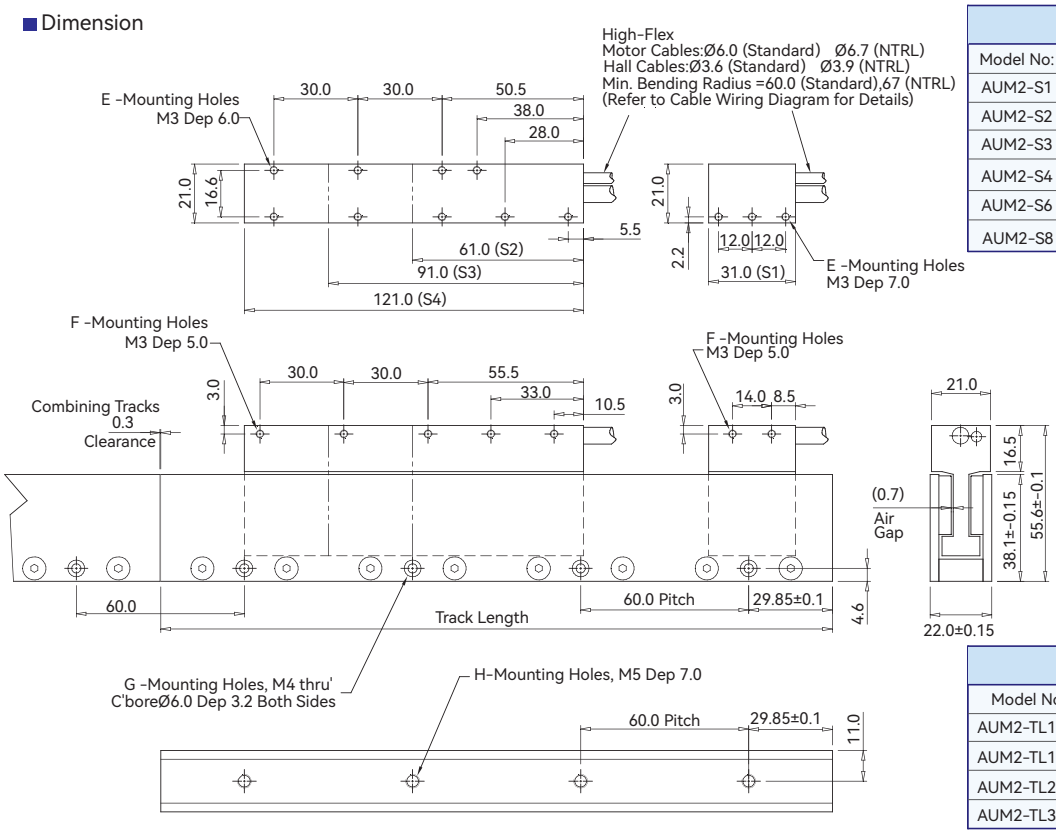
[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz. The variation range of AUM inductance is ±40% because three phase inductances are different. The value in the catalog is the average between the maximum and minimum values. For each phase, the variation range is ±20%.

[4] Both the standard and NTRL versions are recommended to use a bus voltage of up to 330Vdc.

The contents of datasheet are subject to change without prior notice.

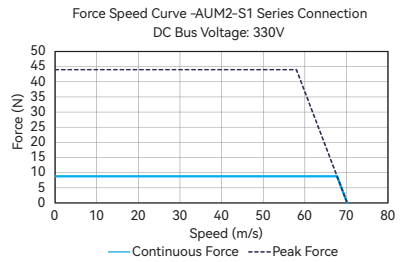
Dimension

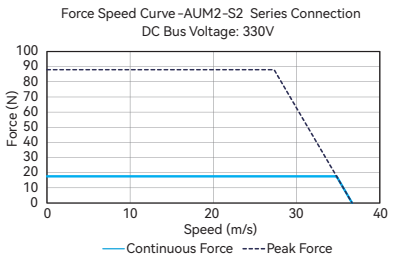


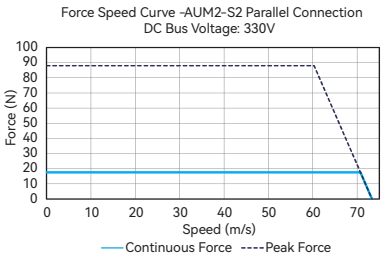
Motor Coil			
Model No:	Coil Length	E	F
AUM2-S1	31.0	3	2
AUM2-S2	61.0	5	5
AUM2-S3	91.0	7	7
AUM2-S4	121.0	9	9
AUM2-S6	181.0	13	13
AUM2-S8	241.0	17	17

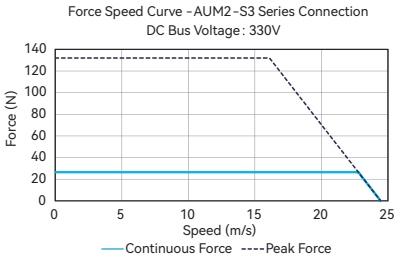
Motor Track			
Model No:	Track Length	G	H
AUM2-TL120	119.7	2	2
AUM2-TL180	179.7	3	3
AUM2-TL240	239.7	4	4
AUM2-TL300	299.7	5	5

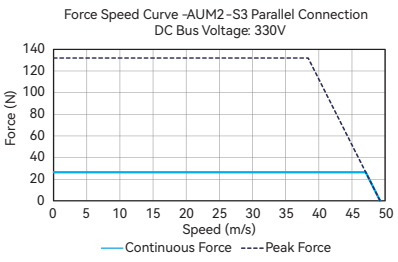
Force-Speed Curve

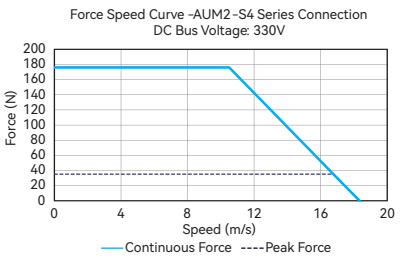


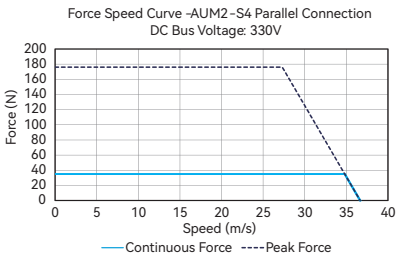


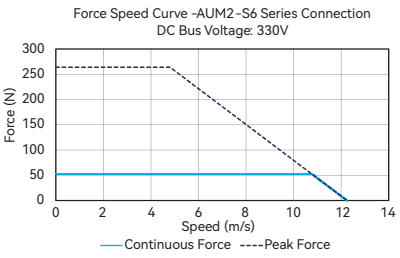


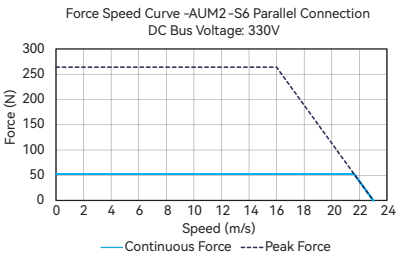


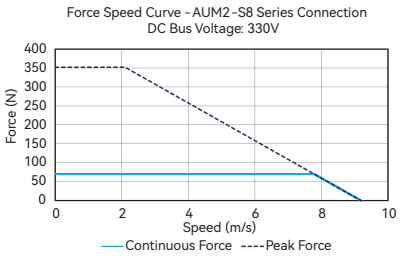


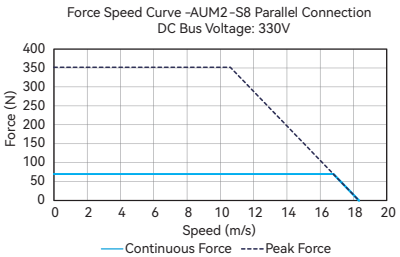












Part Numbering

Motor Coil

AUM2-S-S3-K-HF-0.5-FB-0UA

- **Motor:** AUM2
- **Connection:** S = Series / P = Parallel
- **Size:** S1 / S2 / S3 / S4 / S6 / S8
- **Thermal Sensor:** K = PT100(RTD)
- **Custom Type:** (Blank)❼ / 0UA❽
- **Motor Cable Options:** FB❹ / NFB❺ / 9W4M❻
- **Cable Length (m):** 0.5 / 3.0
- **Hall Cable Option:** NH❶ / HF❷ / H9D❸

❶ NH = Without Built-in Hall Sensor
❷ HF = With Built-in Hall Sensor, Hall Cable C/W Flying Leads
❸ H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
❹ FB = With Ferrite Bead C/W Flying Leads
❺ NFB = Without Ferrite Bead C/W Flying Leads
❻ 9W4M = Without Ferrite bead C/W D-Sub 9W4 Male Connector
❼ (Blank) = Standard Model
❽ 0UA = NTRL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

Motor Track

AUM2-TL120

- **Model:** AUM2
- **Track Length:** TL120 / TL180 / TL240 / TL300

AUM3

			AUM3-S1	AUM3-S2		AUM3-S3		AUM3-S4		AUM3-S5		AUM3-S6
Performance Parameters	Symbol	Unit	Series	Series	Parallel	Series	Parallel	Series	Parallel	Series	Parallel	Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	28	57	57	85	85	113	113	141	141	170
Continuous Force (AC) @100°C[1]	F_{ca}	N	34	68	68	102	102	136	136	170	170	203
Continuous Force (WC) @100°C[1][4]	F_{cw}	N	37	73	73	110	110	147	147	184	184	220
Peak Force	F_{pk}	N	144	289	289	433	433	578	578	722	722	867
Force Constant ±10%	K_f	N/Arms	15.7	31.4	15.7	47.1	23.6	62.8	31.4	78.5	39.3	47.1
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	12.8	25.6	12.8	38.5	19.2	51.3	25.6	64.1	32.0	38.5
Motor Constant @25°C	K_m	N/Sqrt(W)	5.8	8.4	8.2	10.3	10.0	11.9	11.8	13.0	13.0	14.2
Resistance (L-L) @25°C ±10% [2]	R_{25}	Ω	4.90	9.41	2.50	14.09	3.72	18.70	4.74	24.36	6.12	7.33
Inductance (L-L) ±40% [3]	L	mH	3.49	6.99	1.75	10.48	2.62	13.98	3.49	17.47	4.37	5.24
Electrical Time Constant	τ_e	ms	0.71	0.74	0.70	0.74	0.70	0.75	0.74	0.72	0.71	0.71
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	1.8	1.8	3.6	1.8	3.6	1.8	3.6	1.8	3.6	3.6
Continuous Current (AC) @100°C[1]	I_{ca}	Arms	2.2	2.2	4.3	2.2	4.3	2.2	4.3	2.2	4.3	4.3
Continuous Current (WC) @100°C[1][4]	I_{cw}	Arms	2.3	2.3	4.7	2.3	4.7	2.3	4.7	2.3	4.7	4.7
Peak Current	I_{pk}	Arms	9.2	9.2	18.4	9.2	18.4	9.2	18.4	9.2	18.4	18.4
Continuous Power Dissipation (NC) @100°C[1]	P_{cn}	W	30.7	58.9	62.6	88.3	93.2	117.1	118.8	152.6	153.2	183.7
Continuous Power Dissipation (AC) @100°C[1]	P_{ca}	W	44.2	84.9	90.2	127.1	134.2	168.7	171.0	219.7	220.7	264.5
Continuous Power Dissipation (WC) @100°C[1][4]	P_{cw}	W	51.9	99.6	105.9	149.1	157.5	197.9	200.7	257.9	259.0	310.5
Max. Coil Temperature	t_{max}	°C	100	100	100	100	100	100	100	100	100	100
Thermal Dissipation Constant (NC) [1]	K_{thn}	W/°C	0.4	0.8	0.8	1.2	1.2	1.6	1.6	2.0	2.0	2.4
Thermal Dissipation Constant (AC) [1]	K_{tha}	W/°C	0.6	1.1	1.2	1.7	1.8	2.2	2.3	2.9	2.9	3.5
Thermal Dissipation Constant (WC) [1][4]	K_{thw}	W/°C	0.7	1.3	1.4	2.0	2.1	2.6	2.7	3.4	3.5	4.1
Max. Bus Voltage[5]	U_{bus}	Vdc	330	330	330	330	330	330	330	330	330	330
Magnetic Period	τ_{NN}	mm	60	60	60	60	60	60	60	60	60	60
Attraction Force	F_a	kN	0	0	0	0	0	0	0	0	0	0
Mechanical Parameters												
Coil Mass (NC)	m_{cn}	kg	0.22	0.45	0.45	0.68	0.68	0.91	0.91	1.14	1.14	1.37
Coil Length (NC)	L_{cn}	mm	61.0	121.0	121.0	181.0	181.0	241.0	241.0	301.0	301.0	361.0
Coil Length (AC)	L_{ca}	mm	61.0	121.0	121.0	181.0	181.0	241.0	241.0	301.0	301.0	361.0
Coil Length (WC)	L_{cw}	mm	61.0	121.0	121.0	181.0	181.0	241.0	241.0	301.0	301.0	361.0
Track Mass Per Meter	m_{track}	kg/m	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
Other Information												
Insulation Class			Class B (130°C)									
Protection Grade			IP00									
Compliance with Global Standards			RoHS, CE, NTRL(option)									
Ambient Temperature	Operation		0°C to 40°C (non-freezing)									
	Storage		-15°C to 70°C (non-freezing)									
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)									
	Storage		10%RH to 90%RH (non-condensing)									
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.									

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling, AC-Air Cooling, WC-Water Cooling.

[2] Resistance is measured by DC current with standard 0.5 m cable.

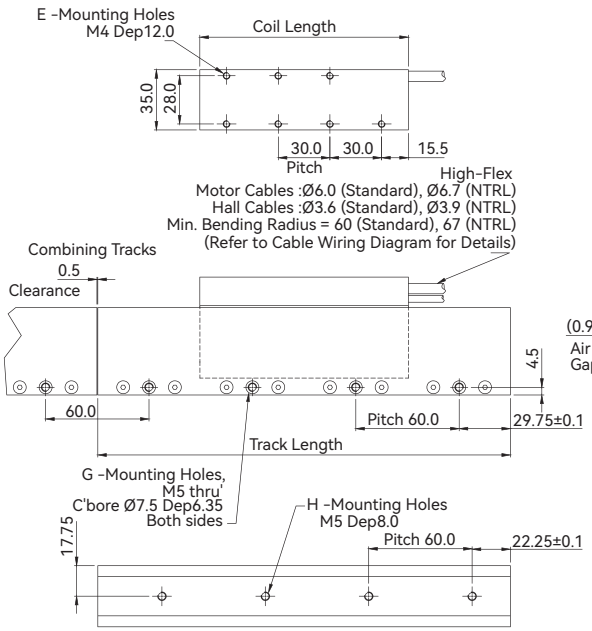
[3] Inductance is measured by current frequency of 1 kHz. The variation range of AUM inductance is ±40% because three phase inductances are different. The value in the catalog is the average between the maximum and minimum values. For each phase, the variation range is ±20%.

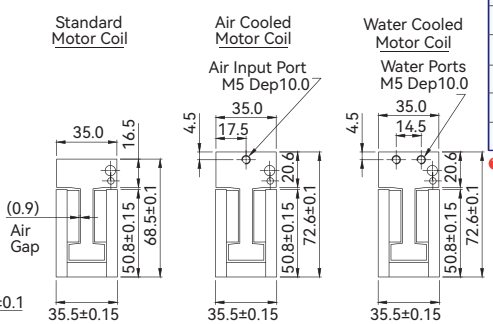
[4] Water cooling test conditions: the inlet water temperature of motor is 20℃, and the flow rate is 1.5 L/min. (For detailed test conditions, please consult Akribis)

[5] Both the standard and NTRL versions are recommended to use a bus voltage of up to 330Vdc.

The contents of datasheet are subject to change without prior notice.

Dimension



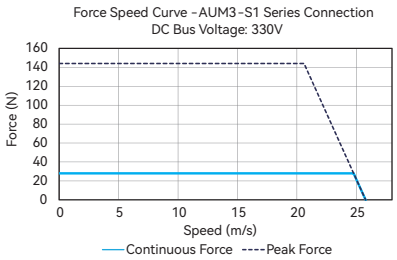


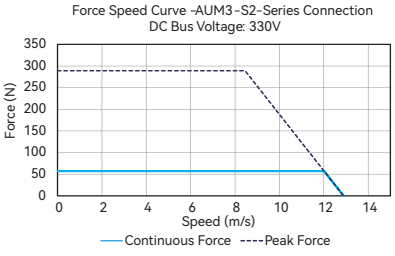
Motor Coil		
Model No:[1]	Coil Length	E
AUM3-S1	61.0	3
AUM3-S2	121.0	7
AUM3-S3	181.0	11
AUM3-S4	241.0	15
AUM3-S5	301.0	19
AUM3-S6	361.0	23

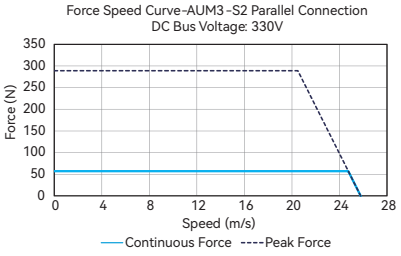
[1] For air or water cooled models, Coil Length and E are the same as the standard model.

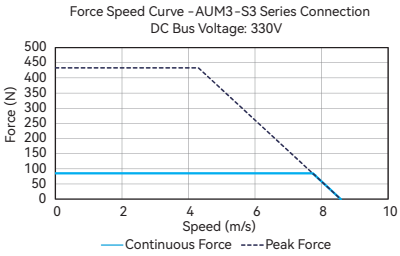
Motor Track			
Model No:	Track Length	G	H
AUM3-TL120	119.5	2	2
AUM3-TL180	179.5	3	3
AUM3-TL240	239.5	4	4
AUM3-TL300	299.5	5	5
AUM3-TL600	599.5	10	10

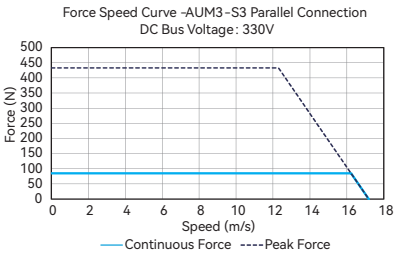
Force-Speed Curve

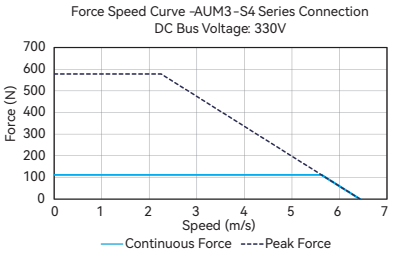


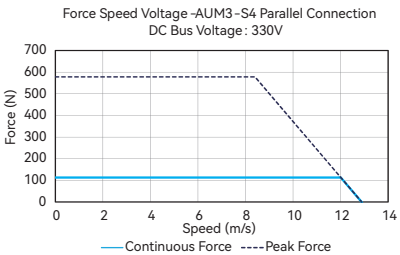


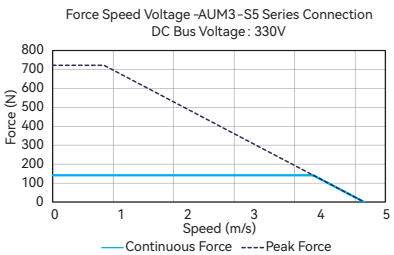


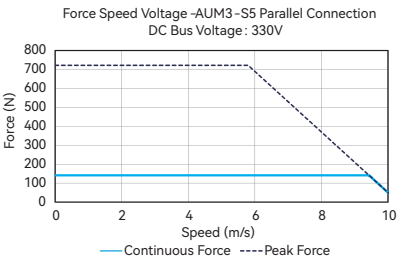


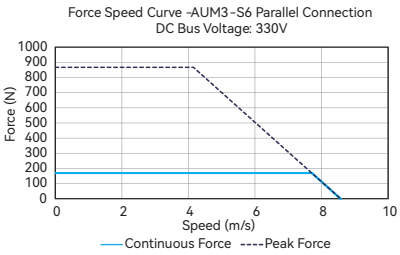












Part Numbering

Motor Coil

AUM3-▮-S-S3-K-HF-0.5-FB-0UA

Motor:
AUM3

Cooling Option:
(Blank) = Natural Convection
A = Air Cooled / W = Water Cooled

Connection:
S = Series / P = Parallel

Size:
S1 / S2 / S3 / S4 / S5 / S6

Custom Type:
(Blank)[7] / 0UA[8]

Motor Cable Options:
FB[4] / NFB[5] / 9W4M[6]

Cable Length (m):
0.5 / 3.0

Hall Cable Option:
NH[1] / HF[2] / H9D[3]

Thermal Sensor:
J = Thermostat (standard) / K = PT100 (RTD)

1. NH = Without Built-in Hall Sensor
2. HF = With Built-in Hall Sensor, Hall Cable C/W Flying Leads
3. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
4. FB = With Ferrite Bead C/W Flying Leads
5. NFB = Without Ferrite Bead C/W Flying Leads
6. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
7. (Blank) = Standard Model
8. 0UA = NTRL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

Motor Track

AUM3-TL120

Model:
AUM3

Track Length:
TL120 / TL180 / TL240 / TL300 / TL600

AUM4

			AUM4-S1	AUM4-S2		AUM4-S3		AUM4-S4		AUM4-S5	AUM4-S6	AUM4-S8
Performance Parameters	Symbol	Unit	Series	Series	Parallel	Series	Parallel	Series	Parallel	Parallel	Parallel	Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	55	110	110	166	166	221	221	276	331	442
Continuous Force (AC) @100°C[1]	F_{ca}	N	66	132	132	199	199	265	265	331	397	530
Continuous Force (WC) @100°C[1][4]	F_{cw}	N	72	144	144	215	215	287	287	359	431	574
Peak Force	F_{pk}	N	312	624	624	936	936	1248	1248	1560	1872	2496
Force Constant ±10%	K_f	N/Arms	24.0	48.0	24.0	72.0	36.0	96.0	48.0	60.0	72.0	96.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	19.6	39.2	19.6	58.8	29.4	78.4	39.2	49.0	58.8	78.4
Motor Constant @25°C	K_m	N/Sqrt(W)	9.1	12.9	12.7	15.7	15.7	18.2	18.2	20.3	22.3	25.7
Resistance (L-L) @25°C ±10% [2]	R_{25}	Ω	4.68	9.33	2.43	13.97	3.52	18.62	4.68	5.84	7.00	9.33
Inductance (L-L) ±40% [3]	L	mH	3.83	7.67	1.92	11.50	2.87	15.33	3.83	4.79	5.75	7.67
Electrical Time Constant	τ_e	ms	0.82	0.82	0.79	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	2.3	2.3	4.6	2.3	4.6	2.3	4.6	4.6	4.6	4.6
Continuous Current (AC) @100°C[1]	I_{ca}	Arms	2.8	2.8	5.5	2.8	5.5	2.8	5.5	5.5	5.5	5.5
Continuous Current (WC) @100°C[1][4]	I_{cw}	Arms	3.0	3.0	6.0	3.0	6.0	3.0	6.0	6.0	6.0	6.0
Peak Current	I_{pk}	Arms	13.0	13.0	26.0	13.0	26.0	13.0	26.0	26.0	26.0	26.0
Continuous Power Dissipation (NC) @100°C [1]	P_{cn}	W	48	95	99	143	144	190	191	239	286	381
Continuous Power Dissipation (AC) @100°C [1]	P_{ca}	W	69	137	143	206	207	274	276	344	412	549
Continuous Power Dissipation (WC) @100°C[1][4]	P_{cw}	W	81	161	168	241	243	322	324	404	484	645
Max. Coil Temperature	t_{max}	°C	100	100	100	100	100	100	100	100	100	100
Thermal Dissipation Constant (NC) [1]	K_{thn}	W/°C	0.6	1.3	1.3	1.9	1.9	2.5	2.6	3.2	3.8	5.1
Thermal Dissipation Constant (AC) [1]	K_{tha}	W/°C	0.9	1.8	1.9	2.7	2.8	3.7	3.7	4.6	5.5	7.3
Thermal Dissipation Constant (WC) [1][4]	K_{thw}	W/°C	1.1	2.1	2.2	3.2	3.2	4.3	4.3	5.4	6.5	8.6
Max. Bus Voltage [5]	U_{bus}	Vdc	330/600	330/600	330/600	330/600	330/600	330/600	330/600	330/600	330/600	330/600
Magnetic Period	τ_{NN}	mm	60	60	60	60	60	60	60	60	60	60
Attraction Force	F_a	kN	0	0	0	0	0	0	0	0	0	0
Mechanical Parameters												
Coil Mass (NC)	m_{cn}	kg	0.28	0.56	0.56	0.89	0.89	1.19	1.19	1.49	1.78	2.37
Coil Length (NC)	L_{cn}	mm	61.0	121.0	121.0	181.0	181.0	241.0	241.0	301.0	361.0	481.0
Coil Length (AC)	L_{ca}	mm	61.0	121.0	121.0	181.0	181.0	241.0	241.0	301.0	361.0	481.0
Coil Length (WC)	L_{cw}	mm	61.0	121.0	121.0	181.0	181.0	241.0	241.0	301.0	361.0	481.0
Track Mass Per Meter	m_{track}	kg/m	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75

Other Information		
Insulation Class		Class B (130°C)
Protection Grade		IP00
Compliance with Global Standards		RoHS, CE, NTRL(option)
Ambient Temperature	Operation	0°C to 40°C (non-freezing)
	Storage	-15°C to 70°C (non-freezing)
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)
	Storage	10%RH to 90%RH (non-condensing)
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling, AC-Air Cooling, WC-Water Cooling.

[2] Resistance is measured by DC current with standard 0.5 m cable.

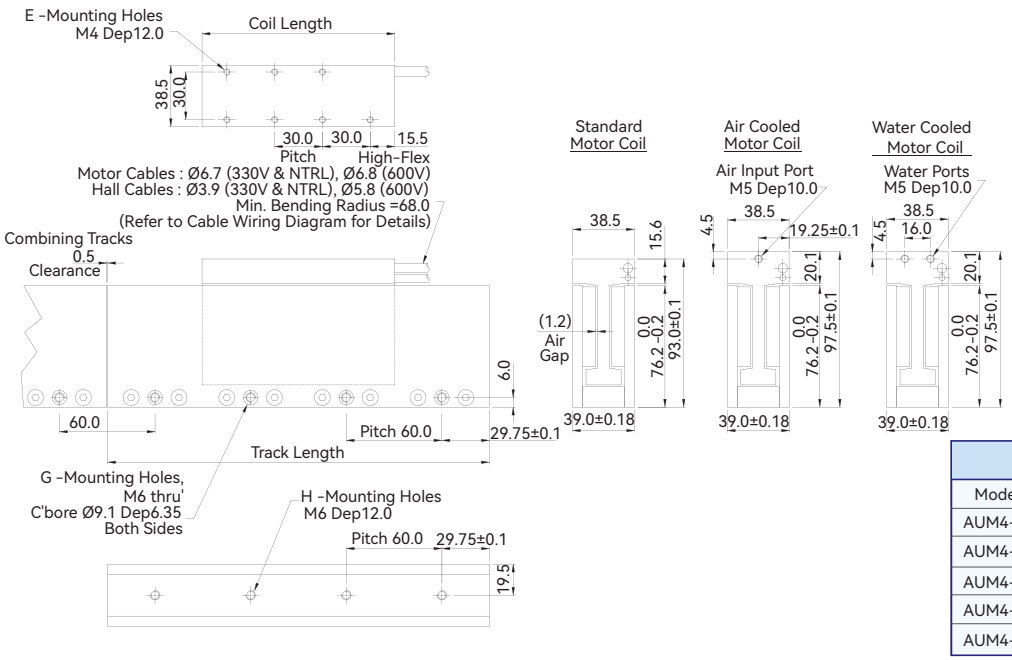
[3] Inductance is measured by current frequency of 1 kHz. The variation range of AUM inductance is ±40% because three phase inductances are different. The value in the catalog is the average between the maximum and minimum values. For each phase, the variation range is ±20%.

[4] Water cooling test conditions: the inlet water temperature of motor is 20°C, and the flow rate is 1.5 L/min for S1-S6, and the flow rate is 2 L/min for S8. (For detailed test conditions, please consult Akribis)

[5] The bus voltage of the standard version supports up to 330Vdc, and the bus voltage of the NTRL version supports up to 600Vdc.

The contents of datasheet are subject to change without prior notice.

Dimension



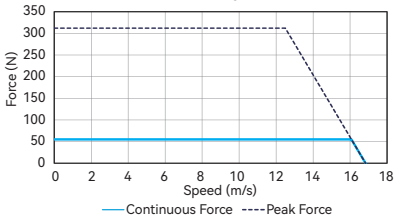
Motor Coil		
Model No:[1]	Coil Length	E
AUM4-S1	61.0	3
AUM4-S2	121.0	7
AUM4-S3	181.0	11
AUM4-S4	241.0	15
AUM4-S5	301.0	19
AUM4-S6	361.0	23
AUM4-S8	481.0	31

[1] For air or water cooled models, Coil Length and E are the same as the standard model.

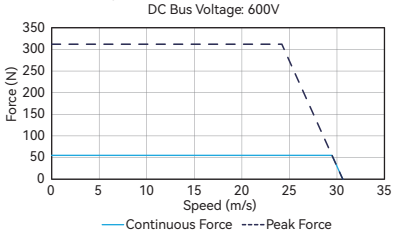
Motor Track			
Model No:	Track Length	G	H
AUM4-TL120	119.5	2	2
AUM4-TL180	179.5	3	3
AUM4-TL240	239.5	4	4
AUM4-TL300	299.5	5	5
AUM4-TL600	599.5	10	10

Force-Speed Curve

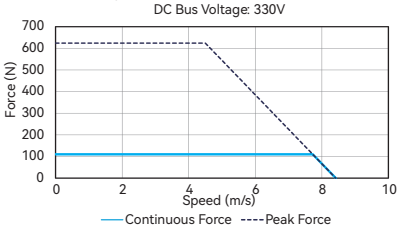
Force Speed Curve -AUM4-S1 Series Connection
DC Bus Voltage: 330V



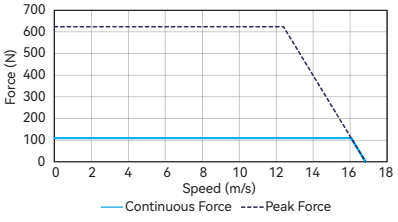
Force Speed Curve -AUM4-S1 Series Connection
DC Bus Voltage: 600V



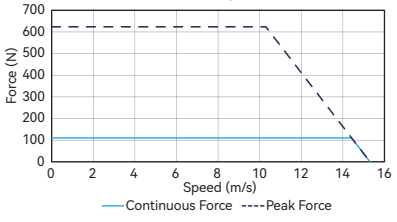
Force Speed Curve -AUM4-S2 Series Connection
DC Bus Voltage: 330V



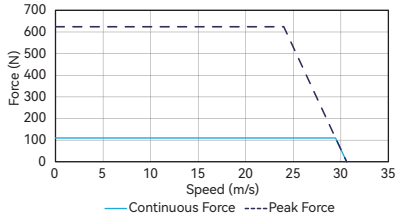
Force Speed Curve -AUM4-S2 Parallel Connection
DC Bus Voltage: 330V



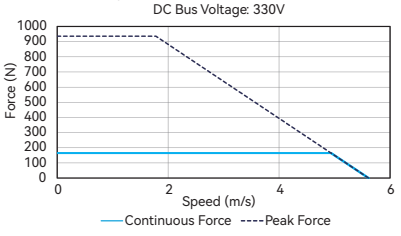
Force Speed Curve -AUM4-S2 Series Connection
DC Bus Voltage: 600V



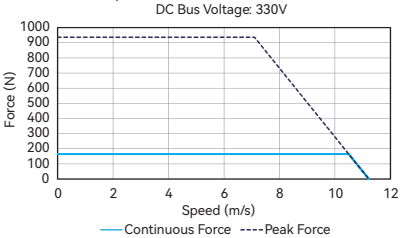
Force Speed Curve -AUM4-S2 Parallel Connection
DC Bus Voltage: 600V



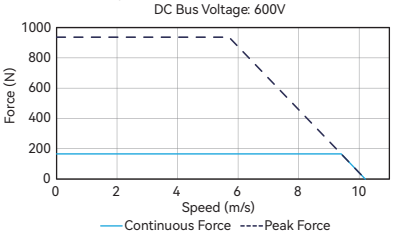
Force Speed Curve -AUM4-S3 Series Connection
DC Bus Voltage: 330V



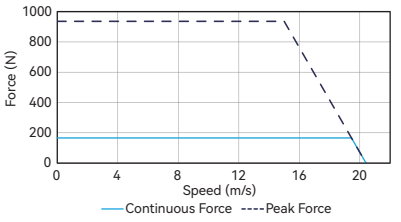
Force Speed Curve -AUM4-S3 Parallel Connection
DC Bus Voltage: 330V



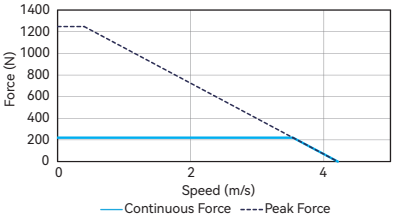
Force Speed Curve -AUM4-S3 Series Connection
DC Bus Voltage: 600V



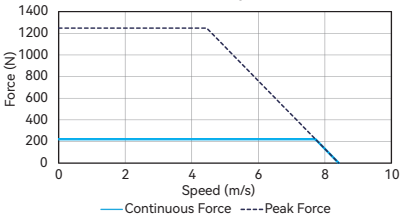
Force Speed Curve -AUM4-S3 Parallel Connection
DC Bus Voltage: 600V



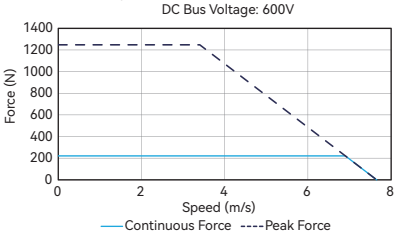
Force Speed Curve -AUM4-S4 Series Connection
DC Bus Voltage: 330V



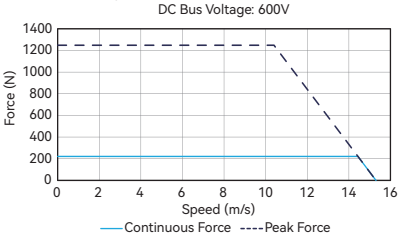
Force Speed Curve -AUM4-S4 Parallel Connection
DC Bus Voltage: 330V



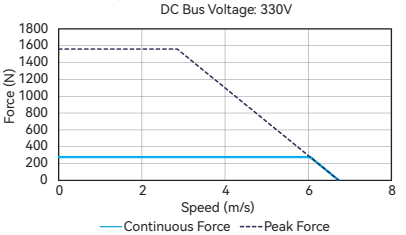
Force Speed Curve -AUM4-S4 Series Connection
DC Bus Voltage: 600V



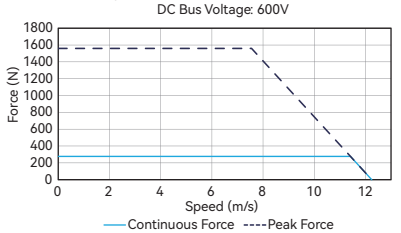
Force Speed Curve -AUM4-S4 Parallel Connection
DC Bus Voltage: 600V



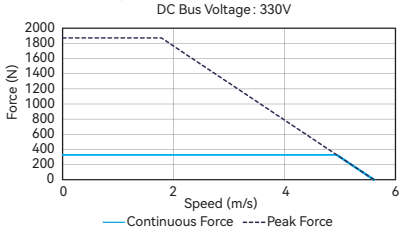
Force Speed Curve -AUM4-S5 Parallel Connection
DC Bus Voltage: 330V



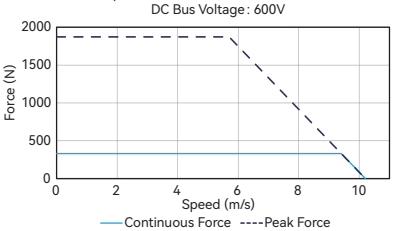
Force Speed Curve -AUM4-S5 Parallel Connection
DC Bus Voltage: 600V

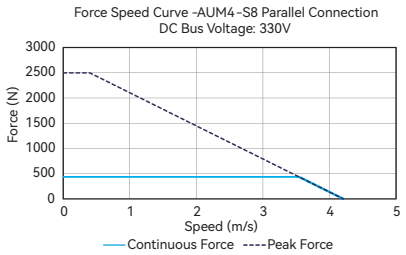


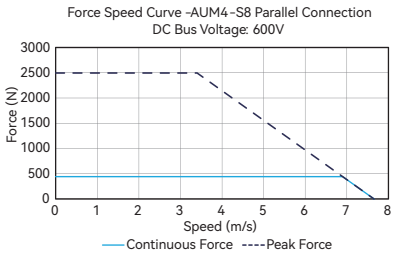
Force Speed Curve -AUM4-S6 Parallel Connection
DC Bus Voltage : 330V



Force Speed Curve -AUM4-S6 Parallel Connection
DC Bus Voltage : 600V







Part Numbering

Motor Coil

AUM4-[ ]-S-S3-K-HF-0.5-FB-0UA

- Motor: AUM4
- Cooling Option: (Blank) = Natural Convection; A = Air Cooled / W = Water Cooled
- Connection: S = Series / P = Parallel
- Size: S1 / S2 / S3 / S4 / S6
- Custom Type: (Blank)[7] / 0UA[8]
- Motor Cable Options: FB[4] / NFB[5] / 9W4M[6]
- Cable Length (m): 0.5 / 3.0
- Hall Cable Option: NH[1] / HF[2] / H9D[3]
- Thermal Sensor: J = Thermostat (standard) / K = PT100 (RTD)

1. NH = Without Built-in Hall Sensor
2. HF = With Built-in Hall Sensor, Hall Cable C/W Flying Leads
3. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
4. FB = With Ferrite Bead C/W Flying Leads
5. NFB = Without Ferrite Bead C/W Flying Leads
6. 9W4M = Without Ferrite bead C/W D-Sub 9W4 Male Connector
7. (Blank) = Standard CE-Certified Model
8. 0UA = NTRL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

Motor Track

AUM4-TL120

- Model: AUM4
- Track Length: TL120 / TL180 / TL240 / TL300 / TL600

AUM5

			AUM5-S1	AUM5-S2		AUM5-S3		AUM5-S4		AUM5-S5	AUM5-S6	AUM5-S8 -V107	AUM5-S9 -V80	AUM5-S10 -V107	AUM5-S12 -V107
Performance Parameters	Symbol	Unit	Series	Series	Parallel	Series	Parallel	Series	Parallel	Parallel	Parallel	P5	P7	P5	P5
Continuous Force (NC) @100°C[1]	F_{cn}	N	98	197	197	295	295	393	393	491	590	786	884	983	1179
Continuous Force (AC) @100°C[1]	F_{ca}	N	118	236	236	354	354	472	472	590	707	-	-	-	-
Continuous Force (WC) @100°C[1][4]	F_{cw}	N	128	255	255	383	383	511	511	639	766	-	-	-	-
Peak Force	F_{pk}	N	707	1415	1415	2122	2122	2830	2830	3537	4244	5659	6367	7078	8489
Force Constant ±10%	K_f	N/Arms	39.3	78.6	39.3	117.9	59.0	157.2	78.6	98.3	117.9	78.6	117.9	98.3	117.9
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	32.1	64.2	32.1	96.3	48.1	128.4	64.2	80.2	96.3	64.2	96.3	80.3	96.3
Motor Constant @25°C	K_m	N/Sqrt(W)	15.8	22.4	21.8	27.4	27.4	31.6	31.6	34.8	38.7	44.7	47.4	50.0	54.2
Resistance (L-L) @25°C ±10%[2]	R_{25}	Ω	4.16	8.28	2.20	12.40	3.13	16.52	4.16	5.34	6.22	2.07	4.13	2.58	3.16
Inductance (L-L) ±40%[3]	L	mH	6.50	13.00	3.25	19.50	4.88	26.00	6.50	8.13	9.75	3.25	6.50	4.06	4.88
Electrical Time Constant	τ_e	ms	1.56	1.57	1.48	1.57	1.56	1.57	1.56	1.52	1.57	1.57	1.57	1.57	1.54
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	2.5	2.5	5.0	2.5	5.0	2.5	5.0	5.0	5.0	10.0	7.5	10.0	10.0
Continuous Current (AC) @100°C[1]	I_{ca}	Arms	3.0	3.0	6.0	3.0	6.0	3.0	6.0	6.0	6.0	-	-	-	-
Continuous Current (WC) @100°C[1][4]	I_{cw}	Arms	3.3	3.3	6.5	3.3	6.5	3.3	6.5	6.5	6.5	-	-	-	-
Peak Current	I_{pk}	Arms	18.0	18.0	36.0	18.0	36.0	18.0	36.0	36.0	36.0	72.0	54.0	72.0	72.0
Continuous Power Dissipation (NC) @100°C[1]	P_{cn}	W	50	100	106	150	151	200	201	258	300	400	449	499	611
Continuous Power Dissipation (AC) @100°C[1]	P_{ca}	W	72	144	153	216	217	287	289	372	433	-	-	-	-
Continuous Power Dissipation (WC) @100°C[1][4]	P_{cw}	W	85	169	180	253	255	337	339	436	508	-	-	-	-
Max. Coil Temperature	t_{max}	°C	100	100	100	100	100	100	100	100	100	100	100	100	100
Thermal Dissipation Constant (NC)[1]	K_{thn}	W/°C	0.7	1.3	1.4	2.0	2.0	2.7	2.7	3.4	4.0	5.3	6.0	6.7	8.1
Thermal Dissipation Constant (AC)[1]	K_{tha}	W/°C	1.0	1.9	2.0	2.9	2.9	3.8	3.9	5.0	5.8	-	-	-	-
Thermal Dissipation Constant (WC)[1][4]	K_{thw}	W/°C	1.1	2.3	2.4	3.4	3.4	4.5	4.5	5.8	6.8	-	-	-	-
Max. Bus Voltage[5]	U_{bus}	Vdc	330/600	330/600	330/600	330/600	330/600	330/600	330/600	330/600	330/600	330/600	330/600	330/600	330/600
Magnetic Period	τ_{NN}	mm	84	84	84	84	84	84	84	84	84	84	84	84	84
Attraction Force	F_a	kN	0	0	0	0	0	0	0	0	0	0	0	0	0
Mechanical Parameters															
Coil Mass (NC)	m_{cn}	kg	0.73	1.45	1.45	2.16	2.16	2.88	2.88	3.60	4.32	5.73	6.53	7.25	8.76
Coil Length (NC)	L_{cn}	mm	85.0	169.0	169.0	253.0	253.0	337.0	337.0	421.0	505.0	673.0	757.0	841.0	1009.0
Coil Length (AC)	L_{ca}	mm	85.0	169.0	169.0	253.0	253.0	337.0	337.0	421.0	505.0	-	-	-	-
Coil Length (WC)	L_{cw}	mm	85.0	169.0	169.0	253.0	253.0	337.0	337.0	421.0	505.0	-	-	-	-
Track Mass Per Meter	m_{track}	kg/m	35.50	35.50	35.50	35.50	35.50	35.50	35.50	35.50	35.50	35.50	35.50	35.50	35.50

Other Information		
Insulation Class		Class B (130°C)
Protection Grade		IP00
Compliance with Global Standards		RoHS, CE, NTRL(option)
Ambient Temperature	Operation	0°C to 40°C (non-freezing)
	Storage	-15°C to 70°C (non-freezing)
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)
	Storage	10%RH to 90%RH (non-condensing)
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling, AC-Air Cooling, WC-Water Cooling.

[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz. The variation range of AUM inductance is ±40% because three phase inductances are different. The value in the catalog is the average between the maximum and minimum values. For each phase, the variation range is ±20%.

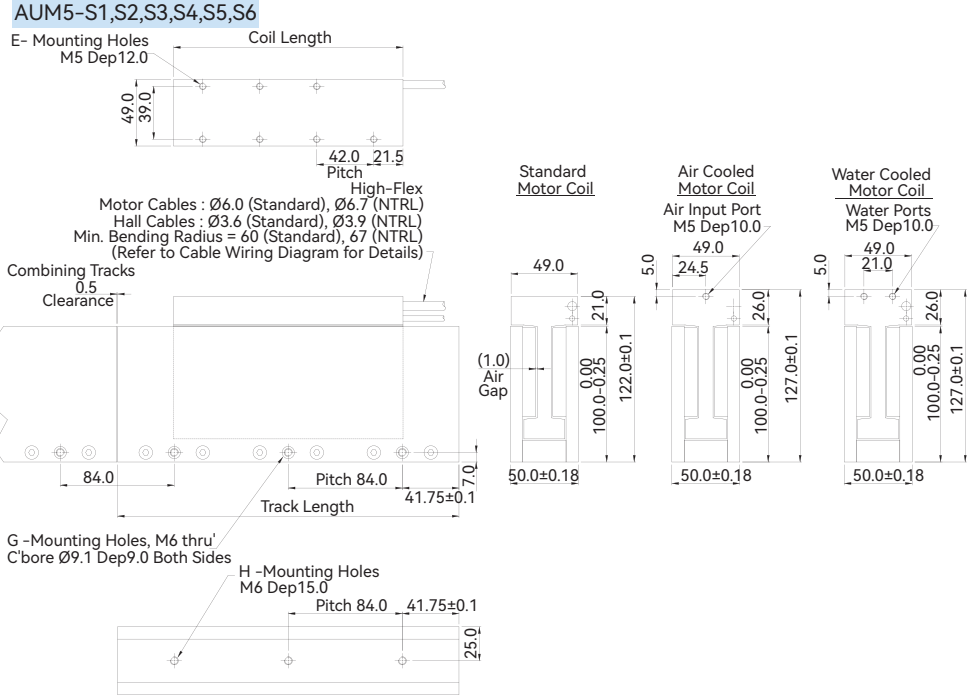
[4] Water cooling test conditions: the inlet water temperature of motor is 20°C, and the flow rate is 1.5 L/min for S1-S5, and the flow rate is 2 L/min for S6-S12. (For detailed test conditions, please consult Akribis)

[5] The bus voltage of the standard version supports up to 330Vdc, and the bus voltage of the NTRL version supports up to 600Vdc.

The contents of datasheet are subject to change without prior notice.

Dimension

AUM5-S1,S2,S3,S4,S5,S6



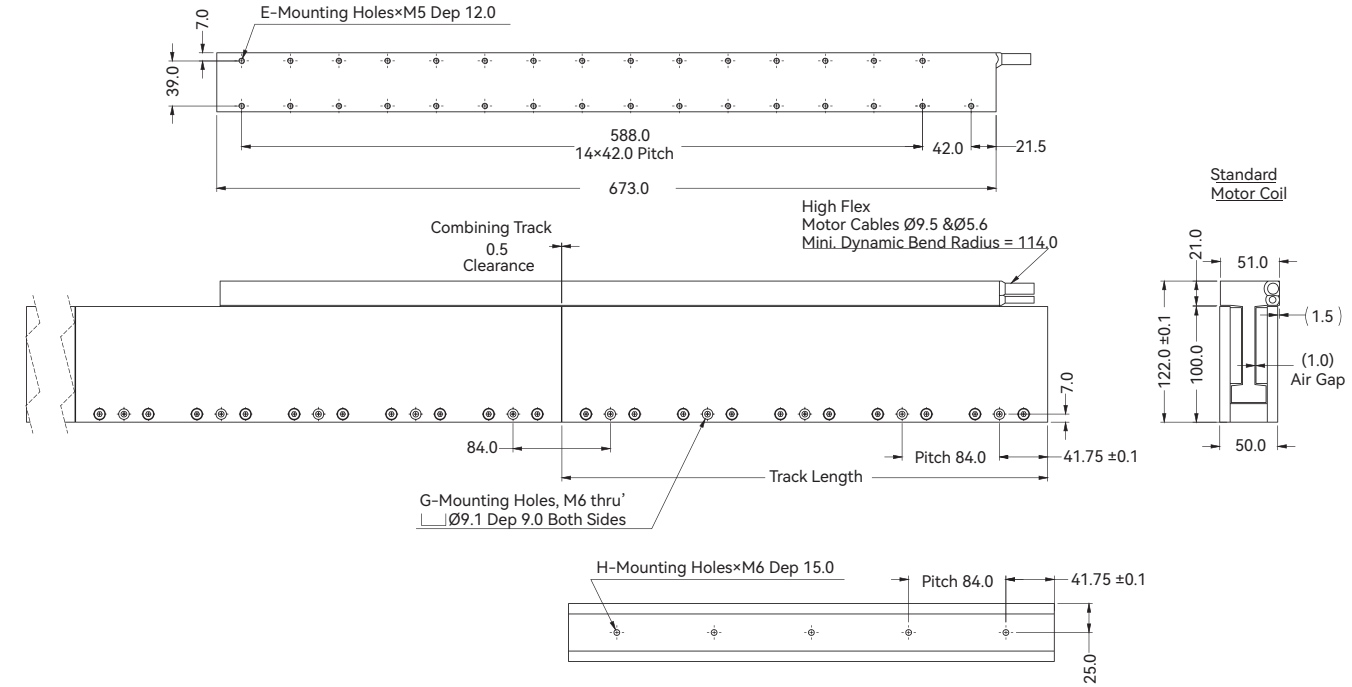
Motor Coil		
Model No: [1][2]	Coil Length	E
AUM5-S1	85.0	3
AUM5-S2	169.0	7
AUM5-S3	253.0	11
AUM5-S4	337.0	15
AUM5-S5	421.0	19
AUM5-S6	505.0	23

[1] For air or water cooled models, Coil Length and E are the same as the standard model.

[2] Air and Water cooled models are only available up to S6 Coil length.

Motor Track			
Model No:	Track Length	G	H
AUM5-TL168	167.5	2	2
AUM5-TL252	251.5	3	3
AUM5-TL420	419.5	5	5

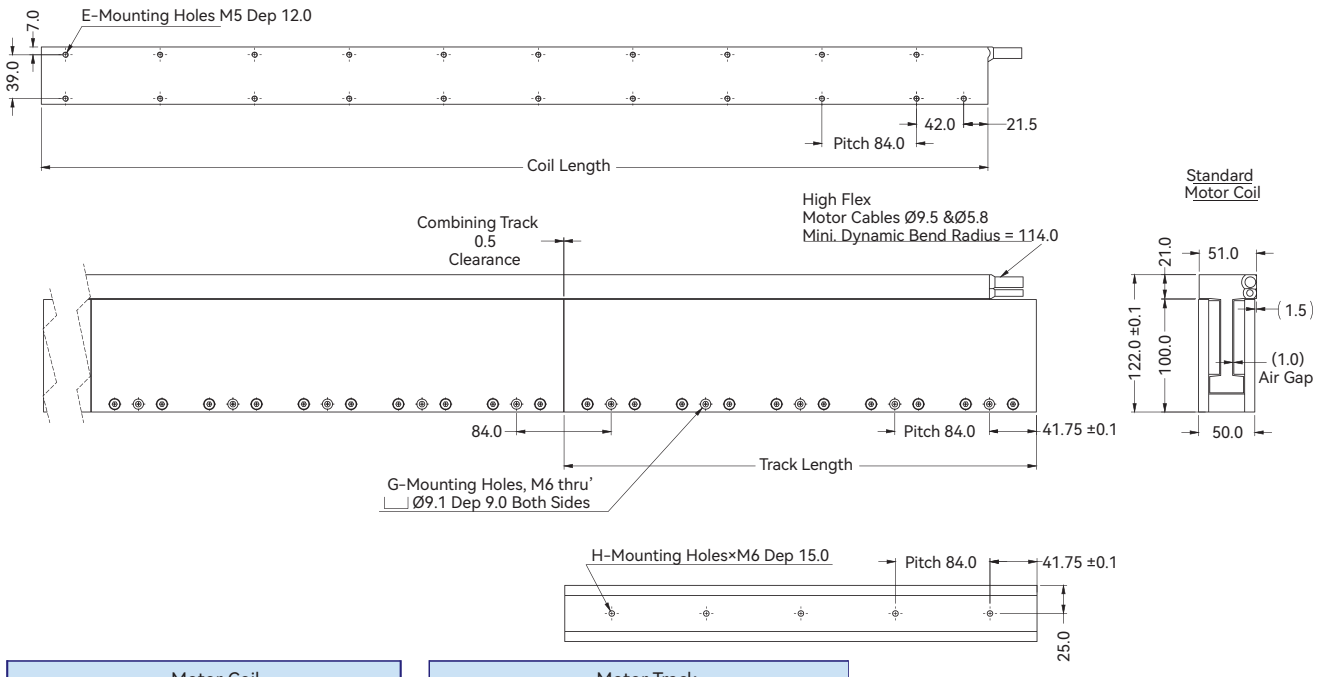
AUM5-P5-S8-V107



Motor Coil		
Model No:	Coil Length	E
AUM5-P5-S8-V107	673.0	31

Motor Track			
Model No:	Track Length	G	H
AUM5-TL168	167.5	2	2
AUM5-TL252	251.5	3	3
AUM5-TL420	419.5	5	5

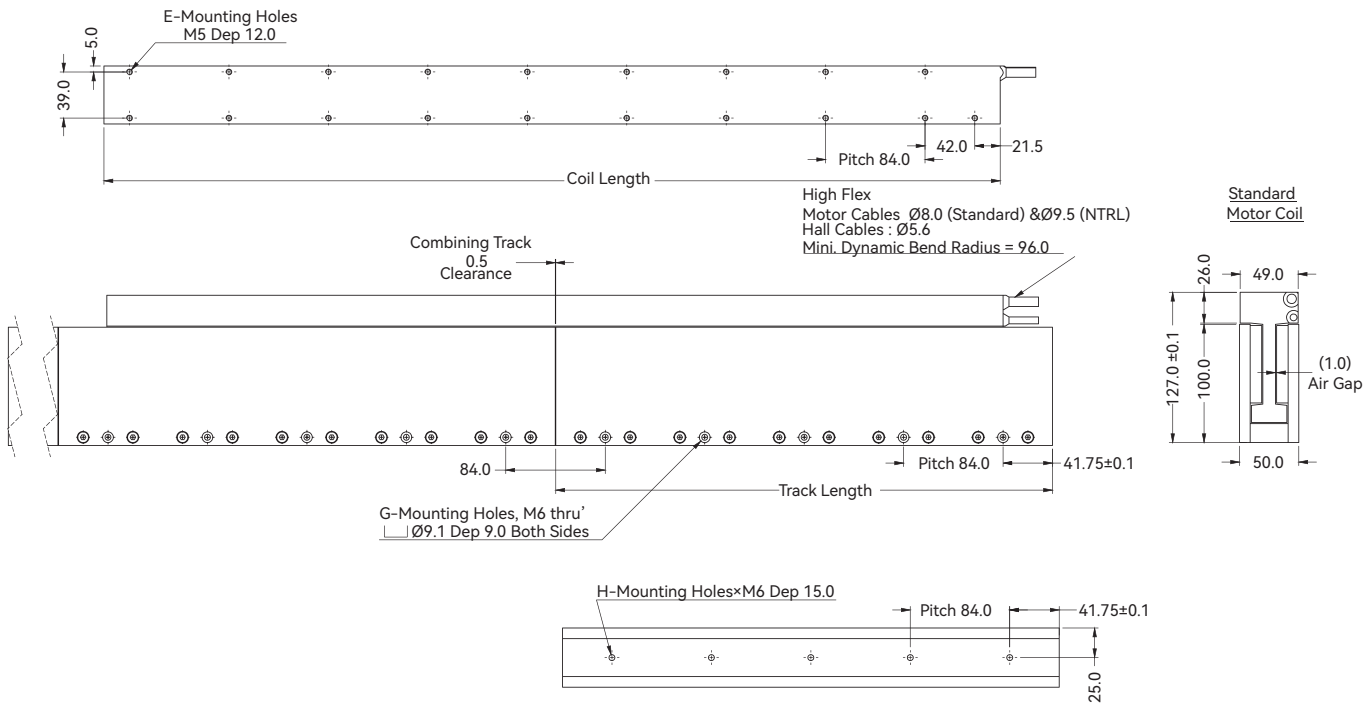
AUM5-P5-S10,S12-V107



Motor Coil		
Model No:	Coil Length	E
AUM5-P5-S10-V107	841.0	21
AUM5-P5-S12-V107	1009.0	25

Motor Track			
Model No:	Track Length	G	H
AUM5-TL168	167.5	2	2
AUM5-TL252	251.5	3	3
AUM5-TL420	419.5	5	5

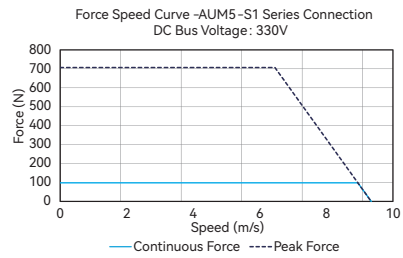
AUM5-P7-S9-V80

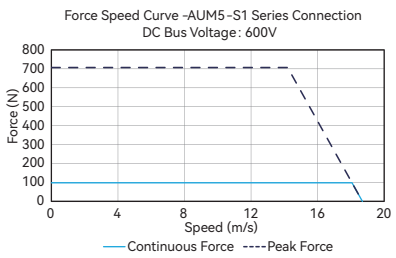


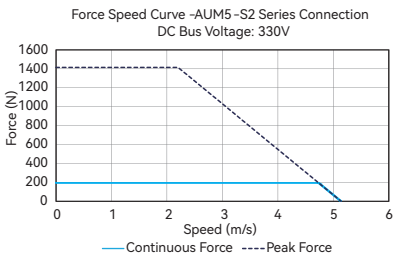
Motor Coil		
Model No:	Coil Length	E
AUM5-P7-S9-V80	757.0	19

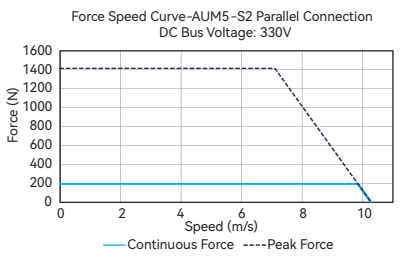
Motor Track			
Model No:	Track Length	G	H
AUM5-TL168	167.5	2	2
AUM5-TL252	251.5	3	3
AUM5-TL420	419.5	5	5

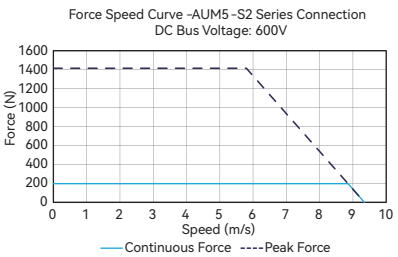
■ Force-Speed Curve

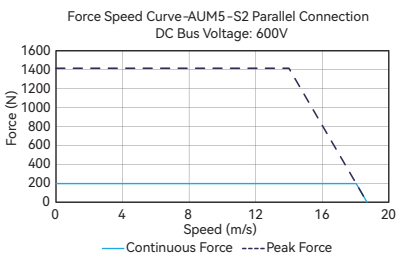






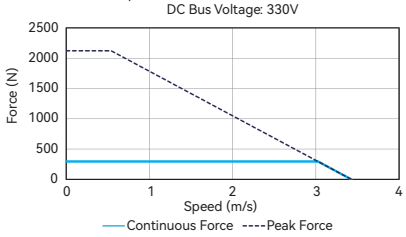




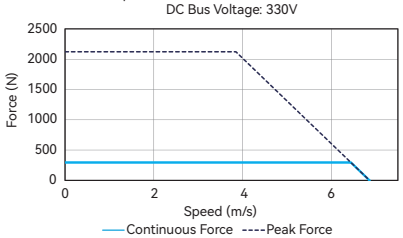


AUM Series

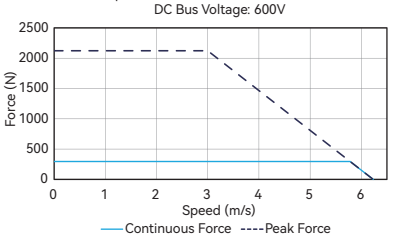
Force Speed Curve -AUM5-S3 Series Connection
DC Bus Voltage: 330V



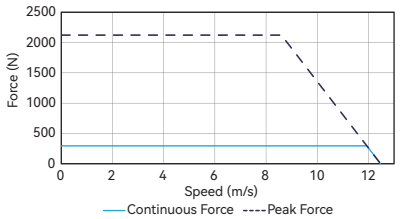
Force Speed Curve -AUM5-S3 Parallel Connection
DC Bus Voltage: 330V



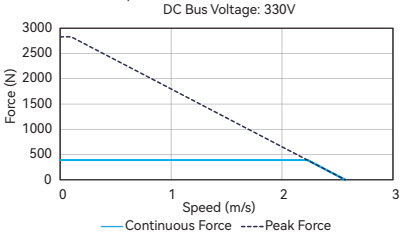
Force Speed Curve -AUM5-S3 Series Connection
DC Bus Voltage: 600V



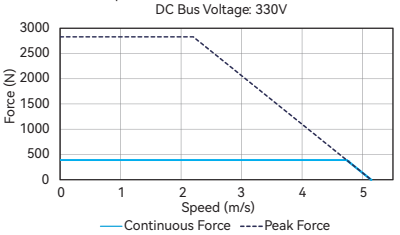
Force Speed Curve -AUM5-S3 Parallel Connection
DC Bus Voltage: 600V



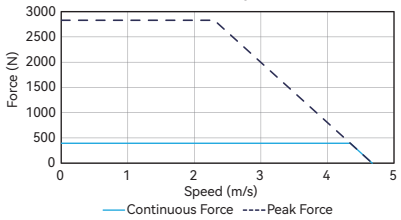
Force Speed Curve-AUM5-S4 Series Connection
DC Bus Voltage: 330V



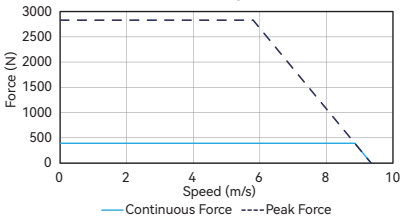
Force Speed Curve -AUM5-S4 Parallel Connection
DC Bus Voltage: 330V



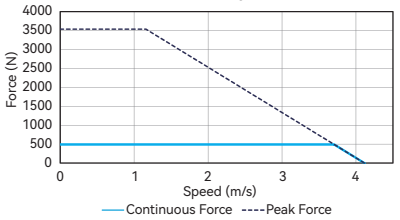
Force Speed Curve-AUM5-S4 Series Connection
DC Bus Voltage: 600V



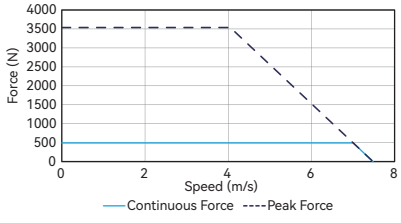
Force Speed Curve -AUM5-S4 Parallel Connection
DC Bus Voltage: 600V



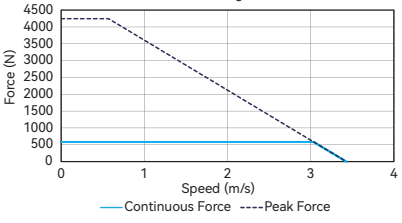
Force Speed Curve -AUM5-S5 Parallel Connection
DC Bus Voltage: 330V



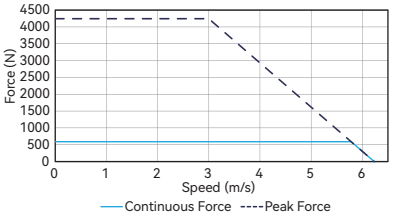
Force Speed Curve -AUM5-S5 Parallel Connection
DC Bus Voltage: 600V



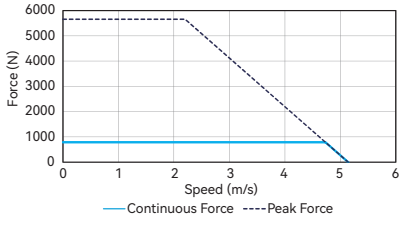
Force Speed Curve -AUM5-S6 Parallel Connection
DC Bus Voltage: 330V



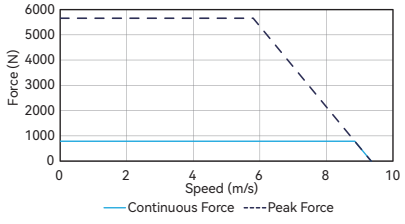
Force Speed Curve -AUM5-S6 Parallel Connection
DC Bus Voltage: 600V



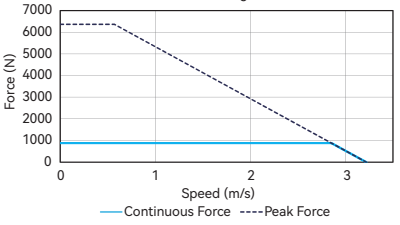
Force Speed Curve -AUM5-S8-V107Parallel Connection
DC Bus Voltage: 330V



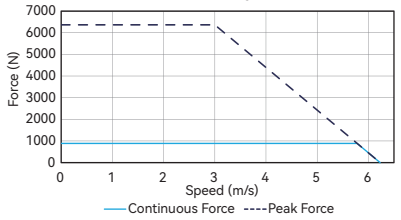
Force Speed Curve -AUM5-S8-V107Parallel Connection
DC Bus Voltage: 600V



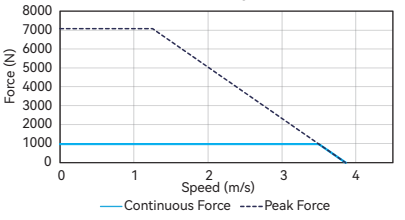
Force Speed Curve -AUM5-S9-V80Parallel Connection
DC Bus Voltage: 330V



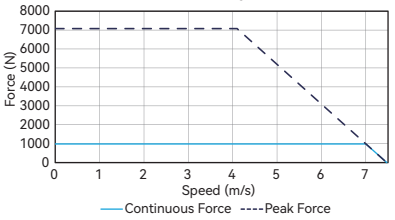
Force Speed Curve -AUM5-S9-V80Parallel Connection
DC Bus Voltage: 600V

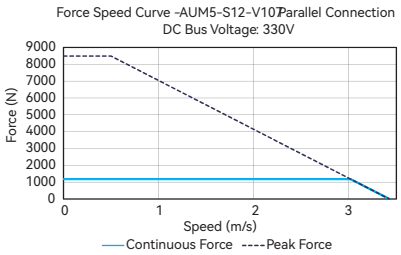


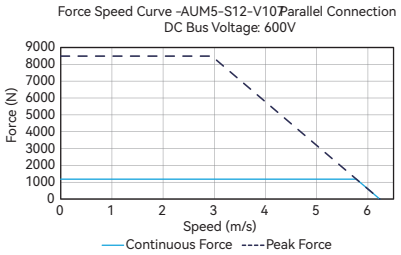
Force Speed Curve -AUM5-S10-V107Parallel Connection
DC Bus Voltage: 330V



Force Speed Curve -AUM5-S10-V107Parallel Connection
DC Bus Voltage: 600V







Part Numbering

Motor Coil

AUM5-▮-S-S3-K-HF-0.5-FB-0UA

Motor:
AUM5

Cooling Option:
(Blank) = Natural Convection
A = Air Cooled / W = Water Cooled ❶

Connection:
S = Series / P = Parallel / P5 / P7

Size:
S1 / S2 / S3 / S4 / S6

Custom Type:
❽ (Blank) / ❾ V80 / ❿ V107 / ⓫ 0UA

Motor Cable Options:
❺ FB / ❻ NFB / ❼ 9W4M

Cable Length (m):
0.5 / 3.0

Hall Cable Option:
❷ NH / ❸ HF / ❹ H9D

Thermal Sensor:
J = Thermostat (standard) / K = PT100 (RTD)

❶ Cooling Options is Only Valid for AUM5-S1 to S6 Models
❷ NH = Without Built-in Hall Sensor
❸ HF = With Built-in Hall Sensor, Hall Cable C/W Flying Leads
❹ H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
❺ FB = With Ferrite Bead C/W Flying Leads
❻ NFB = Without Ferrite Bead C/W Flying Leads
❼ 9W4M = Without Ferrite bead C/W D-Sub 9W4 Male Connector
❽ (Blank) = Standard Model
❾ V80 = Only for AUM5-S9
❿ V107 = Only for AUM5-S8, AUM5-S10 & AUM5-S12
⓫ 0UA = NTRL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

Motor Track

AUM5-TL168

Model:
AUM5

Track Length:
TL168 / TL252 / TL420

AUM6

			AUM6-P5-S4	AUM6-P8-S6	AUM6-P5-S8	AUM6-P8-S9	AUM6-P7-S10	AUM6-P8-S12
Performance Parameters	Symbol	Unit	P5	P8	P5	P8	P7	P8
Continuous Force (NC) @100°C[1]	F_{cn}	N	660	990	1320	1485	1650	1980
Peak Force	F_{pk}	N	5400	8100	10800	12150	13500	16200
Force Constant ±10%	K_f	N/Arms	75.0	75.0	150.0	112.5	150.0	150.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	61.2	61.2	122.5	91.9	122.5	122.5
Motor Constant @25°C	K_m	N/Sqrt(W)	48.9	59.9	69.2	73.4	77.3	84.7
Resistance (L-L) @25°C ±10% [2]	R_{25}	Ω	1.57	1.05	3.14	1.57	2.52	2.10
Inductance (L-L) ±40% [3]	L	mH	2.65	1.77	5.30	2.65	4.24	3.53
Electrical Time Constant	τ_e	ms	1.68	1.68	1.69	1.68	1.69	1.68
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	8.8	13.2	8.8	13.2	11.0	13.2
Peak Current	I_{pk}	Arms	72.0	108.0	72.0	108.0	90.0	108.0
Continuous Power Dissipation (NC) @100°C[1]	P_{cn}	W	236	354	470	530	588	706
Max. Coil Temperature	t_{max}	°C	100	100	100	100	100	100
Thermal Dissipation Constant (NC) [1]	K_{thn}	W/°C	3.1	4.7	6.3	7.1	7.8	9.4
Max. Bus Voltage[4]	U_{bus}	Vdc	330/600	330/600	330/600	330/600	330/600	330/600
Magnetic Period	τ_{NN}	mm	84	84	84	84	84	84
Attraction Force	F_a	kN	0	0	0	0	0	0
Mechanical Parameters								
Coil Mass (NC)	m_{cn}	kg	4.50	6.75	9.00	10.13	11.25	13.50
Coil Length (NC)	L_{cn}	mm	337.0	505.0	673.0	757.0	841.0	1009.0
Track Mass Per Meter	m_{track}	kg/m	66.67	66.67	66.67	66.67	66.67	66.67
Other Information								
Insulation Class			Class B (130°C)					
Protection Grade			IP00					
Compliance with Global Standards			RoHS, CE, NTRL(option)					
Ambient Temperature	Operation		0°C to 40°C (non-freezing)					
	Storage		-15°C to 70°C (non-freezing)					
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)					
	Storage		10%RH to 90%RH (non-condensing)					
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.					

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling, AC-Air Cooling, WC-Water Cooling.

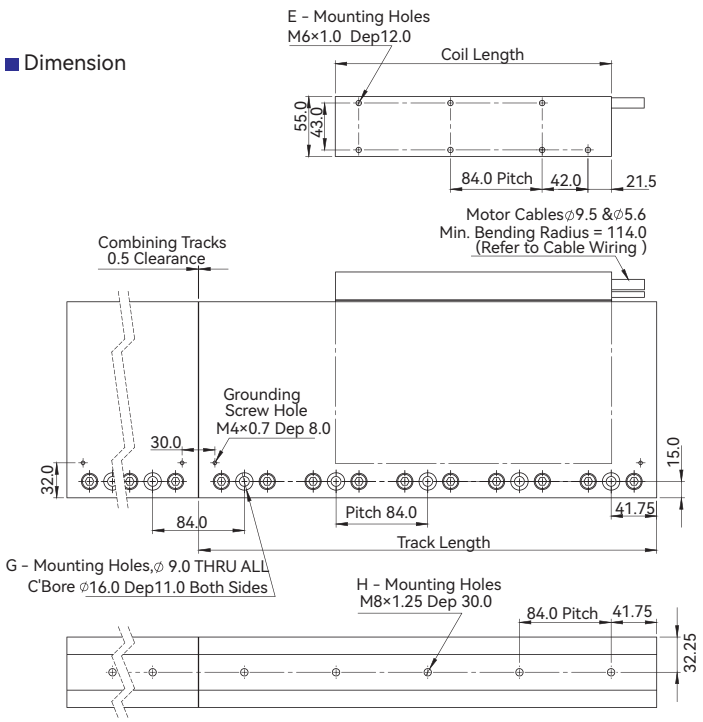
[2] Resistance is measured by DC current with standard 0.5 m cable.

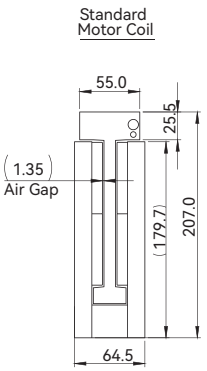
[3] Inductance is measured by current frequency of 1 kHz. The variation range of AUM inductance is ±40% because three phase inductances are different. The value in the catalog is the average between the maximum and minimum values. For each phase, the variation range is ±20%.

[4] The bus voltage of the standard version supports up to 330Vdc, and the bus voltage of the UL version supports up to 600Vdc.

The contents of datasheet are subject to change without prior notice.

Dimension

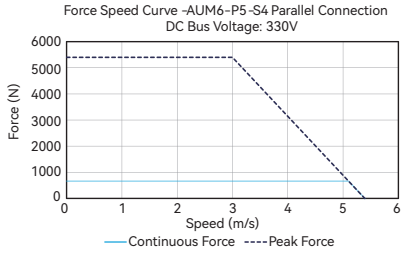


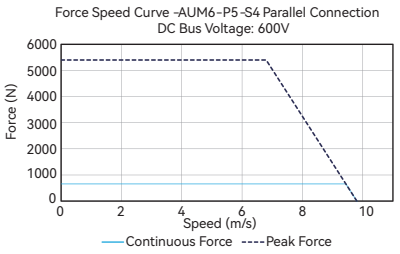


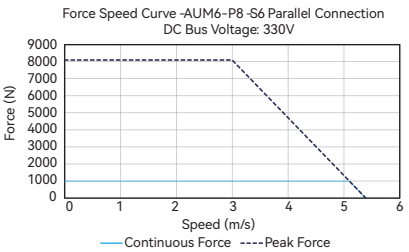
Motor Coil		
Model No:	Coil Length	E
AUM6-P5-S4	337.0	9
AUM6-P8-S6	505.0	13
AUM6-P5-S8	673.0	17
AUM6-P8-S9	757.0	19
AUM6-P7-S10	841.0	21
AUM6-P8-S12	1009.0	25

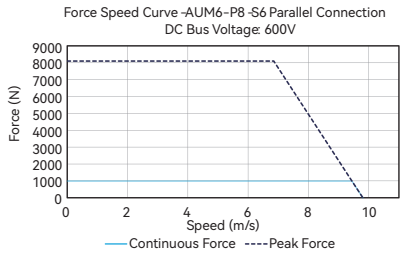
Motor Track			
Model No:	Track Length	G	H
AUM6-TL168	167.5	2	2
AUM6-TL252	251.5	3	3
AUM6-TL420	419.5	5	5

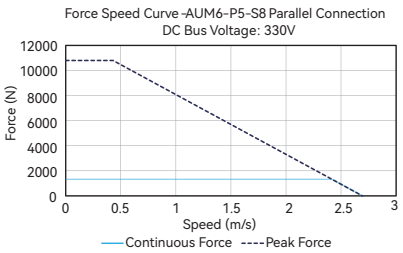
Force-Speed Curve

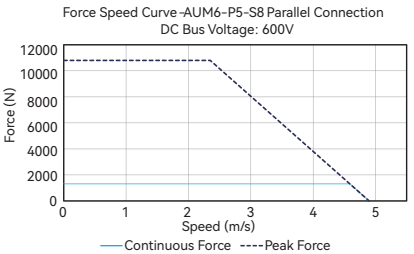


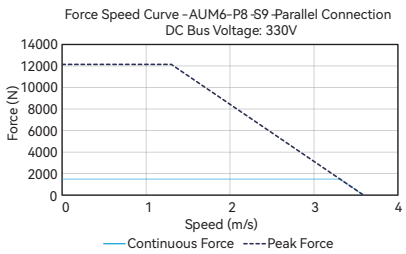


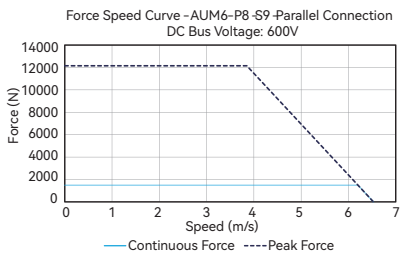


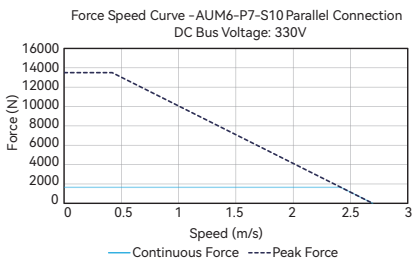


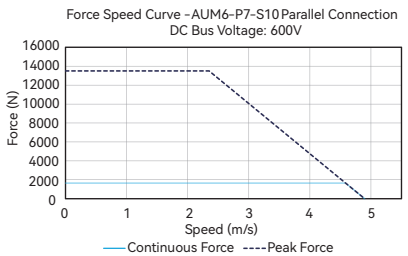


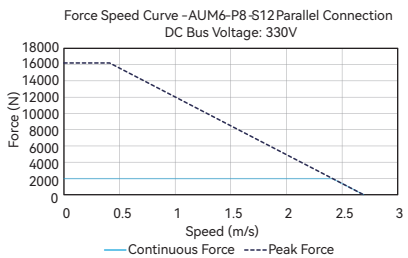


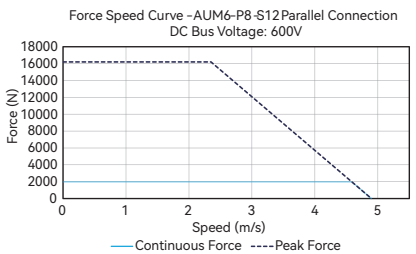






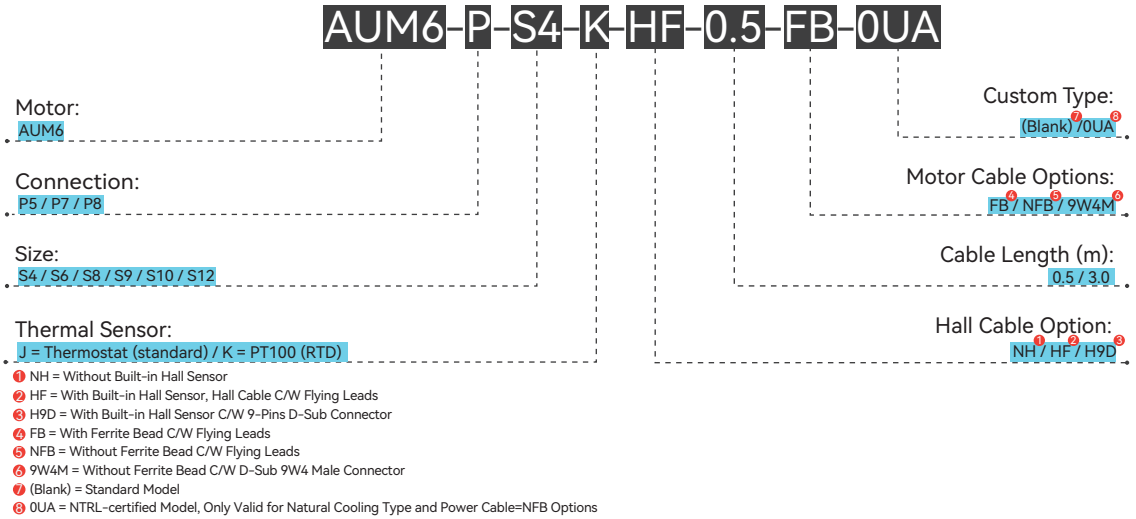






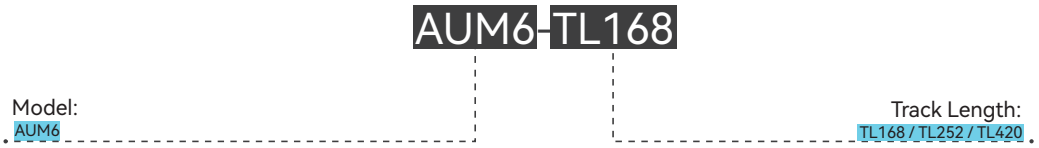
Part Numbering

Motor Coil



1. NH = Without Built-in Hall Sensor
2. HF = With Built-in Hall Sensor, Hall Cable C/W Flying Leads
3. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
4. FB = With Ferrite Bead C/W Flying Leads
5. NFB = Without Ferrite Bead C/W Flying Leads
6. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
7. (Blank) = Standard Model
8. 0UA = NTRL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

Motor Track



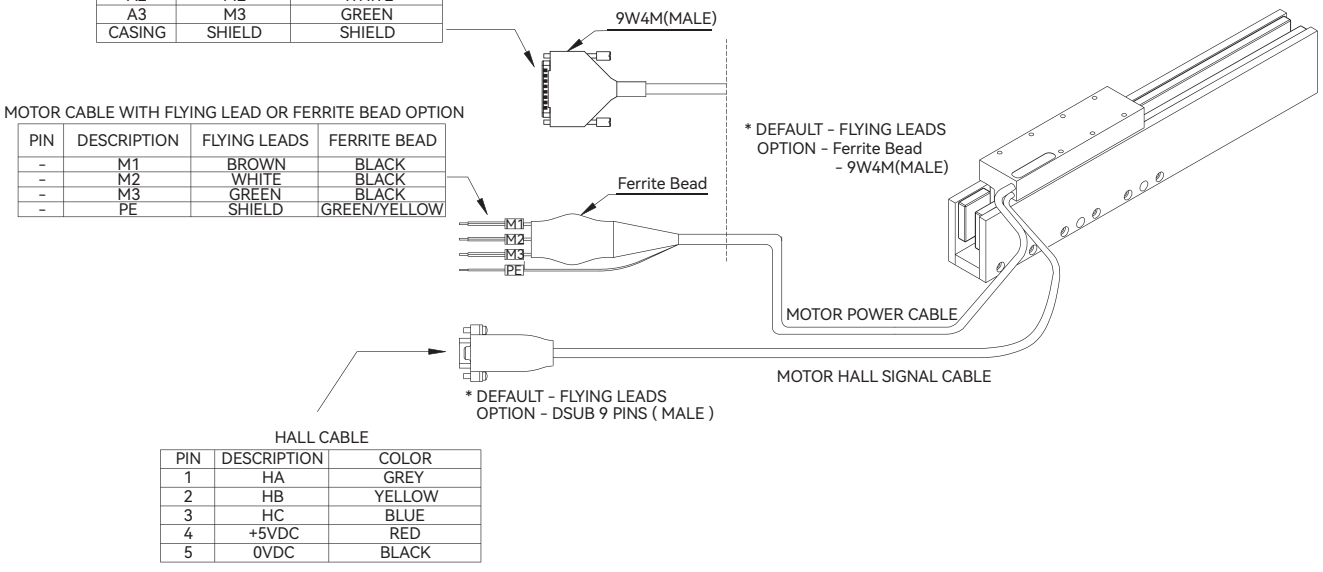
AUM1 Series Motor Cable Connection

MOTOR CABLE WITH 9W4M

PIN	DESCRIPTION	9W4M
A1	M1	BROWN
A2	M2	WHITE
A3	M3	GREEN
CASING	SHIELD	SHIELD

MOTOR CABLE WITH FLYING LEAD OR FERRITE BEAD OPTION

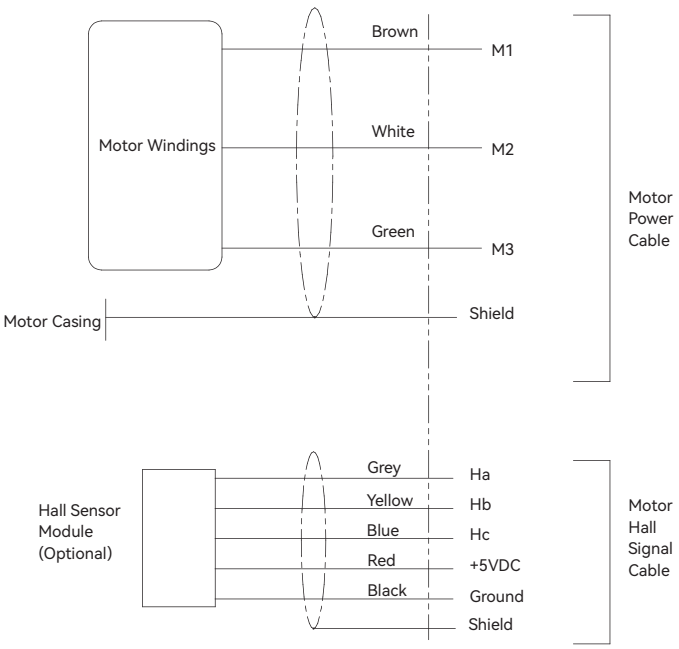
PIN	DESCRIPTION	FLYING LEADS	FERRITE BEAD
-	M1	BROWN	BLACK
-	M2	WHITE	BLACK
-	M3	GREEN	BLACK
-	PE	SHIELD	GREEN/YELLOW



HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREY
2	HB	YELLOW
3	HC	BLUE
4	+5VDC	RED
5	0VDC	BLACK

Cable Connection Information



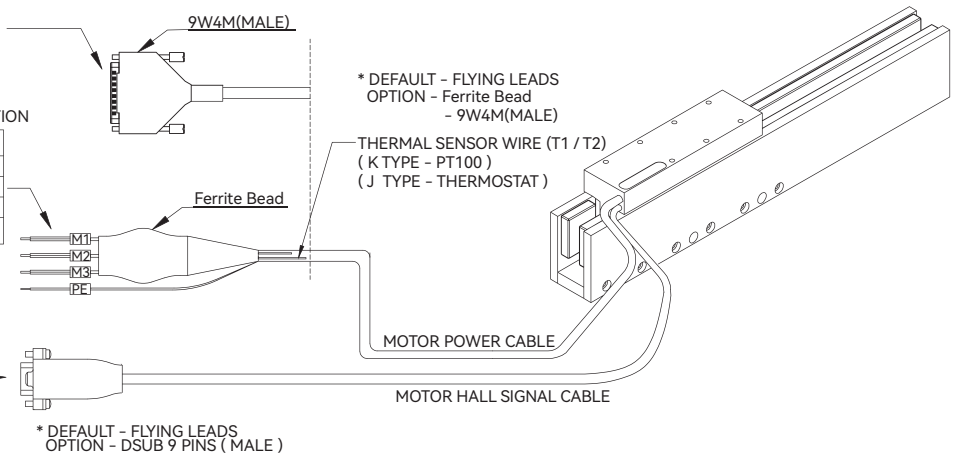
AUM2 / 3 Series Motor Cable Connection

MOTOR CABLE WITH 9W4M

PIN	DESCRIPTION	9W4M
A1	M1	YELLOW / GREY
A2	M2	BLUE/ORANGE
A3	M3	RED/GREEN
A4	PE	GREEN/YELLOW
1	T1	BROWN
2	T2	BROWN / BLACK
CASING	SHIELD	SHIELD

MOTOR CABLE WITH FLYING LEAD OR FERRITE BEAD OPTION

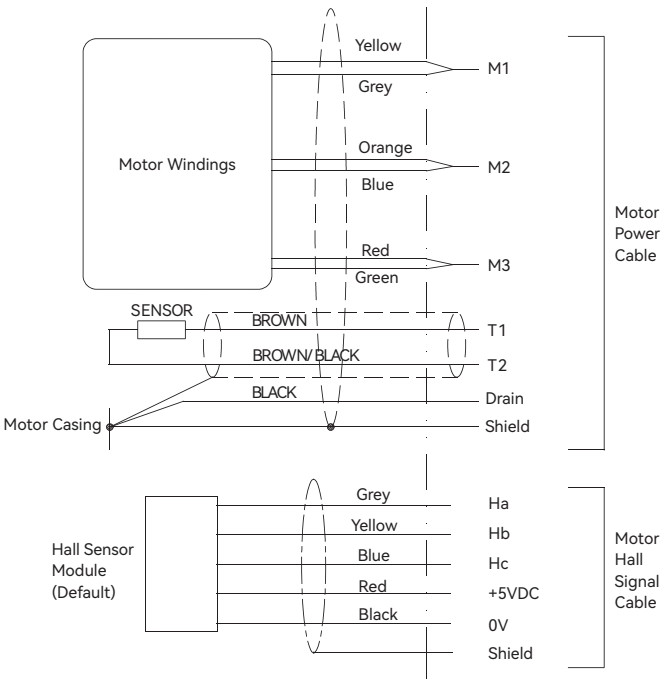
PIN	DESCRIPTION	FLYING LEADS	FERRITE BEAD
-	M1	YELLOW / GREY	BLACK
-	M2	BLUE/ORANGE	BLACK
-	M3	RED/GREEN	BLACK
-	PE	BLACK	YELLOW/GREEN



HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREY
2	HB	YELLOW
3	HC	BLUE
4	+5VDC	RED
5	0VDC	BLACK

Cable Connection Information



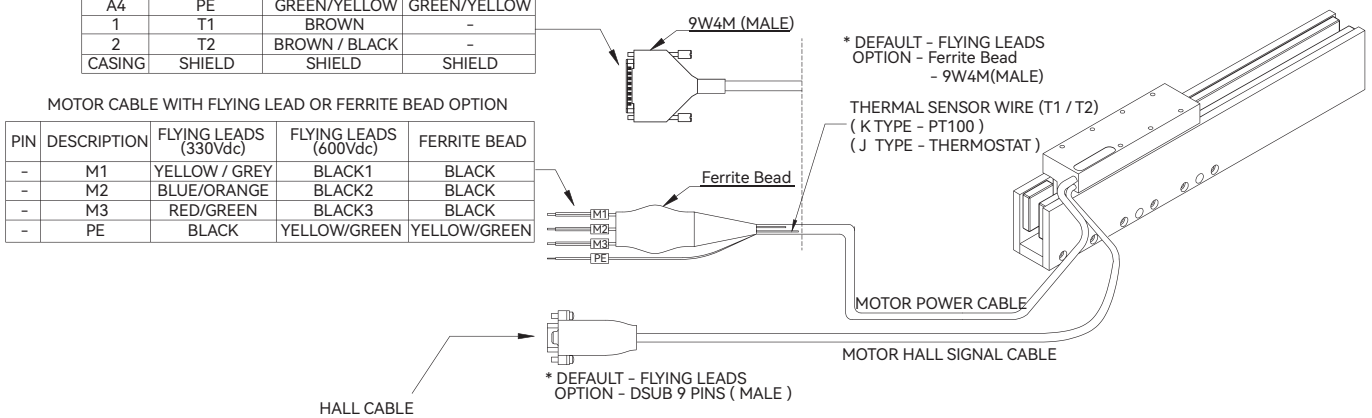
AUM4 / 5 Series Motor Cable Connection

MOTOR CABLE WITH 9W4M

PIN	DESCRIPTION	9W4M (330Vdc)	9W4M (600Vdc)
A1	M1	YELLOW / GREY	BLACK1
A2	M2	BLUE/ORANGE	BLACK2
A3	M3	RED/GREEN	BLACK3
A4	PE	GREEN/YELLOW	GREEN/YELLOW
1	T1	BROWN	-
2	T2	BROWN / BLACK	-
CASING	SHIELD	SHIELD	SHIELD

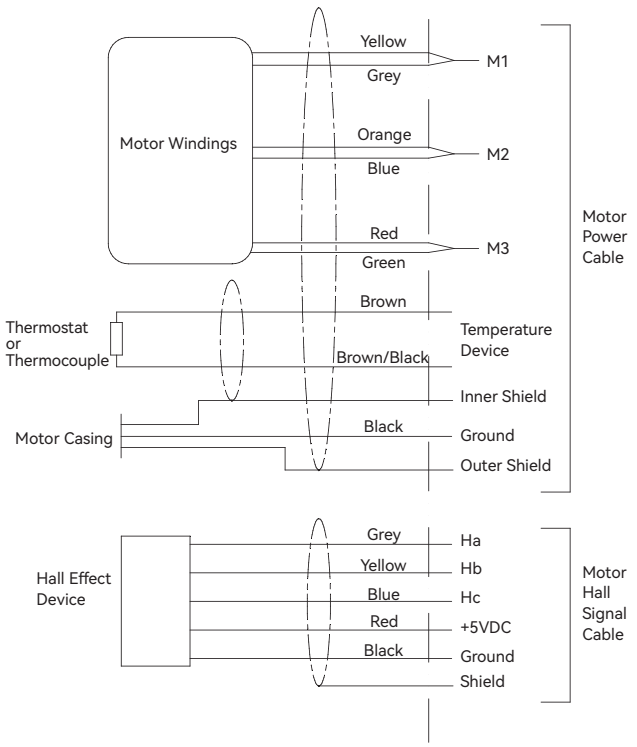
MOTOR CABLE WITH FLYING LEAD OR FERRITE BEAD OPTION

PIN	DESCRIPTION	FLYING LEADS (330Vdc)	FLYING LEADS (600Vdc)	FERRITE BEAD
-	M1	YELLOW / GREY	BLACK1	BLACK
-	M2	BLUE/ORANGE	BLACK2	BLACK
-	M3	RED/GREEN	BLACK3	BLACK
-	PE	BLACK	YELLOW/GREEN	YELLOW/GREEN

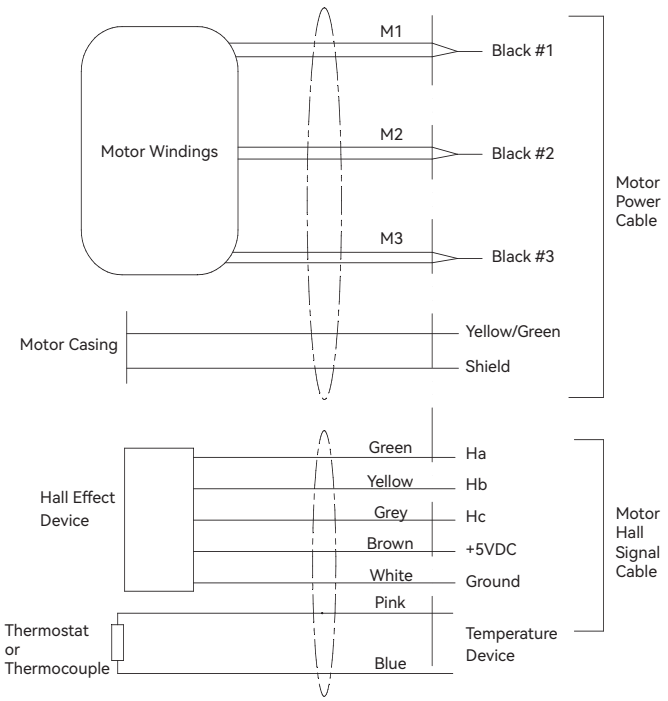


PIN	DESCRIPTION	FLYING LEAD (330Vdc)	FLYING LEAD (600Vdc)
1	HA	GREY	GREEN
2	HB	YELLOW	YELLOW
3	HC	BLUE	GREY
4	+5VDC	RED	BROWN
5	0VDC	BLACK	WHITE
8	T1	-	PINK
9	T2	-	BLUE

Cable Connection Information (330Vdc)



Cable Connection Information (600Vdc)



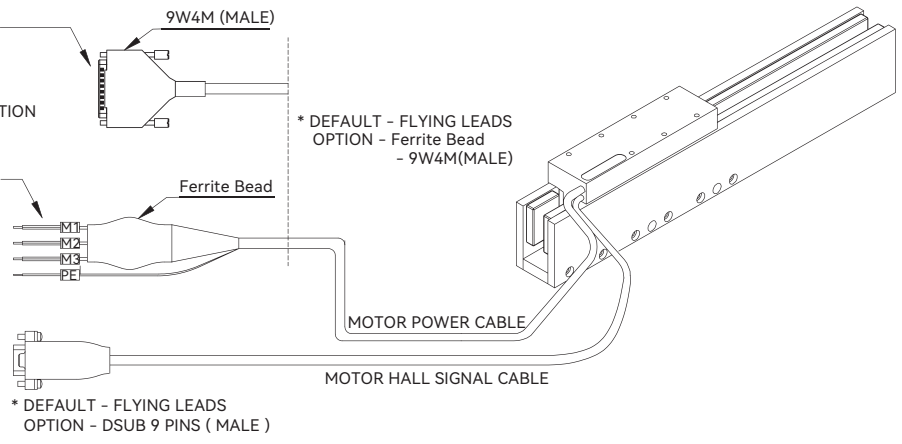
AUM5-V107 Series Motor Cable Connection

MOTOR CABLE WITH 9W4M

PIN	DESCRIPTION	9W4M
A1	M1	BLACK 1
A2	M2	BLACK 2
A3	M3	BLACK 3
A4	PE	GREEN/YELLOW
CASING	SHIELD	SHIELD

MOTOR CABLE WITH FLYING LEAD OR FERRITE BEAD OPTION

PIN	DESCRIPTION	FLYING LEADS	FERRITE BEAD
-	M1	BLACK 1	BLACK
-	M2	BLACK 2	BLACK
-	M3	BLACK 3	BLACK
-	PE	YELLOW/GREEN	YELLOW/GREEN

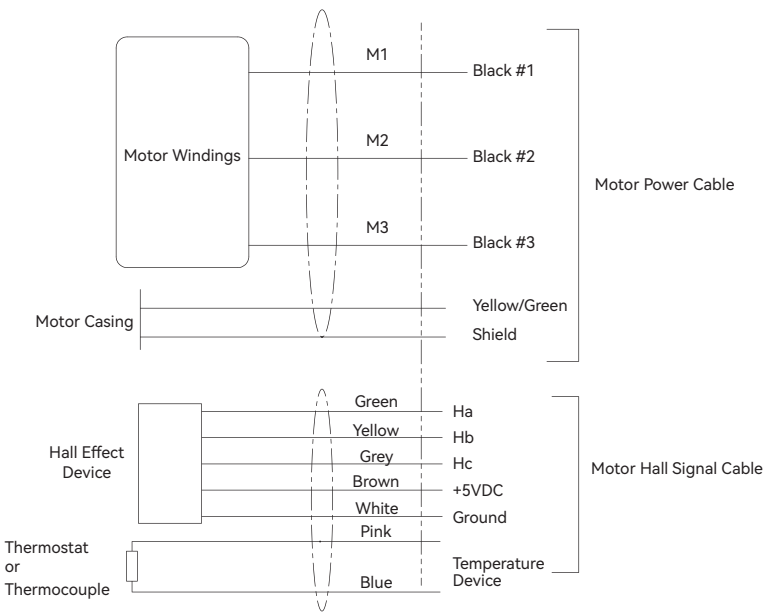


HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	+5VDC	BROWN
5	0VDC	WHITE
8	T1	PINK
9	T2	BLUE

THERMAL SENSOR WIRE (T1 / T2)
(K TYPE - PT100)
(J TYPE - THERMOSTAT)

Cable Connection Information



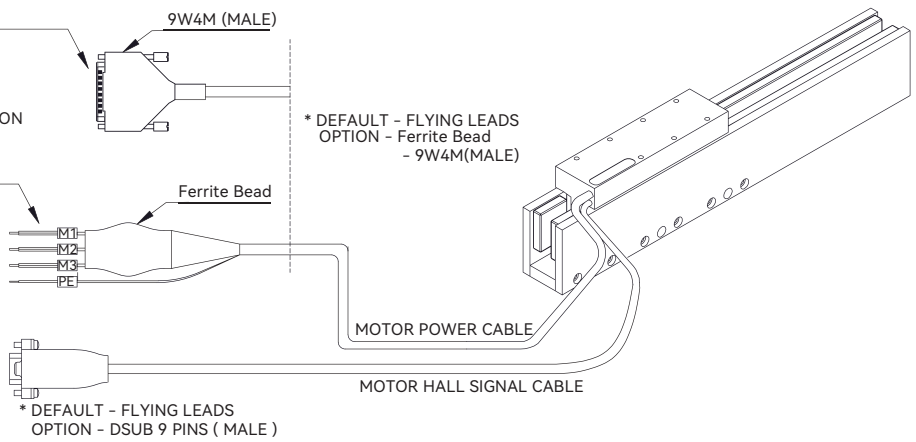
AUM6 Series Motor Cable Connection

MOTOR CABLE WITH 9W4M

PIN	DESCRIPTION	9W4M
A1	M1	BLACK 1
A2	M2	BLACK 2
A3	M3	BLACK 3
A4	PE	GREEN/YELLOW
CASING	SHIELD	SHIELD

MOTOR CABLE WITH FLYING LEAD OR FERRITE BEAD OPTION

PIN	DESCRIPTION	FLYING LEADS	FERRITE BEAD
-	M1	BLACK 1	BLACK
-	M2	BLACK 2	BLACK
-	M3	BLACK 3	BLACK
-	PE	YELLOW/GREEN	GREEN/YELLOW

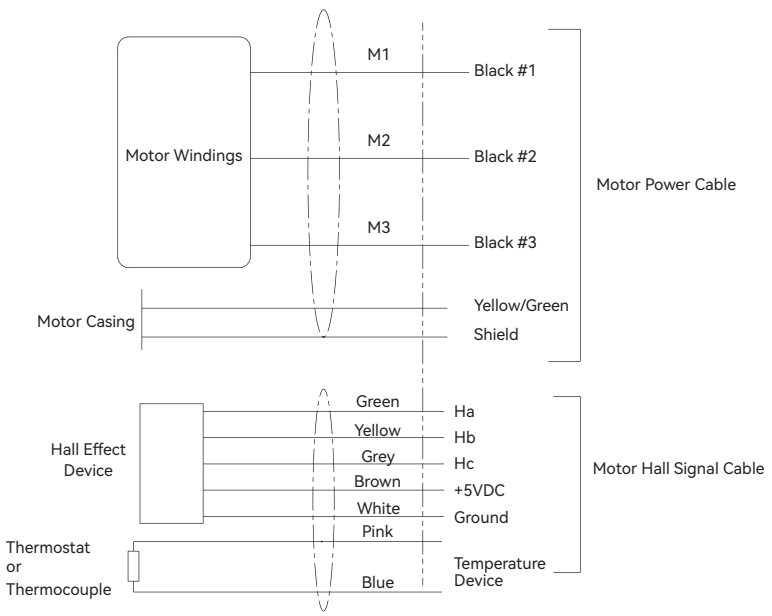


HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	+5VDC	BROWN
5	0VDC	WHITE
8	T1	PINK
9	T2	BLUE

THERMAL SENSOR WIRE (T1 / T2)
(K TYPE - PT100)
(J TYPE - THERMOSTAT)

Cable Connection Information





ALM-T SERIES

- Small thickness, light weight and high force density
- Zero cogging force and smooth operation
- High dynamic response
- Optional digital hall modules

EN-26.3.1

Introduction

ALM-T is a kind of ironless linear motor, featuring zero cogging force, light weight and high force density. It's suitable for applications with demanding velocity ripple and dynamic response, as well as force control application.

Continuous force Fcn = 10.0N ~ 850.5N
Peak force Fpk = 36.0N ~ 4233.6N

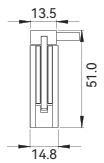
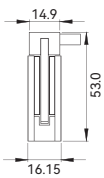
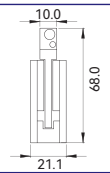
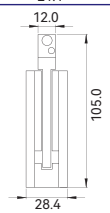
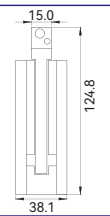
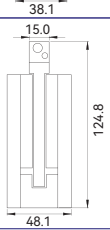
Features

- Small thickness, light weight and high force density
- Zero cogging force and smooth operation
- High dynamic response
- Optional digital hall modules

Applications

The ALM-T motors are suitable to be integrated in modules with small thickness, running with high speed, especially in areas such as:

- Semiconductor
- Flat panel display
- Ultra-precision stages
- Biomedicine / Lab automation
- Optics

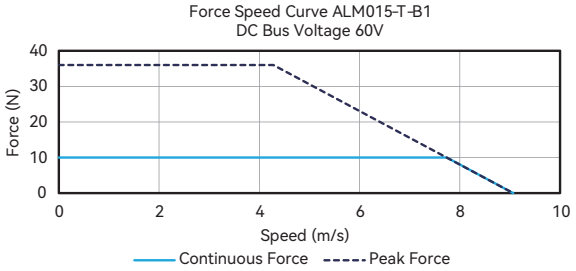
	Series	Coil Length (mm)	● Continuous Force (F_{cn}) / ■ PeakForce (F_{pk}) Unit: N 10 50 200 400 600 800 ....
	ALM015-T-B1	34.0	● 10.0 / ■ 36.0
	ALM015-T-B2	67.0	● 20.0 / ■ 72.0
	ALM016-T-B1	49.0	● 19.5 / ■ 42.5
	ALM016-T-B2	97.0	● 39.0 / ■ 85.0
	ALM021-T-B1	78.0	● 28.6 / ■ 99.5
	ALM021-T-B2	138.0	● 57.1 / ■ 199.1
	ALM021-T-B3	198.0	● 85.7 / ■ 298.6
	ALM021-T-B4	258.0	● 114.2 / ■ 398.2
	ALM028-T-B1	106.0	● 74.4 / ■ 256.9
	ALM028-T-B2	190.0	● 148.7 / ■ 513.8
	ALM028-T-B3	274.0	● 223.1 / ■ 770.6
	ALM028-T-B4	358.0	● 297.4/ ■ 1027.5
	ALM028-T-B5	442.0	● 371.8/ ■ 1284.4
	ALM038-T-B1	134.0	● 125.1/ ■ 622.7
	ALM038-T-B2	248.0	● 250.2/ ■ 1245.4
	ALM038-T-B3	362.0	● 375.3/ ■ 1868.2
	ALM038-T-B4	476.0	● 500.4/ ■ 2490.9
	ALM038-T-B6	704.0	● 750.6/ ■ 3736.3
	ALM048-T-B1	134.0	● 141.8/ ■ 705.6
	ALM048-T-B2	248.0	● 283.5/ ■ 1411.2
	ALM048-T-B3	362.0	● 425.3/ ■ 2116.8
	ALM048-T-B4	476.0	● 567.0/ ■ 2822.4
	ALM048-T-B6	704.0	● 850.5/ ■ 4233.6

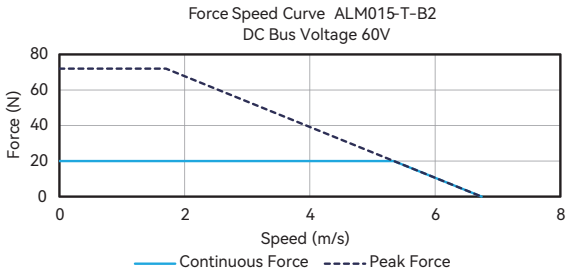
ALM015-T

			ALM015-T-B1	ALM015-T-B2
Performance Parameters	Symbol	Unit	M	M
Continuous Force (NC) @100℃❶❷	F_{cn}	N	10.0	20.0
Stall Force (NC) @100℃❶❸	F_{sn}	N	8.3	16.7
Peak Force	F_{pk}	N	36.0	72.0
Force Constant ±10%	K_f	N/Arms	8.1	10.9
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	6.6	8.9
Motor Constant @25℃	K_m	N/Sqrt(W)	3.1	4.3
Resistance (L-L) @25℃ ±10% ❹	R_{25}	Ω	4.51	4.30
Inductance (L-L) ±30% ❺	L	mH	0.58	0.60
Electrical Time Constant	τ_e	ms	0.13	0.14
Continuous current (NC) @100℃❶❷	I_{cn}	Arms	1.23	1.83
Stall current (NC) @100℃❶❸	I_{sn}	Arms	1.03	1.53
Peak current	I_{pk}	Arms	4.4	6.6
Continuous Power Dissipation (NC) @100℃ ❶❷	P_{cn}	W	13.3	28.0
Max. Coil Temperature	T_{max}	℃	100.0	100.0
Thermal Dissipation Constant (NC) ❶❷	K_{thn}	W/℃	0.18	0.37
Max bus Voltage	U_{bus}	Vdc	60	60
Magnetic Period	τ_{NN}	mm	16.5	16.5
Attraction Force	F_a	N	0.0	0.0
Mechanical Parameters				
Coil Mass (NC)❻	m_{cn}	kg	0.028	0.052
Coil Length (NC)	L_{cn}	mm	34.0	67.0
Track Mass Per Meter	m_{track}	kg/m	3.2	3.2
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS,CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust		

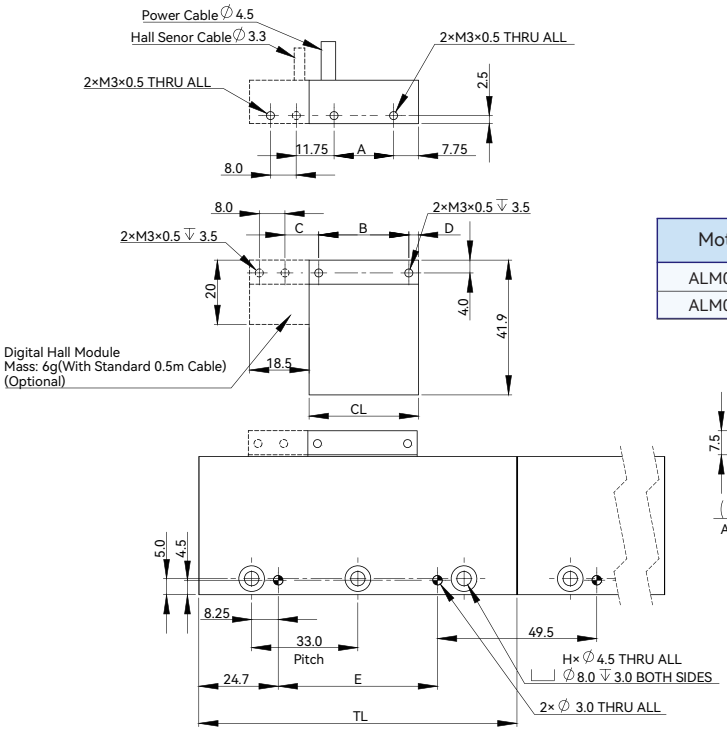
❶Measurement is taken at ambient temperature 25℃. Abbreviations: NC-Natural Cooling
❷Value depends on the thermal environment. Please consult the technical department for details
❸Minimum heatsink area is 0.03m², and minimum speed is 10mm/s
❹Resistance is measured by DC current with standard 0.5m cable
❺Inductance is measured by current frequency of 1kHz
❻Coil mass does not include hall module mass
The contents of datasheet are subject to change without prior notice

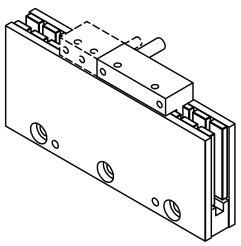
Force-Speed Curve



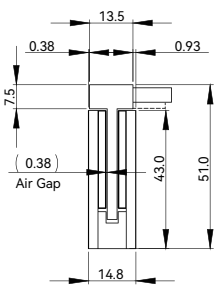


Dimensional Drawing





Motor Coil	Coil Length "CL"	Hole Pitch "A"	Hole Pitch "B"	Hole Pitch "C"	"D"
ALM015-T-B1	34.0	18.5	28.0	10.5	3.0
ALM015-T-B2	67.0	51.5	59.0	11.5	4.0



Motor Track	Track Length "TL"	Pin Hole Pitch "E"	No.of Hole "H"
ALM015-T-TL066	65.9	16.5	2
ALM015-T-TL099	98.9	49.5	3
ALM015-T-TL264	263.9	214.5	8

Part Numbering

Motor Coil

ALM015-T-B1-N-XX-M-NF-005-XF-000

- Model: ALM015-T
- Size: B1 / B2
- Cooling Type: N[1]
- Thermal Sensor: XX[2]
- Winding Code: M
- Hall Sensor Cable: NF[3] / HF[4] / HL[5]
- Cable Length:[6] 005 / 030
- Power Cable: XF[7] / XL[8]
- Design Control Code: 000

1. N = Natural Cooling
2. XX = No Temperature Sensor
3. NF = Without Built-in Hall Sensor C/W Flying Leads
4. HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
5. HL = With Hall Sensor & Hall Cable C/W MATE-N-LOK Plug
6. 005 = 0.5m; 030 = 3.0m
7. XF = Without Ferrite Bead C/W Flying Leads
8. XL = Without Ferrite Bead C/W MATE-N-LOK Plug

Motor Track

ALM015-T-TL066-TN-000

- Model: ALM015-T
- Track Length: TL066 / TL099 / TL264
- Track Type: TN[9]
- Design Control Code: 000

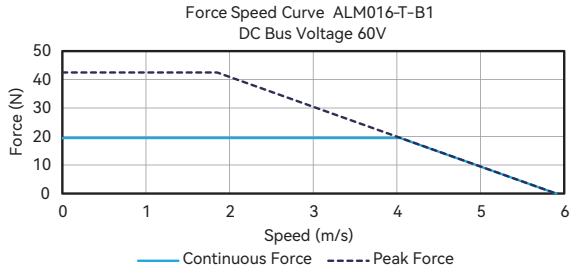
9. TN = Standard Track, No Cover

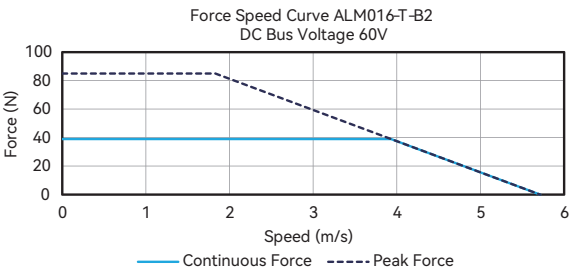
ALM016-T

			ALM016-T-B1	ALM016-T-B2
Performance Parameters	Symbol	Unit	M	M
Continuous Force (NC) @100℃ ❶❷	F_{cn}	N	19.5	39.0
Stall Force (NC) @100℃ ❶❸	F_{sn}	N	15.0	30.0
Peak Force	F_{pk}	N	42.5	85.0
Force Constant ±10%	K_f	N/Arms	12.4	12.9
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	10.2	10.5
Motor Constant @25℃	K_m	N/Sqrt(W)	3.7	5.4
Resistance (L-L) @25℃ ±10% ❹	R_{25}	Ω	7.42	3.80
Inductance (L-L) ±30% ❺	L	mH	1.65	0.85
Electrical Time Constant	τ_e	ms	0.22	0.22
Continuous current (NC) @100℃ ❶❷	I_{cn}	Arms	1.57	3.03
Stall current (NC) @100℃ ❶❸	I_{sn}	Arms	1.21	2.33
Peak current	I_{pk}	Arms	3.4	6.6
Continuous Power Dissipation (NC) @100℃ ❶❷	P_{cn}	W	35.2	67.4
Max. Coil Temperature	T_{max}	℃	100.0	100.0
Thermal Dissipation Constant (NC) ❶❷	K_{thn}	W/℃	0.47	0.90
Max bus Voltage	U_{bus}	Vdc	60	60
Magnetic Period	τ_{NN}	mm	24.0	24.0
Attraction Force	F_a	N	0.0	0.0
Mechanical Parameters				
Coil Mass (NC)❻	m_{cn}	kg	0.046	0.090
Coil Length (NC)	L_{cn}	mm	49.0	97.0
Track Mass Per Meter	m_{track}	kg/m	3.2	3.2
Other Information				
Insulation Class			Class B (130℃)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS,CE	
Ambient Temperature	Operation		0℃ to 40℃ (non-freezing)	
	Storage		-15℃ to 70℃ (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust	

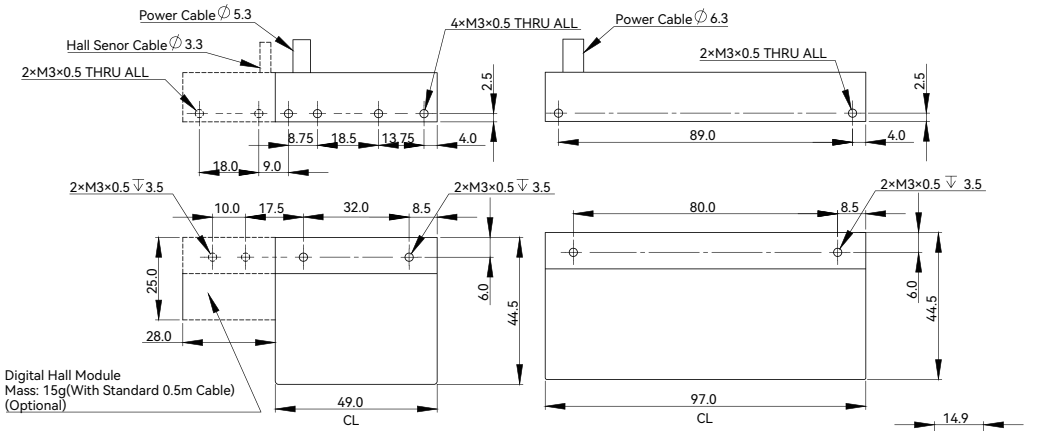
❶Measurement is taken at ambient temperature 25℃. Abbreviations: NC-Natural Cooling
❷Value depends on the thermal environment. Please consult the technical department for details
❸Minimum heatsink area is 0.03m² and minimum speed is 10mm/s
❹Resistance is measured by DC current with standard 0.5m cable
❺Inductance is measured by current frequency of 1kHz
❻Coil mass does not include hall module mass
The contents of datasheet are subject to change without prior notice

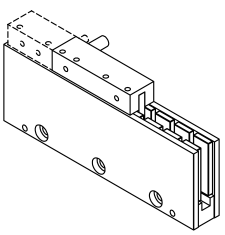
Force-Speed Curve



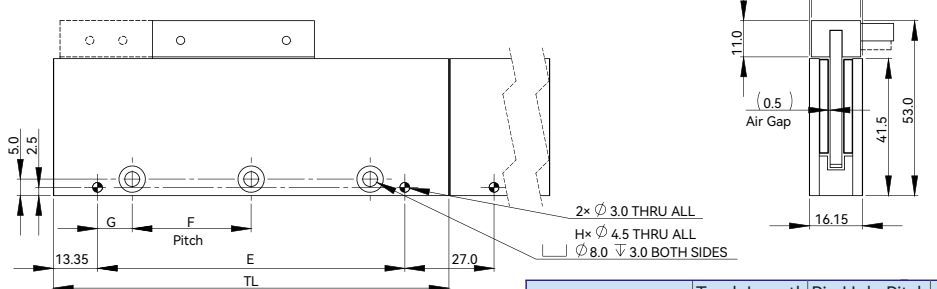


Dimensional Drawing





Motor Coil	Coil Length "CL"
ALM016-T-B1	49.0
ALM016-T-B2	97.0



Motor Track	Track Length "TL"	Pin Hole Pitch "E"	Hole Pitch "F"	"G"	No.of Hole "H"
ALM016-T-TL072	71.7	45.0	30.0	7.5	2
ALM016-T-TL120	119.7	93.0	36.0	10.5	3

Part Numbering

Motor Coil

ALM016-T-B1-N-KX-M-NF-005-XF-000

- Model: ALM016-T
- Size: B1 / B2
- Cooling Type: N[1]
- Thermal Sensor: KX[2]
- Hall Sensor Cable: NF[3] / HF[4] / HL[5]
- Cable Length: 005 / 030[6]
- Power Cable: XF[7] / XL[8]
- Design Control Code: 000
- Winding Code: M

1. N = Natural cooling
2. KX = PT100 (RTD)
3. NF = Without Built-in Hall Sensor C/W Flying Leads
4. HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
5. HL = With Hall Sensor & Hall Cable C/W MATE-N-LOK Plug
6. 005 = 0.5m; 030 = 3.0m
7. XF = Without Ferrite Bead C/W Flying Leads
8. XL = Without Ferrite Bead C/W MATE-N-LOK Plug

Motor Track

ALM016-T-TL072-TN-000

- Model: ALM016-T
- Track Length: TL072 / TL120
- Track Type: TN[9]
- Design Control Code: 000

9. TN = Standard Track, No Cover

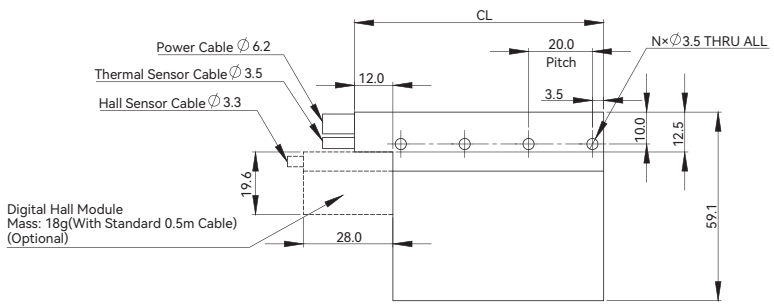
ALM021-T

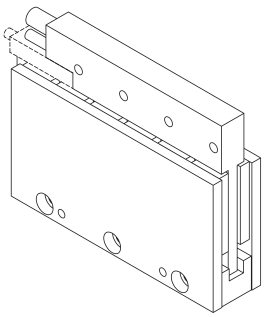
Performance Parameters	Symbol	Unit	ALM021-T-B1		ALM021-T-B2		ALM021-T-B3		ALM021-T-B4	
			M	H	M	H	M	H	M	H
Continuous Force (NC) @110℃ ❶	F_{cn}	N	28.6	28.6	57.1	57.1	85.7	85.7	114.2	114.2
Peak Force	F_{pk}	N	99.5	99.5	199.1	199.1	298.6	298.6	398.2	398.2
Force Constant ±10%	K_f	N/Arms	42.0	21.0	42.0	21.0	42.0	21.0	42.0	21.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	34.3	17.1	34.3	17.1	34.3	17.1	34.3	17.1
Motor Constant @25℃	K_m	N/Sqrt(W)	5.2	5.2	7.3	7.3	8.9	9.0	10.3	10.3
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	44.20	11.00	22.10	5.50	14.73	3.67	11.05	2.75
Inductance (L-L) ±30% ❸	L	mH	15.30	3.80	7.65	1.90	5.10	1.27	3.83	0.95
Electrical Time Constant	τ_e	ms	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Continuous Current (NC) @110℃ ❶	I_{cn}	Arms	0.7	1.4	1.4	2.8	2.1	4.1	2.8	5.5
Peak Current	I_{pk}	Arms	2.4	4.8	4.8	9.6	7.2	14.4	9.6	19.2
Continuous Power Dissipation (NC) @110℃ ❶	P_{cn}	W	42.0	42.0	83.9	83.9	125.9	125.9	167.8	167.8
Max. Coil Temperature	T_{max}	℃	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.5	0.5	1.0	1.0	1.5	1.5	2.0	2.0
Temperature Sensor	-	-	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0	330.0	330.0	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Attraction Force	F_a	N	0	0	0	0	0	0	0	0
Mechanical Parameters										
Coil Mass (NC) ❹	m_{cn}	kg	0.08	0.08	0.17	0.17	0.23	0.23	0.30	0.30
Coil Length (NC)	L_{cn}	mm	78.0	78.0	138.0	138.0	198.0	198.0	258.0	258.0
Track Mass Per Meter	m_{track}	kg/m	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7

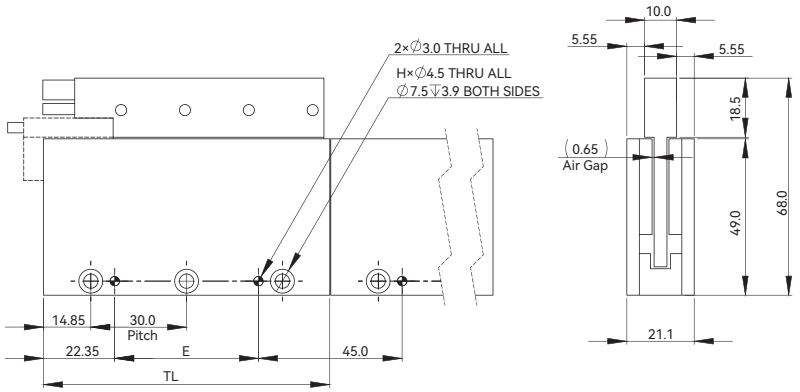
Other Information		
Insulation Class		Class B (130°C)
Protection Grade		IP00
Compliance with Global Standards		RoHS, CE
Ambient Temperature	Operation	0°C to 40°C (non-freezing)
	Storage	-15°C to 70°C (non-freezing)
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)
	Storage	10%RH to 90%RH (non-condensing)
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.

❶Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.
❷Resistance is measured by DC current with standard 0.5 m cable.
❸Inductance is measured by current frequency of 1 kHz.
❹Coil mass does not include hall module mass.
The contents of datasheet are subject to change without prior notice.

Dimensional Drawing



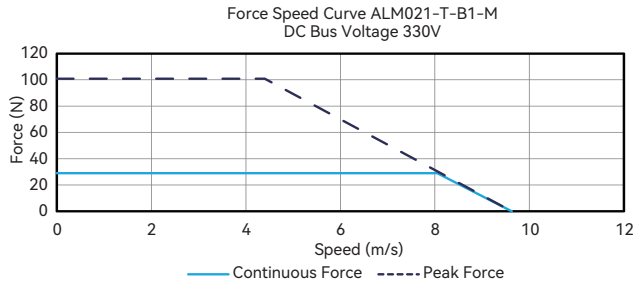


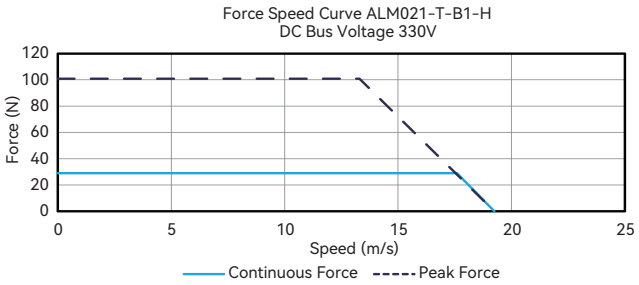


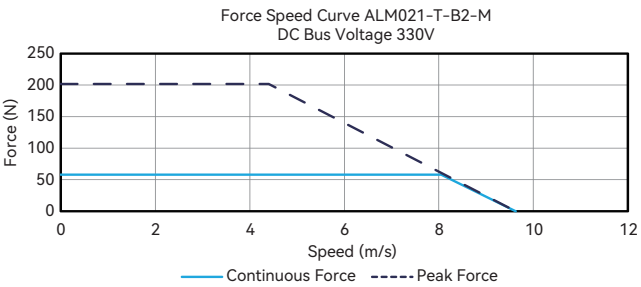
Motor Coil	Coil Length "CL"	No. of Holes "N"
ALM021-T-B1	78.0	4
ALM021-T-B2	138.0	7
ALM021-T-B3	198.0	10
ALM021-T-B4	258.0	13

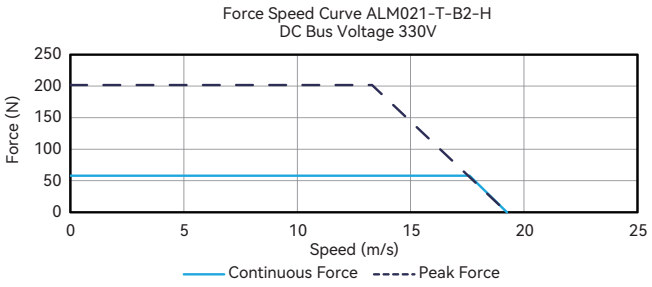
Motor Track	Track Length "TL"	Pin Hole Pitch "E"	No. of Holes "H"
ALM021-T-TL090	89.7	60.0	3
ALM021-T-TL120	119.7	90.0	4
ALM021-T-TL150	149.7	120.0	5
ALM021-T-TL390	389.7	360.0	13

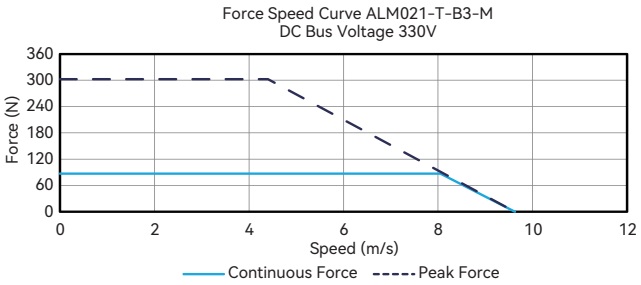
Force-Speed Curve

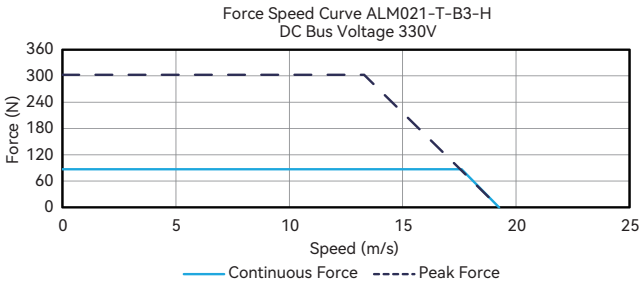


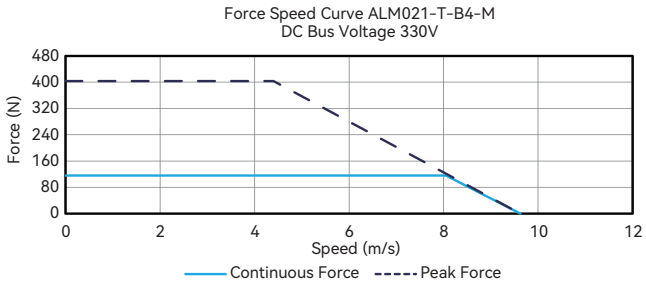


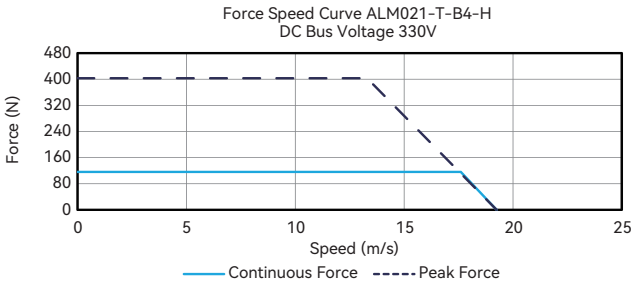












Part Numbering

Motor Coil

ALM021-T-B1-N-NP-M-NF-005-XF-000

- Model: ALM021-T
- Size: B1 / B2 / B3 / B4
- Cooling Type: N[1]
- Thermal Sensor: NP[2]
- Winding Code: M[3] / H[4]
- Hall Sensor Cable: NF[5] / HF[6]
- Cable Length:[7] 005 / 030
- Power Cable: XF[8]
- Design Control Code: 000

1. N = Natural Cooling
2. NP = NTC+PTC
3. M = Mid speed winding
4. H = High speed winding
5. NF = Without Built-in Hall Sensor C/W Flying Leads
6. HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
7. 005 = 0.5m; 030 = 3.0m
8. XF = Without Ferrite Bead C/W Flying Leads
   (Cables with connectors can be customized, for more options, please consult cust-service@akribis-sys.com)

Motor Track

ALM021-T-TL120-TN-000

- Model: ALM021-T
- Track Length: TL090 / TL120 / TL150 / TL390
- Track Type: TN[9]
- Design Control Code: 000

9. TN = Standard Track, No Cover

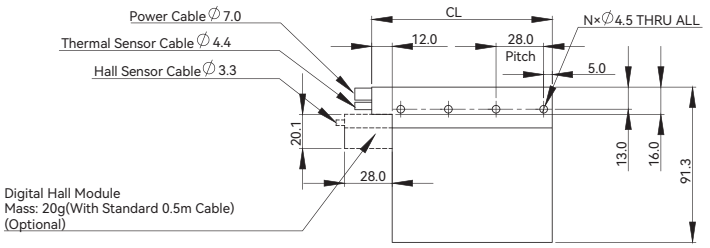
ALM028-T

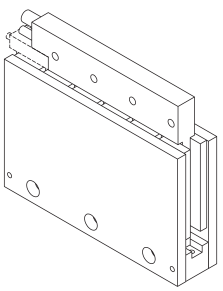
Performance Parameters	Symbol	Unit	ALM028-T-B1		ALM028-T-B2		ALM028-T-B3		ALM028-T-B4		ALM028-T-B5	
			M	H	M	H	M	H	M	H	M	H
Continuous Force (NC) @110℃[1]	F_{cn}	N	74.4	74.4	148.7	148.7	223.1	223.1	297.4	297.4	371.8	371.8
Peak Force	F_{pk}	N	256.9	256.9	513.8	513.8	770.6	770.6	1027.5	1027.5	1284.4	1284.4
Force Constant ±10%	K_f	N/Arms	67.6	27.6	67.6	27.6	67.6	27.6	67.6	27.6	67.6	27.6
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	55.2	22.5	55.2	22.5	55.2	22.5	55.2	22.5	55.2	22.5
Motor Constant @25℃	K_m	N/Sqrt(W)	10.2	10.2	14.5	14.5	17.8	17.7	20.5	20.5	22.9	22.9
Resistance (L-L) @25℃ ±10%[2]	R_{25}	Ω	29.00	4.85	14.50	2.43	9.67	1.62	7.25	1.21	5.80	0.97
Inductance (L-L) ±30%[3]	L	mH	21.60	3.60	10.80	1.80	7.20	1.20	5.40	0.90	4.32	0.72
Electrical Time Constant	τ_e	ms	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Continuous Current (NC) @110℃[1]	I_{cn}	Arms	1.1	2.7	2.2	5.4	3.3	8.1	4.4	10.8	5.5	13.5
Peak Current	I_{pk}	Arms	3.8	9.3	7.6	18.6	11.4	27.9	15.2	37.2	19.0	46.5
Continuous Power Dissipation (NC) @110℃[1]	P_{cn}	W	69.9	69.9	139.7	139.7	209.6	209.6	279.4	279.4	349.3	349.3
Max. Coil Temperature	T_{max}	℃	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0
Thermal Dissipation Constant (NC)[1]	K_{thn}	W/℃	0.8	0.8	1.6	1.6	2.5	2.5	3.3	3.3	4.1	4.1
Temperature Sensor	-	-	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0	330.0	330.0	330.0	330.0	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0
Attraction Force	F_a	N	0	0	0	0	0	0	0	0	0	0
Mechanical Parameters												
Coil Mass (NC)[4]	m_{cn}	kg	0.24	0.24	0.49	0.49	0.69	0.69	0.91	0.91	1.14	1.14
Coil Length (NC)	L_{cn}	mm	106.0	106.0	190.0	190.0	274.0	274.0	358.0	358.0	442.0	442.0
Track Mass Per Meter	m_{track}	kg/m	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0

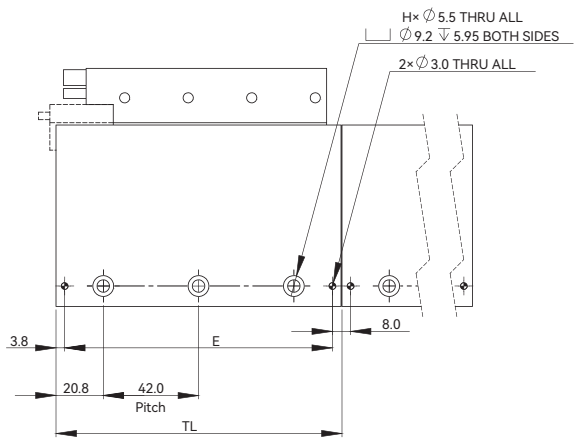
Other Information		
Insulation Class		Class B (130°C)
Protection Grade		IP00
Compliance with Global Standards		RoHS, CE
Ambient Temperature	Operation	0°C to 40°C (non-freezing)
	Storage	-15°C to 70°C (non-freezing)
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)
	Storage	10%RH to 90%RH (non-condensing)
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.

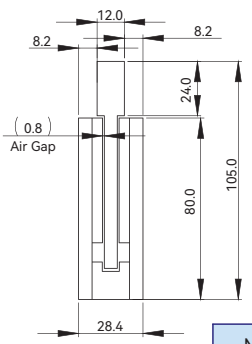
[1] Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.
[2] Resistance is measured by DC current with standard 0.5 m cable.
[3] Inductance is measured by current frequency of 1 kHz.
[4] Coil mass does not include hall module mass.
The contents of datasheet are subject to change without prior notice.

Dimensional Drawing





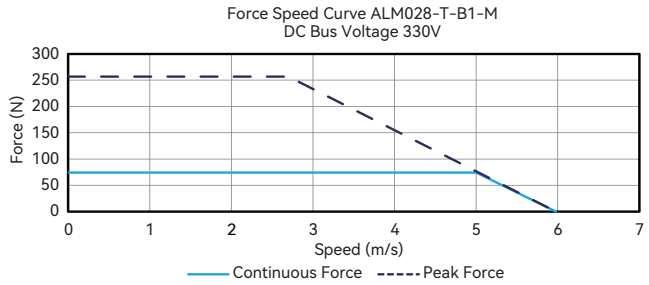


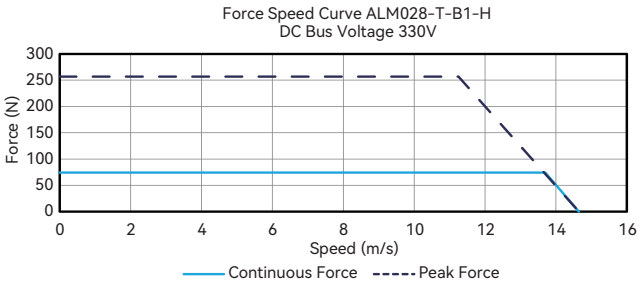


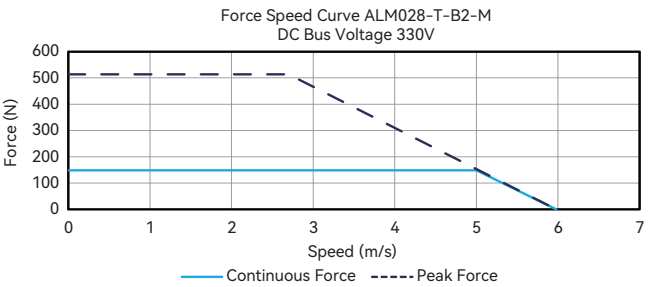
Motor Coil	Coil Length "CL"	No. of Holes "N"
ALM028-T-B1	106.0	4
ALM028-T-B2	190.0	7
ALM028-T-B3	274.0	10
ALM028-T-B4	358.0	13
ALM028-T-B5	442.0	16

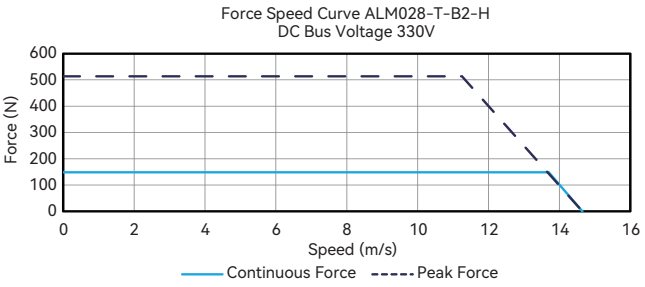
Motor Track	Track Length "TL"	Pin Hole Pitch "E"	No. of Holes "H"
ALM028-T-TL126	125.6	118.0	3
ALM028-T-TL168	167.6	160.0	4
ALM028-T-TL210	209.6	202.0	5
ALM028-T-TL546	545.6	538.0	13

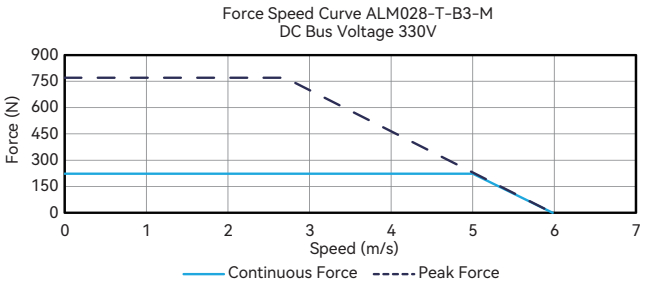
Force-Speed Curve

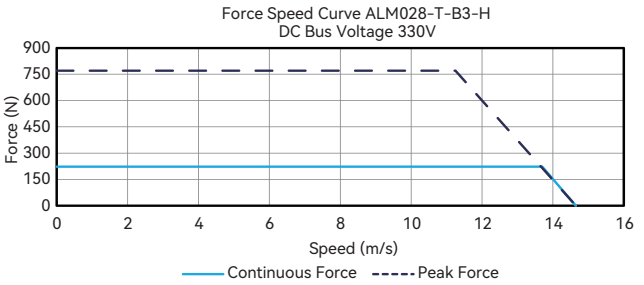


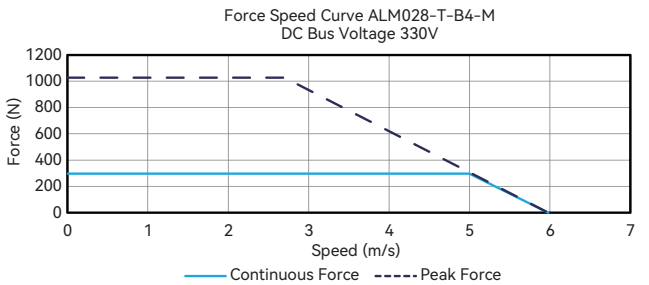


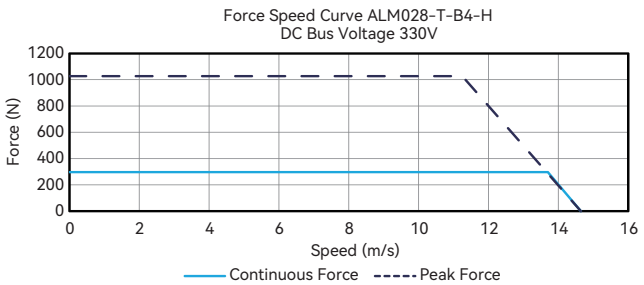


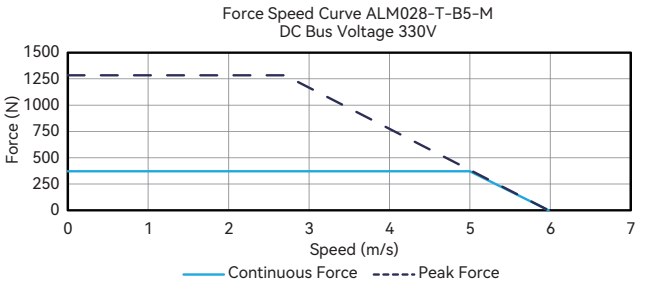


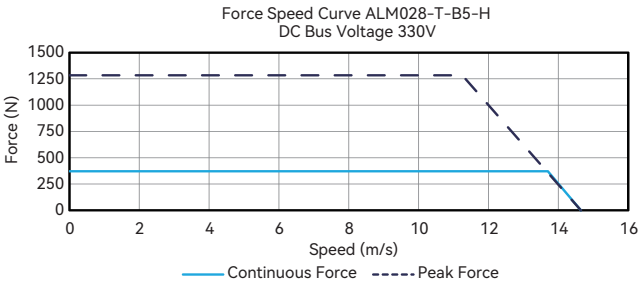












Part Numbering

Motor Coil

ALM028-T-B1-N-NP-M-NF-005-XF-000

- Model: ALM028-T
- Size: B1 / B2 / B3 / B4 / B5
- Cooling Type: N[1]
- Thermal Sensor: NP[2]
- Winding Code: M[3] / H[4]
- Hall Sensor Cable: NF[5] / HF[6]
- Cable Length:[7] 005 / 030
- Power Cable: XF[8]
- Design Control Code: 000

1. N = Natural Cooling
2. NP = NTC+PTC
3. M = Mid speed winding
4. H = High speed winding
5. NF = Without Built-in Hall Sensor C/W Flying Leads
6. HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
7. 005 = 0.5m; 030 = 3.0m
8. XF = Without Ferrite Bead C/W Flying Leads
   (Cables with connectors can be customized, for more options, please consult cust-service@akribis-sys.com)

Motor Track

ALM028-T-TL126-TN-000

- Model: ALM028-T
- Track Length: TL126 / TL168 / TL210 / TL546
- Track Type: TN[9]
- Design Control Code: 000

9. TN = Standard Track, No Cover

ALM038-T

Performance Parameters	Symbol	Unit	ALM038-T-B1		ALM038-T-B2		ALM038-T-B3		ALM038-T-B4		ALM038-T-B6
			M	H	M	H	M	H	M	H	M
Continuous Force (NC) @110℃ ❶	F_{cn}	N	125.1	125.1	250.2	250.2	375.3	375.3	500.4	500.4	750.6
Peak Force	F_{pk}	N	622.7	622.7	1245.4	1245.4	1868.2	1868.2	2490.9	2490.9	3736.3
Force Constant ±10%	K_f	N/Arms	111.2	45.0	111.2	45.0	111.2	45.0	111.2	45.0	111.2
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	90.8	36.7	90.8	36.7	90.8	36.7	90.8	36.7	90.8
Motor Constant @25℃	K_m	N/Sqrt(W)	16.7	16.7	23.6	23.6	28.9	28.9	33.4	33.4	40.9
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	29.56	4.84	14.78	2.42	9.85	1.61	7.39	1.21	4.93
Inductance (L-L) ±30% ❸	L	mH	44.60	7.30	22.30	3.65	14.87	2.43	11.15	1.83	7.43
Electrical Time Constant	τ_e	ms	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
Continuous Current (NC) @110℃ ❶	I_{cn}	Arms	1.1	2.8	2.3	5.6	3.4	8.3	4.5	11.1	6.7
Peak Current	I_{pk}	Arms	5.6	13.8	11.2	27.7	16.8	41.5	22.4	55.4	33.6
Continuous Power Dissipation (NC) @110℃ ❶	P_{cn}	W	74.5	74.5	149.0	149.0	223.4	223.4	297.9	297.9	445.6
Max. Coil Temperature	T_{max}	℃	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.9	0.9	1.8	1.8	2.6	2.6	3.5	3.5	5.2
Temperature Sensor	-	-	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0	330.0	330.0	330.0	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0
Attraction Force	F_a	N	0	0	0	0	0	0	0	0	0
Mechanical Parameters											
Coil Mass (NC) ❹	m_{cn}	kg	0.54	0.54	1.05	1.05	1.58	1.58	2.12	2.12	3.10
Coil Length (NC)	L_{cn}	mm	134.0	134.0	248.0	248.0	362.0	362.0	476.0	476.0	704.0
Track Mass Per Meter	m_{track}	kg/m	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
Other Information											
Insulation Class			Class B (130℃)								
Protection Grade			IP00								
Compliance with Global Standards			RoHS, CE								
Ambient Temperature	Operation		0℃ to 40℃ (non-freezing)								
	Storage		-15℃ to 70℃ (non-freezing)								
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)								
	Storage		10%RH to 90%RH (non-condensing)								
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.								

❶Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.

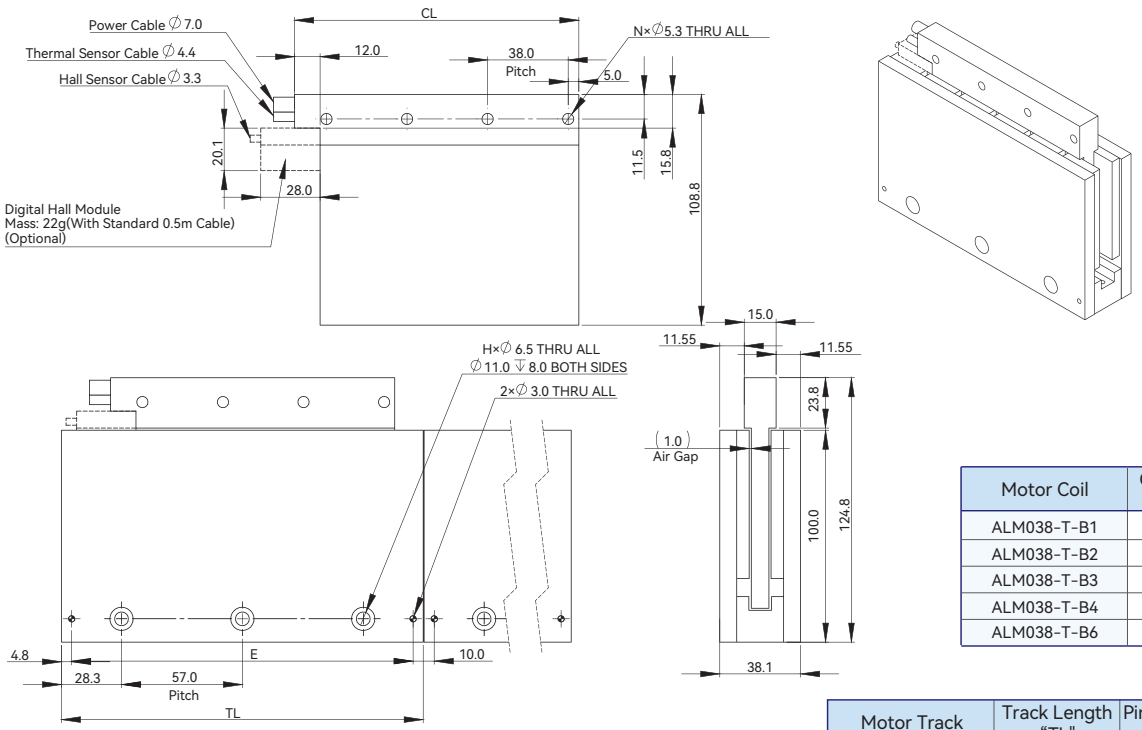
❷Resistance is measured by DC current with standard 0.5 m cable.

❸Inductance is measured by current frequency of 1 kHz.

❹Coil mass does not include hall module mass.

The contents of datasheet are subject to change without prior notice.

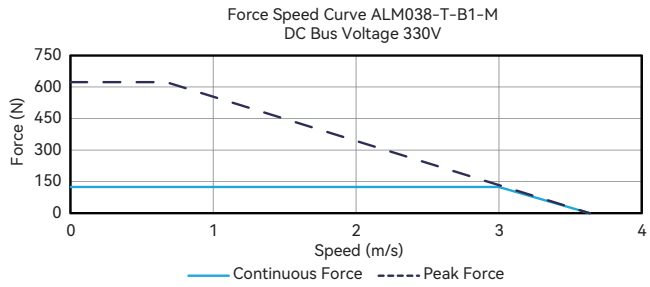
Dimensional Drawing

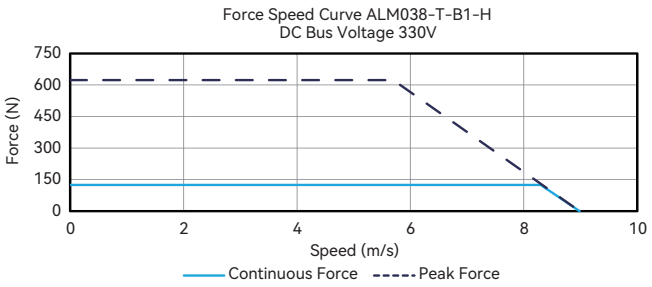


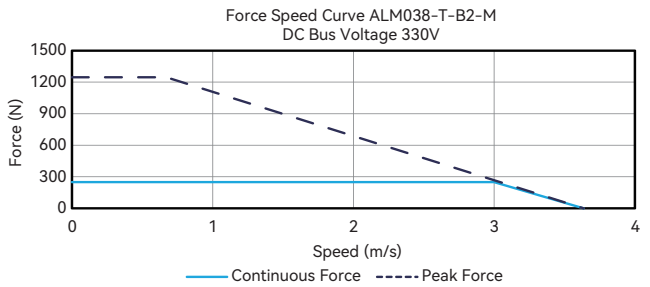
Motor Coil	Coil Length "CL"	No. of Holes "N"
ALM038-T-B1	134.0	4
ALM038-T-B2	248.0	7
ALM038-T-B3	362.0	10
ALM038-T-B4	476.0	13
ALM038-T-B6	704.0	19

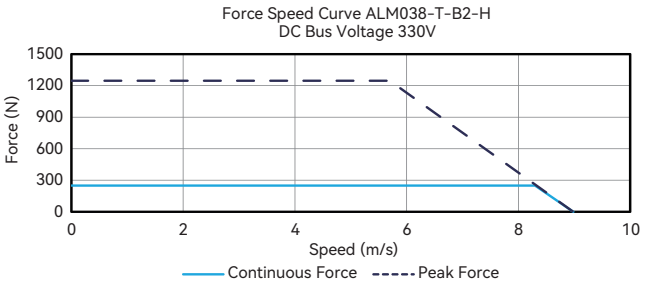
Motor Track	Track Length "TL"	Pin Hole Pitch "E"	No. of Holes "H"
ALM038-T-TL114	113.6	104.0	2
ALM038-T-TL171	170.6	161.0	3
ALM038-T-TL456	455.6	446.0	8

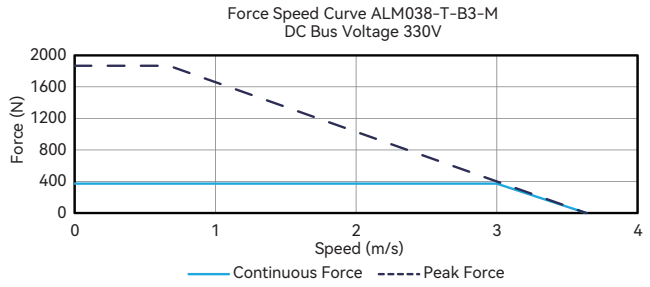
Force-Speed Curve

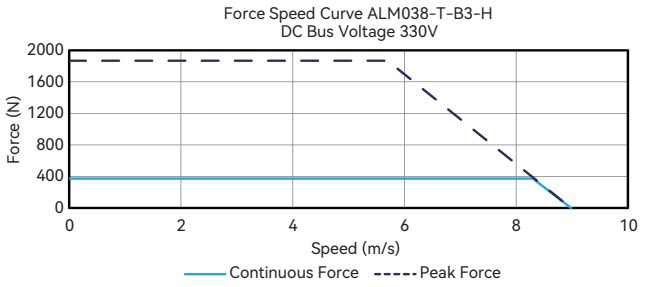


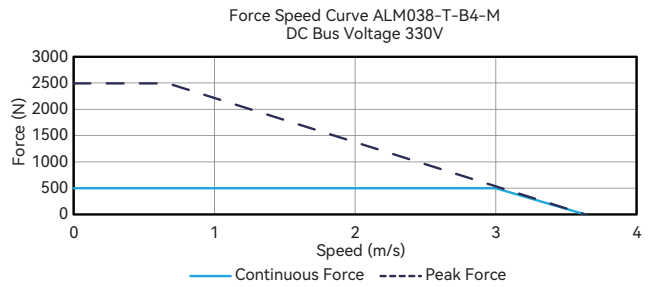


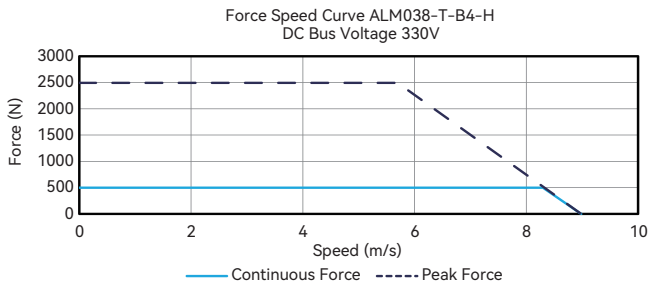


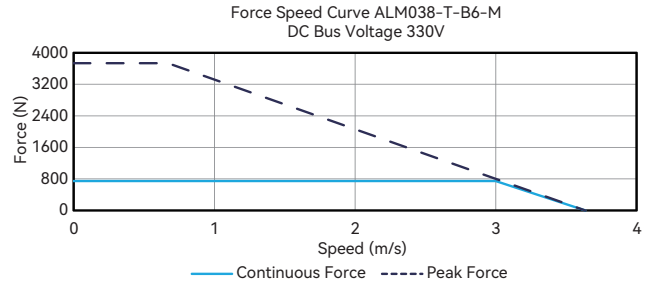












Part Numbering

Motor Coil

ALM038-T-B1-N-NP-M-NF-005-XF-000

- Model: ALM038-T
- Size: B1 / B2 / B3 / B4 / B6
- Cooling Type: N[1]
- Thermal Sensor: NP[2]
- Winding Code: M[3] / H[4]
- Hall Sensor Cable: NF[5] / HF[6]
- Cable Length:[7] 005 / 030
- Power Cable: XF[8]
- Design Control Code: 000

1. N = Natural Cooling
2. NP = NTC+PTC
3. M = Mid speed winding
4. H = High speed winding
5. NF = Without Built-in Hall Sensor C/W Flying Leads
6. HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
7. 005 = 0.5m; 030 = 3.0m
8. XF = Without Ferrite Bead C/W Flying Leads
   (Cables with connectors can be customized, for more options, please consult cust-service@akribis-sys.com)

Motor Track

ALM038-T-TL114-TN-000

- Model: ALM038-T
- Track Length: TL114 / TL171 / TL456
- Track Type: TN[9]
- Design Control Code: 000

9. TN = Standard Track, No Cover

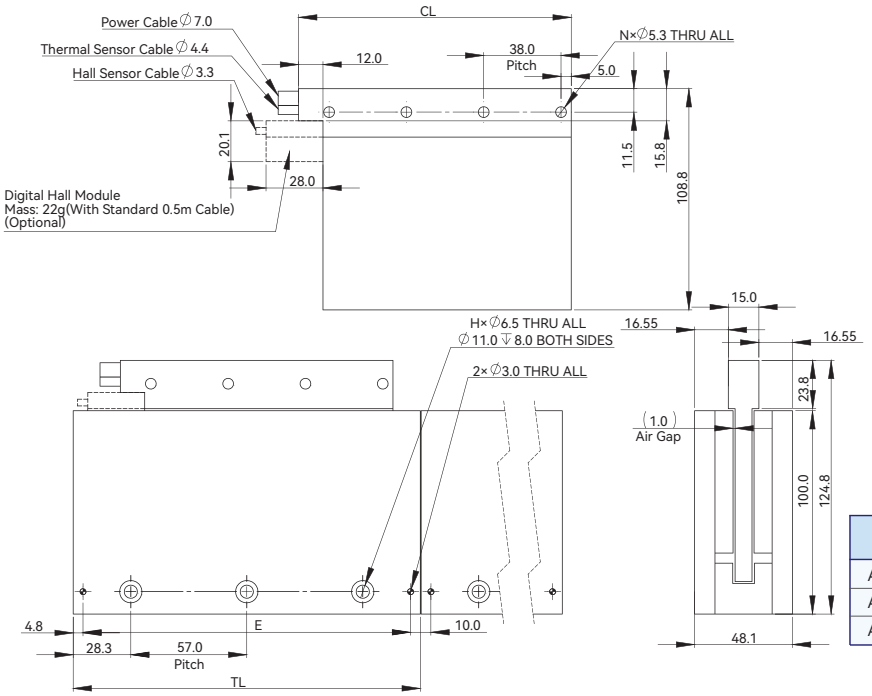
ALM048-T

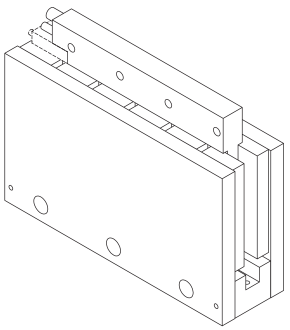
Performance Parameters	Symbol	Unit	ALM048-T-B1		ALM048-T-B2		ALM048-T-B3		ALM048-T-B4		ALM048-T-B6
			M	H	M	H	M	H	M	H	M
Continuous Force (NC) @110℃ ❶	F_{cn}	N	141.8	141.8	283.5	283.5	425.3	425.3	567.0	567.0	850.5
Peak Force	F_{pk}	N	705.6	705.6	1411.2	1411.2	2116.8	2116.8	2822.4	2822.4	4233.6
Force Constant ±10%	K_f	N/Arms	126.0	51.0	126.0	51.0	126.0	51.0	126.0	51.0	126.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	102.9	41.6	102.9	41.6	102.9	41.6	102.9	41.6	102.9
Motor Constant @25℃	K_m	N/Sqrt(W)	18.9	18.9	26.8	26.8	32.8	32.8	37.8	37.9	46.3
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	29.56	4.84	14.78	2.42	9.85	1.61	7.39	1.21	4.93
Inductance (L-L) ±30% ❸	L	mH	44.60	7.30	22.30	3.65	14.87	2.43	11.15	1.83	7.43
Electrical Time Constant	τ_e	ms	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
Continuous Current (NC) @110℃ ❶	I_{cn}	Arms	1.1	2.8	2.3	5.6	3.4	8.3	4.5	11.1	6.7
Peak Current	I_{pk}	Arms	5.6	13.8	11.2	27.7	16.8	41.5	22.4	55.3	33.6
Continuous Power Dissipation (NC) @110℃ ❶	P_{cn}	W	74.5	74.5	149.0	149.0	223.4	223.4	297.9	297.9	445.6
Max. Coil Temperature	T_{max}	℃	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.9	0.9	1.8	1.8	2.6	2.6	3.5	3.5	5.2
Temperature Sensor	-	-	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC	PTC/NTC
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0	330.0	330.0	330.0	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0
Attraction Force	F_a	N	0	0	0	0	0	0	0	0	0
Mechanical Parameters											
Coil Mass (NC) ❹	m_{cn}	kg	0.54	0.54	1.05	1.05	1.58	1.58	2.12	2.12	3.10
Coil Length (NC)	L_{cn}	mm	134.0	134.0	248.0	248.0	362.0	362.0	476.0	476.0	704.0
Track Mass Per Meter	m_{track}	kg/m	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9

Other Information		
Insulation Class		Class B (130°C)
Protection Grade		IP00
Compliance with Global Standards		RoHS, CE
Ambient Temperature	Operation	0°C to 40°C (non-freezing)
	Storage	-15°C to 70°C (non-freezing)
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)
	Storage	10%RH to 90%RH (non-condensing)
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.

❶Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.
❷Resistance is measured by DC current with standard 0.5 m cable.
❸Inductance is measured by current frequency of 1 kHz.
❹Coil mass does not include hall module mass.
The contents of datasheet are subject to change without prior notice.

Dimensional Drawing



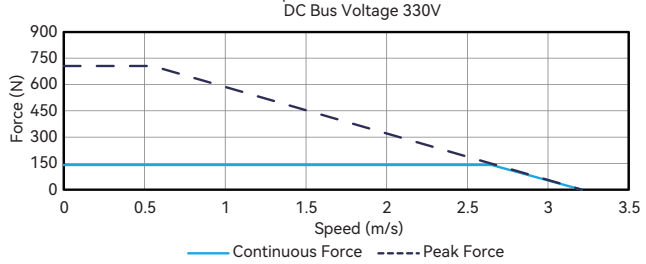


Motor Coil	Coil Length "CL"	No. of Holes "N"
ALM048-T-B1	134.0	4
ALM048-T-B2	248.0	7
ALM048-T-B3	362.0	10
ALM048-T-B4	476.0	13
ALM048-T-B6	704.0	19

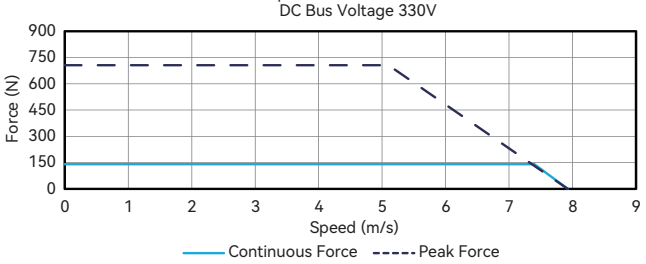
Motor Track	Track Length "TL"	Pin Hole Pitch "E"	No. of Holes "H"
ALM048-T-TL114	113.6	104.0	2
ALM048-T-TL171	170.6	161.0	3
ALM048-T-TL456	455.6	446.0	8

Force-Speed Curve

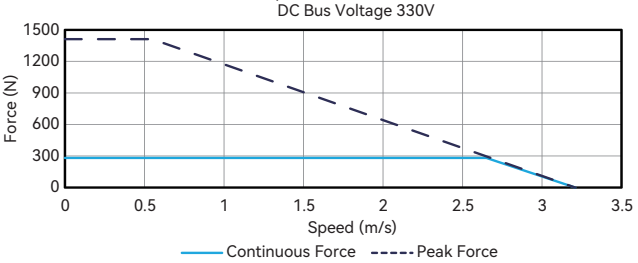
Force Speed Curve ALM048-T-B1-M
DC Bus Voltage 330V



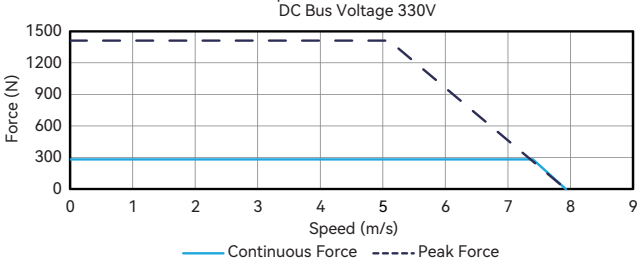
Force Speed Curve ALM048-T-B1-H
DC Bus Voltage 330V



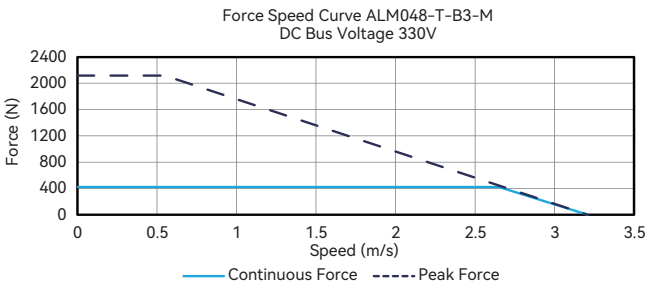
Force Speed Curve ALM048-T-B2-M
DC Bus Voltage 330V



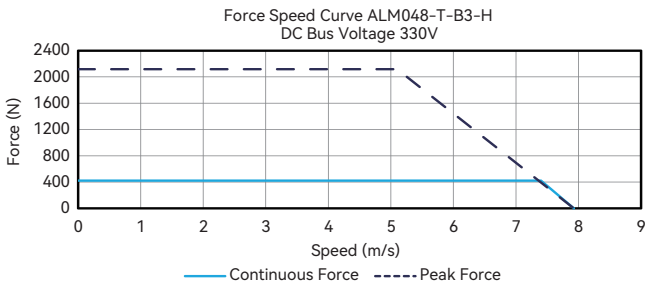
Force Speed Curve ALM048-T-B2-H
DC Bus Voltage 330V



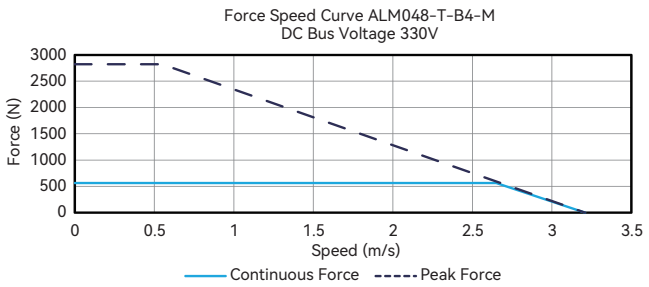
Force Speed Curve ALM048-T-B3-M
DC Bus Voltage 330V



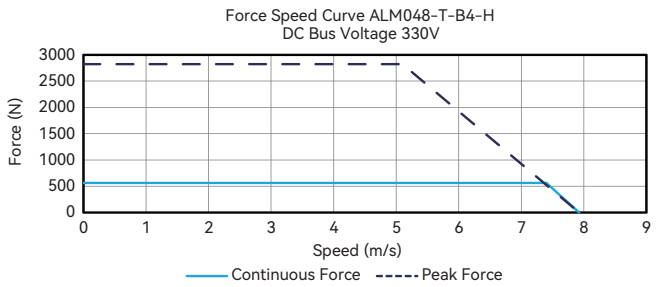
Force Speed Curve ALM048-T-B3-H
DC Bus Voltage 330V



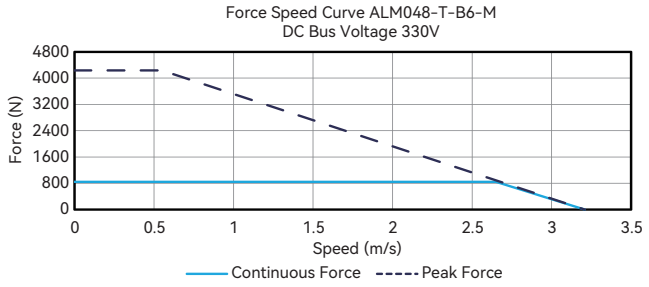
Force Speed Curve ALM048-T-B4-M
DC Bus Voltage 330V



Force Speed Curve ALM048-T-B4-H
DC Bus Voltage 330V



Force Speed Curve ALM048-T-B6-M
DC Bus Voltage 330V



Part Numbering

Motor Coil

ALM048-T-B1-N-NP-M-NF-005-XF-000

- Model: ALM048-T
- Size: B1 / B2 / B3 / B4 / B6
- Cooling Type: N[1]
- Thermal Sensor: NP[2]
- Winding Code: M[3] / H[4]
- Hall Sensor Cable: NF[5] / HF[6]
- Cable Length: 005 / 030[7]
- Power Cable: XF[8]
- Design Control Code: 000

1. N = Natural Cooling
2. NP = NTC+PTC
3. M = Mid speed winding
4. H = High speed winding
5. NF = Without Built-in Hall Sensor C/W Flying Leads
6. HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
7. 005 = 0.5m; 030 = 3.0m
8. XF = Without Ferrite Bead C/W Flying Leads
   (Cables with connectors can be customized, for more options, please consult cust-service@akribis-sys.com)

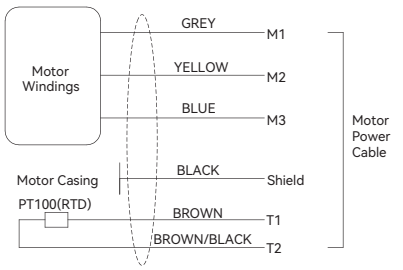
Motor Track

ALM048-T-TL114-TN-000

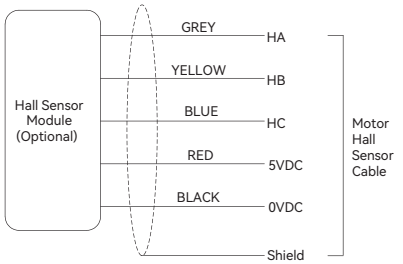
- Model: ALM048-T
- Track Length: TL114 / TL171 / TL456
- Track Type: TN[9]
- Design Control Code: 000

9. TN = Standard Track, No Cover

ALM015 / 016-T Series Motor Cable Connection

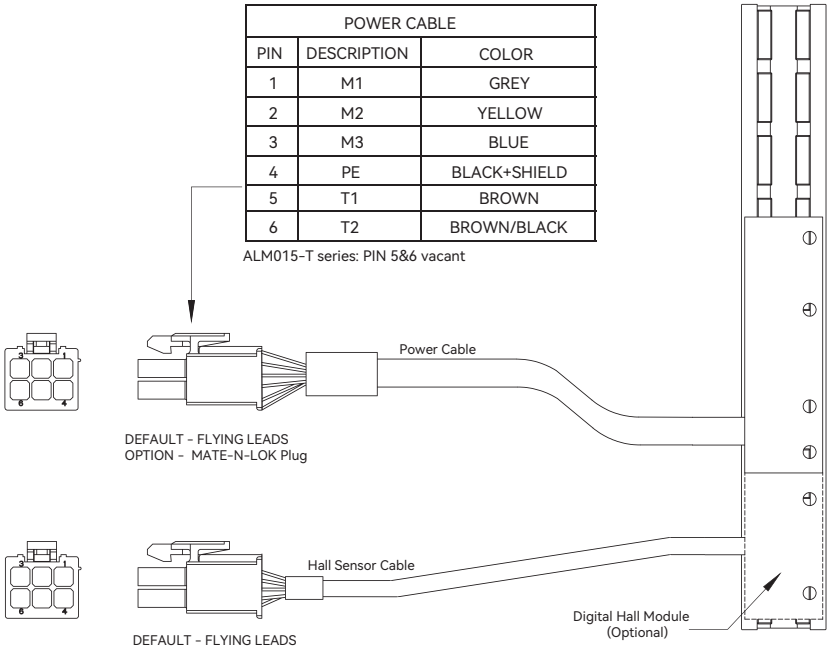


ALM015-T series: no temperature sensor
ALM016-T series: with temperature sensor - PT100(RTD)



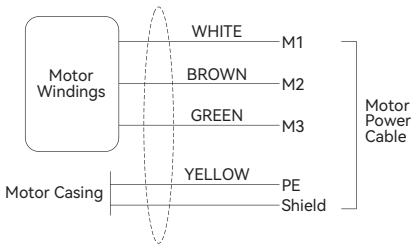
POWER CABLE		
PIN	DESCRIPTION	COLOR
1	M1	GREY
2	M2	YELLOW
3	M3	BLUE
4	PE	BLACK+SHIELD
5	T1	BROWN
6	T2	BROWN/BLACK

ALM015-T series: PIN 5&6 vacant



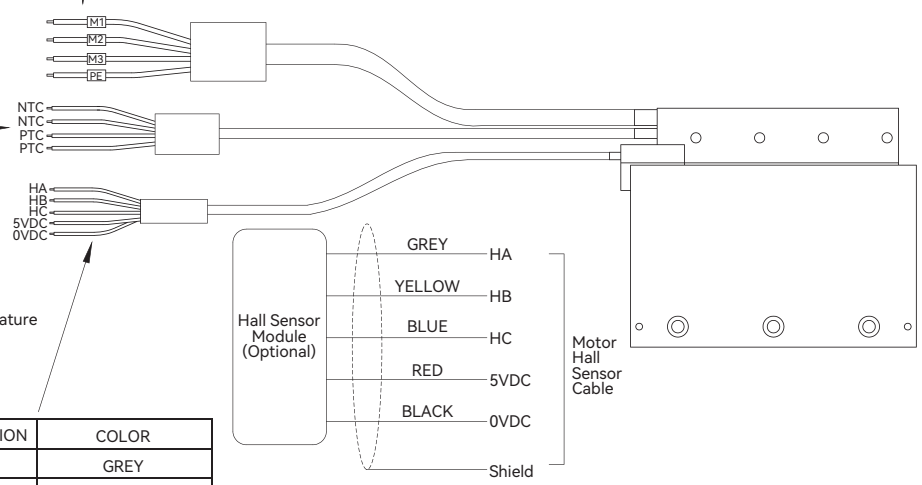
HALL SENSOR CABLE		
PIN	DESCRIPTION	COLOR
1	HA	GREY
2	HB	YELLOW
3	HC	BLUE
4	5VDC	RED
5	0VDC	BLACK
6	SHILED	

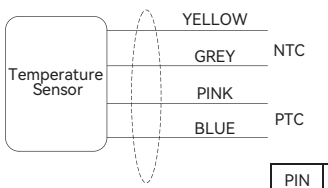
ALM021-T Series Motor Cable Connection



POWER CABLE		
PIN	DESCRIPTION	COLOR
-	M1	WHITE
-	M2	BROWN
-	M3	GREEN
-	PE	YELLOW

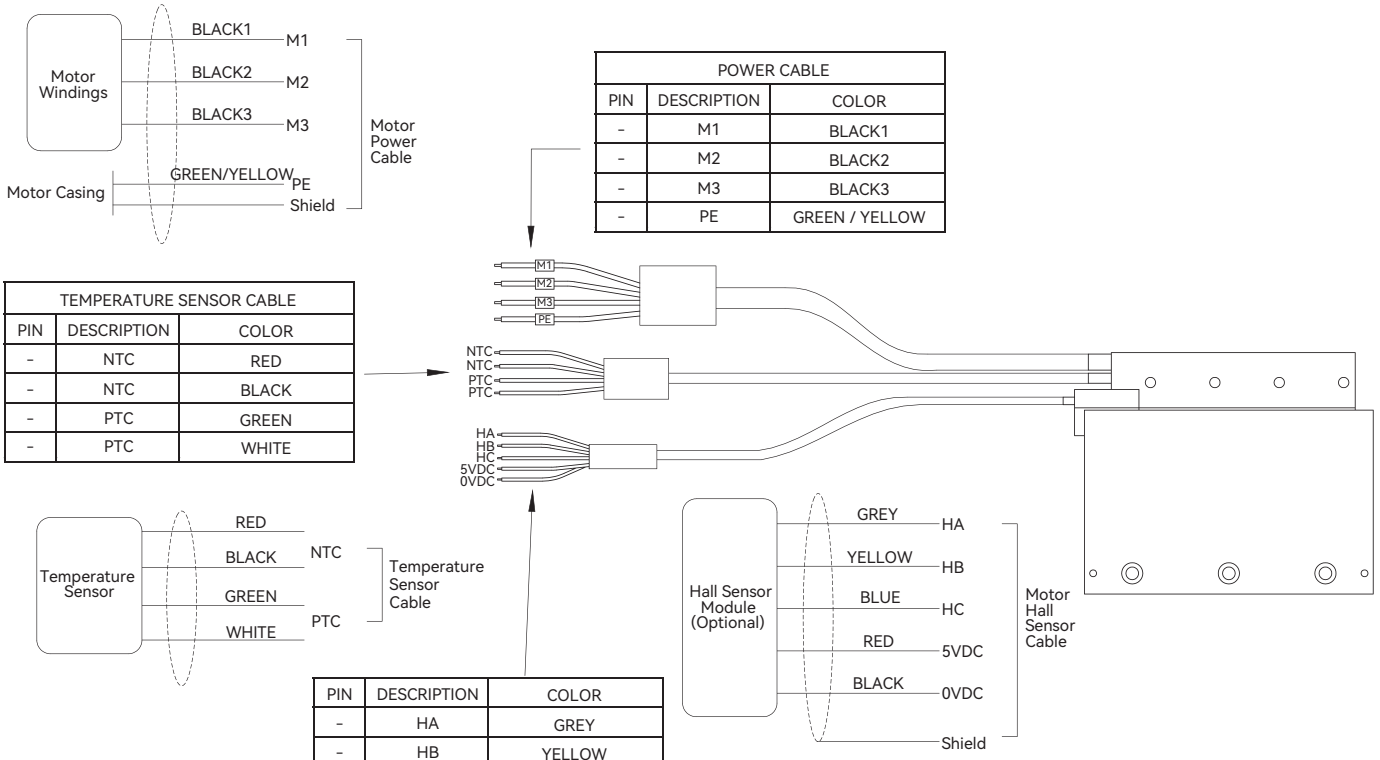
TEMPERATURE SENSOR CABLE		
PIN	DESCRIPTION	COLOR
-	NTC	YELLOW
-	NTC	GREY
-	PTC	PINK
-	PTC	BLUE





PIN	DESCRIPTION	COLOR
-	HA	GREY
-	HB	YELLOW
-	HC	BLUE
-	5VDC	RED
-	0VDC	BLACK
-	SHIELD	

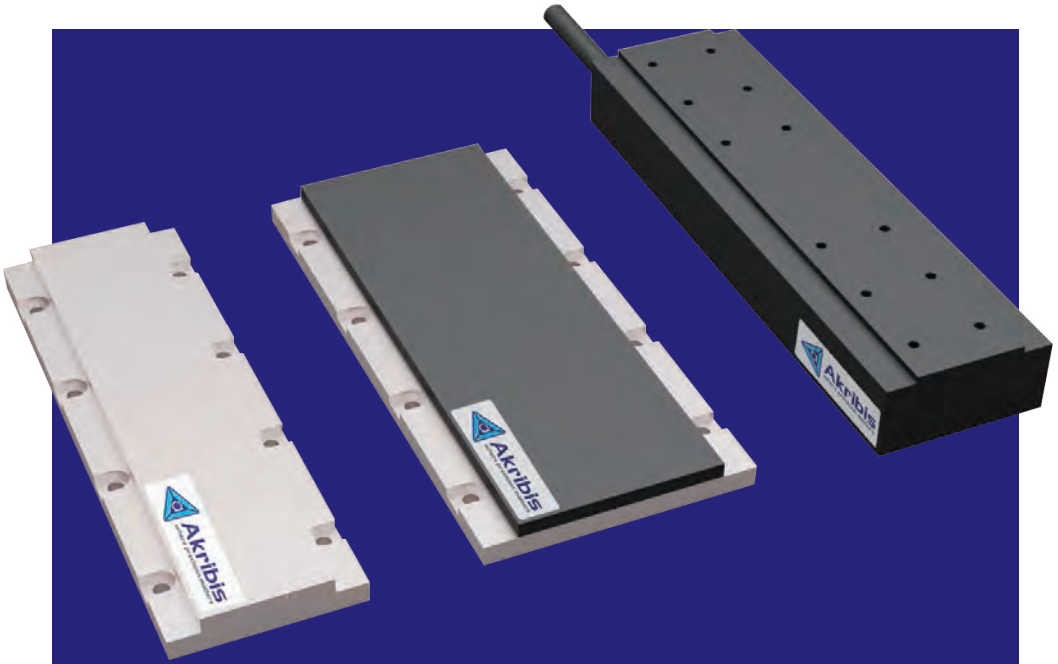
ALM028 / 038 / 048-T Series Motor Cable Connection



POWER CABLE		
PIN	DESCRIPTION	COLOR
-	M1	BLACK1
-	M2	BLACK2
-	M3	BLACK3
-	PE	GREEN / YELLOW

TEMPERATURE SENSOR CABLE		
PIN	DESCRIPTION	COLOR
-	NTC	RED
-	NTC	BLACK
-	PTC	GREEN
-	PTC	WHITE

PIN	DESCRIPTION	COLOR
-	HA	GREY
-	HB	YELLOW
-	HC	BLUE
-	5VDC	RED
-	0VDC	BLACK
-	SHIELD	



AJM SERIES

- Iron core technology
- Low cogging force
- Integrated with hall sensors
- High force and stiffness

EN-26.3.1

Akribis systems

Introduction

Iron core AJM series linear motors provide compact size, high force density and quick response.

Continuous Force Fcn = 44N ~ 446.8N

Peak Force Fpk = 117N ~ 1409.1N

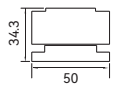
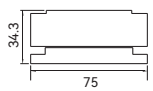
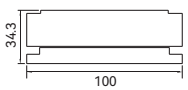
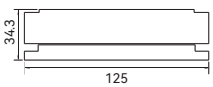
Features

- Iron core technology and low cogging force
- High continuous and peak force
- Optional hall sensors
- High motor constant

Applications

Best suited for point-to-point motion with micron level positioning ; unlimited travel stroke with top speed of 5m/s or faster (stroke of 100m or longer).

Applications & Industries: high speed positioning systems for product handling in semiconductor, photovoltaic and lithium battery, glass and LCD applications, as well as industrial printing machines, laser processing machines with demanding precision and motion control requirements.

	Series	Coil Length (mm)[1]	● Continuous Force (F_{cn}) / ■ PeakForce (F_{pk}) Unit: N							
			100	150	200	250	300	400	500	....
	AJM30-B1	56	● 44 / ■ 117							
	AJM30-B2	96		● 68.1 / ■ 214.7						
	AJM30-B4	176			● 136.2 / ■ 429.4					
	AJM50-B1	56		● 76 / ■ 201						
	AJM50-B2	96			● 117 / ■ 369					
	AJM50-B4	176				● 234 / ■ 738.1				
	AJM80-B1	56			● 113 / ■ 300					
	AJM80-B2	96				● 174.5 / ■ 550.2				
	AJM80-B4	176						● 348.9 / ■ 1100.4		
	AJM100-B1	56			● 145 / ■ 384					
	AJM100-B2	96					● 223.4 / ■ 704.5			
	AJM100-B4	176							● 446.8 / ■ 1409.1	

[1] No hall sensor.

AJM30

			AJM30-B1	AJM30-B2	AJM30-B4
Performance Parameters	Symbol	Unit	Series	Series	Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	44	68.1	136.2
Peak Force	F_{pk}	N	117	214.7	429.4
Force Constant ±10%	K_f	N/Arms	14.8	29.6	29.6
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	12.1	24.2	24.2
Motor Constant @25°C	K_m	N/Sqrt(W)	8.5	12.2	17.0
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	2.0	3.9	2.0
Inductance (L-L) ±30% [3]	L	mH	8.2	16.5	8.2
Electrical Time Constant	τ_e	ms	4.1	4.2	4.1
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	3.0	2.3	4.6
Peak Current	I_{pk}	Arms	12.0	9.0	18.0
Continuous Power Dissipation (NC) @100°C[1]	P_{cn}	W	34.6	40.1	82.6
Max. Coil Temperature	t_{max}	°C	100	100	100
Thermal Dissipation Constant (NC)[1]	K_{thn}	W/°C	0.5	0.5	1.1
Max. Bus Voltage	U_{bus}	Vdc	600	600	600
Magnetic Period	τ_{NN}	mm	20	20	20
Attraction Force	F_a	N	189	378	756
Mechanical Parameters					
Coil Mass (NC)	m_{cn}	kg	0.4	0.6	1.1
Coil Length (NC)	L_{cn}	mm	56	96	176
Track Mass Per Meter	m_{track}	kg/m	3.3	3.3	3.3
Other Information					
Insulation Class		Class B (130°C)			
Protection Grade		IP00			
Compliance with Global Standards		RoHS, CE, UL(option)			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)			
	Storage	-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.

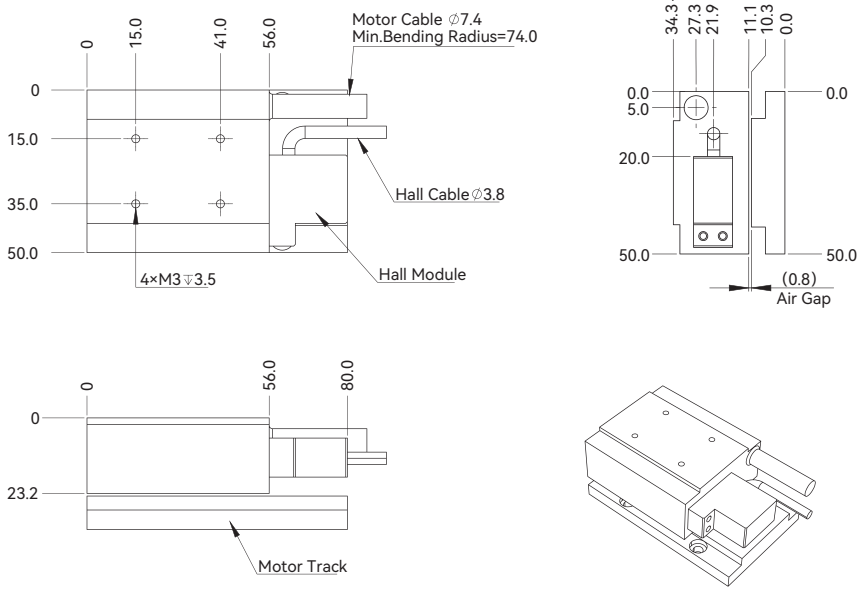
[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz.

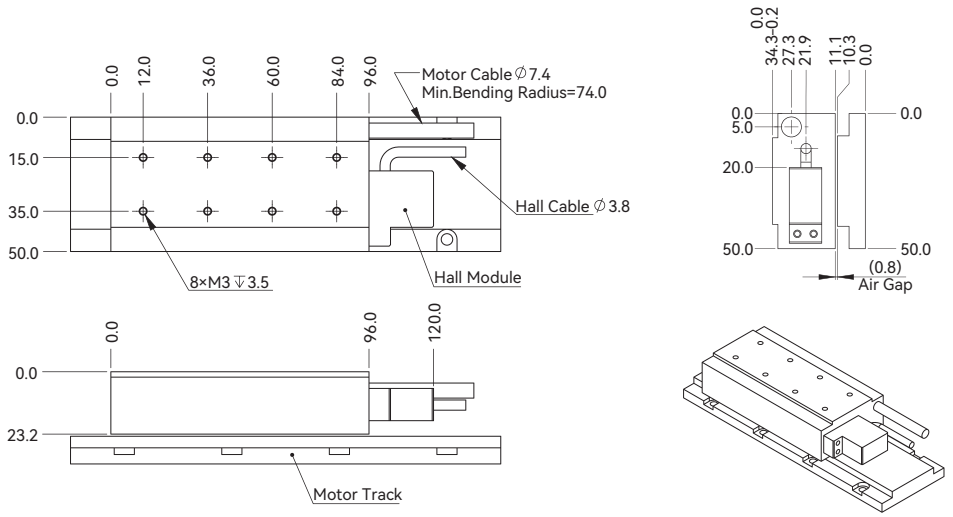
The contents of datasheet are subject to change without prior notice.

Dimensional Drawing

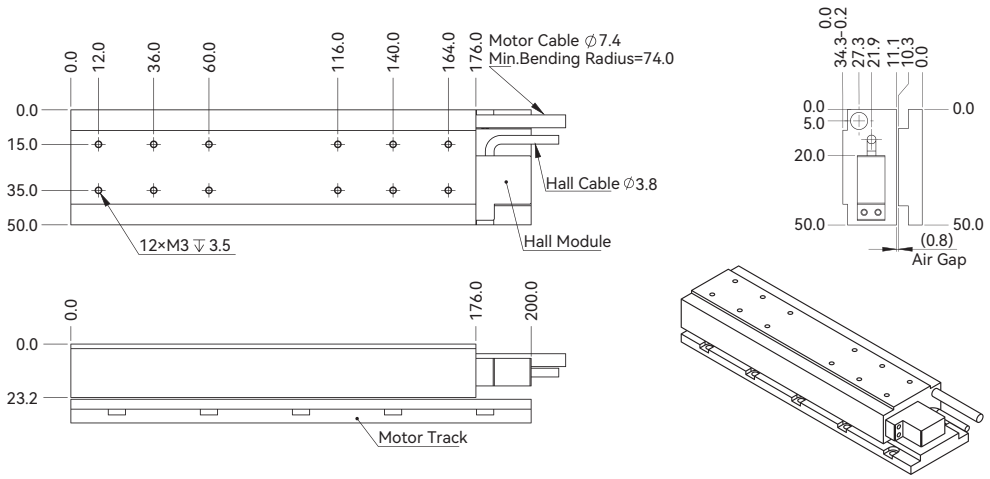
AJM30-B1



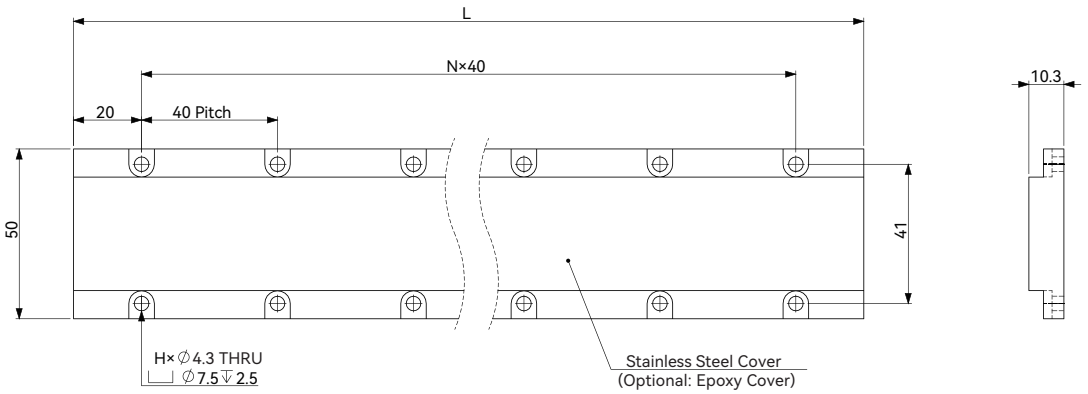
AJM30-B2



AJM30-B4



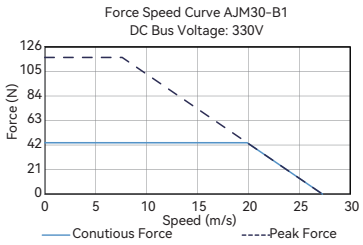
AJM30 Track

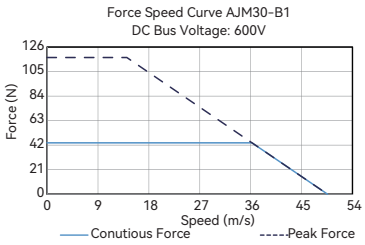


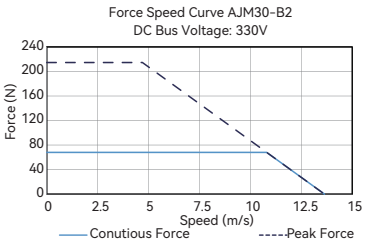
Magnet Track	L	N	H
AJM30-TL80-S	80	1	4
AJM30-TL200-S	200	4	10
AJM30-TL400-S	400	9	20

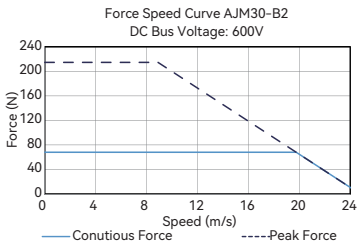
For epoxy cover option, change" -S " to " -E ". (e.g. AJM30-TL80-E)

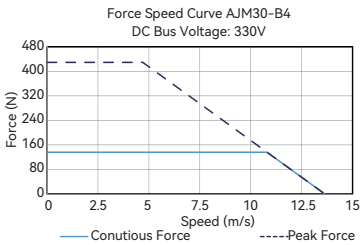
■ Force-Speed Curve

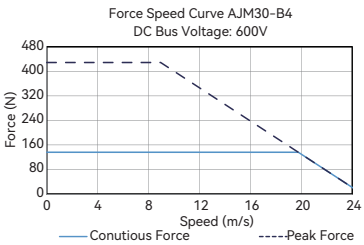












AJM50

			AJM50-B1	AJM50-B2	AJM50-B4
Performance Parameters	Symbol	Unit	Series	Series	Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	76	117.0	234.0
Peak Force	F_{pk}	N	201	369.0	738.1
Force Constant ±10%	K_f	N/Arms	25.4	50.9	50.9
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	20.8	41.5	41.5
Motor Constant @25°C	K_m	N/Sqrt(W)	11.9	17.0	23.8
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	3.0	6.0	3.1
Inductance (L-L) ±30% [3]	L	mH	13.0	25.9	13.0
Electrical Time Constant	τ_e	ms	4.2	4.3	4.2
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	3.0	2.3	4.6
Peak Current	I_{pk}	Arms	12.0	9.0	18.0
Continuous Power Dissipation (NC) @100°C[1]	P_{cn}	W	52.7	61.2	124.8
Max. Coil Temperature	t_{max}	℃	100	100	100
Thermal Dissipation Constant (NC)[1]	K_{thn}	W/℃	0.7	0.8	1.7
Max. Bus Voltage	U_{bus}	Vdc	600	600	600
Magnetic Period	τ_{NN}	mm	20	20	20
Attraction Force	F_a	N	325	650	1299
Mechanical Parameters					
Coil Mass (NC)	m_{cn}	kg	0.6	0.9	1.7
Coil Length (NC)	L_{cn}	mm	56	96	176
Track Mass Per Meter	m_{track}	kg/m	5.0	5.0	5.0
Other Information					
Insulation Class		Class B (130°C)			
Protection Grade		IP00			
Compliance with Global Standards		RoHS, CE, UL(option)			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)			
	Storage	-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

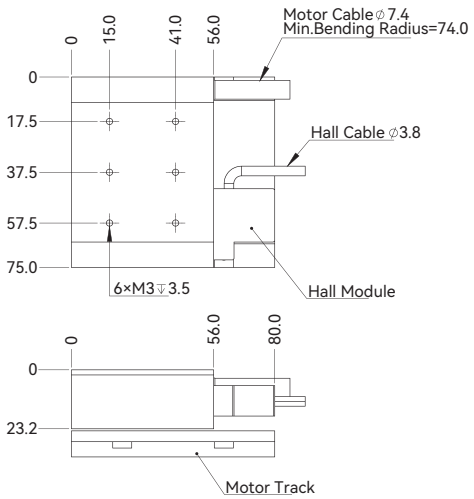
[2] Resistance is measured by DC current with standard 0.5 m cable.

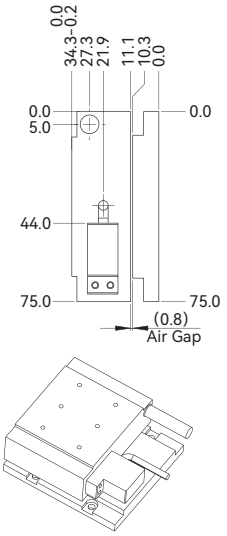
[3] Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

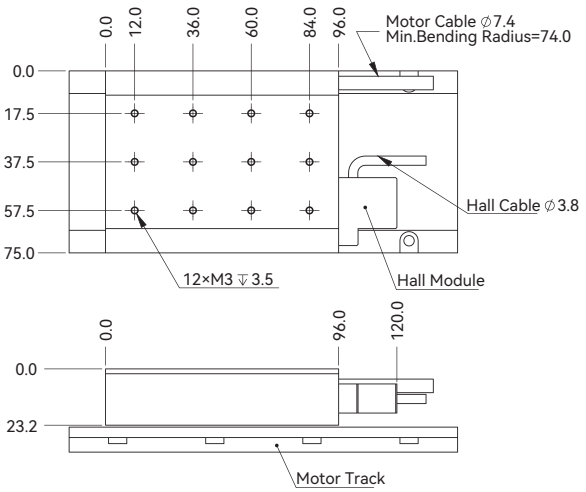
■ Dimensional Drawing

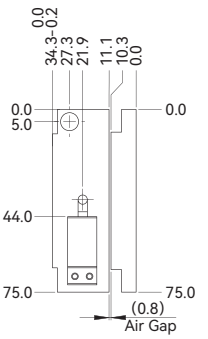
AJM50-B1

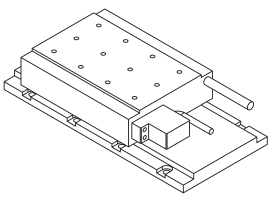




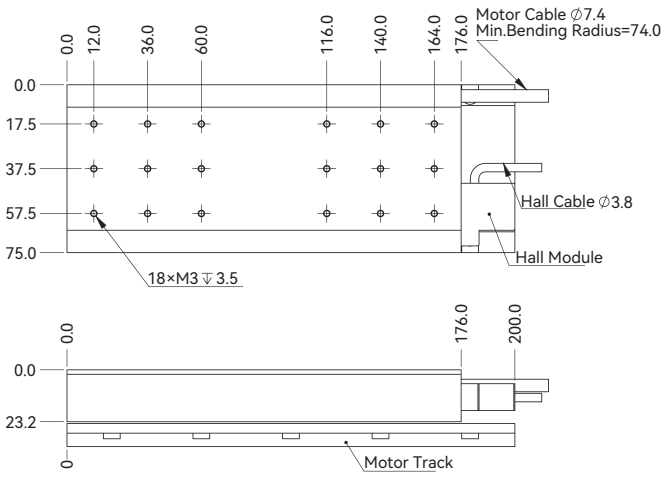
AJM50-B2

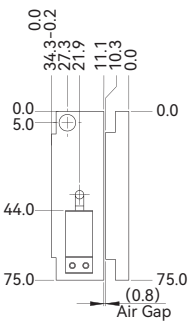


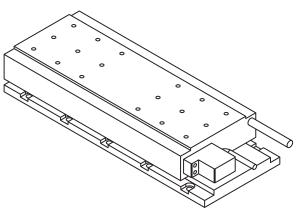




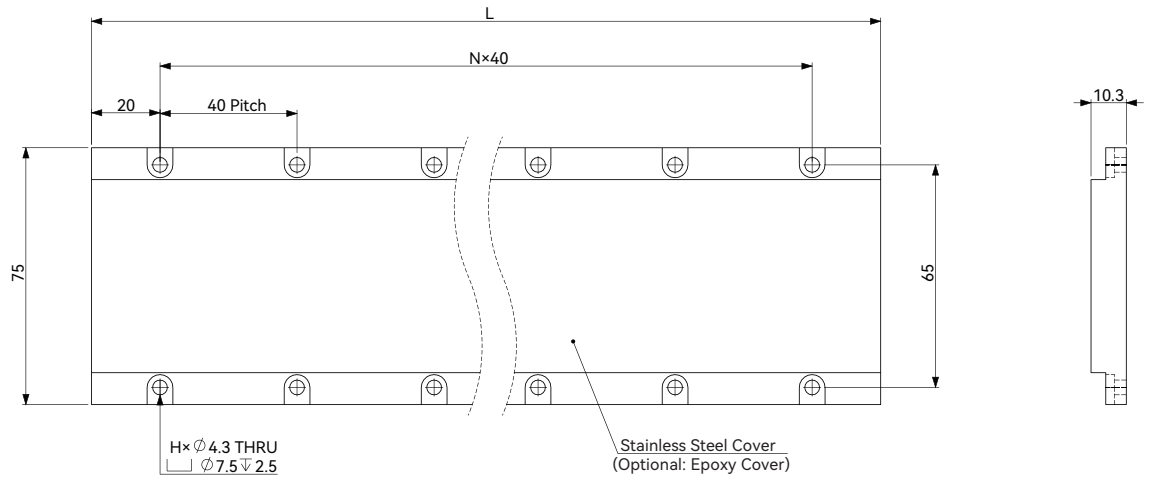
AJM50-B4







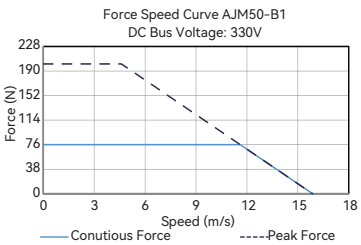
AJ M50 Track

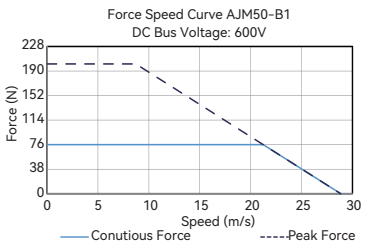


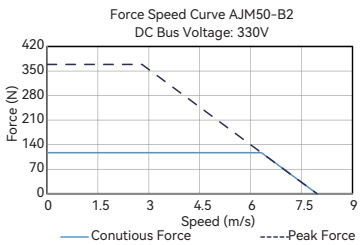
Magnet Track	L	N	H
AJM50-TL80-S	80	1	4
AJM50-TL200-S	200	4	10
AJM50-TL400-S	400	9	20

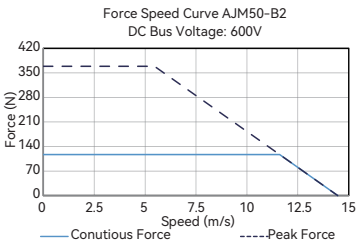
For epoxy cover option, change" -S " to " -E ". (e.g. AJM50-TL80-E)

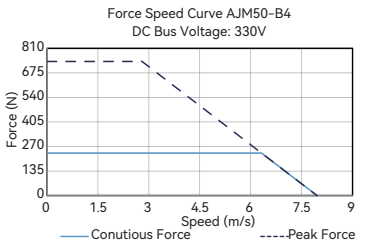
Force-Speed Curve

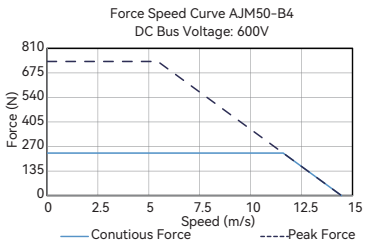












AJM80

			AJM80-B1	AJM80-B2	AJM80-B4
Performance Parameters	Symbol	Unit	Series	Series	Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	113	174.5	348.9
Peak Force	F_{pk}	N	300	550.2	1100.4
Force Constant ±10%	K_f	N/Arms	37.9	75.9	75.9
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	31.0	61.9	61.9
Motor Constant @25°C	K_m	N/Sqrt(W)	15.0	21.4	30.1
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	4.3	8.4	4.2
Inductance (L-L) ±30% [3]	L	mH	18.6	37.3	18.6
Electrical Time Constant	τ_e	ms	4.4	4.5	4.4
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	3.0	2.3	4.6
Peak Current	I_{pk}	Arms	12.0	9.0	18.0
Continuous Power Dissipation (NC) @100°C[1]	P_{cn}	W	73.7	85.5	173.5
Max. Coil Temperature	t_{max}	℃	100	100	100
Thermal Dissipation Constant (NC)[1]	K_{thn}	W/℃	1.0	1.1	2.3
Max. Bus Voltage	U_{bus}	Vdc	600	600	600
Magnetic Period	τ_{NN}	mm	20	20	20
Attraction Force	F_a	N	484	969	1937
Mechanical Parameters					
Coil Mass (NC)	m_{cn}	kg	0.8	1.2	2.3
Coil Length (NC)	L_{cn}	mm	56	96	176
Track Mass Per Meter	m_{track}	kg/m	7.0	7.0	7.0
Other Information					
Insulation Class		Class B (130°C)			
Protection Grade		IP00			
Compliance with Global Standards		RoHS, CE, UL(option)			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)			
	Storage	-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.

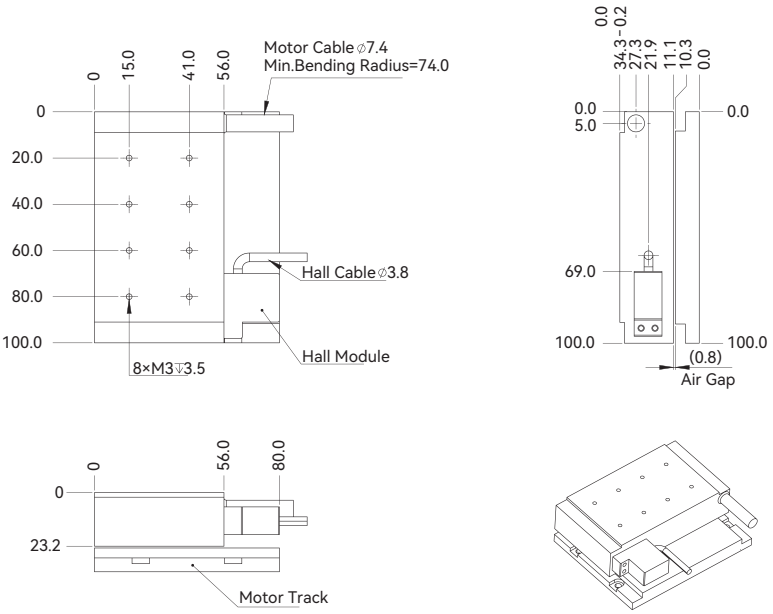
[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz.

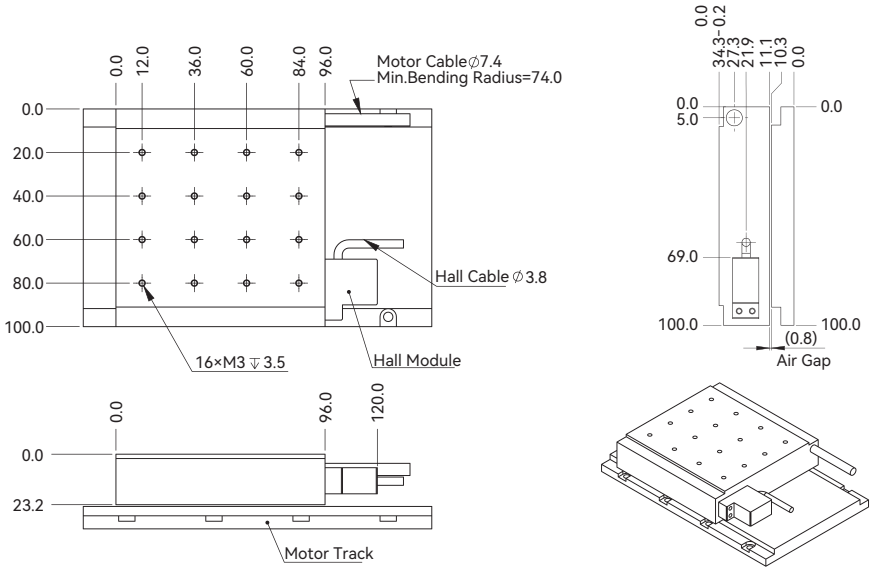
The contents of datasheet are subject to change without prior notice.

Dimensional Drawing

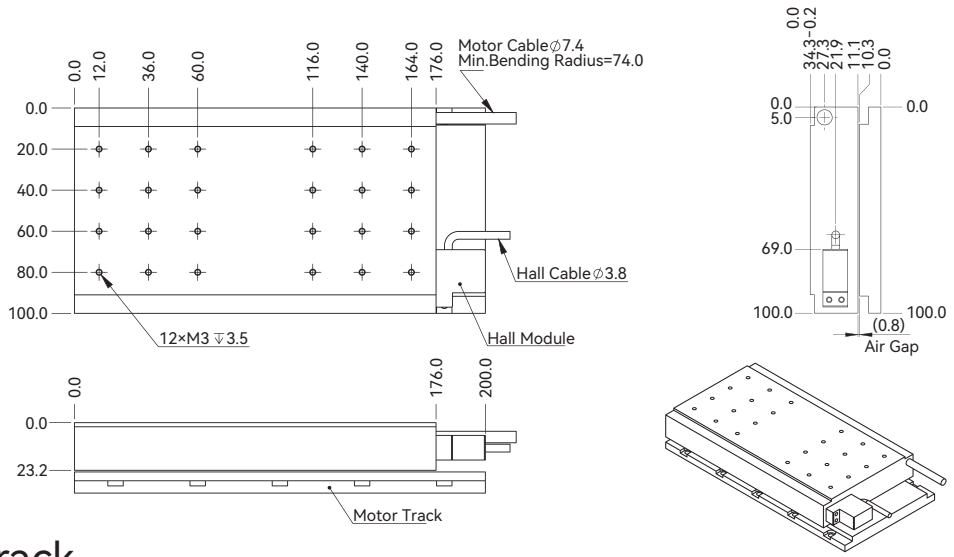
AJM80-B1



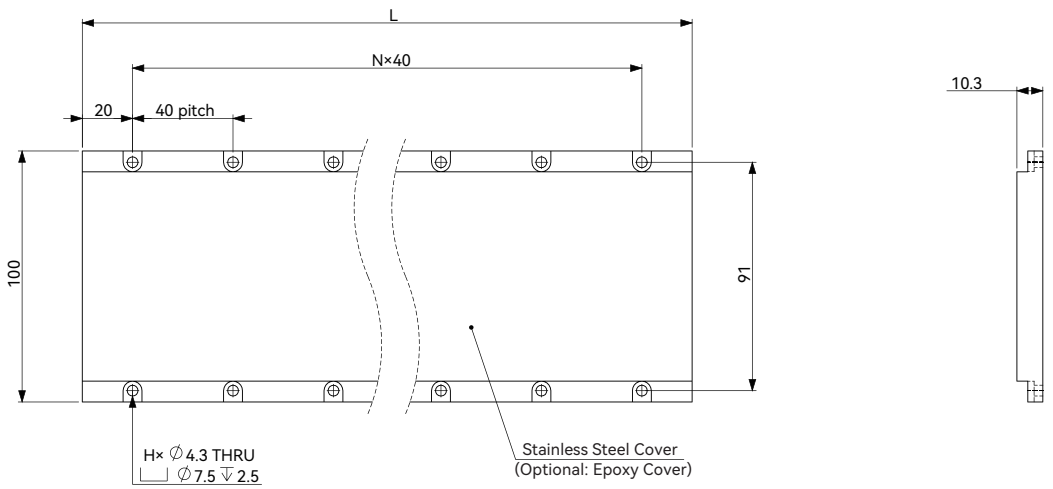
AJM80-B2



AJM80-B4



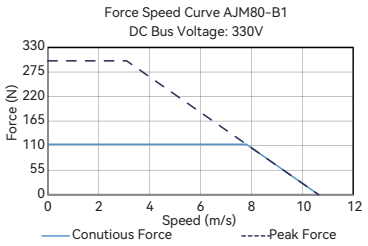
AJM80 Track

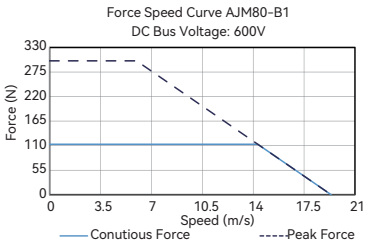


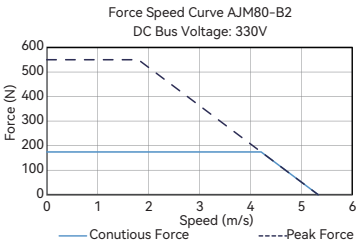
Magnet Track	L	N	H
AJM80-TL80-S	80	1	4
AJM80-TL200-S	200	4	10
AJM80-TL400-S	400	9	20

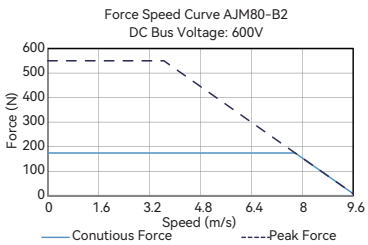
For epoxy cover option, change" -S " to " -E ". (e.g. AJM80-TL80-E)

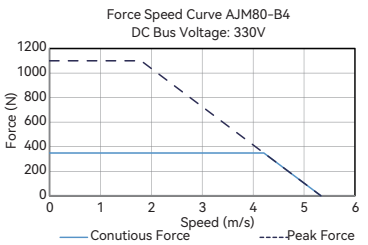
Force-Speed Curve

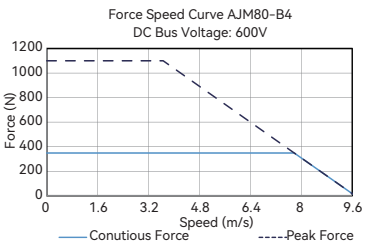












AJM100

			AJM100-B1	AJM100-B2	AJM100-B4
Performance Parameters	Symbol	Unit	Series	Series	Parallel
Continuous Force (NC) @100°C❶	F_{cn}	N	145	223.4	446.8
Peak Force	F_{pk}	N	384	704.5	1409.1
Force Constant ±10%	K_f	N/Arms	48.6	97.1	97.1
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	39.7	79.3	79.3
Motor Constant @25°C	K_m	N/Sqrt(W)	17.3	24.7	34.8
Resistance (L-L) 25°C ±10%❷	R_{25}	Ω	5.3	10.3	5.2
Inductance (L-L) ±30%❸	L	mH	23.6	47.2	23.6
Electrical Time Constant	τ_e	ms	4.5	4.6	4.5
Continuous Current (NC) @100°C❶	I_{cn}	Arms	3.0	2.3	4.6
Peak Current	I_{pk}	Arms	12.0	9.0	18.0
Continuous Power Dissipation (NC) @100°C❶	P_{cn}	W	90.7	105.3	213.0
Max. Coil Temperature	t_{max}	℃	100	100	100
Thermal Dissipation Constant (NC)❶	K_{thn}	W/℃	1.2	1.4	2.8
Max. Bus Voltage	U_{bus}	Vdc	600	600	600
Magnetic Period	τ_{NN}	mm	20	20	20
Attraction Force	F_a	N	620	1240	2481
Mechanical Parameters					
Coil Mass (NC)	m_{cn}	kg	1.0	1.5	2.9
Coil Length (NC)	L_{cn}	mm	56	96	176
Track Mass Per Meter	m_{track}	kg/m	8.8	8.8	8.8
Other Information					
Insulation Class			Class B (130°C)		
Protection Grade			IP00		
Compliance with Global Standards			RoHS, CE, UL(option)		
Ambient Temperature	Operation		0°C to 40°C (non-freezing)		
	Storage		-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.

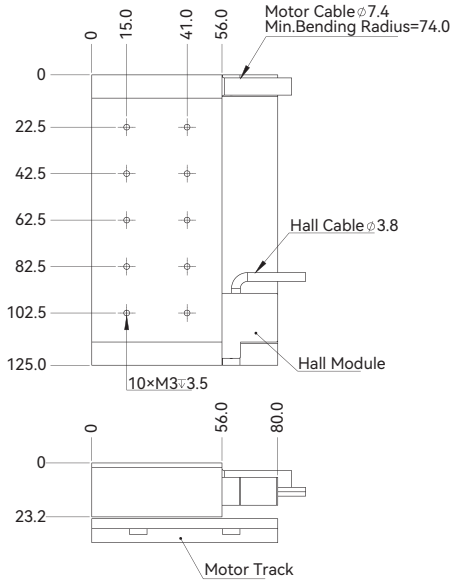
❷ Resistance is measured by DC current with standard 0.5 m cable.

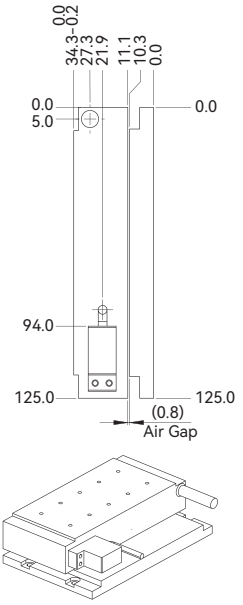
❸ Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

■ Dimensional Drawing

AJM100-B1





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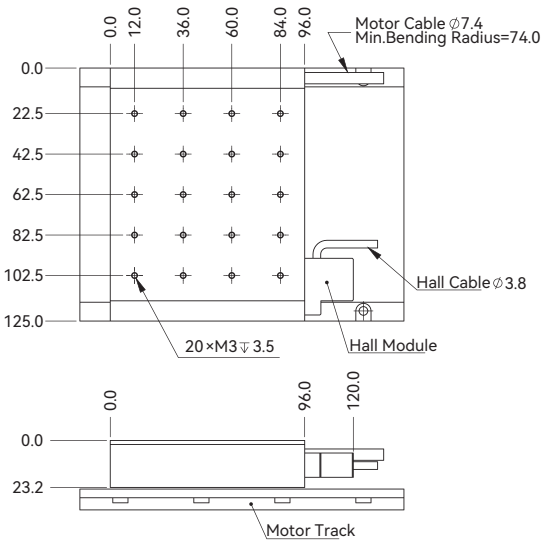

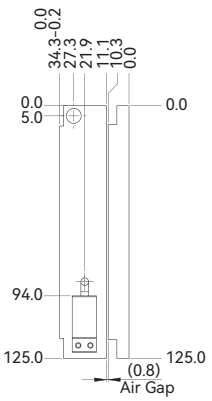

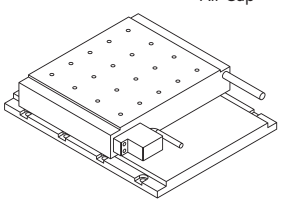

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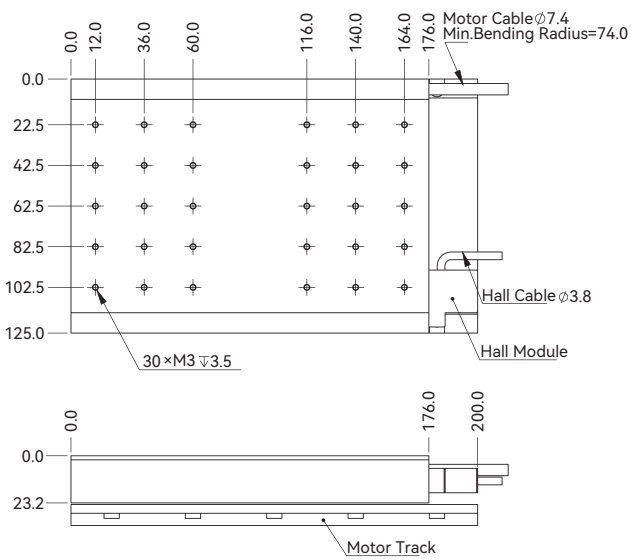
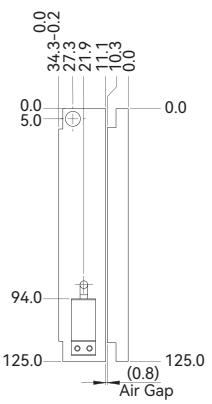
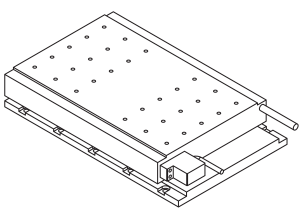
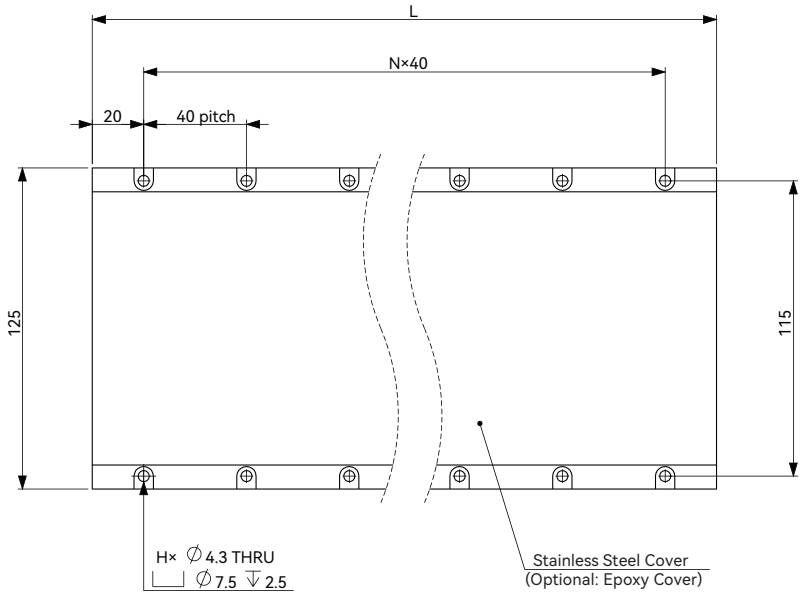
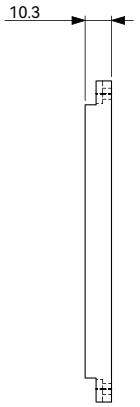






AJM100 Track

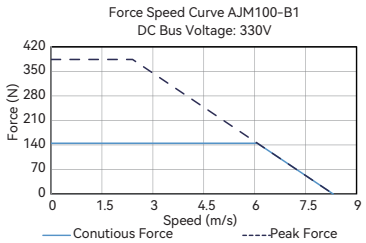


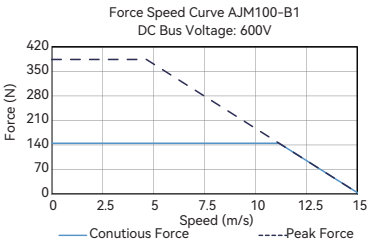


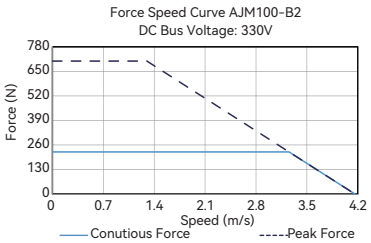
Magnet Track	L	N	H
AJM100-TL80-S	80.0	1	4
AJM100-TL200-S	200.0	4	10
AJM100-TL400-S	400.0	9	20

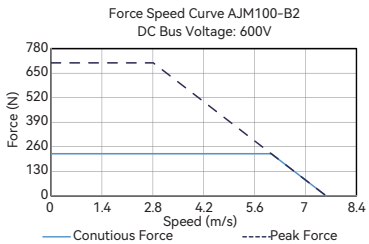
For epoxy cover option, change“ -S ” to “ -E ”. (e.g. AJM100-TL80-E)

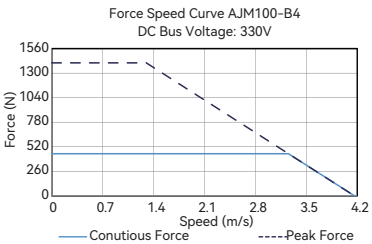
Force-Speed Curve

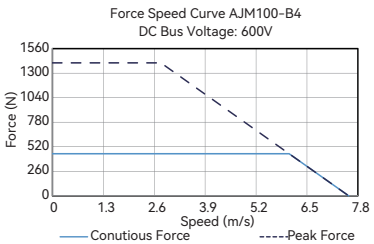








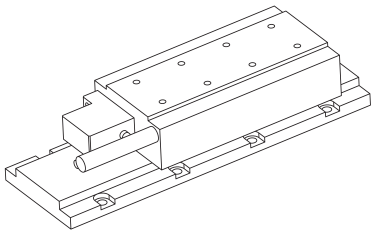


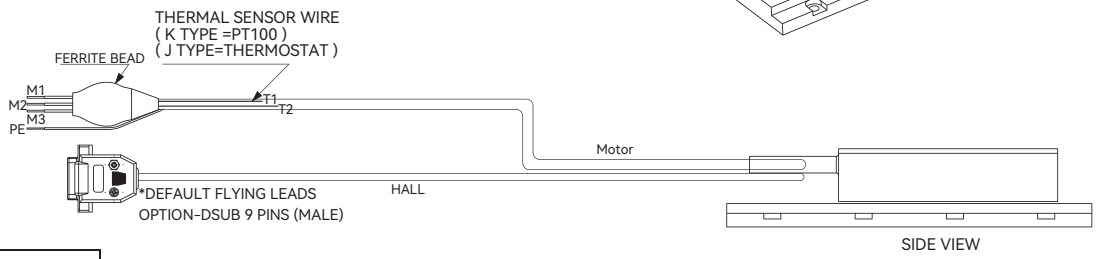


Motor Cable Connection

MOTOR CABLE

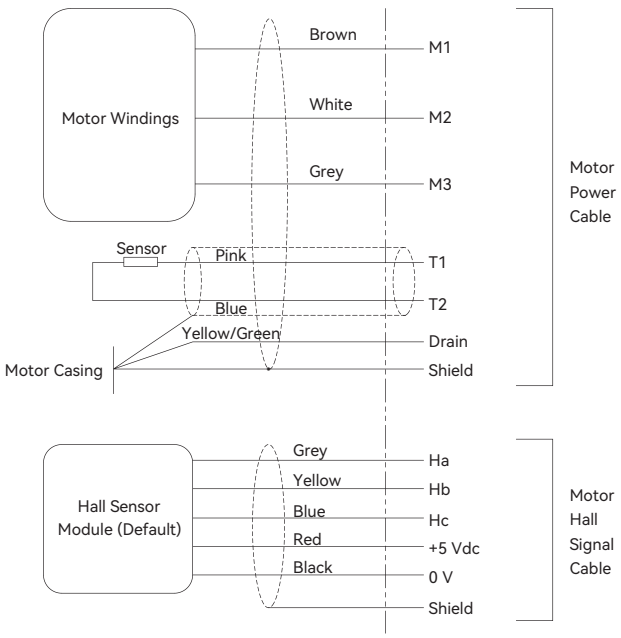
PIN	DESCRIPTION	NO FERRITE BEAD	FERRITE BEAD
-	M1	BROWN	BLACK1
-	M2	WHITE	BLACK2
-	M3	GREY	BLACK3
-	PE	YELLOW/GREEN	YELLOW/GREEN
-	T1	PINK	PINK
-	T2	BLUE	BLUE





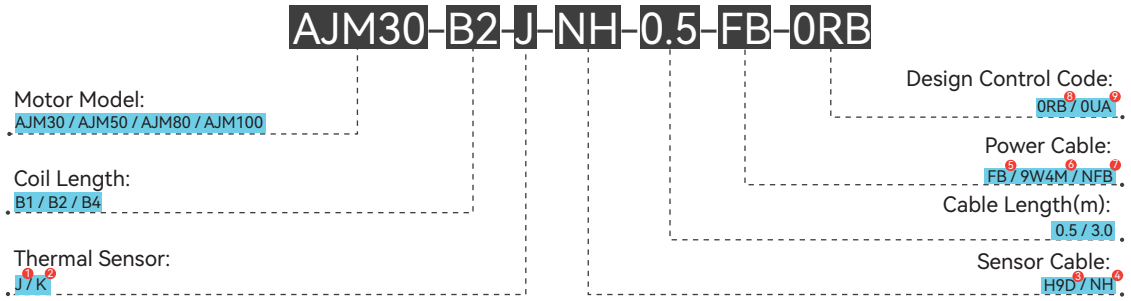
HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREY
2	HB	YELLOW
3	HC	BLUE
4	5VDC	RED
5	0VDC	BLACK



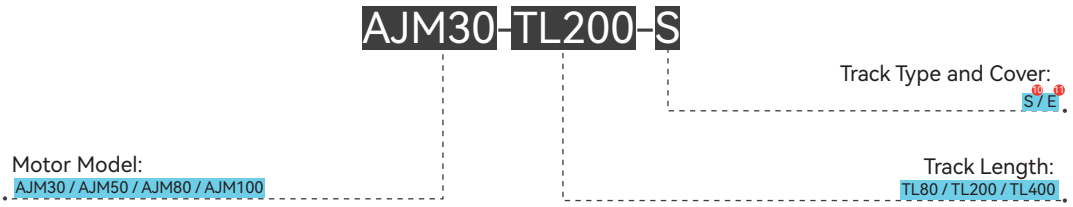
Part Numbering

Motor Coil

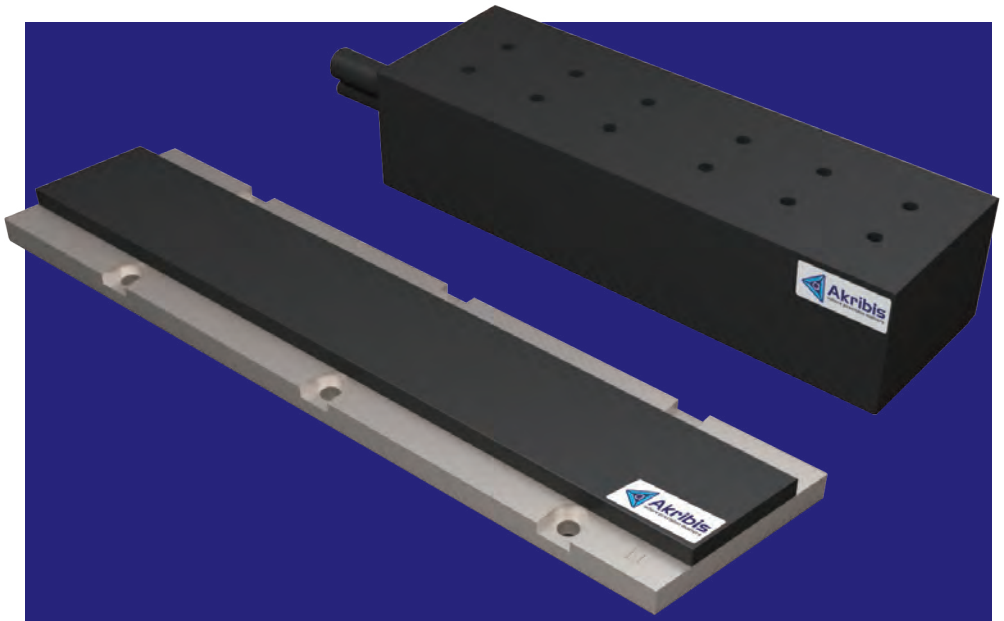


1. J = Thermostat
2. K = PT100(RTD)
3. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
4. NH = Without Built-in Hall Sensor C/W Flying Leads
5. FB = With Ferrite Bead C/W Flying Leads
6. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
7. NFB = Without Ferrite Bead C/W Flying Leads
8. 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)
9. 0UA = UL-certified Model, Only Valid for Power Cable=NFB Options

Motor Track



10. S = Stainless Steel Cover
11. E = Epoxy Cover



AQM SERIES

- Ironcore technology
- Low cogging force
- Higher cost performance
- High response and flexibility
- High force and stiffness

Introduction

Iron Core AQM series linear motors have a low cogging force, a competitive cost advantage, exceptionally narrow width for dimenionally constrainted applications and are ideal for long travel strokes.

Continuous Force Fcn = 20.3N ~ 506N

Peak Force Fpk = 49.7N ~ 1243N

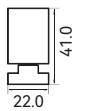
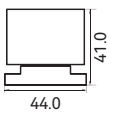
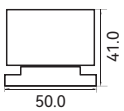
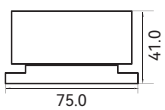
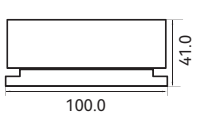
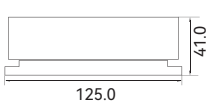
Features

- Iron core technology and low cogging force
- Higher cost performance
- Multiple coil lengths to select

Applications

Applicable to point-to-point micron meter level positioning; unlimited travel stroke with top speed of 5m/s or faster (stroke of 100m or longer).

Applications & Industries: high speed positioning systems for product handling in semiconductor, photovoltaic and lithium battery, glass and LCD applications, as well as industrial printing machines, laser processing machines with demanding precision and motion control requirements.

	Series	Coil Length (mm)	● Continuous Force (F_{cn}) / ■ PeakForce (F_{pk}) Unit: N						
			50	100	200	300	400	500	....
	AQM8-B1	133	● 20.3 / ■ 49.7						
	AQM24-B1	133		● 60.8 / ■ 149.2					
	AQM30-B1	133		● 75.9 / ■ 186.4					
	AQM30-B2	268			● 151.9 / ■ 372.9				
	AQM50-B1	133			● 126.6 / ■ 310.7				
	AQM50-B2	268				● 253.1 / ■ 621.5			
	AQM80-B1	133				● 202.5 / ■ 497.2			
	AQM80-B2	268						● 405 / ■ 994.4	
	AQM100-B1	133				● 253.1 / ■ 621.5			
	AQM100-B2	268							● 506 / ■ 1243

AQM8-B1

			AQM8-B1
Performance Parameters	Symbol	Unit	Series
Continuous Force (NC) @100°C[1]	F_{cn}	N	20.3
Peak Force	F_{pk}	N	49.7
Force Constant ±10%	K_f	N/Arms	8.1
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	6.6
Motor Constant @25°C	K_m	N/Sqrt(W)	3.8
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	3.1
Inductance (L-L) ±30% [3]	L	mH	22.7
Electrical Time Constant	τ_e	ms	7.3
Continuous Current (NC) @100°C [1]	I_{cn}	Arms	2.5
Peak Current	I_{pk}	Arms	9.0
Continuous Power Dissipation (NC) @100°C [1]	P_{cn}	W	37.5
Max. Coil Temperature	t_{max}	℃	100
Thermal Dissipation Constant (NC) [1]	K_{thn}	W/℃	0.5
Max. Bus Voltage	U_{bus}	Vdc	600
Magnetic Period	τ_{NN}	mm	30
Attraction Force	F_a	N	75
Mechanical Parameters			
Coil Mass (NC)	m_{cn}	kg	0.4
Coil Length (NC)	L_{cn}	mm	133
Track Mass Per Meter	m_{track}	kg/m	1.3
Other Information			
Insulation Class		Class B (130°C)	
Protection Grade		IP00	
Compliance with Global Standards		RoHS, CE, UL(option)	
Ambient Temperature	Operation	0°C to 40°C (non-freezing)	
	Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)	
	Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

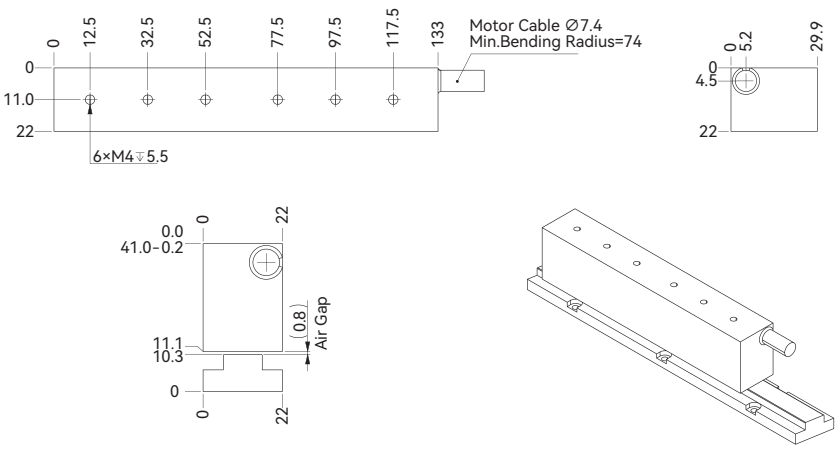
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

[2] Resistance is measured by DC current with standard 0.5 m cable.

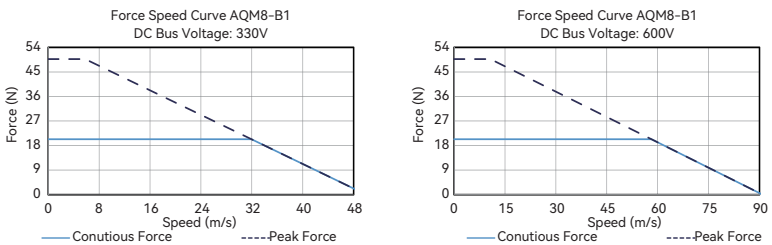
[3] Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

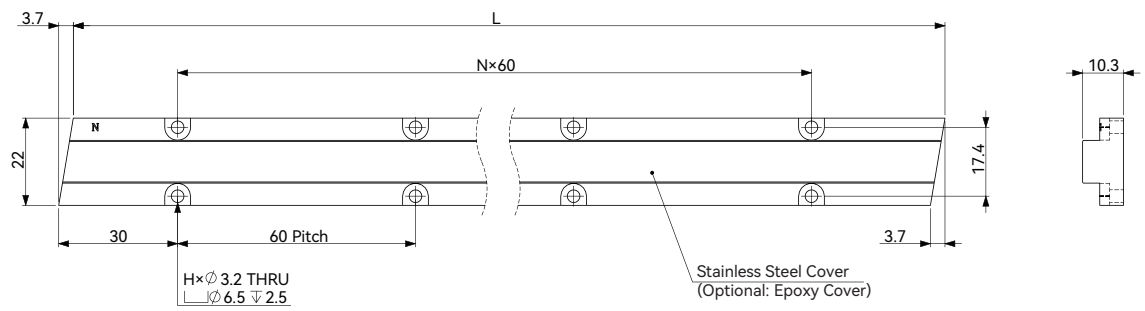
Dimension



Force-Speed Curve



AQM8 Track



Magnet Track	L	N	H
AQM8-TL180-S	180	2	6
AQM8-TL300-S	300	4	10
AQM8-TL420-S	420	6	14

For epoxy cover option, change"-S" to" -E". (e.g. AQM8-TL180-E)

AQM24-B1

			AQM24-B1
Performance Parameters	Symbol	Unit	Parallel
Continuous Force (NC) @100°C❶	F_{cn}	N	60.8
Peak Force	F_{pk}	N	149.2
Force Constant ±10%	K_f	N/Arms	24.3
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	19.8
Motor Constant @25°C	K_m	N/Sqrt(W)	8.8
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	5.1
Inductance (L-L) ±30% ❸	L	mH	39.1
Electrical Time Constant	τ_e	ms	7.7
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	2.5
Peak Current	I_{pk}	Arms	9.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	61.6
Max. Coil Temperature	t_{max}	°C	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	0.8
Max. Bus Voltage	U_{bus}	Vdc	600
Magnetic Period	τ_{NN}	mm	30
Attraction Force	F_a	N	224
Coil Mass (NC)	m_{cn}	kg	0.8
Coil Length (NC)	L_{cn}	mm	133
Track Mass Per Meter	m_{track}	kg/m	2.7
Insulation Class		Class B (130°C)	
Protection Grade		IP00	
Compliance with Global Standards		RoHS, CE, UL(option)	
Ambient Temperature	Operation	0°C to 40°C (non-freezing)	
	Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)	
	Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

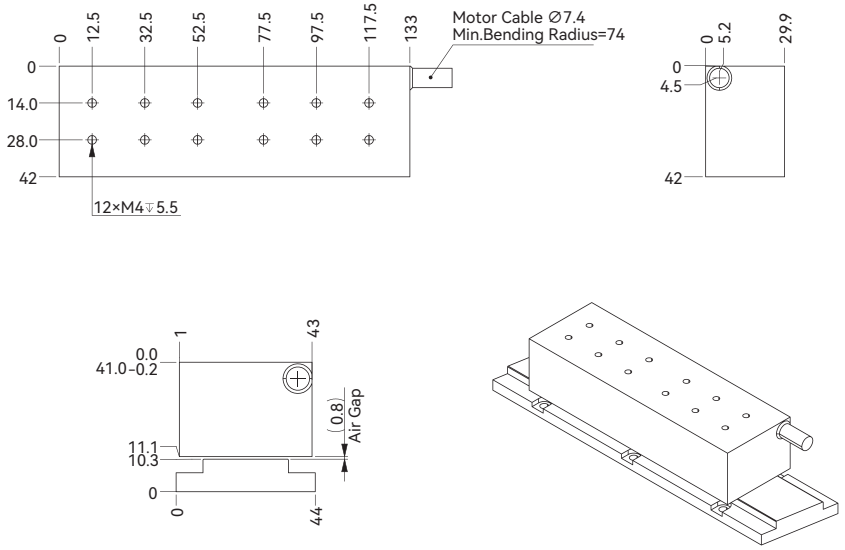
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

❷ Resistance is measured by DC current with standard 0.5 m cable.

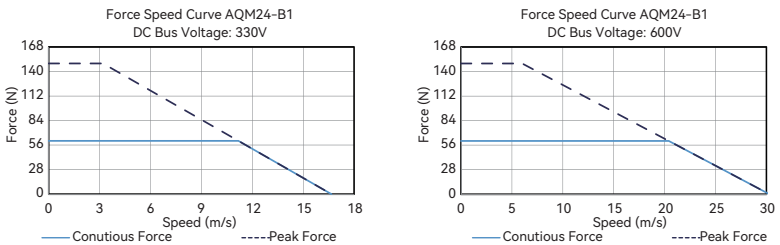
❸ Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

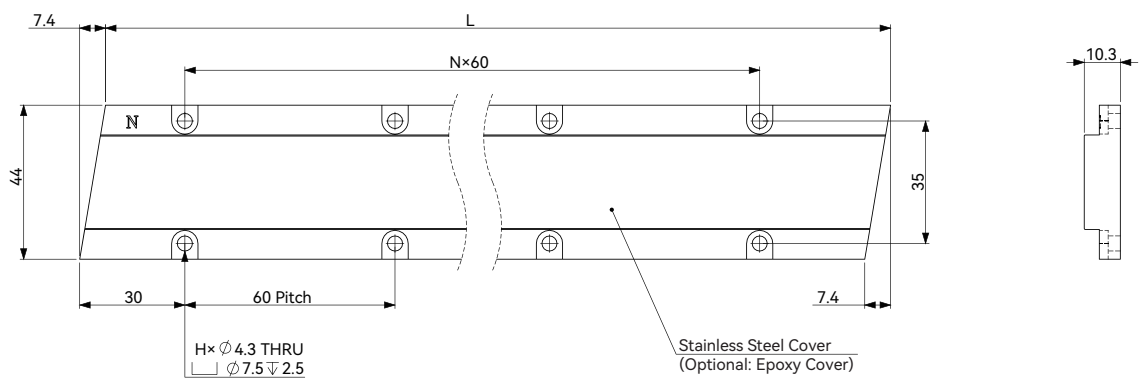
Dimension



Force-Speed Curve



AQM24 Track



Magnet Track	L	N	H
AQM24-TL180-S	180	2	6
AQM24-TL300-S	300	4	10
AQM24-TL420-S	420	6	14

For epoxy cover option, change"-S" to" -E". (e.g. AQM24-TL180-E)

AQM30

			AQM30-B1	AQM30-B2
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Force (NC) @100°C❶	F_{cn}	N	75.9	151.9
Peak Force	F_{pk}	N	186.4	372.9
Force Constant ±10%	K_f	N/Arms	30.4	30.4
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	24.8	24.8
Motor Constant @25°C	K_m	N/Sqrt(W)	10.3	14.6
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	5.8	2.9
Inductance (L-L) ±30% ❸	L	mH	47.1	23.6
Electrical Time Constant	τ_e	ms	8.2	8.2
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	2.5	5.0
Peak Current	I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	69.6	139.2
Max. Coil Temperature	t_{max}	°C	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	0.9	1.9
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	30	30
Attraction Force	F_a	N	280	560
Mechanical Parameters				
Coil Mass (NC)	m_{cn}	kg	1.0	1.9
Coil Length (NC)	L_{cn}	mm	133	268
Track Mass Per Meter	m_{track}	kg/m	3.0	3.0
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE, UL(option)		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

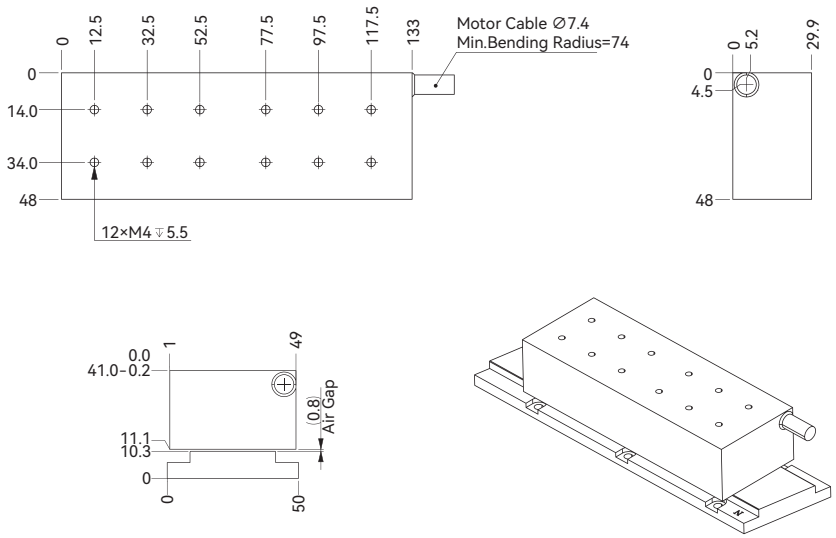
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

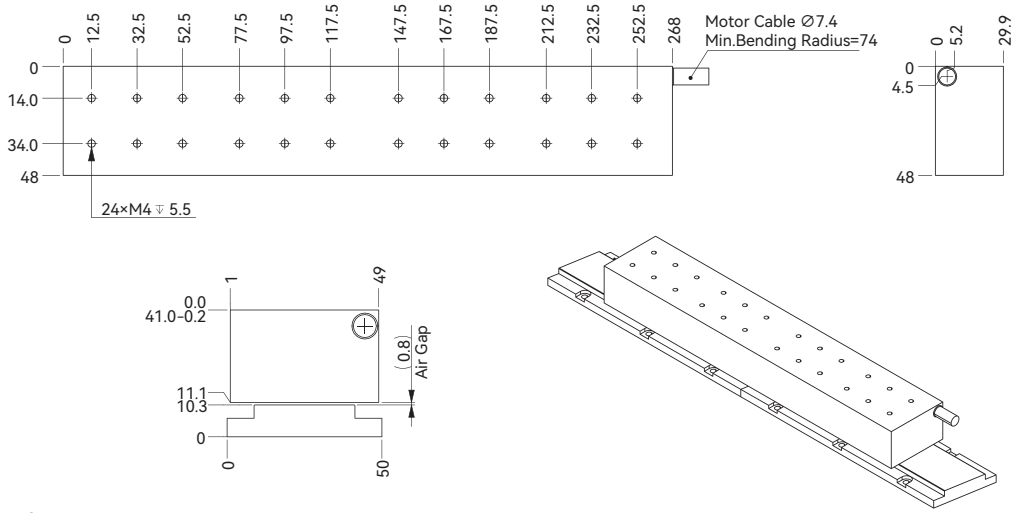
The contents of datasheet are subject to change without prior notice.

■ Dimension

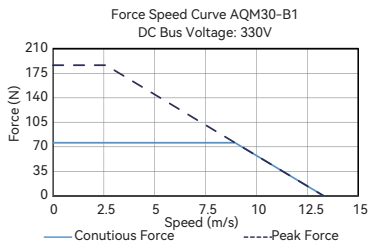
AQM30-B1

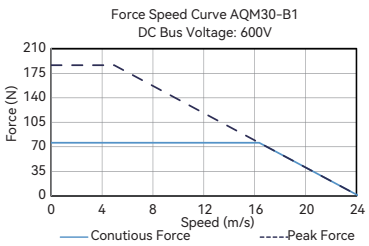


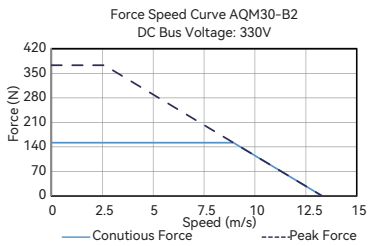
AQM30-B2

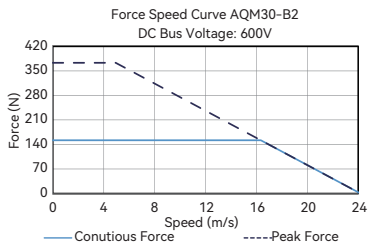


■ Force-Speed Curve

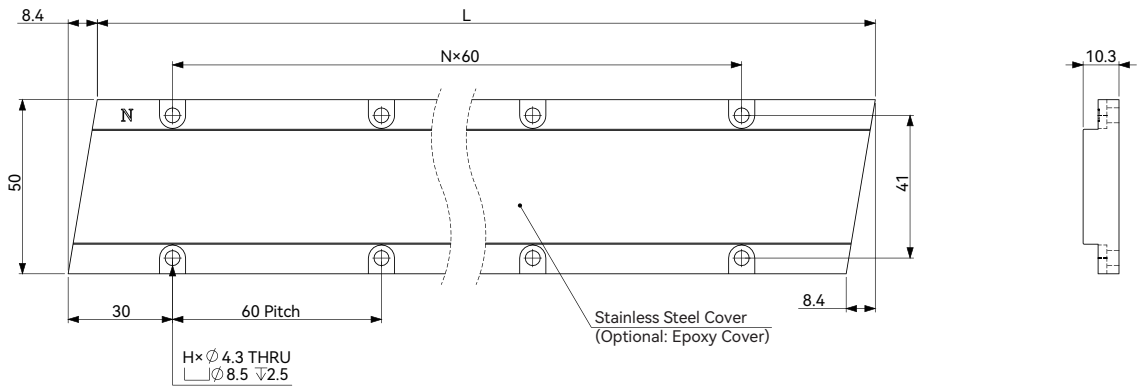








AQM30 Track



Magnet Track	L	N	H
AQM30-TL180-S	180	2	6
AQM30-TL300-S	300	4	10
AQM30-TL420-S	420	6	14

For epoxy cover option, change"-S" to" -E". (e.g. AQM30-TL180-E)

AQM50

			AQM50-B1	AQM50-B2
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Force (NC) @100°C❶	F_{cn}	N	126.6	253.1
Peak Force	F_{pk}	N	310.7	621.5
Force Constant ±10%	K_f	N/Arms	50.6	50.6
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	41.3	41.3
Motor Constant @25°C	K_m	N/Sqrt(W)	14.5	20.4
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	8.2	4.1
Inductance (L-L) ±30% ❸	L	mH	68.3	34.2
Electrical Time Constant	τ_e	ms	8.3	8.3
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	2.5	5.0
Peak Current	I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	98.8	197.7
Max. Coil Temperature	t_{max}	°C	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	1.3	2.6
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	30	30
Attraction Force	F_a	N	467	934
Mechanical Parameters				
Coil Mass (NC)	m_{cn}	kg	1.4	2.7
Coil Length (NC)	L_{cn}	mm	133	268
Track Mass Per Meter	m_{track}	kg/m	4.6	4.6
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS, CE, UL(option)	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

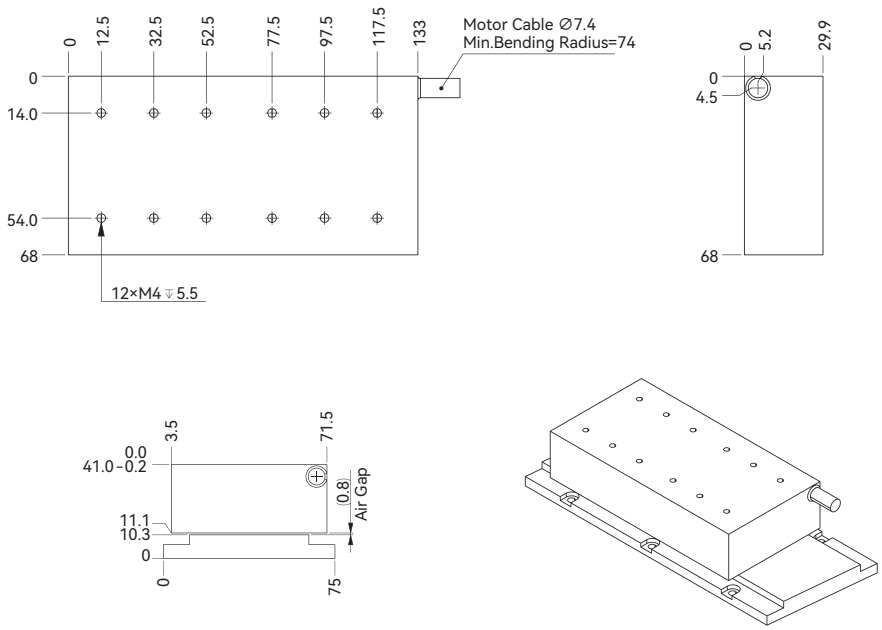
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

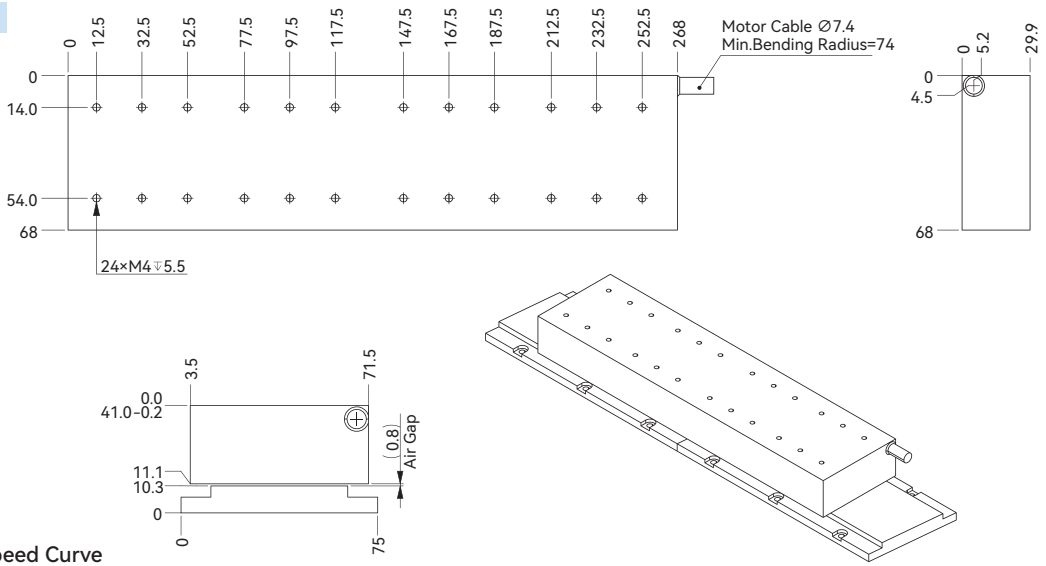
The contents of datasheet are subject to change without prior notice.

Dimension

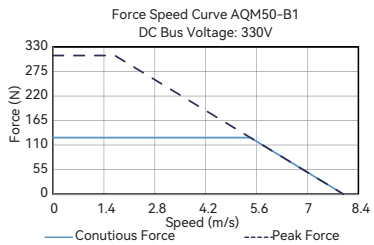
AQM50-B1

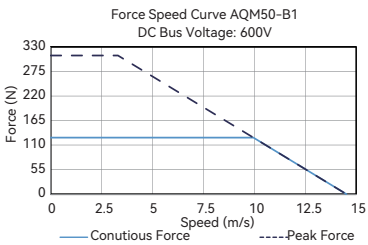


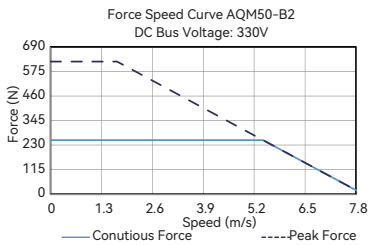
AQM50-B2

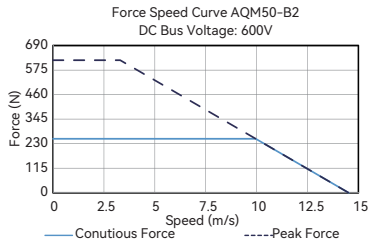


Force-Speed Curve

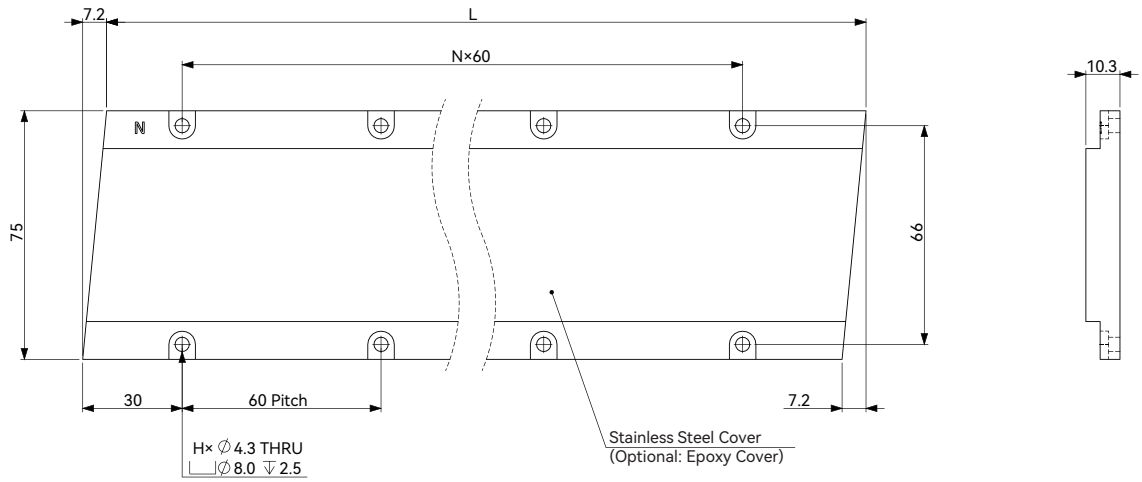








AQM50 Track



Magnet Track	L	N	H
AQM50-TL180-S	180	2	6
AQM50-TL300-S	300	4	10
AQM50-TL420-S	420	6	14

For epoxy cover option, change"-S" to" -E". (e.g. AQM50-TL180-E)

AQM80

			AQM80-B1	AQM80-B2
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Force (NC) @100°C❶	F_{cn}	N	202.5	405.0
Peak Force	F_{pk}	N	497.2	994.4
Force Constant ±10%	K_f	N/Arms	81.0	81.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	66.1	66.1
Motor Constant @25°C	K_m	N/Sqrt(W)	19.5	27.6
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	11.5	5.8
Inductance (L-L) ±30% ❸	L	mH	100.0	50.0
Electrical Time Constant	τ_e	ms	8.7	8.7
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	2.5	5.0
Peak Current	I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	138.9	277.9
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	1.9	3.7
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	30	30
Attraction Force	F_a	N	747	1494
Mechanical Parameters				
Coil Mass (NC)	m_{cn}	kg	1.9	3.9
Coil Length (NC)	L_{cn}	mm	133	268
Track Mass Per Meter	m_{track}	kg/m	6.1	6.1
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS, CE, UL(option)	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

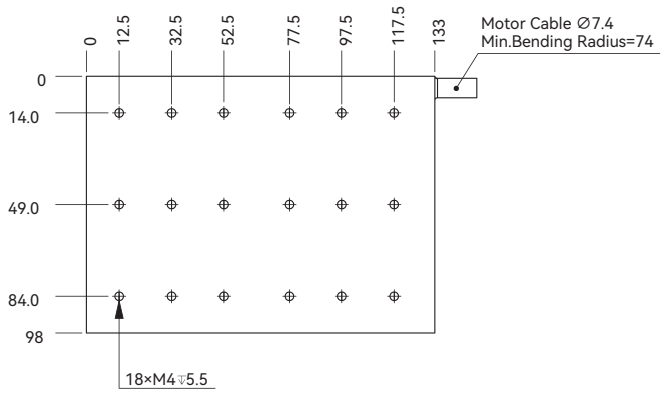
❷ Resistance is measured by DC current with standard 0.5 m cable.

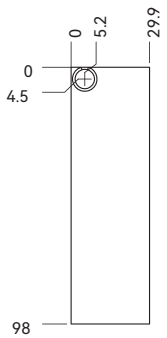
❸ Inductance is measured by current frequency of 1 kHz.

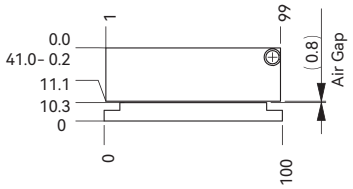
The contents of datasheet are subject to change without prior notice.

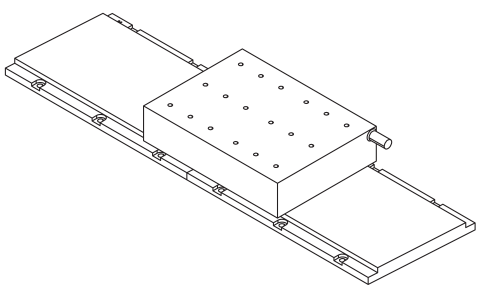
■ Dimension

AQM80-B1

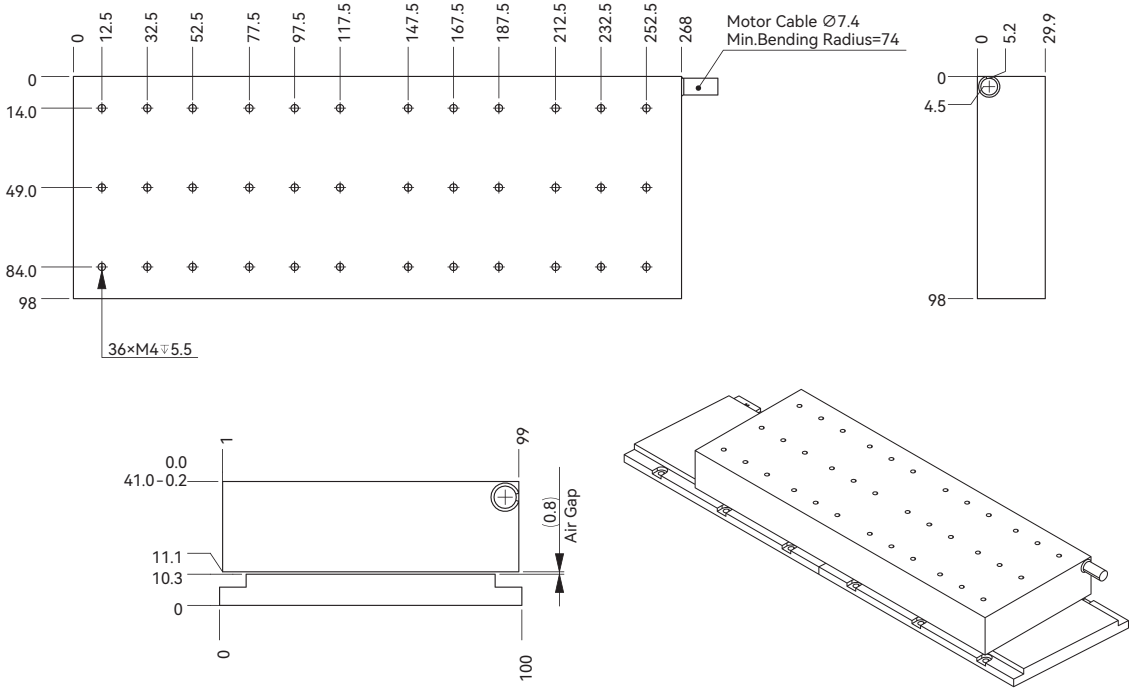




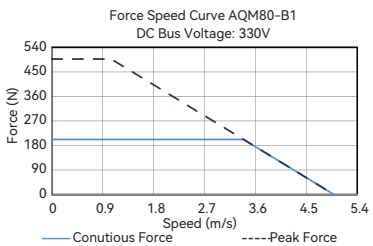


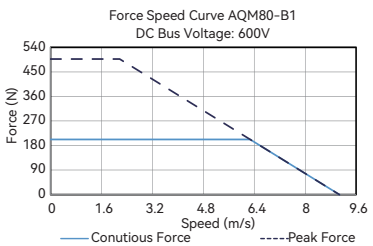


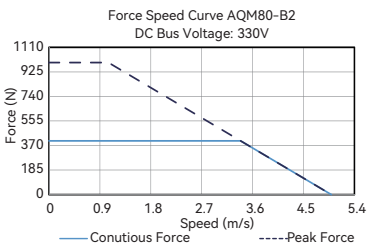
AQM80-B2

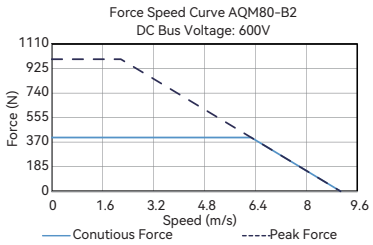


■ Force-Speed Curve

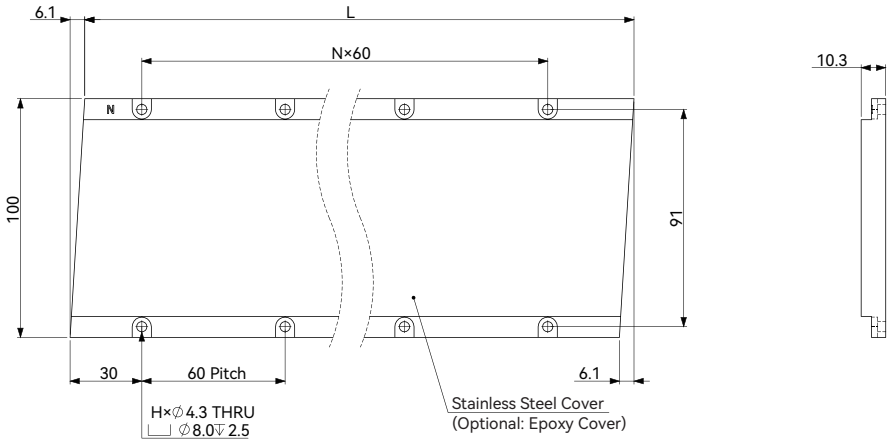








AQM80 Track



Magnet Track	L	N	H
AQM80-TL180-S	180.0	2	6
AQM80-TL300-S	300.0	4	10
AQM80-TL420-S	420.0	6	14

For epoxy cover option, change"-S" to" -E". (e.g. AQM80-TL180-E)

AQM100

			AQM100-B1	AQM100-B2
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Force (NC) @100°C❶	F_{cn}	N	253.1	506
Peak Force	F_{pk}	N	621.5	1243
Force Constant ±10%	K_f	N/Arms	101.3	101.3
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	82.7	82.7
Motor Constant @25°C	K_m	N/Sqrt(W)	21.8	30.8
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	14.4	7.2
Inductance (L-L) ±30% ❸	L	mH	125.0	62.5
Electrical Time Constant	τ_e	ms	8.7	8.7
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	2.5	5.0
Peak Current	I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	173.7	347.4
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	2.3	4.6
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	30	30
Attraction Force	F_a	N	934	1868
Mechanical Parameters				
Coil Mass (NC)	m_{cn}	kg	2.3	4.7
Coil Length (NC)	L_{cn}	mm	133	268
Track Mass Per Meter	m_{track}	kg/m	7.7	7.7
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS, CE, UL(option)	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

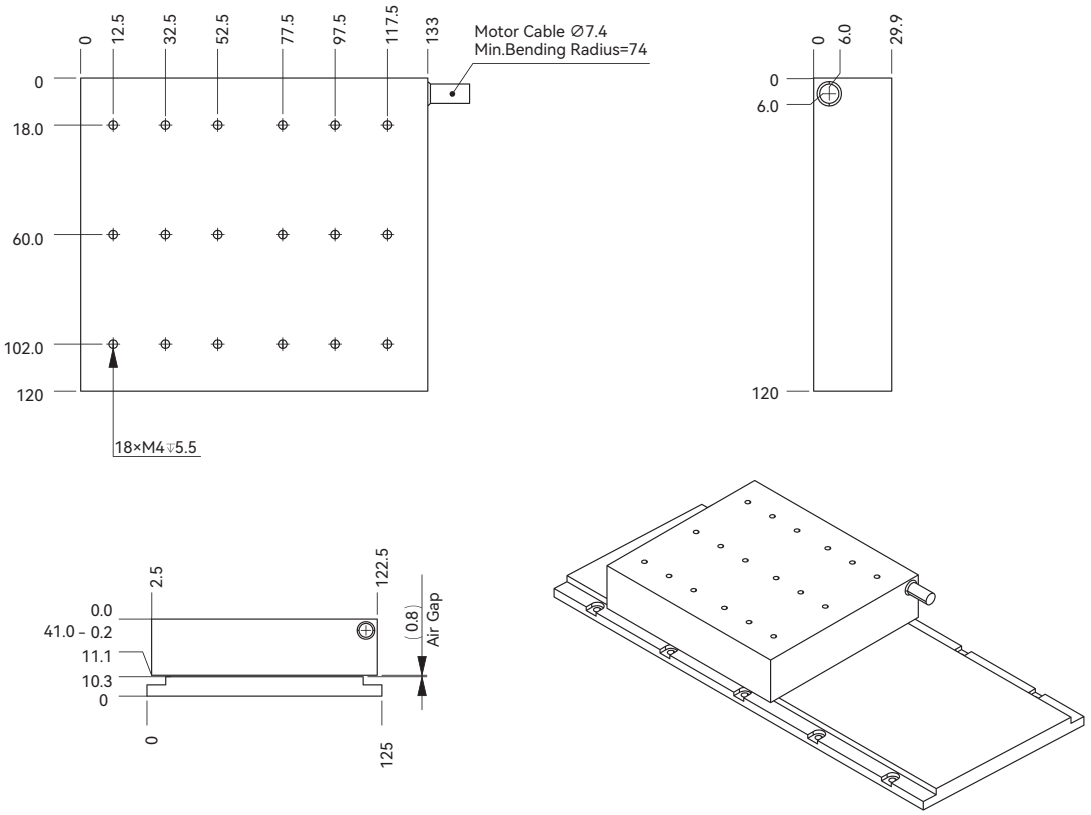
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

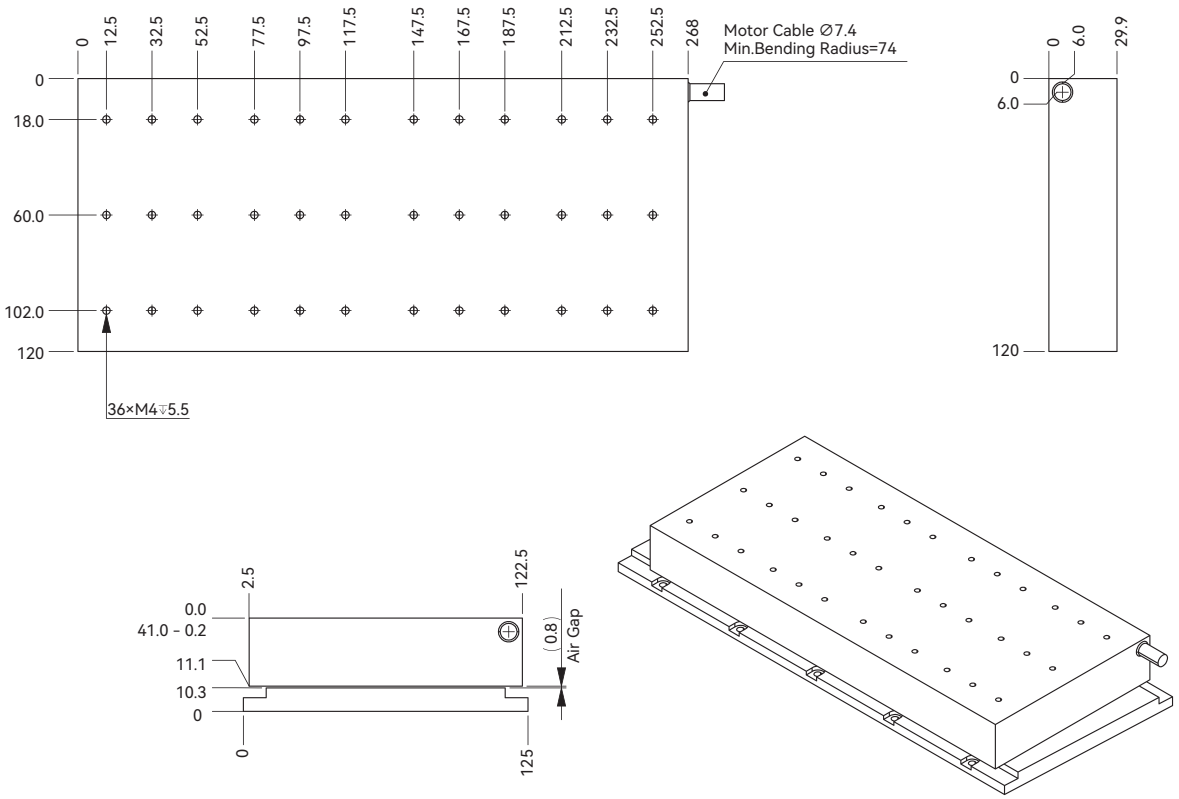
The contents of datasheet are subject to change without prior notice.

Dimension

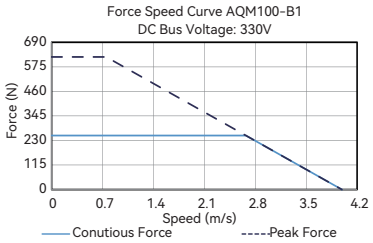
AQM100-B1

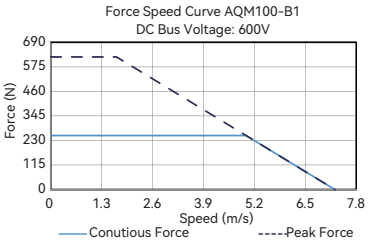


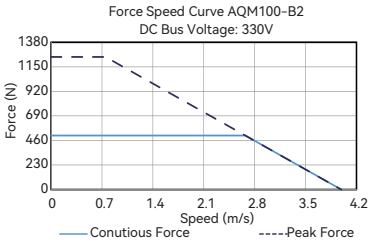
AQM100-B2

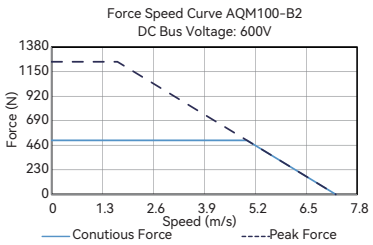


Force-Speed Curve

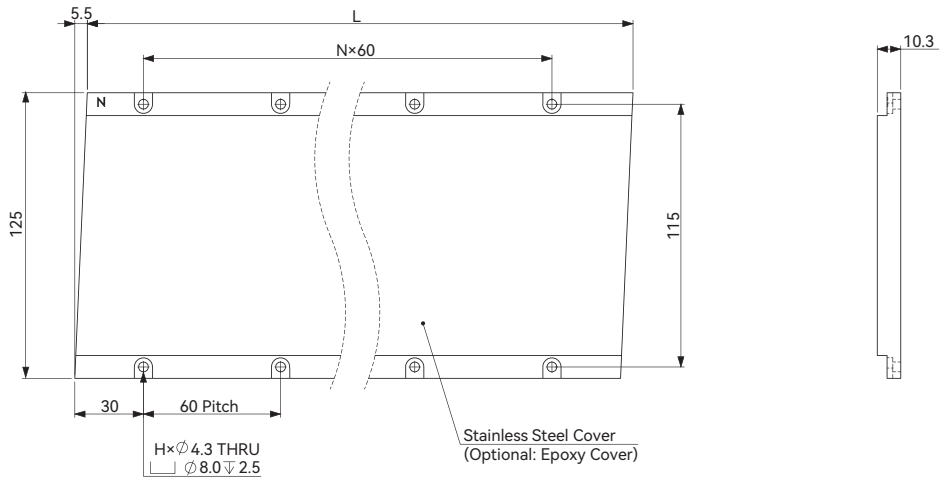








AQM100 Track

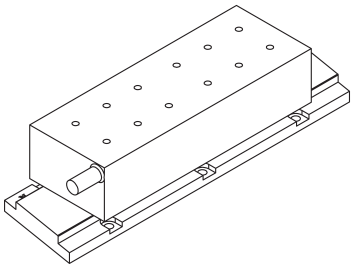


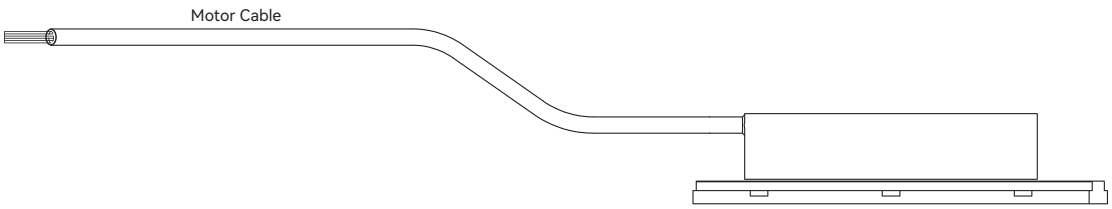
Magnet Track	L	N	H
AQM100-TL180-S	180	2	6
AQM100-TL300-S	300	4	10
AQM100-TL420-S	420	6	14

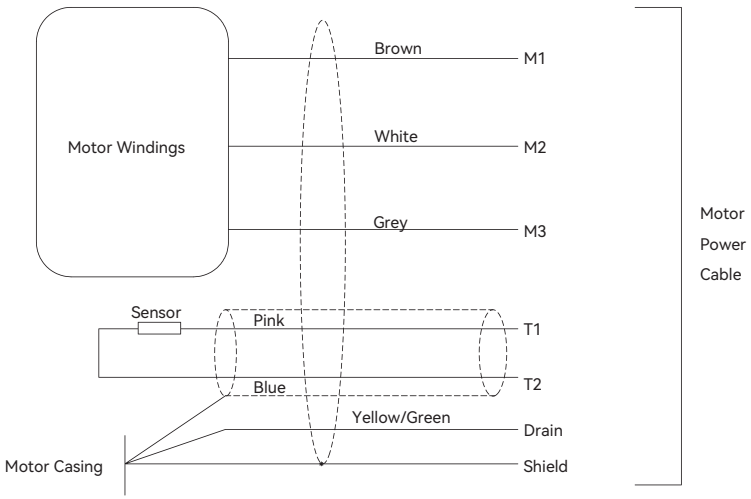
For epoxy cover option, change"-S" to" -E". (e.g. AQM100-TL180-E)

Motor Cable Connection

PIN	DESCRIPTION	COLOR
-	M1	BROWN
-	M2	WHITE
-	M3	GREY
-	PE	YELLOW/GREEN
-	T1	PINK
-	T2	BLUE

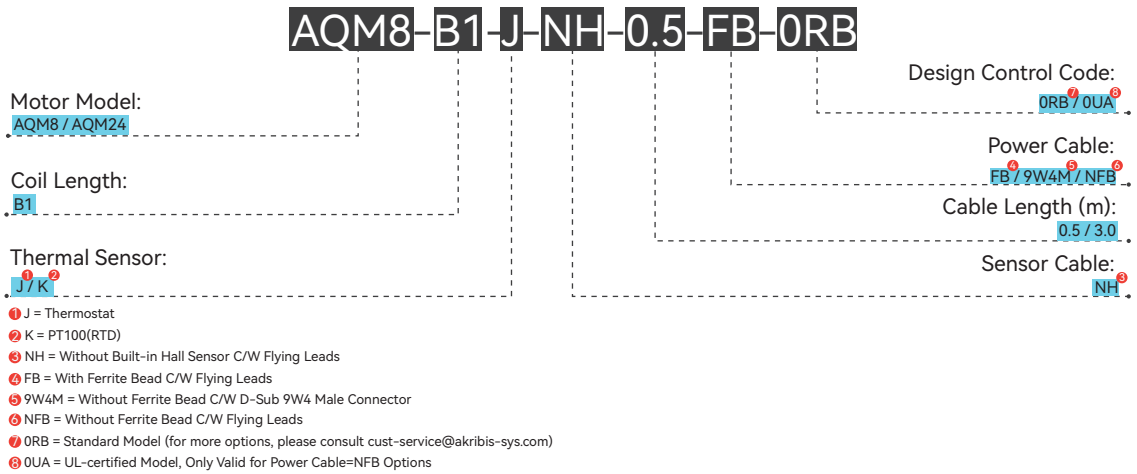




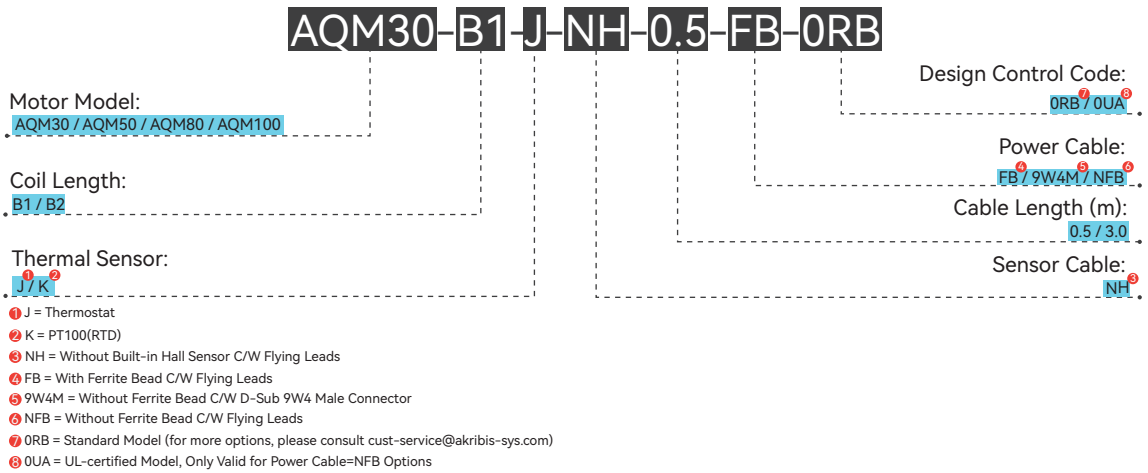


Part Numbering

Motor Coil



1. J = Thermostat
2. K = PT100(RTD)
3. NH = Without Built-in Hall Sensor C/W Flying Leads
4. FB = With Ferrite Bead C/W Flying Leads
5. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
6. NFB = Without Ferrite Bead C/W Flying Leads
7. 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)
8. 0UA = UL-certified Model, Only Valid for Power Cable=NFB Options



1. J = Thermostat
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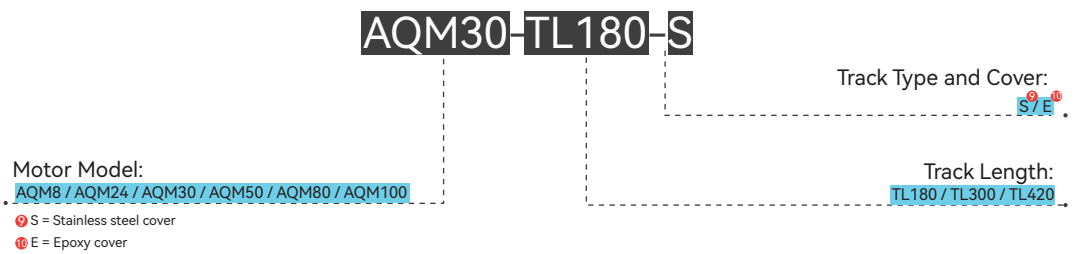
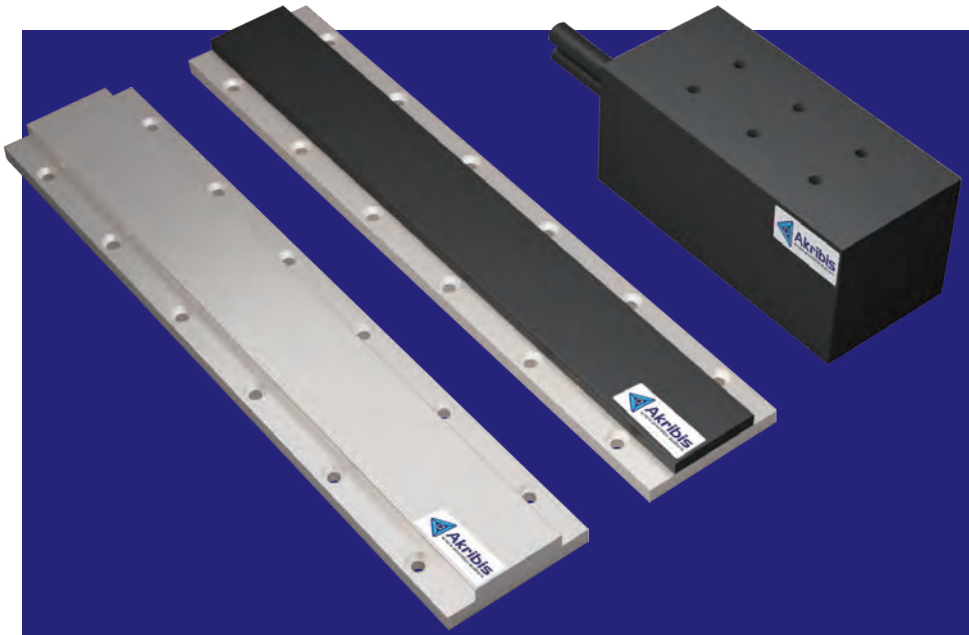
6. NFB = Without Ferrite Bead C/W Flying Leads
7. 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)
8. 0UA = UL-certified Model, Only Valid for Power Cable=NFB Options

Motor Track



9. S = Stainless steel cover
10. E = Epoxy cover



AKM SERIES

- Iron core technology
- Low cogging force
- Integrated with hall sensors
- High force and stiffness

EN-26.3.1

Akribis systems

Introduction

Iron Core AKM series linear motors provide the highest force for the smallest package size. This series also has a wide range of sizes and optional water-cooling configurations which are ideal for aggressive higher force and duty cycle applications.

Continuous Force Fcn = 108.4N ~ 6190.1N

Peak Force Fpk = 241.6N ~ 12884.3N

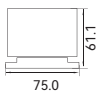
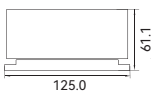
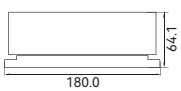
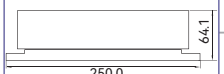
Features

- Iron core technology and low cogging force
- High continuous and peak force
- Optional hall sensors
- High motor constant
- Multiple coil lengths to select

Applications

Applicable to point-to-point micron meter level positioning; unlimited travel stroke with top speed of 5m/s or faster (stroke of 100m or longer).

Applications & Industries: high speed positioning systems for product handling in semiconductor, photovoltaic and lithium battery, glass and LCD applications, as well as machining centers, industrial printing machines, laser processing machines with demanding precision and motion control requirements.

	Series	Coil Length (mm)	● Continuous Force (F_{cn}) / ■ PeakForce (F_{pk})[1] Unit: N 200 500 1500 2500 4500 6500 ....
	AKM30-B1	112	● 108.4 / ■ 241.6
	AKM30-B2	196	● 216.8 / ■ 483.2
	AKM30-B3	280	● 325.2 / ■ 724.7
	AKM30-B4	364	● 433.6 / ■ 966.3
	AKM50-B1	112	● 180.7 / ■ 402.6
	AKM50-B2	196	● 361.3 / ■ 805.3
	AKM50-W-B2	234	● 579.6 / ■ 805.3
	AKM50-B3	280	● 542.0 / ■ 1207.9
	AKM50-B4	364	● 722.6 / ■ 1610.5
	AKM50-W-B4	402	● 1159.3 / ■ 1610.3
	AKM50-B6	532	● 1029.8 / ■ 2415.8
	AKM100-B1	112	● 361.3 / ■ 805.3
	AKM100-B2	196	● 722.6 / ■ 1610.5
	AKM100-W-B2	236	● 1159.3 / ■ 1610.3
	AKM100-B3	280	● 1084 / ■ 2416
	AKM100-B4	364	● 1445.3 / ■ 3221.1
	AKM100-W-B4	404	● 1947.3 / ■ 3221.1
	AKM100-B6	532	● 2059.6 / ■ 4348.5
	AKM150-B4	364	● 2027.0 / ■ 4831.6
	AKM150-W-B4	404	● 2738.4 / ■ 4831.6
	AKM150-B8	700	● 3839.1 / ■ 9663.2
	AKM150-W-B8	786	● 5216.1 / ■ 9963.2
	AKM200-B4	364	● 2539.6 / ■ 6442.2
	AKM200-W-B4	404	● 3249.8 / ■ 6442.2
	AKM200-B8	700	● 4817.7 / ■ 12884.3
	AKM200-W-B8	786	● 6190.1 / ■ 12884.3

[1] Continuous force is measured under the condition of self-cooling. Please refer to the detail parameters table for the continuous force under the condition of water cooling.

AKM30-N

Performance Parameters	Symbol	Unit	AKM30-B1 Series	AKM30-B2 Series	AKM30-B3 Series	AKM30-B4 Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	108.4	216.8	325.2	433.6
Peak Force	F_{pk}	N	241.6	483.2	724.7	966.3
Force Constant ±10%	K_f	N/Arms	23.0	45.9	23.0	45.9
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	18.7	37.5	18.7	37.5
Motor Constant @25°C	K_m	N/Sqrt(W)	17.7	25.0	30.7	35.4
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	1.1	2.2	0.4	1.1
Inductance (L-L) ±30% [3]	L	mH	21.0	42.0	7.0	21.0
Electrical Time Constant	τ_e	ms	18.8	18.8	18.8	18.8
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	4.8	4.8	14.4	9.6
Peak Current	I_{pk}	Arms	14.4	14.4	43.2	28.8
Continuous Power Dissipation (NC) @100°C [1]	P_{cn}	W	49.9	99.8	149.7	199.5
Max. Coil Temperature	t_{max}	℃	100	100	100	100
Thermal Dissipation Constant (NC) [1]	K_{thn}	W/℃	0.7	1.3	2.0	2.7
Max. Bus Voltage	U_{bus}	Vdc	600	600	600	600
Magnetic Period	τ_{NN}	mm	42	42	42	42
Attraction Force	F_a	N	0.4	0.8	1.2	1.6
Mechanical Parameters						
Coil Mass (NC)	m_{cn}	kg	1.5	2.7	3.9	5.3
Coil Length (NC)	L_{cn}	mm	112	196	280	364
Track Mass Per Meter	m_{track}	kg/m	2.6	2.6	2.6	2.6
Other Information						
Insulation Class			Class B (130°C)			
Protection Grade			IP00			
Compliance with Global Standards			RoHS, CE, UL(option)			
Ambient Temperature	Operation		0°C to 40°C (non-freezing)			
	Storage		-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)			
	Storage		10%RH to 90%RH (non-condensing)			
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

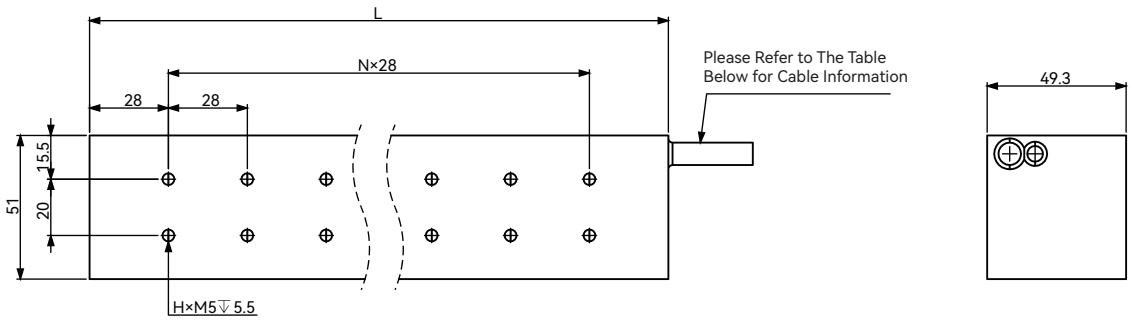
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.

[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

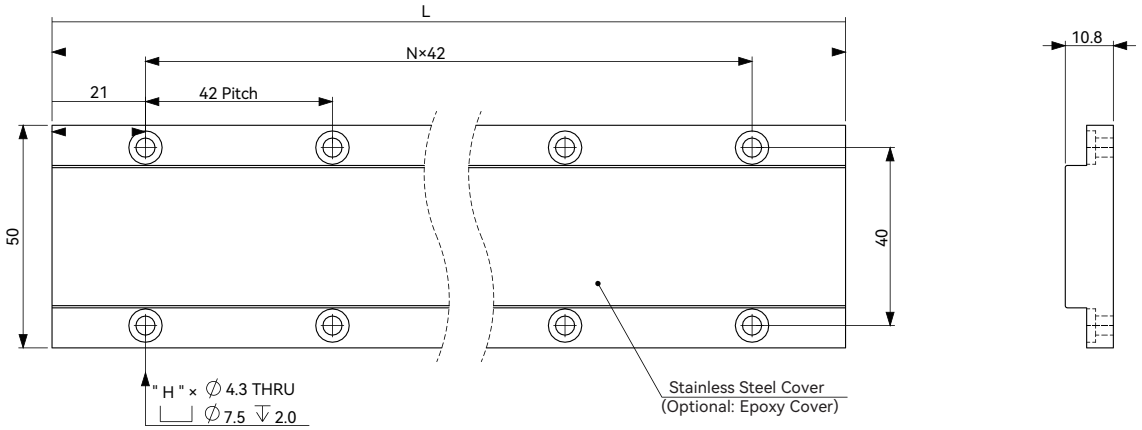
Dimension



Coil Size	L	N	H
AKM30-B1	112	2	6
AKM30-B2	196	5	12
AKM30-B3	280	8	18
AKM30-B4	280	11	24

Motor Model	Motor Cable			Hall Cable		
	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)
AKM30-B1	8	80	40	5.2	52	26
AKM30-B2						
AKM30-B3						
AKM30-B4						

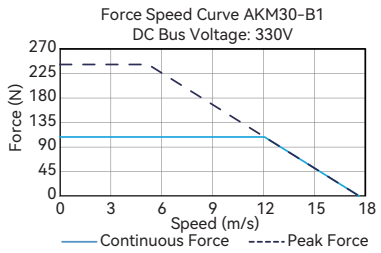
AKM30 Track

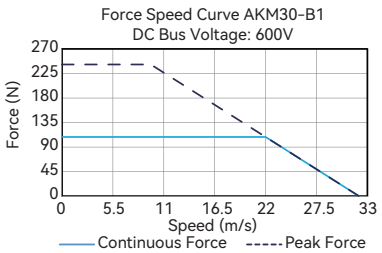


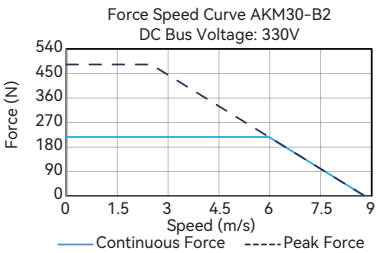
Magnet Track	L	N	H
AKM30-TL168-S	168	3	8
AKM30-TL252-S	252	5	12
AKM30-TL420-S	420	9	20

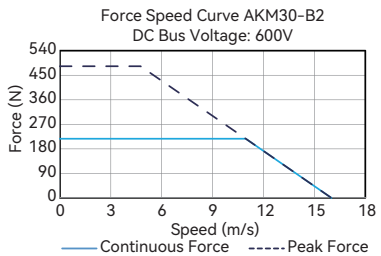
For epoxy cover option, change" -S" to" -E". (e.g. AKM30-TL168-E)

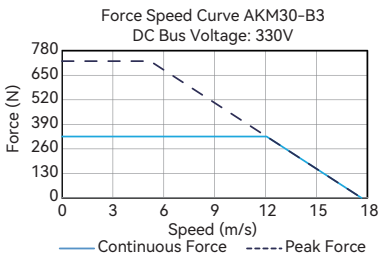
■ Force-Speed Curve

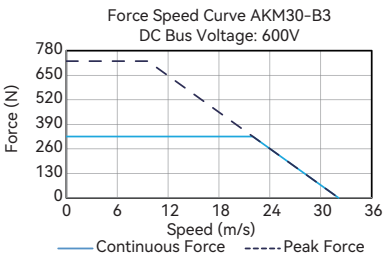


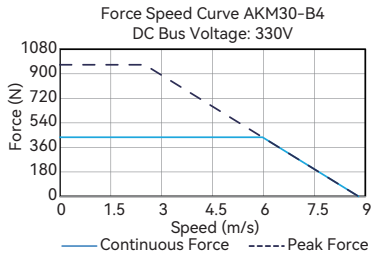


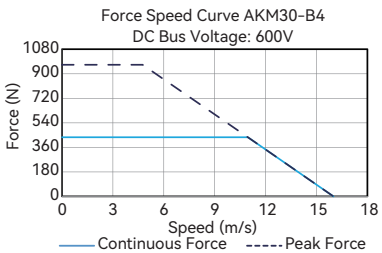






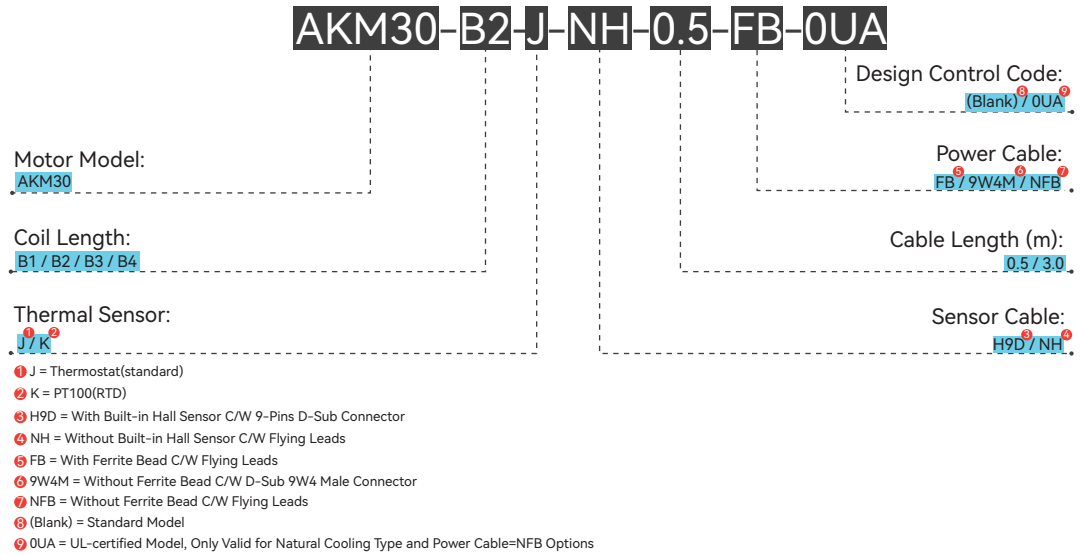






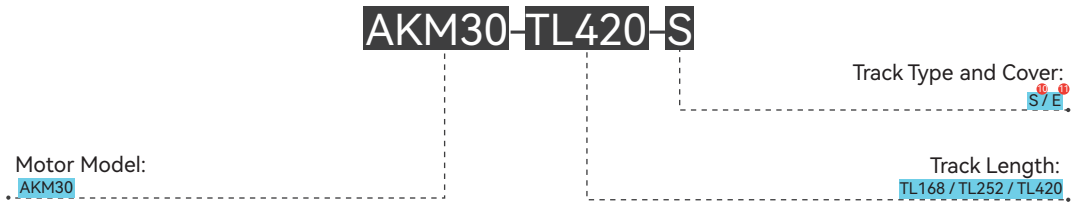
Part Numbering

Motor Coil



1. J = Thermostat(standard)
2. K = PT100(RTD)
3. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
4. NH = Without Built-in Hall Sensor C/W Flying Leads
5. FB = With Ferrite Bead C/W Flying Leads
6. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
7. NFB = Without Ferrite Bead C/W Flying Leads
8. (Blank) = Standard Model
9. 0UA = UL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

Motor Track



10. S = Stainless steel cover
11. E = Epoxy cover

AKM50-N

			AKM50-B1	AKM50-B2	AKM50-B3	AKM50-B4	AKM50-B6
Performance Parameters	Symbol	Unit	Series	Series	Parallel	Parallel	Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	180.7	361.3	542.0	722.6	1029.8
Peak Force	F_{pk}	N	402.6	805.3	1207.9	1610.5	2415.8
Force Constant ±10%	K_f	N/Arms	38.3	76.5	38.3	76.5	76.5
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	31.2	62.5	31.2	62.5	62.5
Motor Constant @25°C	K_m	N/Sqrt(W)	26.4	37.3	45.7	52.8	64.7
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	1.4	2.8	0.5	1.4	0.9
Inductance (L-L) ±30% [3]	L	mH	31.8	63.6	10.6	31.8	21.2
Electrical Time Constant	τ_e	ms	22.7	22.7	22.7	22.7	22.7
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	4.8	4.8	14.4	9.6	13.7
Peak Current	I_{pk}	Arms	14.4	14.4	43.2	28.8	43.2
Continuous Power Dissipation (NC) @100°C[1]	P_{cn}	W	62.4	124.7	187.1	249.4	337.7
Max. Coil Temperature	t_{max}	℃	100	100	100	100	100
Thermal Dissipation Constant (NC) [1]	K_{thn}	W/℃	0.8	1.7	2.5	3.3	4.5
Max. Bus Voltage	U_{bus}	Vdc	600	600	600	600	600
Magnetic Period	τ_{NN}	mm	42.0	42.0	42.0	42.0	42.0
Attraction Force	F_a	N	0.7	1.3	2.1	2.7	4.2
Mechanical Parameters							
Coil Mass (NC)	m_{cn}	kg	2.2	4.1	6.5	7.9	11.7
Coil Length (NC)	L_{cn}	mm	112	196	280	364	532
Track Mass Per Meter	m_{track}	kg/m	4.8	4.8	4.8	4.8	4.8
Other Information							
Insulation Class			Class B (130°C)				
Protection Grade			IP00				
Compliance with Global Standards			RoHS, CE, UL(option)				
Ambient Temperature	Operation		0°C to 40°C (non-freezing)				
	Storage		-15°C to 70°C (non-freezing)				
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)				
	Storage		10%RH to 90%RH (non-condensing)				
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.				

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.

[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz.

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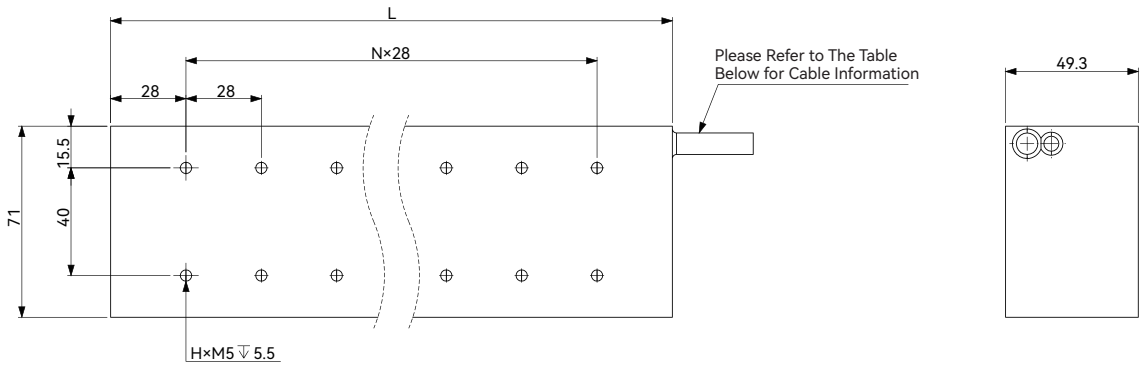
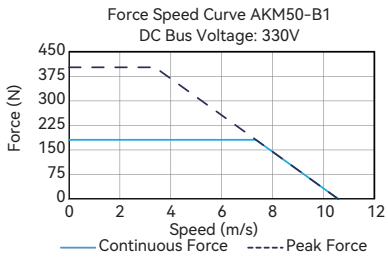
Dimension

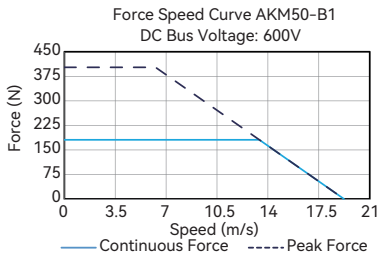


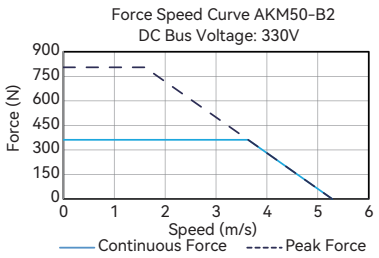
Coil Size	L	N	H
AKM50-B1	112	2	6
AKM50-B2	196	5	12
AKM50-B3	280	8	18
AKM50-B4	364	11	24
AKM50-B6	532	17	36

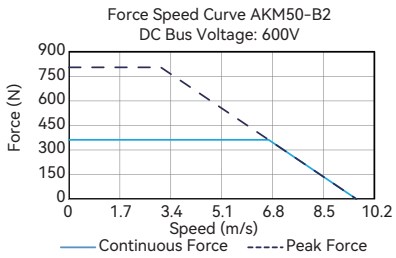
Motor Model	Motor Cable			Hall Cable		
	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)
AKM50-B1	8	80	40	5.2	52	26
AKM50-B2						
AKM50-B3						
AKM50-B4						
AKM50-B6						

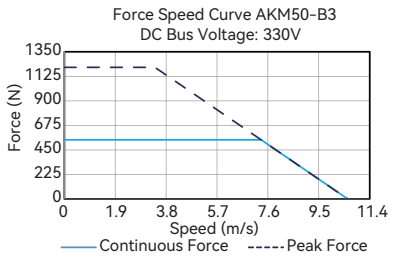
Force-Speed Curve

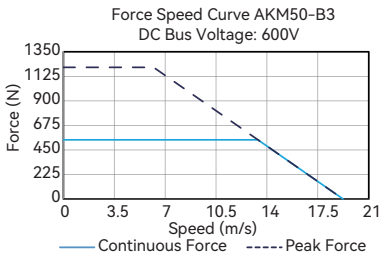


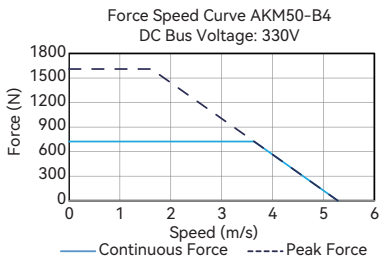


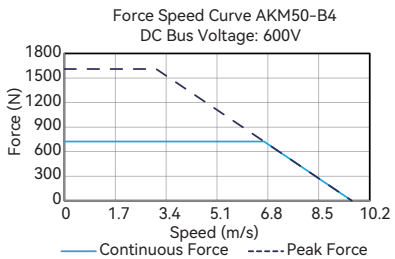


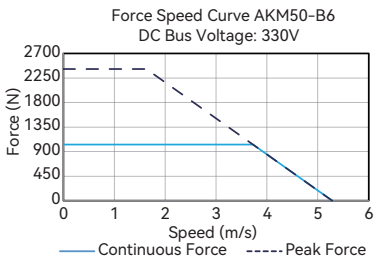


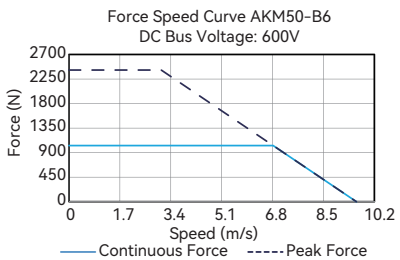












AKM50-W

			AKM50-W-B2	AKM50-W-B4
Performance Parameters	Symbol	Unit	Series	Series
Continuous Force (WC) @100°C❶❹	F_{cw}	N	579.6	1159.3
Peak Force	F_{pk}	N	805.3	1610.5
Force Constant ±10%	K_f	N/Arms	76.5	76.5
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	62.5	62.5
Motor Constant @25°C	K_m	N/Sqrt(W)	37.3	52.8
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	2.8	1.4
Inductance (L-L) ±30% ❸	L	mH	63.6	31.8
Electrical Time Constant	τ_e	ms	22.7	22.7
Continuous Current (WC) @100°C❶❹	I_{cw}	Arms	8.2	16.4
Peak Current	I_{pk}	Arms	14.4	28.8
Continuous Power Dissipation (WC) @100°C❶❹	P_{cw}	W	364.0	727.9
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (WC)❶❹	K_{thw}	W/℃	4.9	9.7
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	42.0	42.0
Attraction Force	F_a	N	1.3	2.7
Mechanical Parameters				
Coil Mass (WC)	m_{cw}	kg	4.9	9.1
Coil Length (WC)	L_{cw}	mm	234	402
Track Mass Per Meter	m_{track}	kg/m	4.8	4.8
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS, CE, UL(option)	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:WC-Water Cooling.

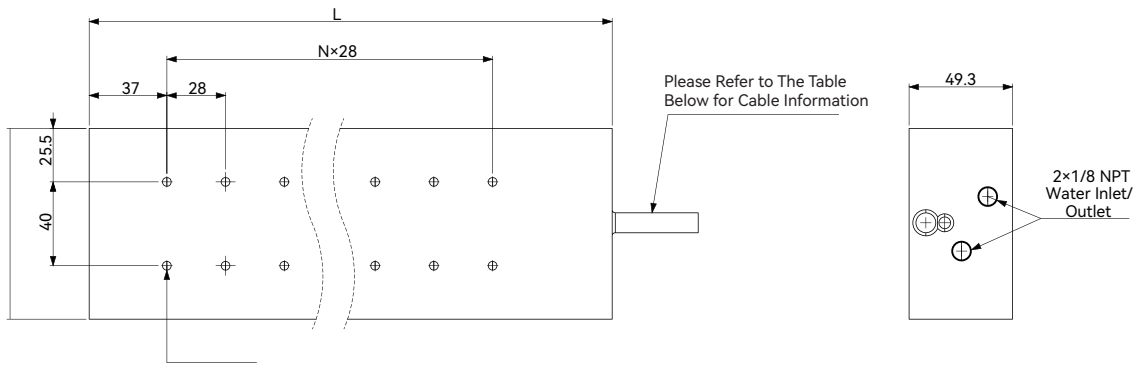
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

❹ Water cooling test conditions: the inlet water temperature of motor is 20℃, and the flow rate is 10 L/min.

The contents of datasheet are subject to change without prior notice.

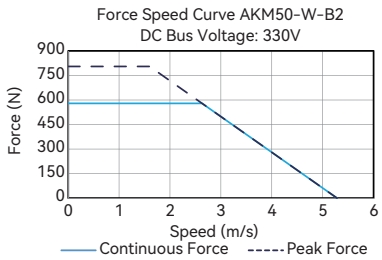
Dimension

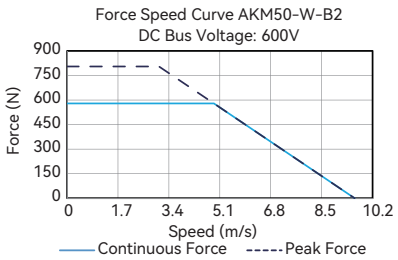


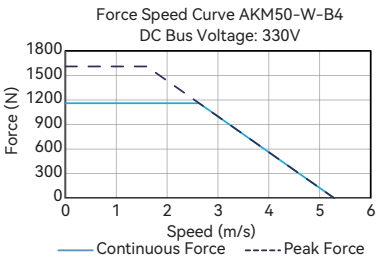
Coil Size	L	N	H
AKM50-W-B2	234	5	12
AKM50-W-B4	402	11	24

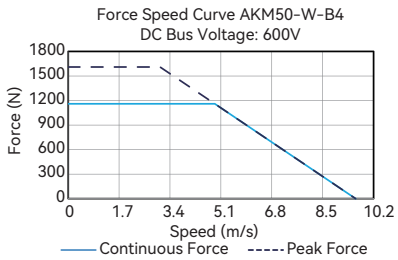
Motor Model	Motor Cable			Hall Cable		
	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)
AKM50-W-B2	8	80	40	5.2	52	26
AKM50-W-B4	9.5	95	47.5			

Force-Speed Curve

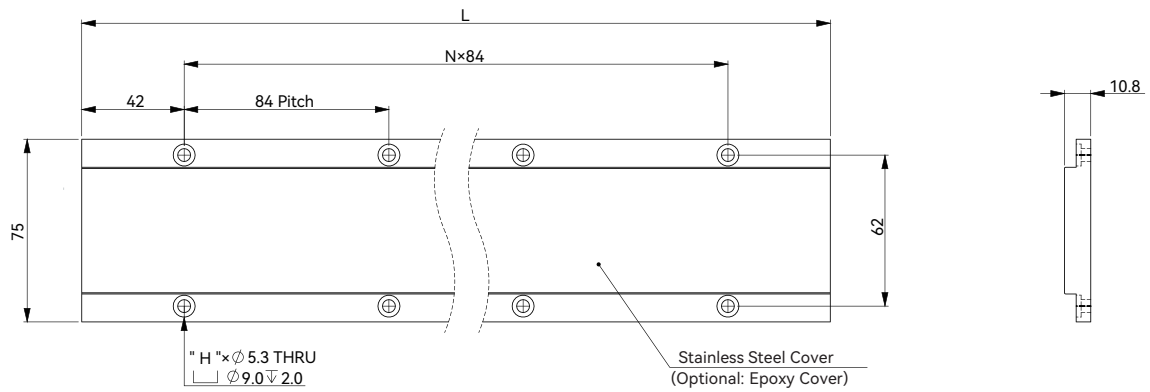








AKM50 Track

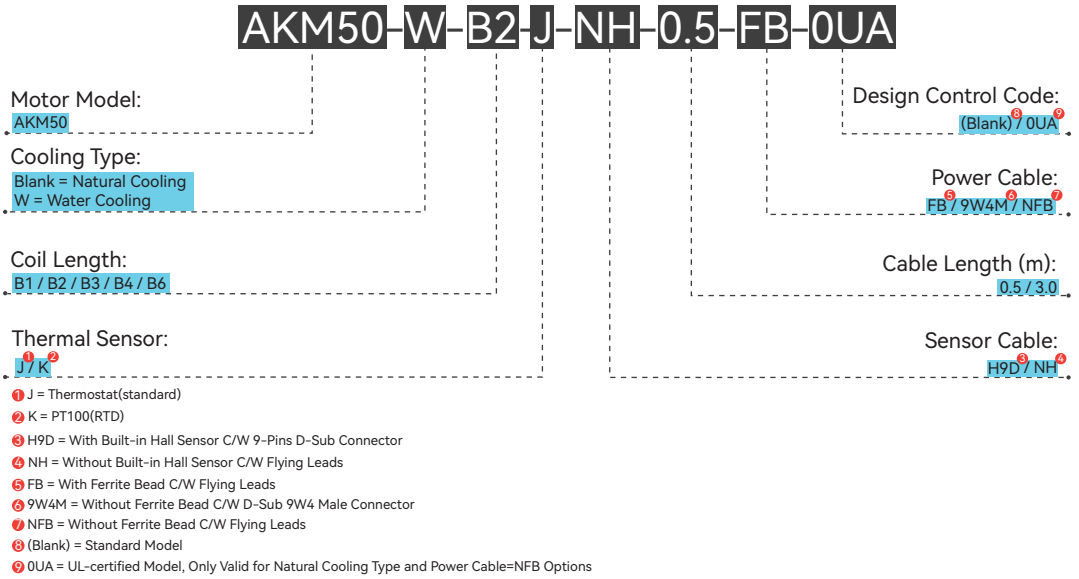


Magnet Track	L	N	H
AKM50-TL168-S	168	1	4
AKM50-TL252-S	252	2	6
AKM50-TL420-S	420	4	10

For epoxy cover option, change" -S " to " -E ". (e.g. AKM50-TL168-E)

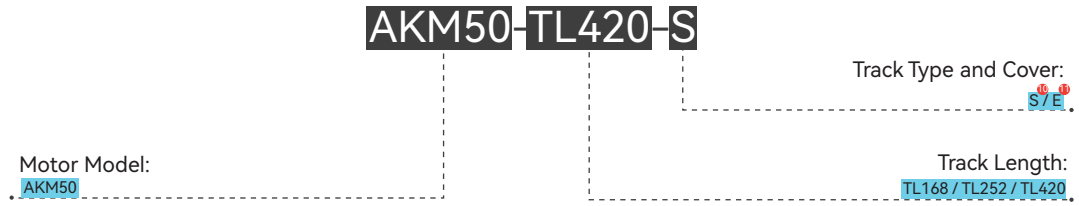
Part Numbering

Motor Coil



1. J = Thermostat(standard)
2. K = PT100(RTD)
3. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
4. NH = Without Built-in Hall Sensor C/W Flying Leads
5. FB = With Ferrite Bead C/W Flying Leads
6. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
7. NFB = Without Ferrite Bead C/W Flying Leads
8. (Blank) = Standard Model
9. 0UA = UL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

Motor Track



10. S = Stainless steel cover
11. E = Epoxy cover

AKM100-N

Performance Parameters	Symbol	Unit	AKM100-B1 Series	AKM100-B2 Series	AKM100-B3 Parallel	AKM100-B4 Parallel	AKM100-B6 Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	361.3	722.6	1084	1445.3	2059.6
Peak Force	F_{pk}	N	805.3	1610.5	2416	3221.1	4348.5
Force Constant ±10%	K_f	N/Arms	76.5	153.0	77	153.0	153.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	62.5	124.9	62	124.9	124.9
Motor Constant @25°C	K_m	N/Sqrt(W)	41.2	58.2	71	82.4	100.9
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	2.3	4.6	0.8	2.3	1.5
Inductance (L-L) ±30% [3]	L	mH	58.0	116.0	19	58.0	38.7
Electrical Time Constant	τ_e	ms	25.2	25.2	25	25.2	25.2
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	4.8	4.8	14.4	9.6	13.7
Peak Current	I_{pk}	Arms	14.4	14.4	43.2	28.8	38.9
Continuous Power Dissipation (NC) @100°C [1]	P_{cn}	W	102.4	204.9	307	409.8	554.7
Max. Coil Temperature	t_{max}	℃	100	100	100	100	130
Thermal Dissipation Constant (NC) [1]	K_{thn}	W/℃	1.4	2.7	4.1	5.5	7.4
Max. Bus Voltage	U_{bus}	Vdc	600	600	600	600	600
Magnetic Period	τ_{NN}	mm	42.0	42.0	42.0	42.0	42.0
Attraction Force	F_a	N	1.3	2.7	4.0	5.4	8.0
Mechanical Parameters							
Coil Mass (NC)	m_{cn}	kg	4.0	7.0	10.2	13.5	20.5
Coil Length (NC)	L_{cn}	mm	112	196	280	364	532
Track Mass Per Meter	m_{track}	kg/m	8.6	8.6	8.6	8.6	8.6
Other Information							
Insulation Class			Class B (130°C)				
Protection Grade			IP00				
Compliance with Global Standards			RoHS, CE, UL(option)				
Ambient Temperature	Operation		0°C to 40°C (non-freezing)				
	Storage		-15°C to 70°C (non-freezing)				
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)				
	Storage		10%RH to 90%RH (non-condensing)				
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.				

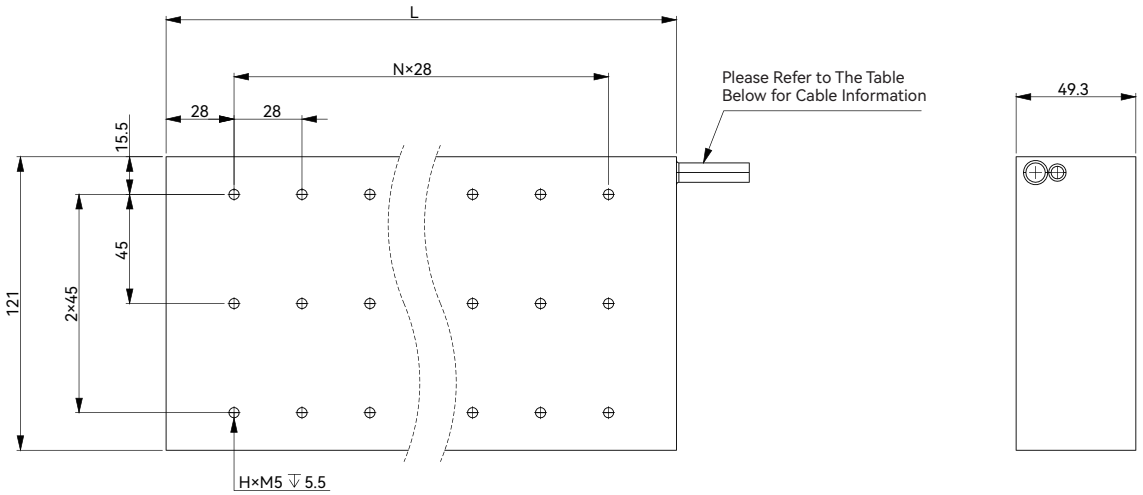
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.

[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

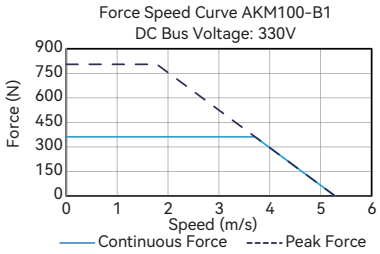
Dimension

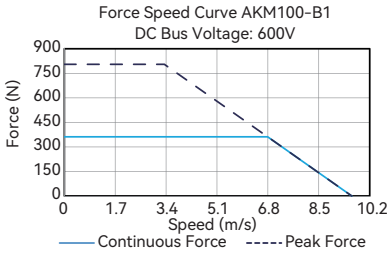


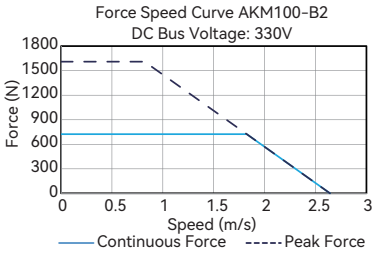
Coil Size	L	N	H
AKM100-B1	112	2	9
AKM100-B2	196	5	18
AKM100-B3	280	8	27
AKM100-B4	364	11	36
AKM100-B6	532	17	54

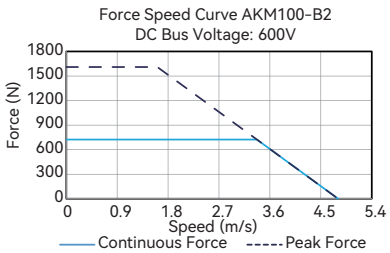
Motor Model	Motor Cable			Hall Cable		
	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)
AKM100-B1	8	80	40	5.2	52	26
AKM100-B2						
AKM100-B3						
AKM100-B4						
AKM100-B6						

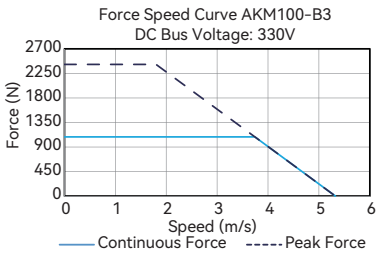
Force-Speed Curve

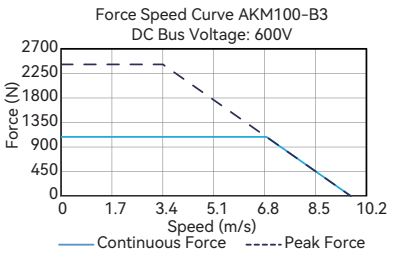


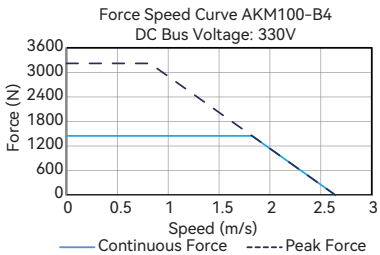


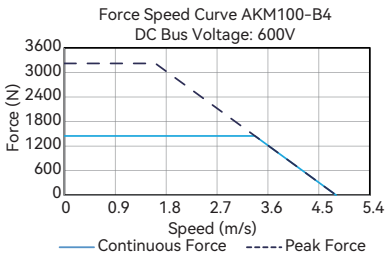


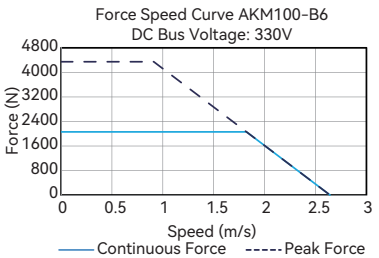


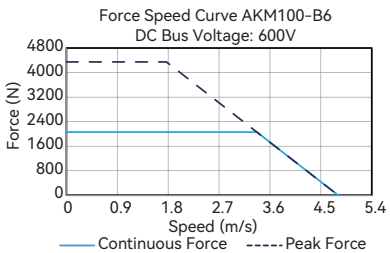










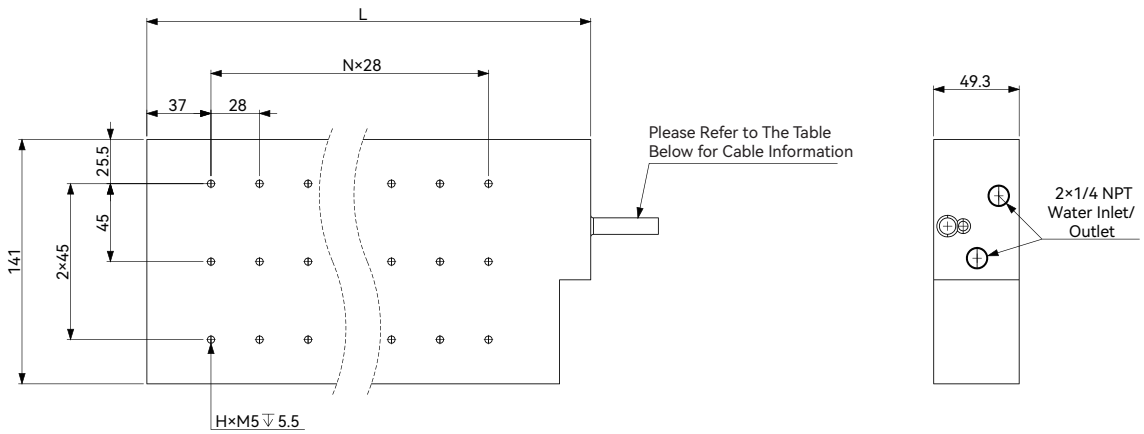


AKM100-W

			AKM100-W-B2	AKM100-W-B4
Performance Parameters	Symbol	Unit	Series	Series
Continuous Force (WC) @100℃❶❹	F_{cw}	N	1159.3	1947.3
Peak Force	F_{pk}	N	1610.5	3221.1
Force Constant ±10%	K_f	N/Arms	153.0	153.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	124.9	124.9
Motor Constant @25℃	K_m	N/Sqrt(W)	58.2	82.4
Resistance (L-L) 25℃ ±10% ❷	R_{25}	Ω	4.6	2.3
Inductance (L-L) ±30% ❸	L	mH	116.0	58.0
Electrical Time Constant	τ_e	ms	25.2	25.2
Continuous Current (WC) @100℃❶❹	I_{cw}	Arms	8.2	13.4
Peak Current	I_{pk}	Arms	14.4	28.8
Continuous Power Dissipation (WC) @100℃❶❹	P_{cw}	W	597.9	803.1
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (WC)❶❹	K_{thw}	W/℃	8.0	10.7
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	42	42
Attraction Force	F_a	N	2.7	5.4
Mechanical Parameters				
Coil Mass (WC)	m_{cw}	kg	8.5	15.8
Coil Length (WC)	L_{cw}	mm	236	404
Track Mass Per Meter	m_{track}	kg/m	8.6	8.6
Other Information				
Insulation Class			Class B (130℃)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS, CE, UL(option)	
Ambient Temperature	Operation		0℃ to 40℃ (non-freezing)	
	Storage		-15℃ to 70℃ (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
Abbreviations:WC-Water Cooling.
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ Water cooling test conditions: the inlet water temperature of motor is 20℃, and the flow rate is 10 L/min.
The contents of datasheet are subject to change without prior notice.

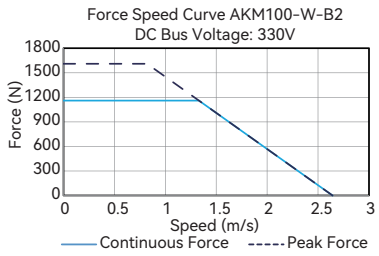
Dimension

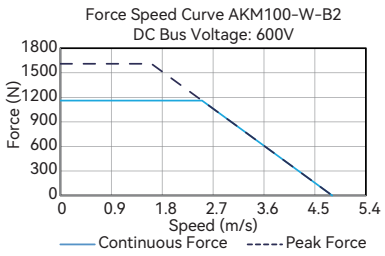


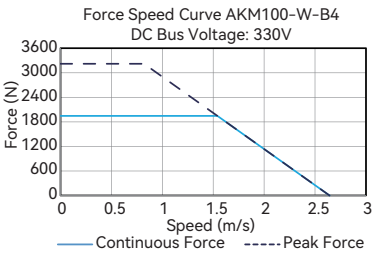
Coil Size	L	N	H
AKM100-W-B2	236	5	18
AKM100-W-B4	402	11	36

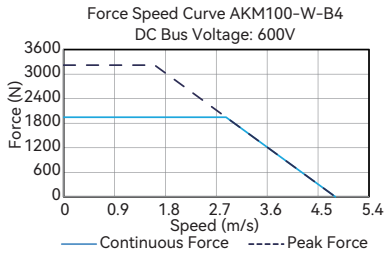
Motor Model	Motor Cable			Hall Cable		
	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)
AKM100-W-B2	8	80	40	5.2	52	26
AKM100-W-B4	9.5	95	47.5			

■ Force-Speed Curve

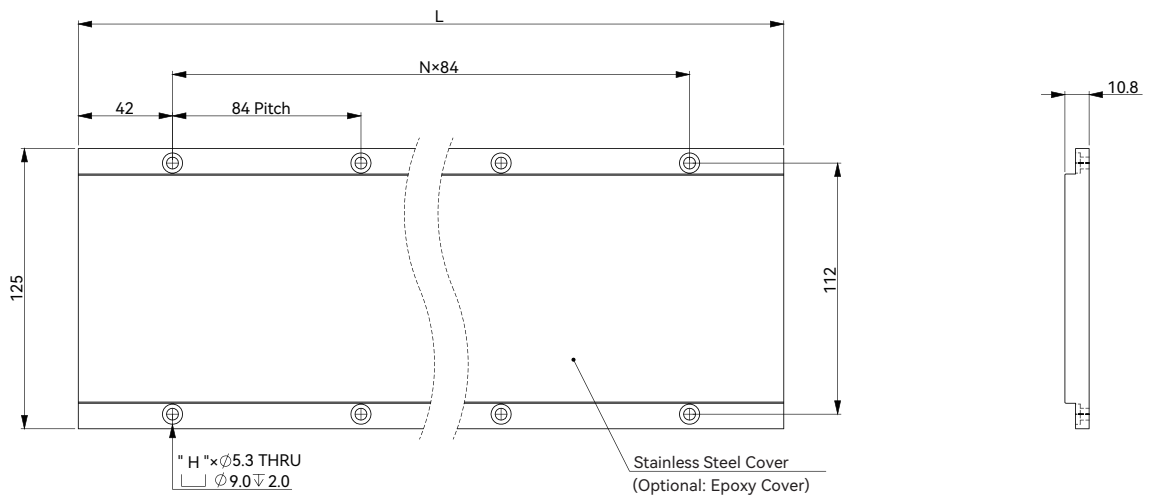








AKM100 Track

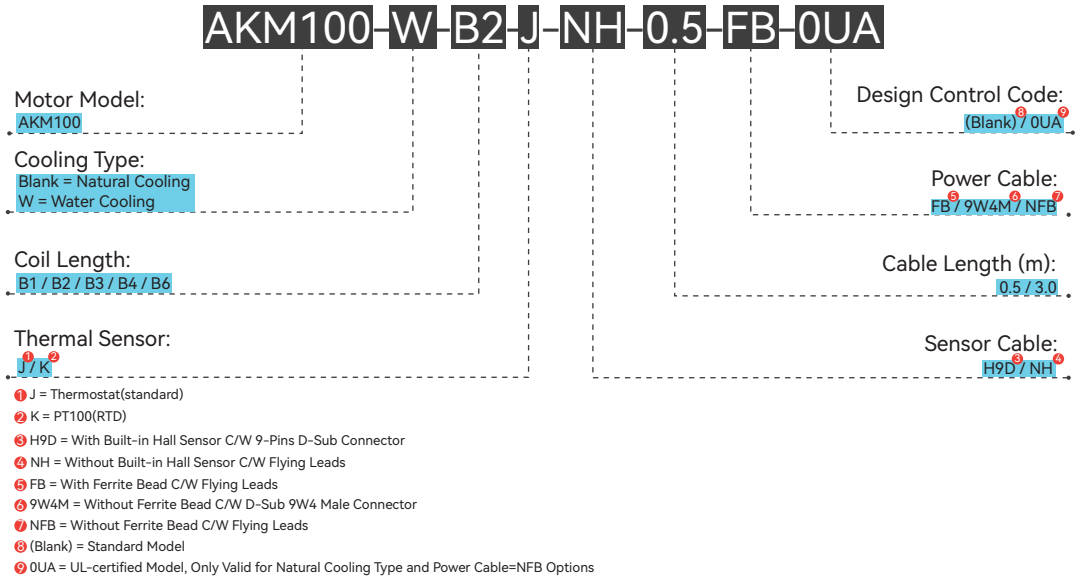


Magnet Track	L	N	H
AKM100-TL168-S	168	1	4
AKM100-TL252-S	252	2	6
AKM100-TL420-S	420	4	10

For epoxy cover option, change" -S " to " -E ". (e.g. AKM100-TL168-E)

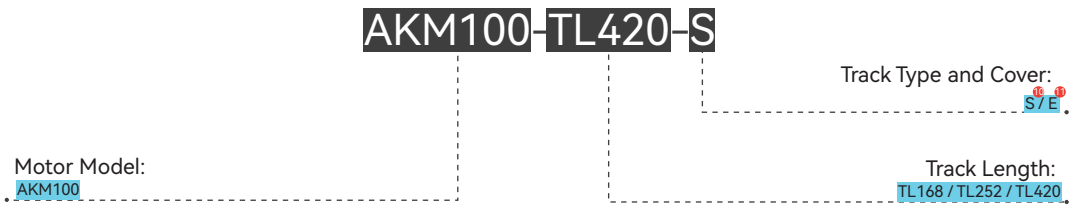
Part Numbering

Motor Coil



❶ J = Thermostat(standard)
❷ K = PT100(RTD)
❸ H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
❹ NH = Without Built-in Hall Sensor C/W Flying Leads
❺ FB = With Ferrite Bead C/W Flying Leads
❻ 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
❼ NFB = Without Ferrite Bead C/W Flying Leads
❽ (Blank) = Standard Model
❾ 0UA = UL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

Motor Track



❿ S = Stainless steel cover
⓫ E = Epoxy cover

AKM150-N

			AKM150-B4	AKM150-B8
Performance Parameters	Symbol	Unit	Parallel	Parallel
Continuous Force (NC) @100°C[1]	F_{cn}	N	2027.0	3839.1
Peak Force	F_{pk}	N	4831.6	9963.2
Force Constant ±10%	K_f	N/Arms	229.5	229.5
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	187.4	187.4
Motor Constant @25°C	K_m	N/Sqrt(W)	104.8	148.1
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	3.2	1.6
Inductance (L-L) ±30% [3]	L	mH	80.5	40.3
Electrical Time Constant	τ_e	ms	25.2	25.2
Continuous Current (NC) @100°C[1]	I_{cn}	Arms	9.0	17.0
Peak Current	I_{pk}	Arms	28.8	57.6
Continuous Power Dissipation (NC) @100°C[1]	P_{cn}	W	498.4	893.9
Max. Coil Temperature	t_{max}	°C	100	100
Thermal Dissipation Constant (NC)[1]	K_{thn}	W/°C	6.6	11.9
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	42.0	42.0
Attraction Force	F_a	N	8.0	16.0
Mechanical Parameters				
Coil Mass (NC)	m_{cn}	kg	20.2	39.4
Coil Length (NC)	L_{cn}	mm	364	700
Track Mass Per Meter	m_{track}	kg/m	15.2	15.2
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS, CE, UL(option)	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

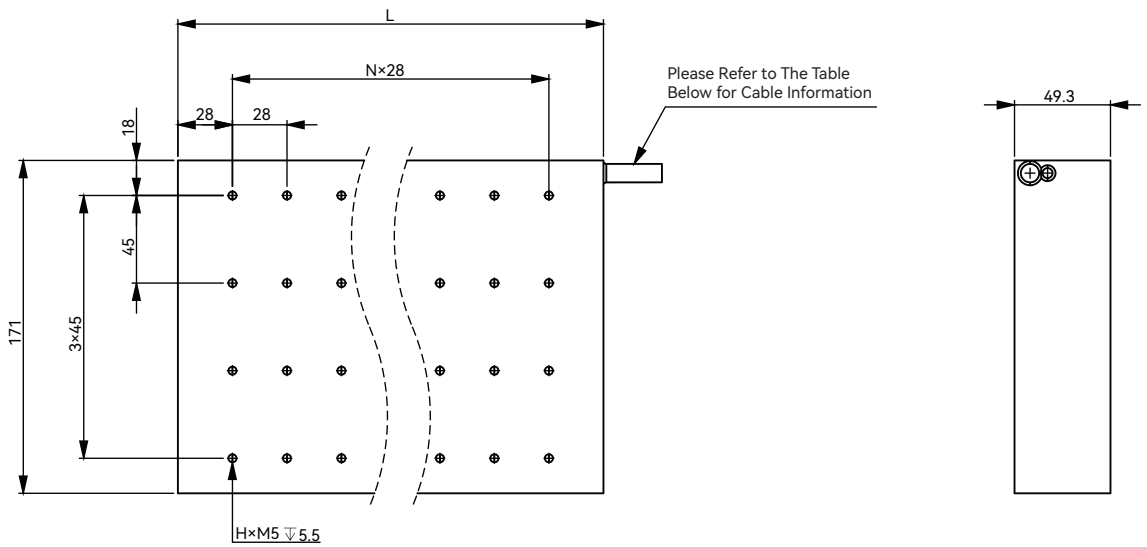
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.

[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

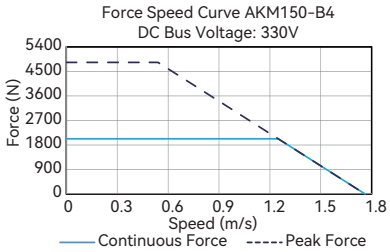
■ Dimension

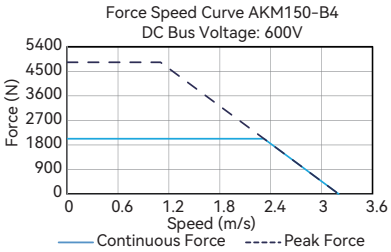


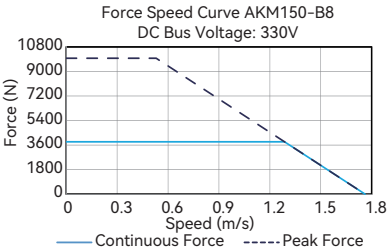
Coil Size	L	N	H
AKM150-B4	364	11	48
AKM150-B8	700	23	96

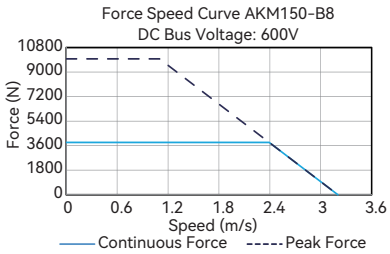
Motor Model	Motor Cable			Hall Cable		
	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)
AKM150-B4	9.5	95	47.5	5.2	52	26
AKM150-B8						

■ Force-Speed Curve









AKM150-W

			AKM150-W-B4	AKM150-W-B8
Performance Parameters	Symbol	Unit	Parallel	Parallel
Continuous Force (WC) @100°C❶❹	F_{cw}	N	2738.4	5216.1
Peak Force	F_{pk}	N	4831.6	9963.2
Force Constant ±10%	K_f	N/Arms	229.5	229.5
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	187.4	187.4
Motor Constant @25°C	K_m	N/Sqrt(W)	104.8	148.1
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	3.2	1.6
Inductance (L-L) ±30% ❸	L	mH	80.5	40.3
Electrical Time Constant	τ_e	ms	25.2	25.2
Continuous Current (WC) @100°C❶❹	I_{cw}	Arms	12.6	24.0
Peak Current	I_{pk}	Arms	28.8	57.6
Continuous Power Dissipation (WC) @100°C❶❹	P_{cw}	W	982.1	1781.6
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (WC)❶❹	K_{thw}	W/℃	13.1	23.8
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	42.0	42.0
Attraction Force	F_a	N	8.0	16.0
Mechanical Parameters				
Coil Mass (WC)	m_{cw}	kg	22.3	42.9
Coil Length (WC)	L_{cw}	mm	404	786
Track Mass Per Meter	m_{track}	kg/m	15.2	15.2
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE, UL(option)		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:WC-Water Cooling.

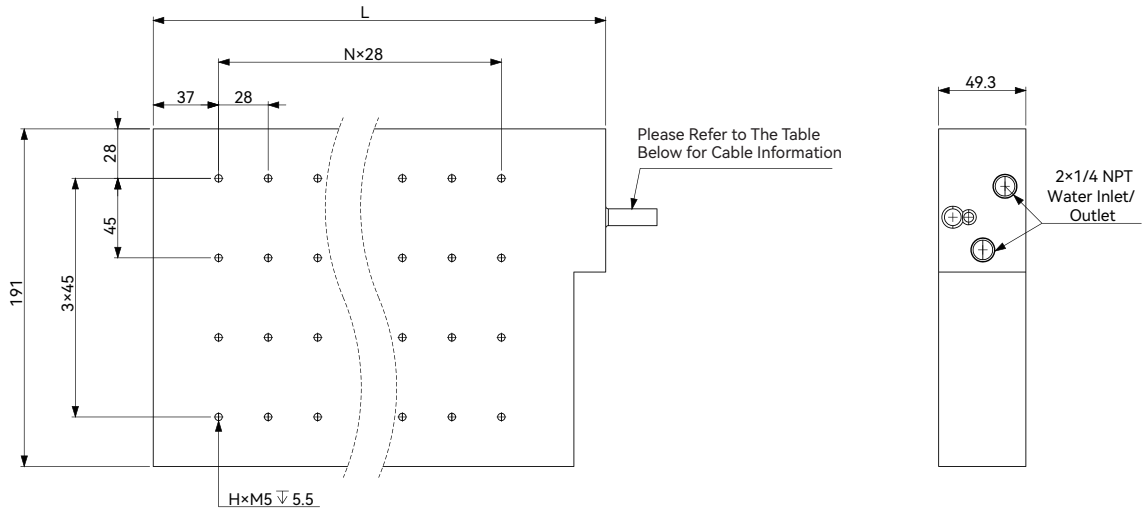
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

❹ Water cooling test conditions: the inlet water temperature of motor is 20℃, and the flow rate is 10 L/min.

The contents of datasheet are subject to change without prior notice.

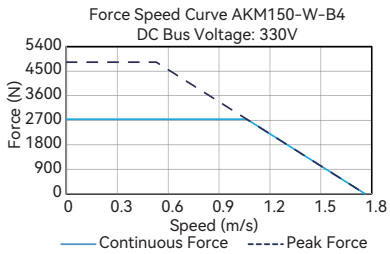
Dimension

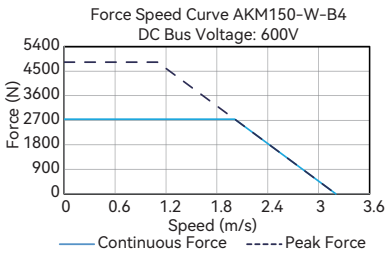


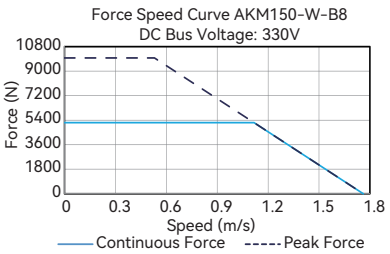
Coil Size	L	N	H
AKM150-W-B4	404	11	48
AKM150-W-B8	786	23	96

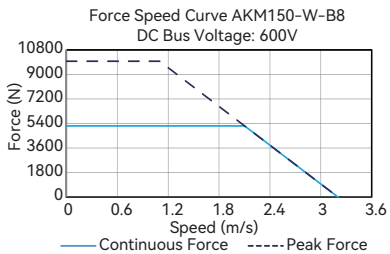
Motor Model	Motor Cable			Hall Cable		
	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)
AKM150-W-B4	9.5	95	47.5	5.2	52	26
AKM150-W-B8	12.6	126	63			

Force-Speed Curve

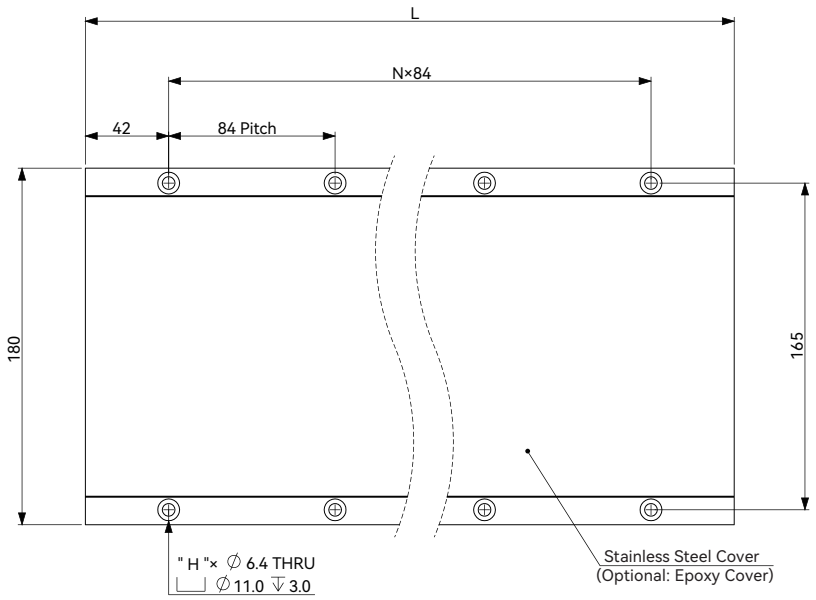


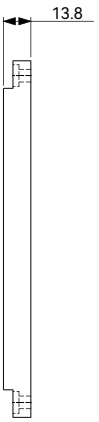






AKM150 Track





磁轨尺寸	L	N	H
AKM150-TL168-S	168	1	4
AKM150-TL252-S	252	2	6
AKM150-TL420-S	420	4	10

For epoxy cover option, change" -S " to " -E ". (e.g. AKM150-TL168-E)

Part Numbering

Motor Coil

AKM150-W-B4-J-NH-0.5-FB-0UA

- Motor Model: AKM150
- Cooling Type: Blank = Natural Cooling; W = Water Cooling
- Coil Length: B4 / B8
- Thermal Sensor: ❶ J / ❷ K
- Design Control Code: ❽ (Blank) / ❾ 0UA
- Power Cable: ❺ FB / ❻ 9W4M / ❼ NFB
- Cable Length (m): 0.5 / 3.0
- Sensor Cable: ❸ H9D / ❹ NH

❶ J = Thermostat(standard)
❷ K = PT100(RTD)
❸ H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
❹ NH = Without Built-in Hall Sensor C/W Flying Leads
❺ FB = With Ferrite Bead C/W Flying Leads
❻ 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
❼ NFB = Without Ferrite Bead C/W Flying Leads
❽ (Blank) = Standard Model
❾ 0UA = UL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

Motor Track

AKM150-TL420-S

- Motor Model: AKM150
- Track Length: TL168 / TL252 / TL420
- Track Type and Cover: ⓬ S / ⓫ E

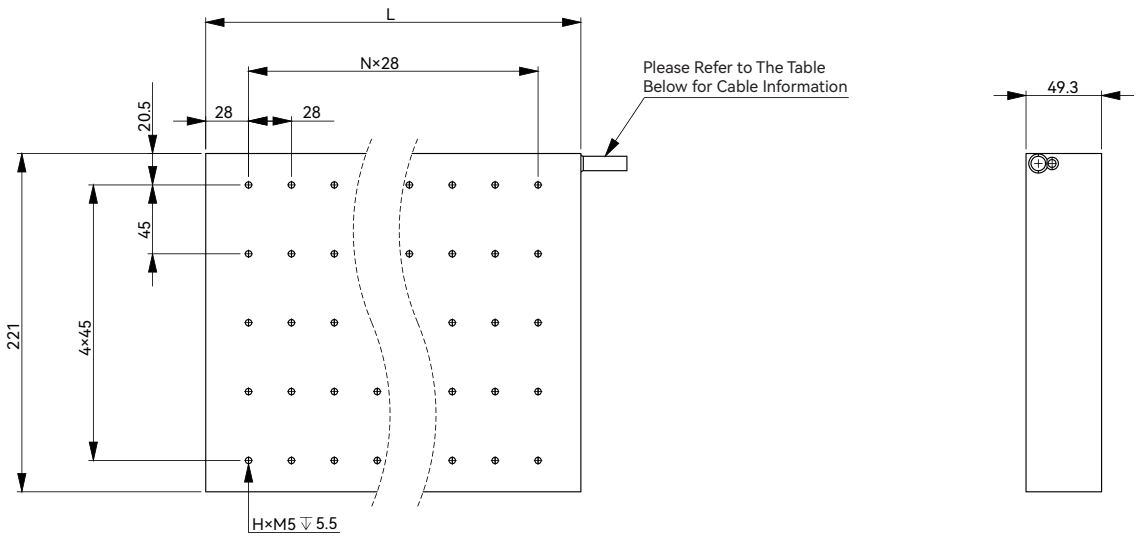
⓬ S = Stainless steel cover
⓫ E = Epoxy cover

AKM200-N

			AKM200-B4	AKM200-B8
Performance Parameters	Symbol	Unit	Parallel	Parallel
Continuous Force (NC) @100℃ ❶	F_{cn}	N	2539.6	4817.7
Peak Force	F_{pk}	N	6442.2	12884.3
Force Constant ±10%	K_f	N/Arms	306.0	306.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	249.8	249.8
Motor Constant @25℃	K_m	N/Sqrt(W)	124.9	176.7
Resistance (L-L) 25℃ ±10% ❷	R_{25}	Ω	4.0	2.0
Inductance (L-L) ±30% ❸	L	mH	103.0	51.5
Electrical Time Constant	τ_e	ms	25.8	25.8
Continuous Current (NC) @100℃ ❶	I_{cn}	Arms	8.4	16.0
Peak Current	I_{pk}	Arms	28.8	57.6
Continuous Power Dissipation (NC) @100℃ ❶	P_{cn}	W	545.6	989.8
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	7.3	13.2
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	42.0	42.0
Attraction Force	F_a	N	10.7	21.4
Mechanical Parameters				
Coil Mass (NC)	m_{cn}	kg	26.5	51.6
Coil Length (NC)	L_{cn}	mm	364	700
Track Mass Per Meter	m_{track}	kg/m	22.4	22.4
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE, UL(option)		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.
❷Resistance is measured by DC current with standard 0.5 m cable.
❸Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

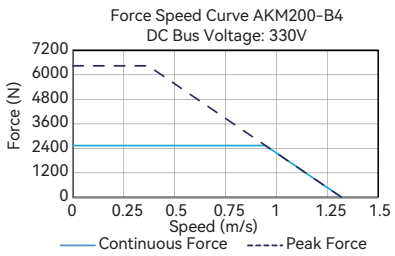
■ Dimension

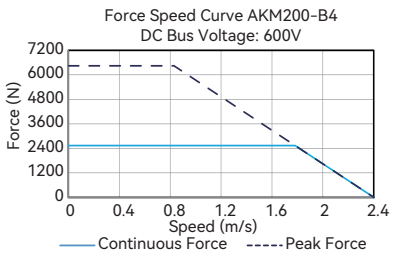


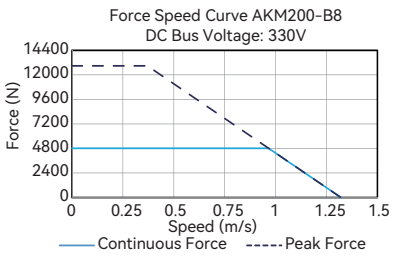
Coil Size	L	N	H
AKM200-B4	364	11	60
AKM200-B8	700	23	120

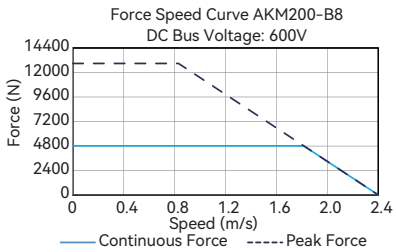
Motor Model	Motor Cable			Hall Cable		
	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)
AKM200-B4	9.5	95	47.5	5.2	52	26
AKM200-B8						

Force-Speed Curve









AKM200-W

			AKM200-W-B4	AKM200-W-B8
Performance Parameters	Symbol	Unit	Parallel	Parallel
Continuous Force (WC) @100°C[1][4]	F_{cw}	N	3249.8	6190.1
Peak Force	F_{pk}	N	6442.2	12884.3
Force Constant ±10%	K_f	N/Arms	306.0	306.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	249.8	249.8
Motor Constant @25°C	K_m	N/Sqrt(W)	124.9	176.7
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	4.0	2.0
Inductance (L-L) ±30% [3]	L	mH	103.0	51.5
Electrical Time Constant	τ_e	ms	25.8	25.8
Continuous Current (WC) @100°C[1][4]	I_{cw}	Arms	10.8	20.6
Peak Current	I_{pk}	Arms	28.8	57.6
Continuous Power Dissipation (WC) @100°C[1][4]	P_{cw}	W	904.4	1640.7
Max. Coil Temperature	t_{max}	°C	100	100
Thermal Dissipation Constant (WC)[1][4]	K_{thw}	W/°C	12.1	21.9
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	42.0	42.0
Attraction Force	F_a	N	10.7	21.4
Mechanical Parameters				
Coil Mass (WC)	m_{cw}	kg	29.0	55.8
Coil Length (WC)	L_{cw}	mm	404	786
Track Mass Per Meter	m_{track}	kg/m	22.4	22.4
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS, CE, UL(option)	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:WC-Water Cooling.

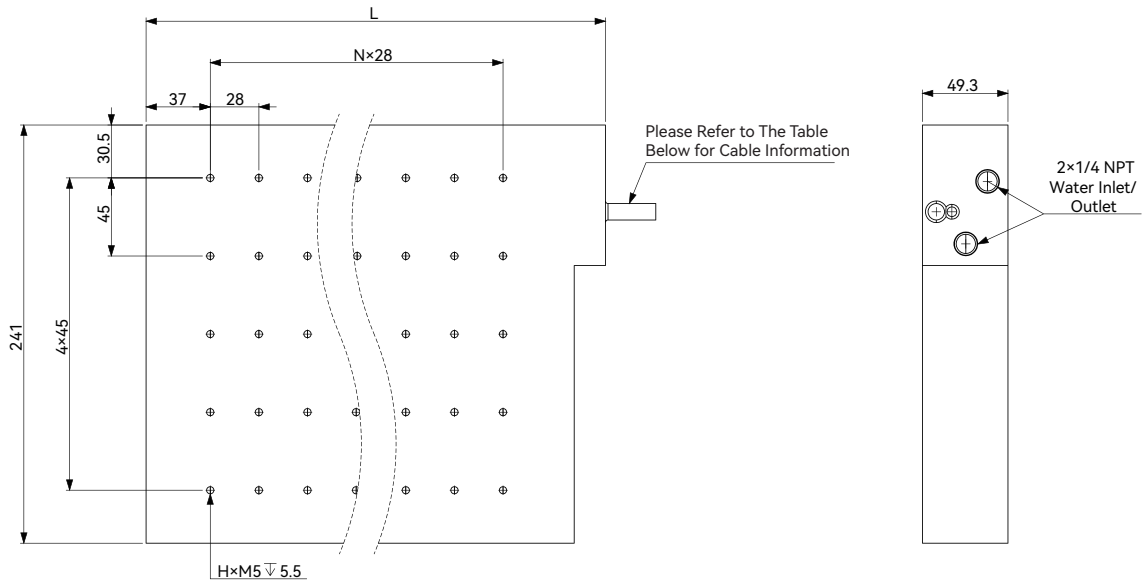
[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz.

[4] Water cooling test conditions: the inlet water temperature of motor is 20°C, and the flow rate is 10 L/min.

The contents of datasheet are subject to change without prior notice.

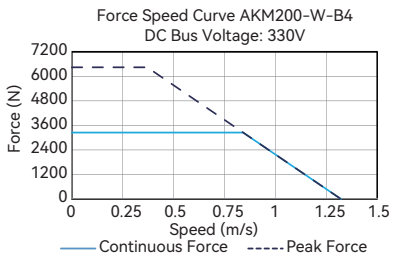
Dimension

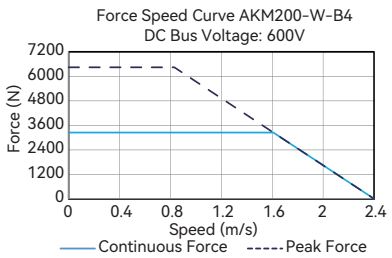


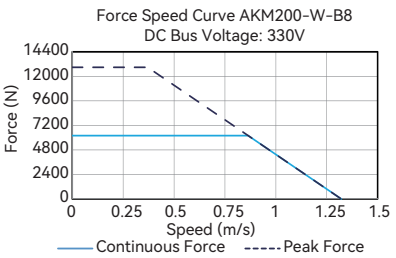
Coil Size	L	N	H
AKM200-W-B4	404	11	60
AKM200-W-B8	786	23	120

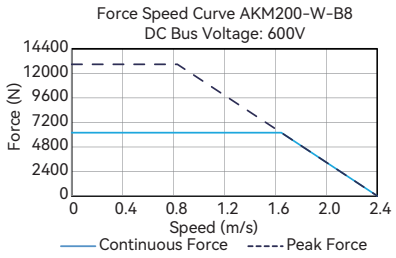
Motor Model	Motor Cable			Hall Cable		
	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)	Outer Diameter	Minimum Bend Radius (Mobile cables)	Minimum Bend Radius (Fixed cable)
AKM200-W-B4	9.5	95	47.5	5.2	52	26
AKM200-W-B8	12.6	126	63			

Force-Speed Curve

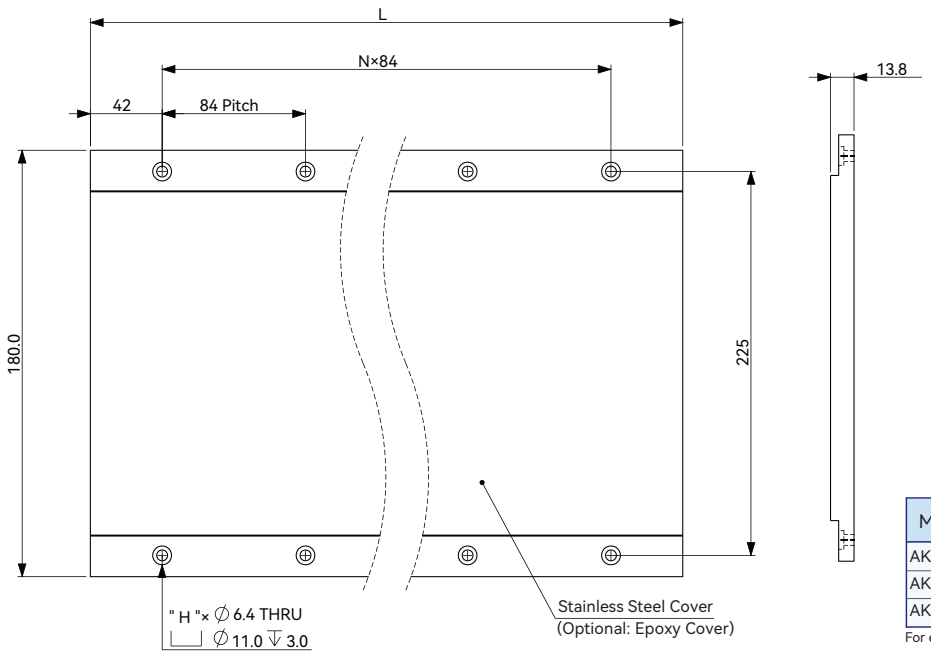








AKM200 Track



Magnet Track	L	N	H
AKM200-TL168-S	168	1	4
AKM200-TL252-S	252	2	6
AKM200-TL420-S	420	4	10

For epoxy cover option, change" -S " to " -E ". (e.g. AKM200-TL168-E)

Part Numbering

Motor Coil

AKM200-W-B8-J-NH-0.5-FB-0UA

- Motor Model: AKM200
- Cooling Type: Blank = Natural Cooling; W = Water Cooling
- Coil Length: B4 / B8
- Thermal Sensor: J(1) / K(2)
- Design Control Code: (Blank)(8) / 0UA(9)
- Power Cable: FB(5) / 9W4M(6) / NFB(7)
- Cable Length (m): 0.5 / 3.0
- Sensor Cable: H9D(3) / NH(4)

1. J = Thermostat(standard)
2. K = PT100(RTD)
3. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
4. NH = Without Built-in Hall Sensor C/W Flying Leads
5. FB = With Ferrite Bead C/W Flying Leads
6. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
7. NFB = Without Ferrite Bead C/W Flying Leads
8. (Blank) = Standard Model
9. 0UA = UL-certified Model, Only Valid for Natural Cooling Type and Power Cable=NFB Options

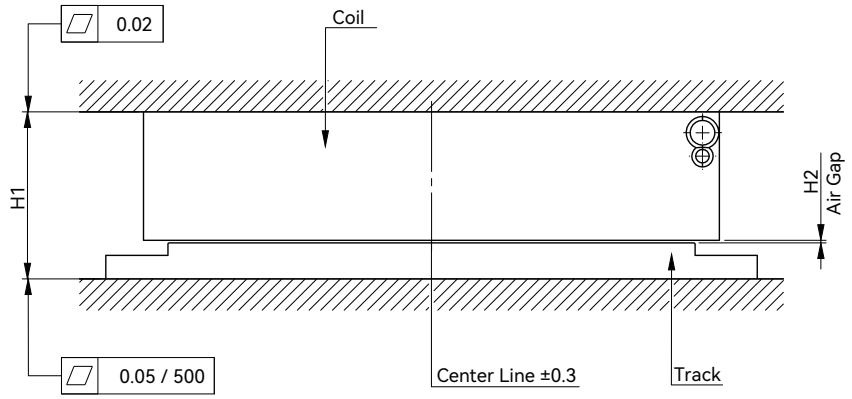
Motor Track

AKM200-TL420-S

- Motor Model: AKM200
- Track Length: TL168 / TL252 / TL420
- Track Type and Cover: S(10) / E(11)

10. S = Stainless steel cover
11. E = Epoxy cover

Motor Assembly Diagram

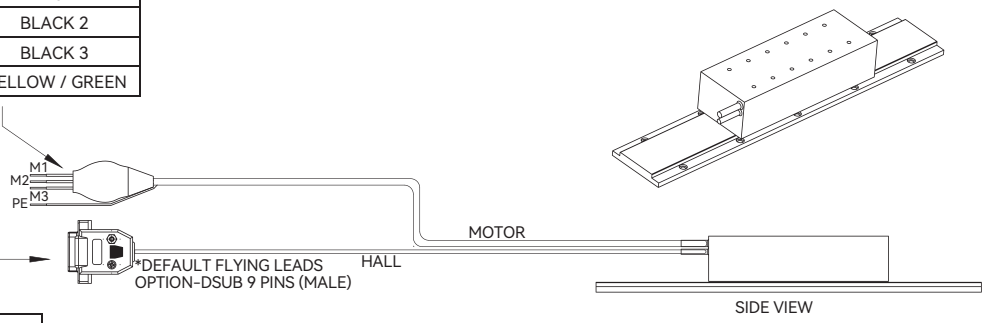


Installation Guide	Magnetic Track Adaptable	H1	H2
AKM30-Bx	AKM30-TLXXX-S	61.1(0,-0.1)	1.0(+0.2,-0.4)
AKM50-Bx	AKM50-TLXXX-S	61.1(0,-0.1)	1.0(+0.2,-0.4)
AKM50-W-Bx			
AKM100-Bx	AKM100-TLXXX-S	61.1(0,-0.1)	1.0(+0.2,-0.4)
AKM100-W-Bx			
AKM150-Bx	AKM150-TLXXX-S	64.1(0,-0.1)	1.0(+0.2,-0.4)
AKM150-W-Bx			
AKM200-Bx	AKM200-TLXXX-S	64.1(0,-0.1)	1.0(+0.2,-0.4)
AKM200-W-Bx			

Motor Cable Connection

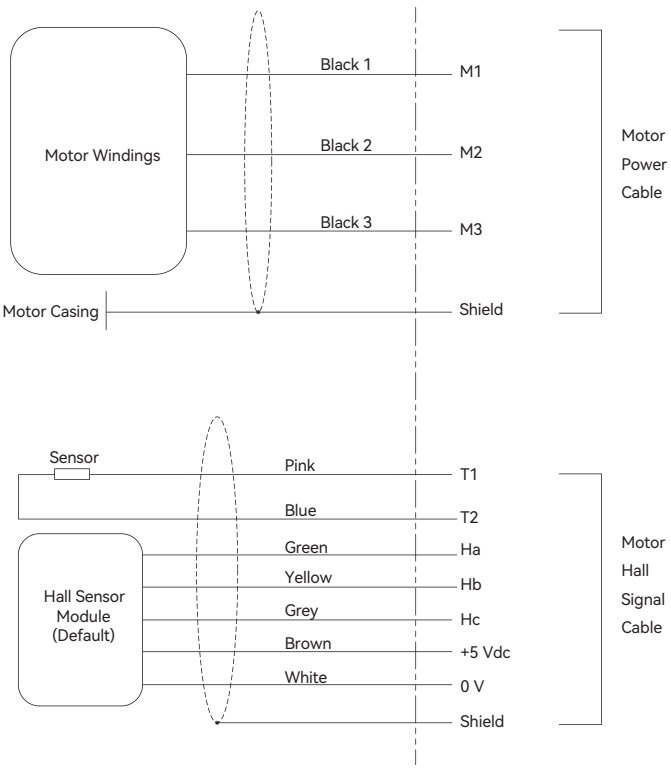
MOTOR CABLE

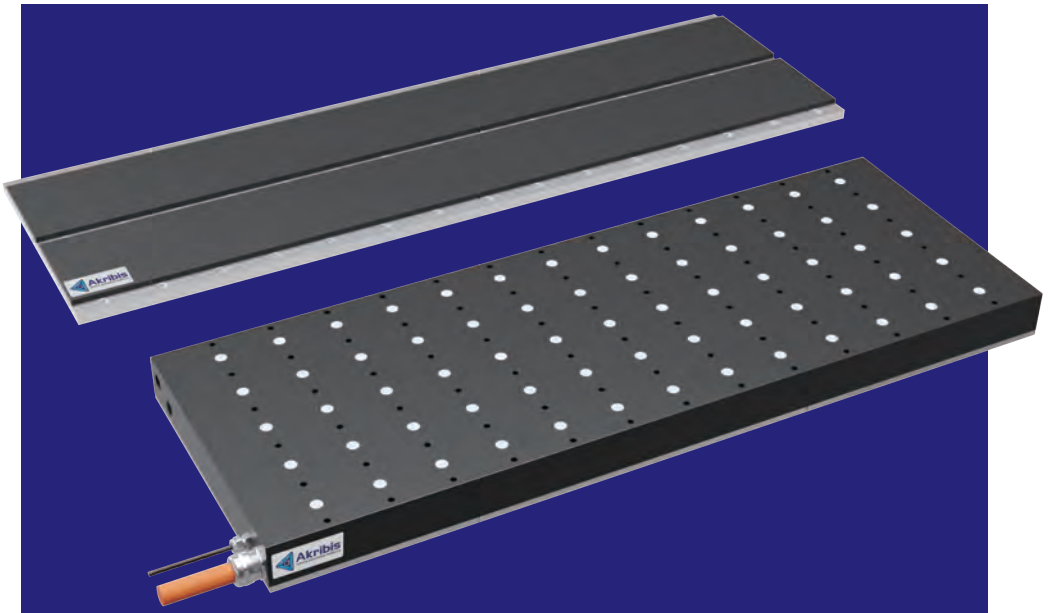
PIN	DESCRIPTION	COLOR
-	M1	BLACK 1
-	M2	BLACK 2
-	M3	BLACK 3
-	PE	YELLOW / GREEN



HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	5VDC	BROWN
5	0VDC	WHITE
8	T1	PINK
9	T2	BLUE





AKH SERIES

- Iron core technology
- Low cogging force
- Fast response and high bandwidth
- High force density and low mass

EN-26.3.1

Akribis systems

AKH Series

Introduction

AKH series motor provides various sizes and two different cooling systems, water-cooling and nature-cooling. It features with compact size, high force density, and quick response, which is suitable for applications with strict requirements of speed, accuracy, and response performance.

Continuous Force Fcn = 631N ~ 6097N

Peak Force Fpk = 2139N ~ 12834N

Features

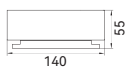
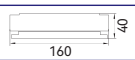
- Self-cooling, water-cooling optional
- Small size and high thrust force
- High response and bandwidth
- High motor constants
- Patented water-cooling design
- Max bus voltage of 600Vdc

Applications

Suitable for applications with strict requirements of speed, accuracy, and response performance. Also, applicable to point-to-point micron level positioning with max peed of 5m/s or faster.

Applications & Industries:

- CNC machines， including laser processing machines, mold machines, lathes, grinders, etc
- High-speed positioning system for handling applications
- Semiconductor, PV, lithium battery, glass and LCD

	Series	Coil Length (mm)	● Continuous Force (F_{cn}) / ■ PeakForce (F_{pk}) Unit: N 1000 2000 3000 4000 5000 6000 ....
	AKH100-N-B2	232	● 631 / ■ 2139
	AKH100-N-B3	340	● 852 / ■ 3209
	AKH100-N-B4	448	● 984 / ■ 4278
	AKH100-W-B2	263	● 1070 / ■ 2139
	AKH100-W-B4	479	● 2112 / ■ 4278
	AKH100-W-B6	695	● 3048 / ■ 6417
	AKH130-N-B3	340	● 961 / ■ 4171
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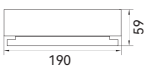
	AKH150-N-B4	448	● 1440 / ■ 6417
	AKH150-W-B2	263	● 1604 / ■ 3209
	AKH150-W-B4	479	● 3169 / ■ 6417
	AKH150-W-B6	695	● 4573 / ■ 9626
	AKH200-N-B2	232	● 989 / ■ 4278
	AKH200-N-B4	448	● 1604 / ■ 8556
	AKH200-W-B2	263	● 2139 / ■ 4278
	AKH200-W-B4	479	● 4225 / ■ 8556
	AKH200-W-B6	695	● 6097 / ■ 12834

AKH100-N-0RB

			AKH100-N-B2		AKH100-N-B3		AKH100-N-B4	
Performance Parameters	Symbol	Unit	L	H	L	H	L	H
Continuous Force (NC) @100℃ ❶	F_{cn}	N	631	631	852	852	984	984
Peak Force	F_{pk}	N	2139	2139	3209	3209	4278	4278
Force Constant ±10%	K_f	N/Arms	137	87	137	87	137	87
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	112	71	112	71	112	71
Motor Constant @25℃	K_m	N/Sqrt(W)	45	45	55	55	64	64
Resistance (L-L) 25℃ ±10% ❷	R_{25}	Ω	6.2	2.5	4.1	1.6	3.1	1.2
Inductance (L-L) ±30% ❸	L	mH	27.0	10.9	18.0	7.3	13.5	5.4
Electrical Time Constant	τ_e	ms	4.4	4.4	4.4	4.4	4.4	4.4
Continuous Current (NC) @100℃ ❶	I_{cn}	Arms	4.6	7.3	6.2	9.8	7.2	11.3
Peak Current	I_{pk}	Arms	20.0	31.5	30.0	47.3	40.0	63.1
Continuous Power Dissipation (NC) @100℃ ❶	P_{cn}	W	252	252	306	306	306	306
Max. Coil Temperature	t_{max}	℃	100	100	100	100	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	3.4	3.4	4.1	4.1	4.1	4.1
Max. Bus Voltage	U_{bus}	Vdc	600	600	600	600	600	600
Magnetic Period	τ_{NN}	mm	27	27	27	27	27	27
Attraction Force	F_a	N	4.3	4.3	6.4	6.4	12.8	12.8
Mechanical Parameters								
Coil Mass (NC)	m_{cn}	kg	5.0	5.0	7.1	7.1	10.0	10.0
Coil Length (NC)	L_{cn}	mm	232	232	340	340	448	448
Track Mass Per Meter	m_{track}	kg/m	9	9	9	9	9	9
Other Information								
Insulation Class			Class B (130℃)					
Protection Grade			IP00					
Compliance with Global Standards			RoHS, CE					
Ambient Temperature	Operation		0℃ to 40℃ (non-freezing)					
	Storage		-15℃ to 70℃ (non-freezing)					
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)					
	Storage		10%RH to 90%RH (non-condensing)					
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.					

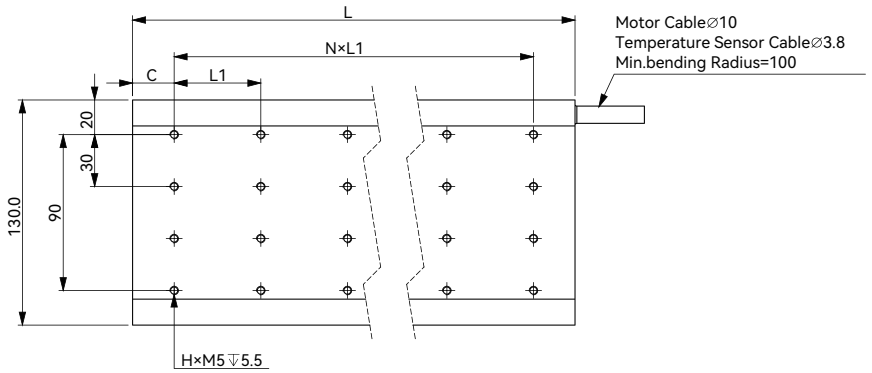
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

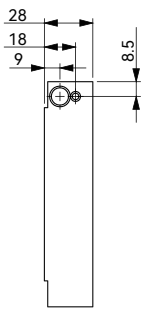
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

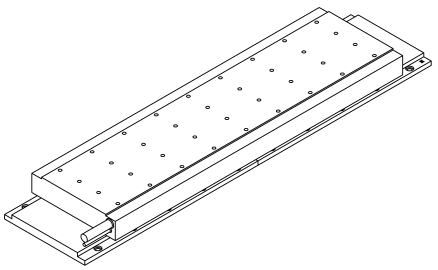
The contents of datasheet are subject to change without prior notice.

Dimension

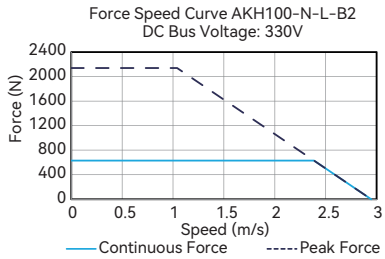


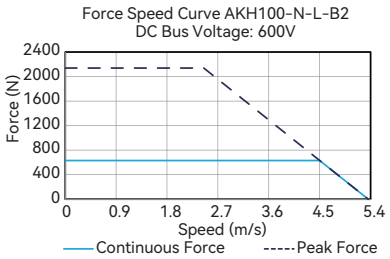


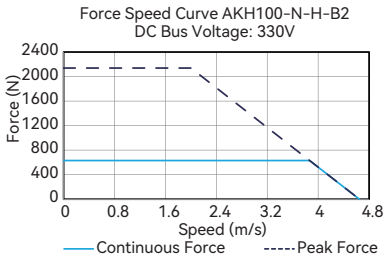
Motor Type	L	C	L1	N	H
AKH100-L/H-B2	232	16	50	4	20
AKH100-L/H-B3	340	20	60	5	24
AKH100-L/H-B4	448	24	50	8	36

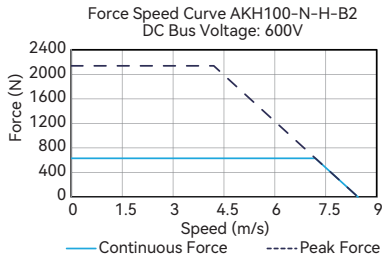


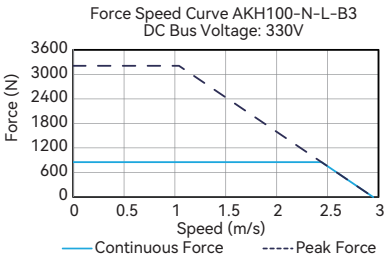
Force-Speed Curve

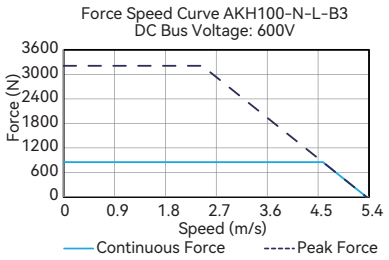


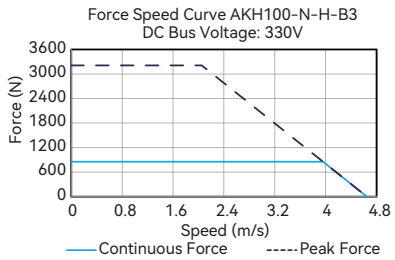


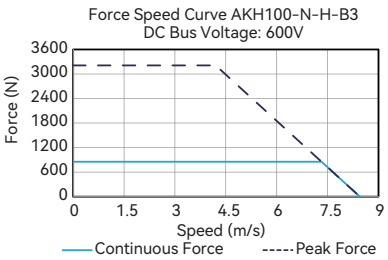


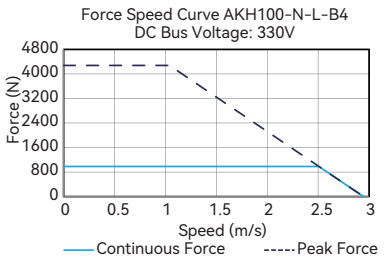


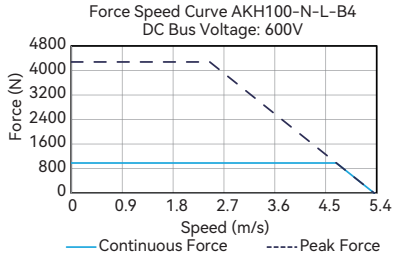


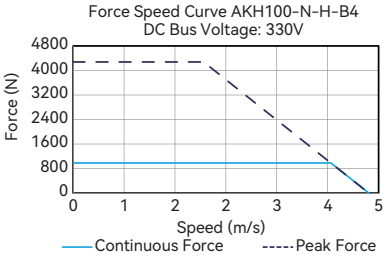


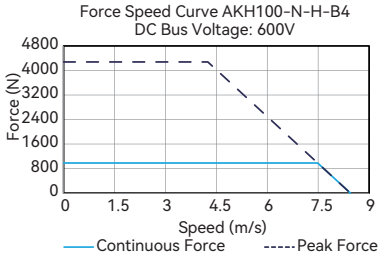












AKH100-W-0RC

			AKH100-W-B2		AKH100-W-B4		AKH100-W-B6	
Performance Parameters	Symbol	Unit	L	H	L	H	L	H
Continuous Force (WC) @100°C❶❹	F_{cw}	N	1070	1070	2112	2112	3048	3048
Peak Force	F_{pk}	N	2139	2139	4278	4278	6417	6417
Force Constant ±10%	K_f	N/Arms	137	87	137	87	137	87
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	112	71	112	71	112	71
Motor Constant @25°C	K_m	N/Sqrt(W)	45.1	45.2	63.9	63.9	78.2	78.2
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	6.2	2.5	3.1	1.2	2.1	0.8
Inductance (L-L) ±30% ❸	L	mH	27.0	10.9	13.5	5.4	9.0	3.6
Electrical Time Constant	τ_e	ms	4.4	4.4	4.4	4.4	4.4	4.4
Continuous Current (WC) @100°C❶❹	I_{cw}	Arms	8.0	12.6	15.8	24.9	22.8	36.0
Peak Current	I_{pk}	Arms	20.0	31.5	40.0	63.1	60.0	94.6
Continuous Power Dissipation (WC) @100°C❶❹	P_{cw}	W	761	761	1484	1484	2060	2060
Max. Coil Temperature	t_{max}	℃	100	100	100	100	100	100
Thermal Dissipation Constant (WC) ❶❹	K_{thw}	W/℃	10.1	10.1	19.8	19.8	27.5	27.5
Max. Bus Voltage	U_{bus}	Vdc	600	600	600	600	600	600
Magnetic Period	τ_{NN}	mm	27	27	27	27	27	27
Attraction Force	F_a	N	4.3	4.3	8.5	8.5	12.8	12.8
Mechanical Parameters								
Coil Mass (WC)	m_{cw}	kg	7	7	13	13	19	19
Coil Length (WC)	L_{cw}	mm	263	263	479	479	695	695
Track Mass Per Meter	m_{track}	kg/m	9	9	9	9	9	9
Other Information								
Insulation Class			Class B (130°C)					
Protection Grade			IP66					
Compliance with Global Standards			RoHS, CE					
Ambient Temperature	Operation		0°C to 40°C (non-freezing)					
	Storage		-15°C to 70°C (non-freezing)					
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)					
	Storage		10%RH to 90%RH (non-condensing)					
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.					

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:WC-Water Cooling.

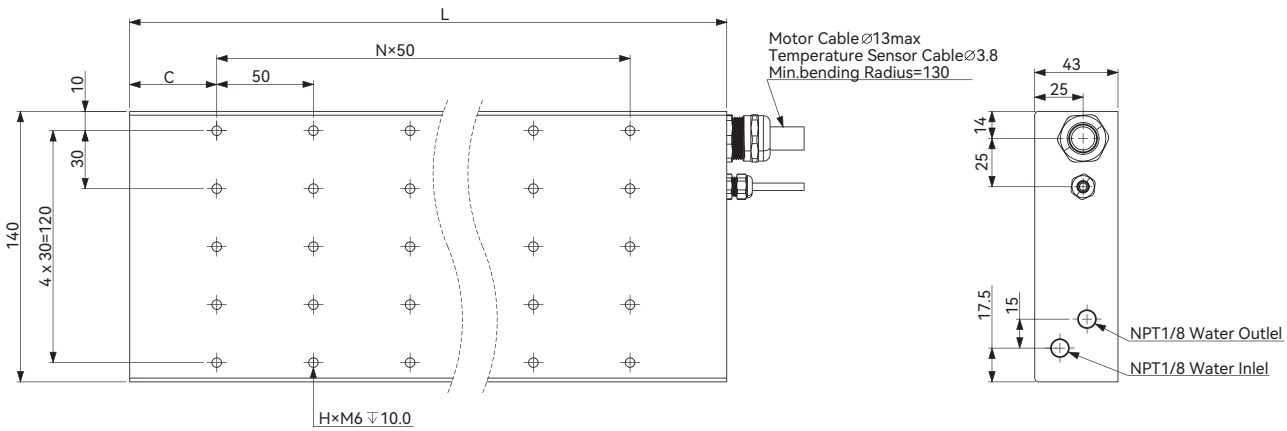
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

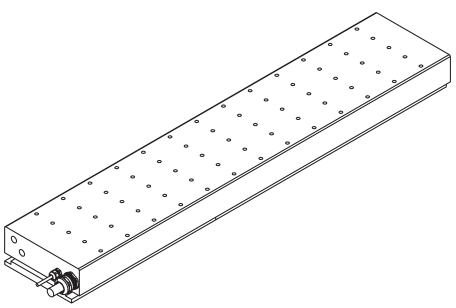
❹ Water cooling test conditions: the inlet water temperature of motor is 20°C, and the flow rate is 6 L/min.

The contents of datasheet are subject to change without prior notice.

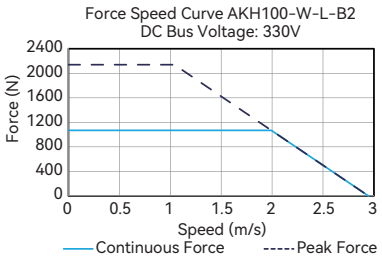
Dimension

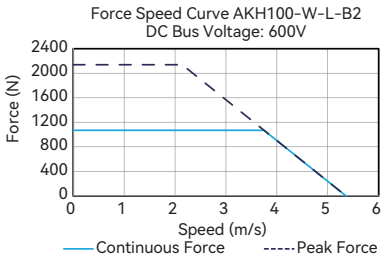


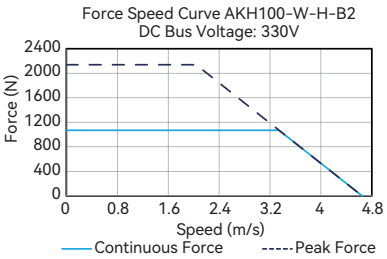
Motor Type	L	C	N	H
AKH100-W-L/H-B2	263	29	4	25
AKH100-W-L/H-B4	479	37	8	45
AKH100-W-L/H-B6	695	45	12	65

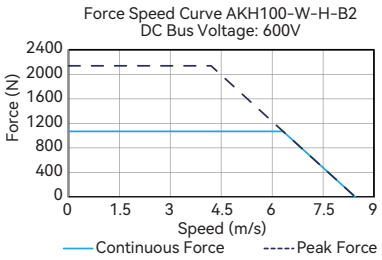


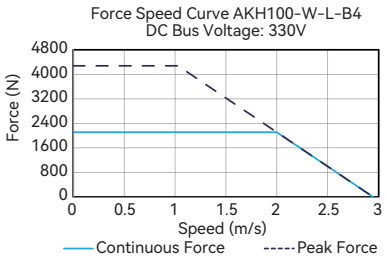
Force-Speed Curve

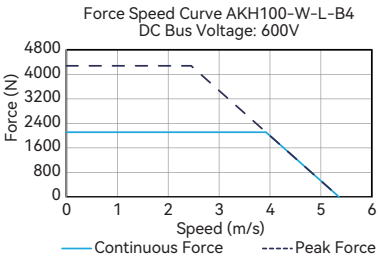


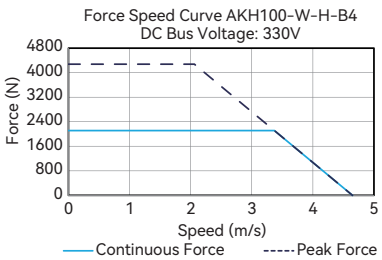


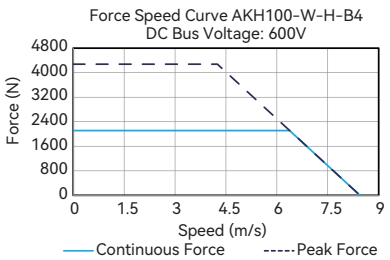


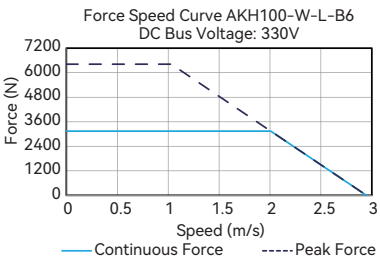


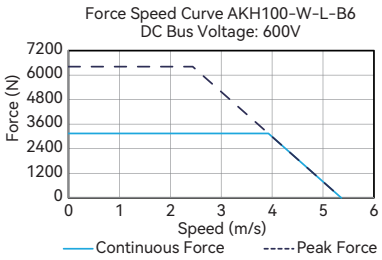


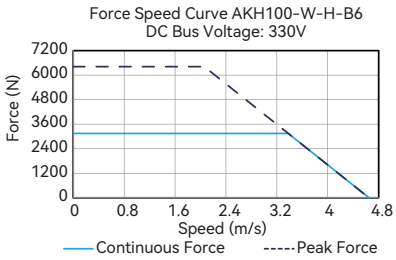


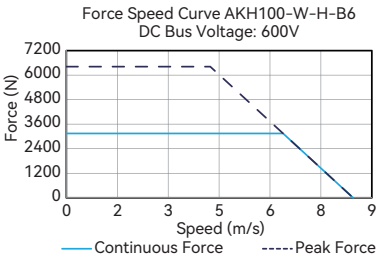




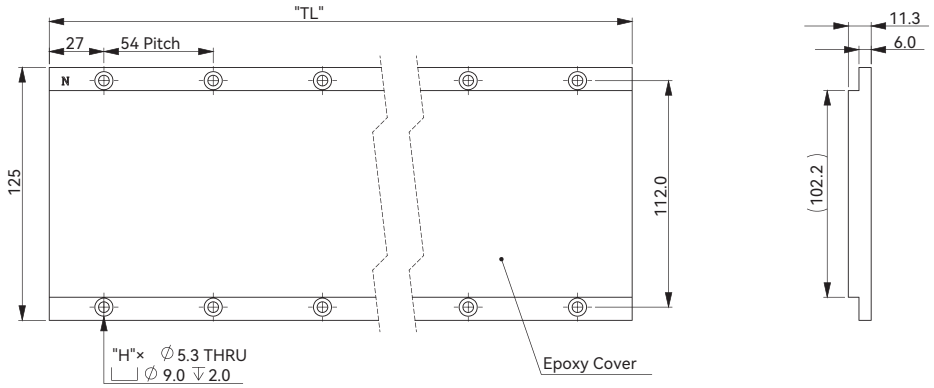








AKH100 Track



Magnet Track P / N:	Track Length "TL"	No.of Holes "H"
AKH100-TL270-E	270	10
AKH100-TL432-E	432	16

AKH130-N-0RB

			AKH130-N-B3	
Performance Parameters	Symbol	Unit	L	H
Continuous Force (NC) @100°C ❶	F_{cn}	N	961	961
Peak Force	F_{pk}	N	4171	4171
Force Constant ±10%	K_f	N/Arms	178	113
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	146	92
Motor Constant @25°C	K_m	N/Sqrt(W)	63	63
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	5.3	2.1
Inductance (L-L) ±30% ❸	L	mH	23.4	9.4
Electrical Time Constant	τ_e	ms	4.4	4.4
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	5.4	8.5
Peak Current	I_{pk}	Arms	30.0	47.3
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	299	299
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	4.0	4.0
Max. Bus Voltage	U_{bus}	Vdc	600	600
Magnetic Period	τ_{NN}	mm	27	27
Attraction Force	F_a	N	8.3	8.3
Mechanical Parameters				
Coil Mass (NC)	m_{cn}	kg	9.1	9.1
Coil Length (NC)	L_{cn}	mm	340	340
Track Mass Per Meter	m_{track}	kg/m	11	11
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

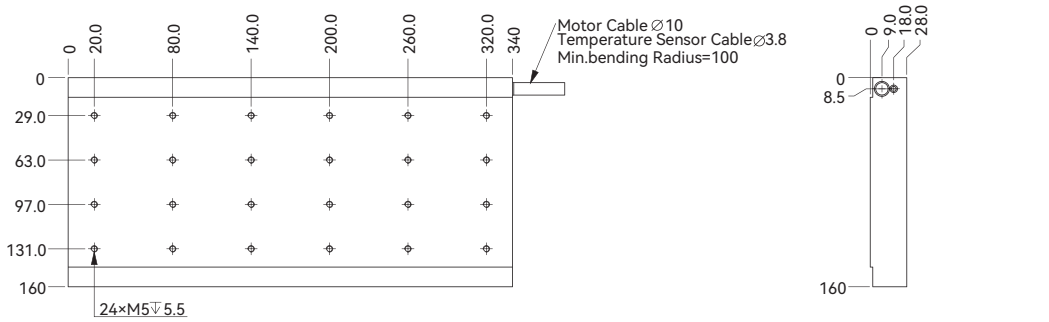
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

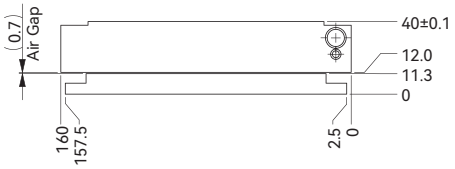
❷ Resistance is measured by DC current with standard 0.5 m cable.

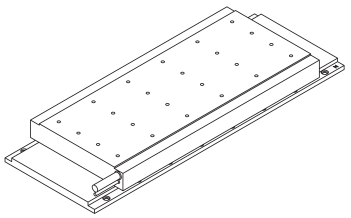
❸ Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

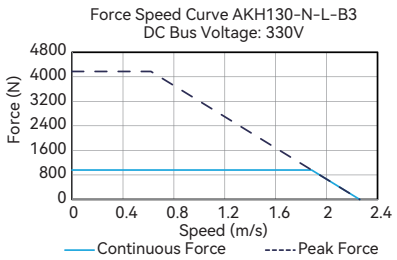
Dimension

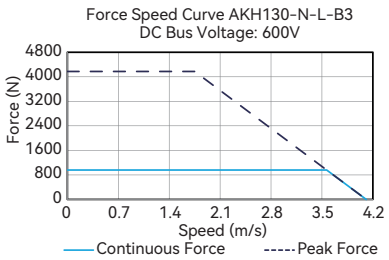


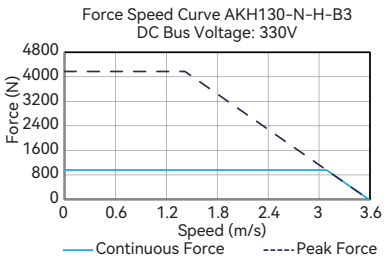


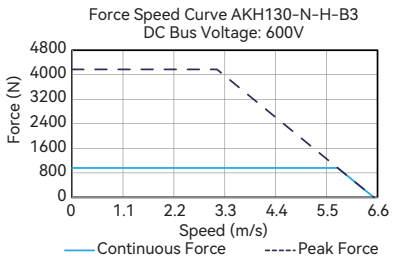


Force-Speed Curve

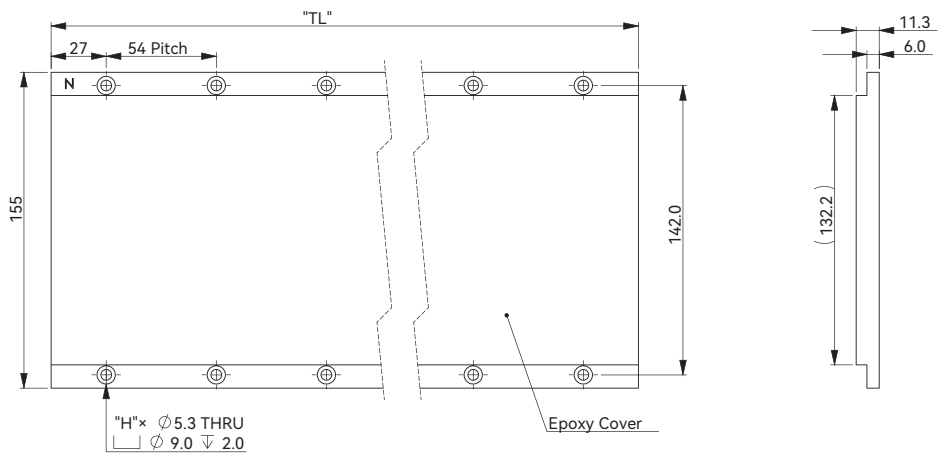








AKH130 Track



Magnet Track P / N:	Track Length "TL"	No.of Holes "H"
AKH130-TL270-E	270	10
AKH130-TL432-E	432	16

AKH150-N-0RB

			AKH150-N-B2		AKH150-N-B4	
Performance Parameters	Symbol	Unit	L	H	L	H
Continuous Force (NC) @100°C ❶	F_{cn}	N	864	864	1440	1440
Peak Force	F_{pk}	N	3209	3209	6417	6417
Force Constant ±10%	K_f	N/Arms	206	130	206	130
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	168	107	168	107
Motor Constant @25°C	K_m	N/Sqrt(W)	57	57	80	80
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	8.8	3.5	4.4	1.8
Inductance (L-L) ±30% ❸	L	mH	38.5	15.5	19.3	7.7
Electrical Time Constant	τ_e	ms	4.4	4.4	4.4	4.4
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	4.2	6.6	7.0	11.0
Peak Current	I_{pk}	Arms	20.0	31.5	40.0	63.1
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	299	299	415	415
Max. Coil Temperature	t_{max}	℃	100	100	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	4.0	4.0	5.5	5.5
Max. Bus Voltage	U_{bus}	Vdc	600	600	600	600
Magnetic Period	τ_{NN}	mm	27	27	27	27
Attraction Force	F_a	N	6.4	6.4	12.8	12.8
Mechanical Parameters						
Coil Mass (NC)	m_{cn}	kg	7.3	7.3	14.3	14.3
Coil Length (NC)	L_{cn}	mm	232	232	448	448
Track Mass Per Meter	m_{track}	kg/m	19	19	19	19

Other Information		
Insulation Class		Class B (130°C)
Protection Grade		IP00
Compliance with Global Standards		RoHS, CE
Ambient Temperature	Operation	0°C to 40°C (non-freezing)
	Storage	-15°C to 70°C (non-freezing)
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)
	Storage	10%RH to 90%RH (non-condensing)
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.

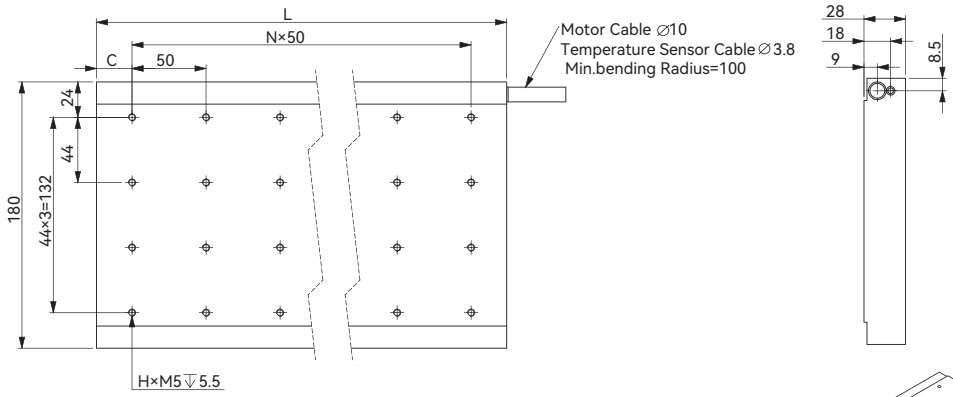
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

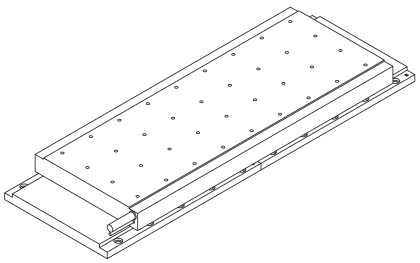
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

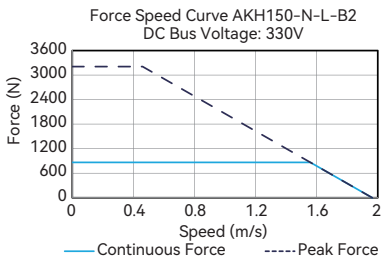
Dimension

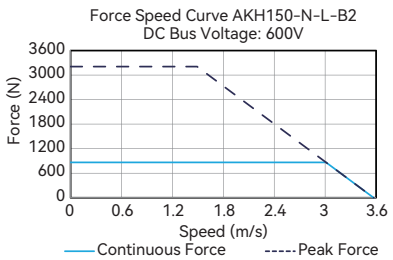


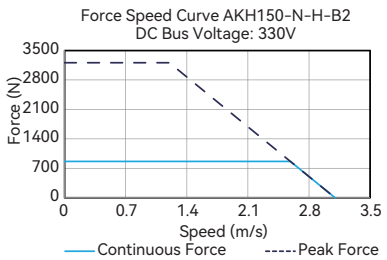


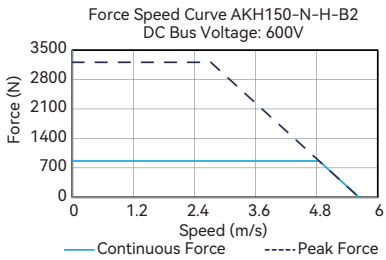
Motor Type	L	C	N	H
AKH150-L/H-B2	232	16	4	20
AKH150-L/H-B4	448	24	8	36

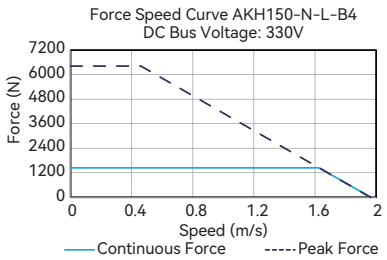
Force-Speed Curve

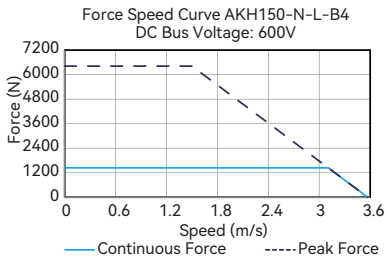


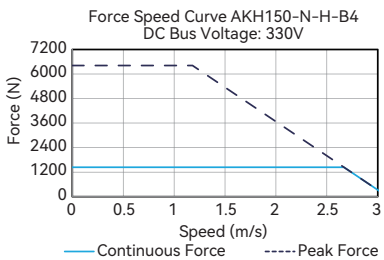


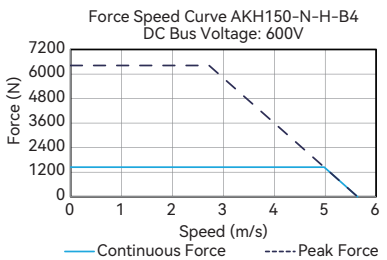












AKH150-W-0RC

			AKH150-W-B2		AKH150-W-B4		AKH150-W-B6	
Performance Parameters	Symbol	Unit	L	H	L	H	L	H
Continuous Force (WC) @100°C[1][4]	F_{cw}	N	1604	1604	3169	3169	4573	4573
Peak Force	F_{pk}	N	3209	3209	6417	6417	9626	9626
Force Constant ±10%	K_f	N/Arms	206	130	206	130	206	130
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	168	107	168	107	168	107
Motor Constant @25°C	K_m	N/Sqrt(W)	56.7	56.7	80.2	80.2	98.3	98.3
Resistance (L-L) 25°C ±10% [2]	R_{25}	Ω	8.8	3.5	4.4	1.8	2.9	1.2
Inductance (L-L) ±30% [3]	L	mH	38.5	15.5	19.3	7.7	12.8	5.2
Electrical Time Constant	τ_e	ms	4.4	4.4	4.4	4.4	4.4	4.4
Continuous Current (WC) @100°C[1][4]	I_{cw}	Arms	8.0	12.6	15.8	24.9	22.8	36.0
Peak Current	I_{pk}	Arms	20.0	31.5	40.0	63.1	60.0	94.6
Continuous Power Dissipation (WC) @100°C[1][4]	P_{cw}	W	1084	1084	2115	2115	2936	2936
Max. Coil Temperature	t_{max}	℃	100	100	100	100	100	100
Thermal Dissipation Constant (WC) [1][4]	K_{thw}	W/℃	14.5	14.5	28.2	28.2	39.1	39.1
Max. Bus Voltage	U_{bus}	Vdc	600	600	600	600	600	600
Magnetic Period	τ_{NN}	mm	27	27	27	27	27	27
Attraction Force	F_a	N	6.4	6.4	12.8	12.8	19.2	19.2
Mechanical Parameters								
Coil Mass (WC)	m_{cw}	kg	10	10	18	18	26	26
Coil Length (WC)	L_{cw}	mm	263	263	479	479	695	695
Track Mass Per Meter	m_{track}	kg/m	19	19	19	19	19	19

Other Information		
Insulation Class		Class B (130°C)
Protection Grade		IP66
Compliance with Global Standards		RoHS, CE
Ambient Temperature	Operation	0°C to 40°C (non-freezing)
	Storage	-15°C to 70°C (non-freezing)
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)
	Storage	10%RH to 90%RH (non-condensing)
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:WC-Water Cooling.

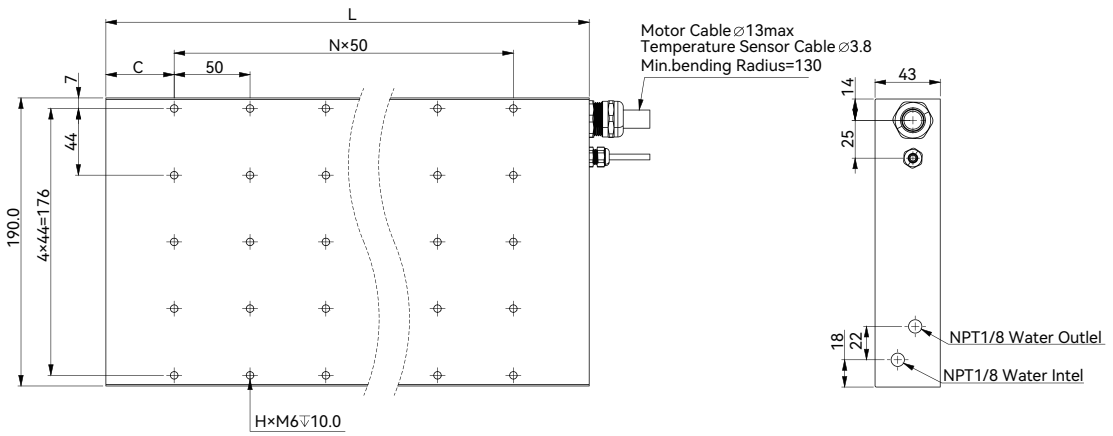
[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz.

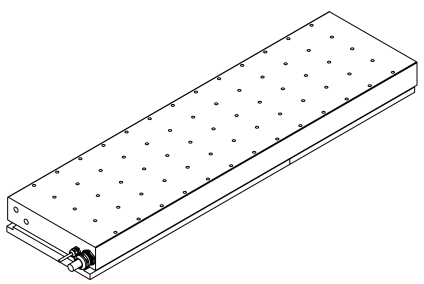
[4] Water cooling test conditions: the inlet water temperature of motor is 20°C, and the flow rate is 6 L/min.

The contents of datasheet are subject to change without prior notice.

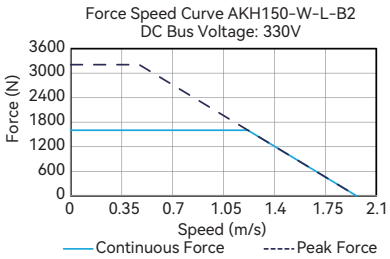
Dimension

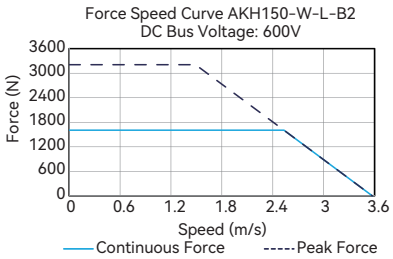


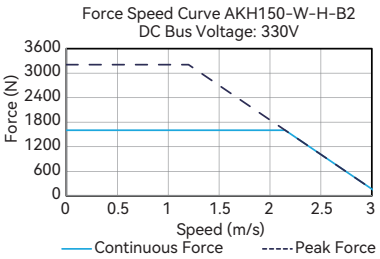
Motor Type	L	C	N	H
AKH150-W-L/H-B2	263	29	4	25
AKH150-W-L/H-B4	479	37	8	45
AKH150-W-L/H-B6	695	45	12	65

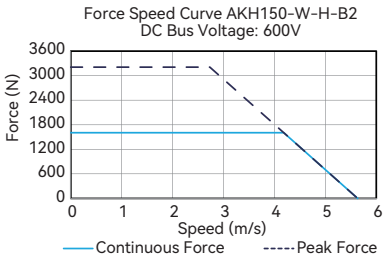


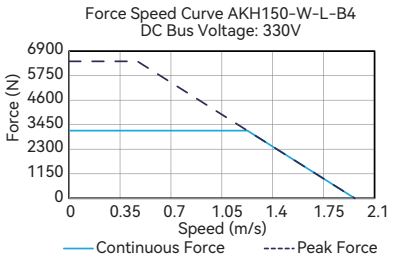
Force-Speed Curve

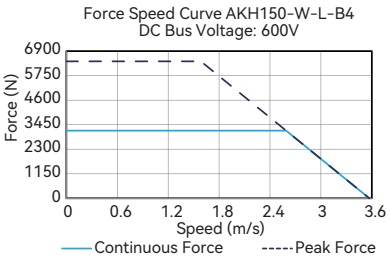


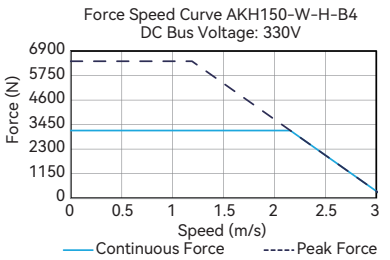


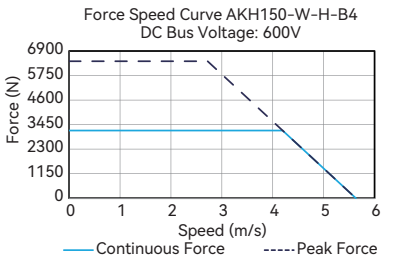


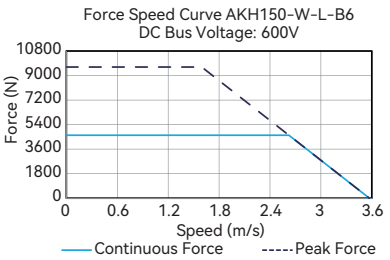


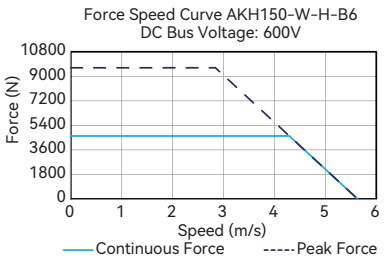




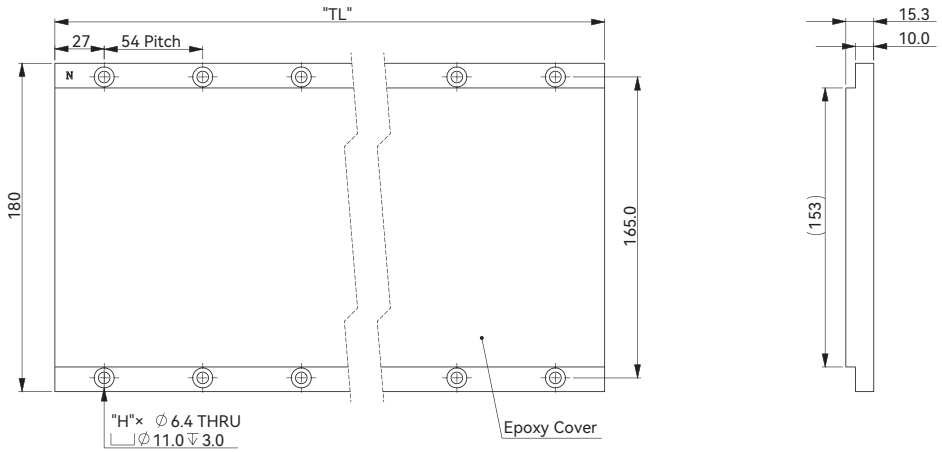








AKH150 Track



Magnet Track P / N:	Track Length "TL"	No.of Holes "H"
AKH150-TL270-E	270	10
AKH150-TL432-E	432	16

AKH200-N-0RB

			AKH200-N-B2		AKH200-N-B4	
Performance Parameters	Symbol	Unit	L	H	L	H
Continuous Force (NC) @100°C ❶	F_{cn}	N	989	989	1604	1604
Peak Force	F_{pk}	N	4278	4278	8556	8556
Force Constant ±10%	K_f	N/Arms	274	174	274	174
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	224	142	224	142
Motor Constant @25°C	K_m	N/Sqrt(W)	64	64	90	90
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	12.3	4.9	6.2	2.5
Inductance (L-L) ±30% ❸	L	mH	54.1	21.8	27.0	10.9
Electrical Time Constant	τ_e	ms	4.4	4.4	4.4	4.4
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	3.7	5.8	6.0	9.5
Peak Current	I_{pk}	Arms	20.0	31.5	40.0	63.1
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	325	325	428	428
Max. Coil Temperature	t_{max}	℃	100	100	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	4.3	4.3	5.7	5.7
Max. Bus Voltage	U_{bus}	Vdc	600	600	600	600
Magnetic Period	τ_{NN}	mm	27	27	27	27
Attraction Force	F_a	N	8.5	8.5	17.0	17.0
Mechanical Parameters						
Coil Mass (NC)	m_{cn}	kg	10	10	19	19
Coil Length (NC)	L_{cn}	mm	232	232	448	448
Track Mass Per Meter	m_{track}	kg/m	26	26	26	26
Other Information						
Insulation Class		Class B (130°C)				
Protection Grade		IP00				
Compliance with Global Standards		RoHS, CE				
Ambient Temperature	Operation	0°C to 40°C (non-freezing)				
	Storage	-15°C to 70°C (non-freezing)				
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)				
	Storage	10%RH to 90%RH (non-condensing)				
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.				

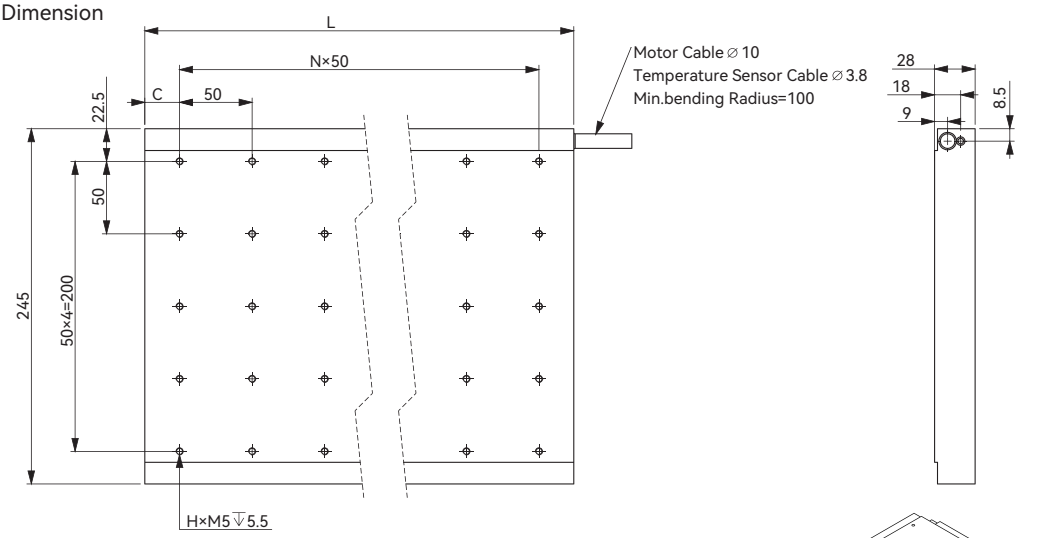
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
Abbreviations:NC-Natural Cooling.

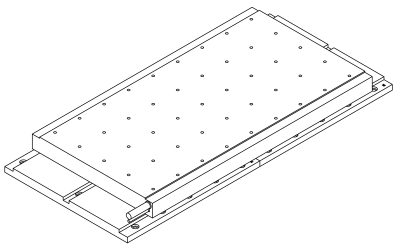
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

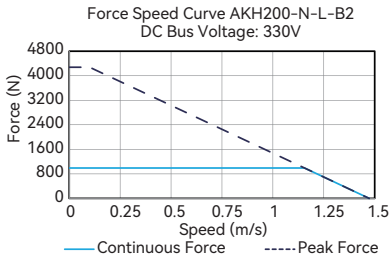
Dimension

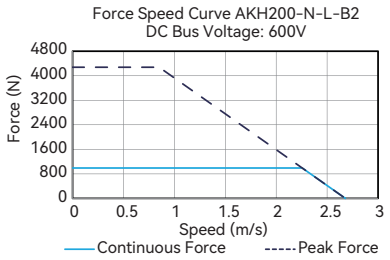


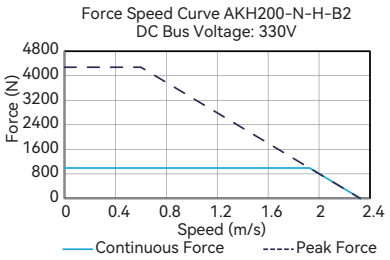


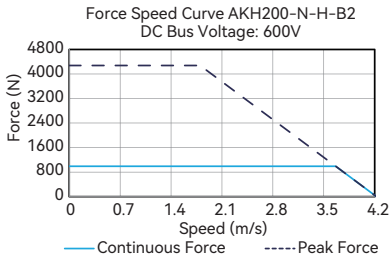
Motor Type	L	C	N	H
AKH200-N-L/H-B2	232	16	4	20
AKH200-N-L/H-B4	448	24	8	36

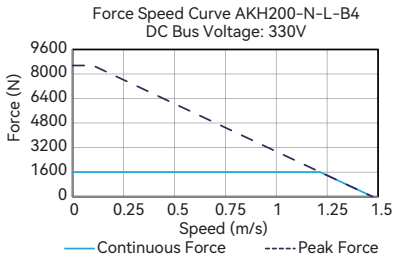
Force-Speed Curve

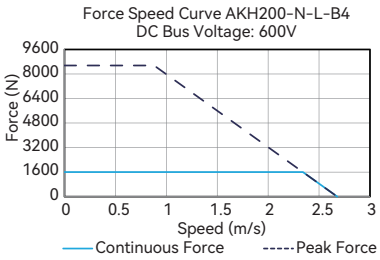


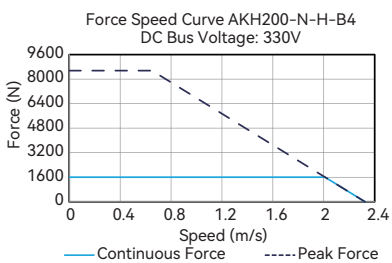


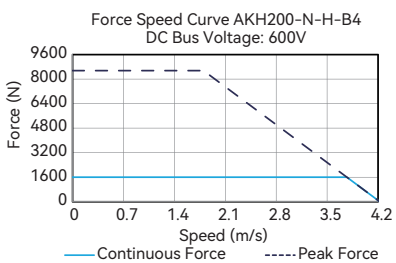












AKH200-W-0RC

			AKH200-W-B2		AKH200-W-B4		AKH200-W-B6	
Performance Parameters	Symbol	Unit	L	H	L	H	L	H
Continuous Force (WC) @100℃[1][4]	F_{cw}	N	2139	2139	4225	4225	6097	6097
Peak Force	F_{pk}	N	4278	4278	8556	8556	12834	12834
Force Constant ±10%	K_f	N/Arms	274	174	274	174	274	174
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	224	142	224	142	224	142
Motor Constant @25℃	K_m	N/Sqrt(W)	63.9	63.9	90.3	90.3	105.9	105.9
Resistance (L-L) 25℃ ±10% [2]	R_{25}	Ω	12.3	4.9	6.2	2.5	4.5	1.8
Inductance (L-L) ±30% [3]	L	mH	54.1	21.8	27.0	10.9	19.8	8.0
Electrical Time Constant	τ_e	ms	4.4	4.4	4.4	4.4	4.4	4.4
Continuous Current (WC) @100℃[1][4]	I_{cw}	Arms	8.0	12.6	15.8	24.9	22.8	36.0
Peak Current	I_{pk}	Arms	20.0	31.5	40.0	63.1	60.0	94.6
Continuous Power Dissipation (WC) @100℃[1][4]	P_{cw}	W	1522	1522	2968	2968	4491	4491
Max. Coil Temperature	t_{max}	℃	100	100	100	100	100	100
Thermal Dissipation Constant (WC) [1][4]	K_{thw}	W/℃	20.3	20.3	39.6	39.6	54.9	54.9
Max. Bus Voltage	U_{bus}	Vdc	600	600	600	600	600	600
Magnetic Period	τ_{NN}	mm	27	27	27	27	27	27
Attraction Force	F_a	N	8.5	8.5	17.0	17.0	25.6	25.6
Mechanical Parameters								
Coil Mass (WC)	m_{cw}	kg	14	14	25	25	37	37
Coil Length (WC)	L_{cw}	mm	263	263	479	479	695	695
Track Mass Per Meter	m_{track}	kg/m	26	26	26	26	26	26
Other Information								
Insulation Class		Class B (130℃)						
Protection Grade		IP66						
Compliance with Global Standards		RoHS, CE						
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)						
	Storage	-15℃ to 70℃ (non-freezing)						
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)						
	Storage	10%RH to 90%RH (non-condensing)						
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.						

[1] Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
Abbreviations:WC-Water Cooling.

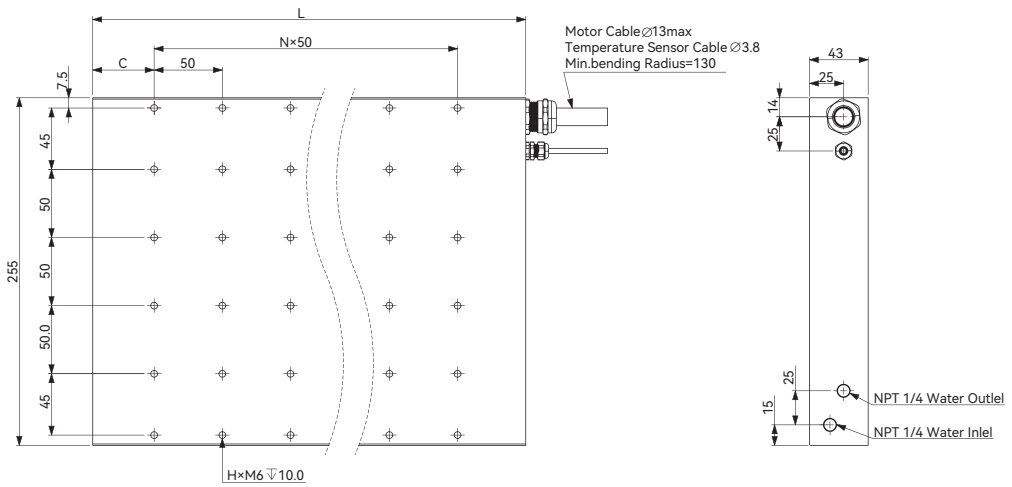
[2] Resistance is measured by DC current with standard 0.5 m cable.

[3] Inductance is measured by current frequency of 1 kHz.

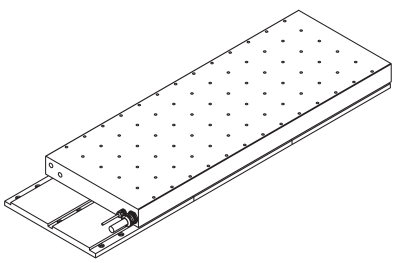
[4] Water cooling test conditions: the inlet water temperature of motor is 20℃, and the flow rate is 6 L/min.

The contents of datasheet are subject to change without prior notice.

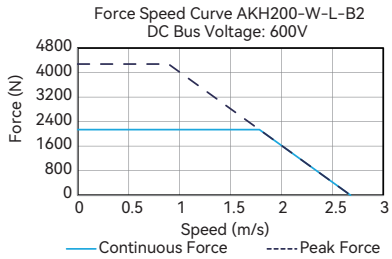
■ Dimension

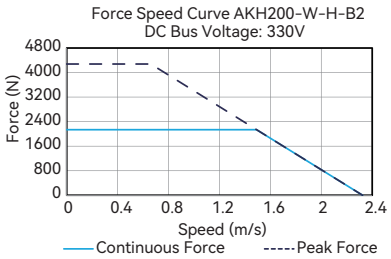


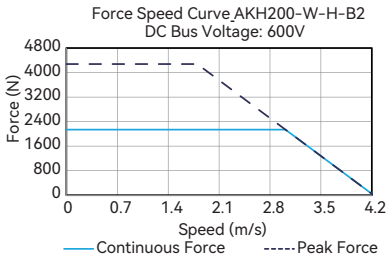
Motor Type	L	C	N	H
AKH200-W-L/H-B2	263	29	4	30
AKH200-W-L/H-B4	479	37	8	54
AKH200-W-L/H-B6	695	45	12	78

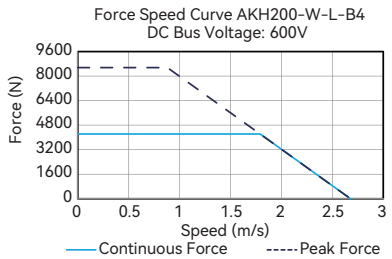


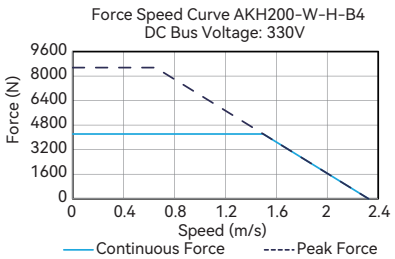
Force-Speed Curve

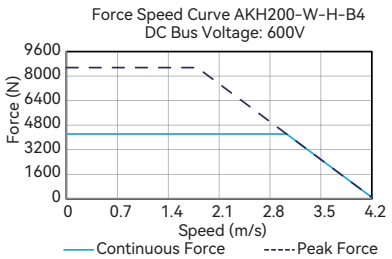


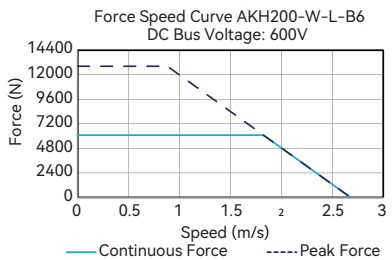


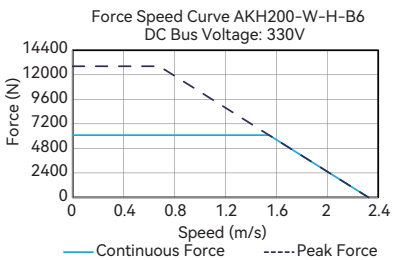


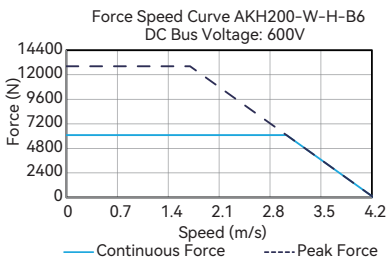




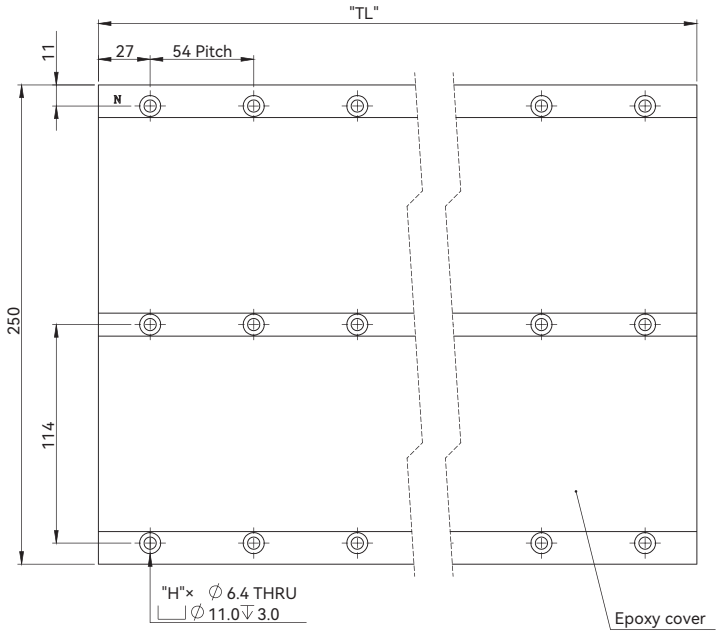


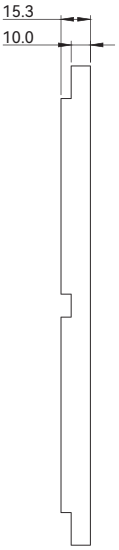






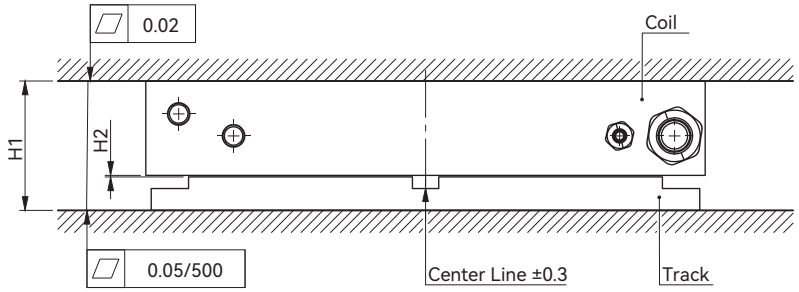
AKH200 Track





Magnet Track P / N:	Track Length "TL"	No.of Holes "H"
AKH200-TL270-E	270	15
AKH200-TL432-E	432	24

Motor Assembly Diagram



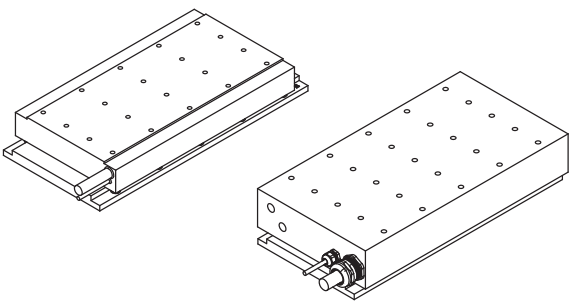
Installation Guide	Adaptive Track	H1	H2
AKH100-N[1]L/H-Bx-0RB	AKH100-TLXXX-E	40(+0.2,0.0)	0.7(+0.2,-0.2)
AKH130-N[1]L/H-Bx-0RB	AKH130-TLXXX-E	40(+0.2,0.0)	0.7(+0.2,-0.2)
AKH150-N[1]L/H-Bx-0RB	AKH150-TLXXX-E	44(+0.2,0.0)	0.7(+0.2,-0.2)
AKH200-N[1]L/H-Bx-0RB	AKH200-TLXXX-E	44(+0.2,0.0)	0.7(+0.2,-0.2)
AKH100-W[2]L/H-Bx-0RC	AKH100-TLXXX-E	55(+0.3,+0.1)	0.7(+0.3,-0.1)
AKH150-W[2]L/H-Bx-0RC	AKH150-TLXXX-E	59(+0.3,+0.1)	0.7(+0.3,-0.1)
AKH200-W[2]L/H-Bx-0RC	AKH200-TLXXX-E	59(+0.3,+0.1)	0.7(+0.3,-0.1)

[1] N = Natural Cooling
[2] W = Water Cooling

Motor Cable Connection

MOTOR CABLE

PIN	DESCRIPTION	COLOR
-	M1	BLACK1
-	M2	BLACK2
-	M3	BLACK3
-	PE	YELLOW/GREEN



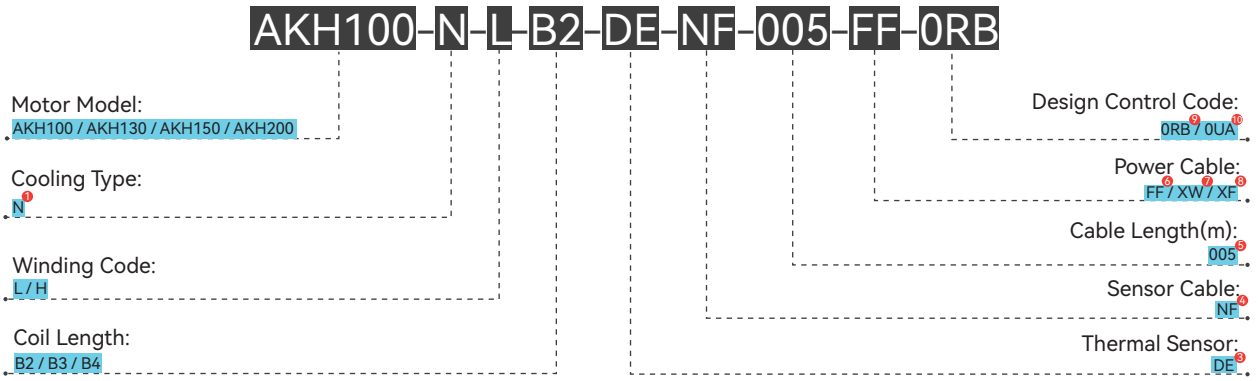


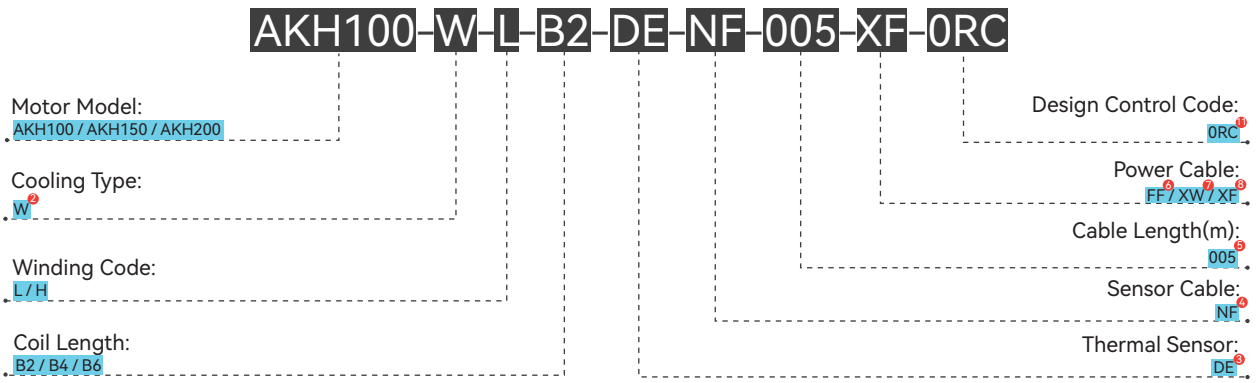
TEMPERATURE SENSOR CABLE

PIN	DESCRIPTION	COLOR
-	D1	BLUE
-	D2	RED
-	E1	YELLOW
-	E2	GREY

Part Numbering

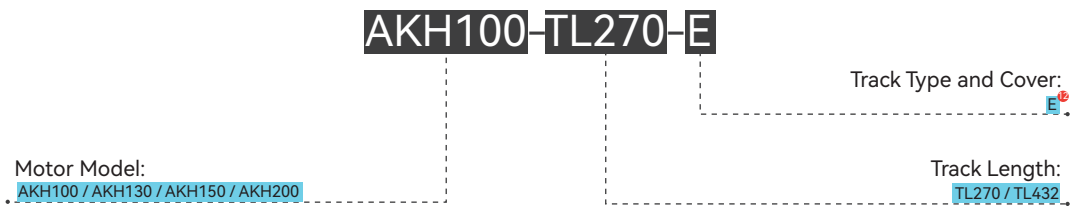
Motor Coil



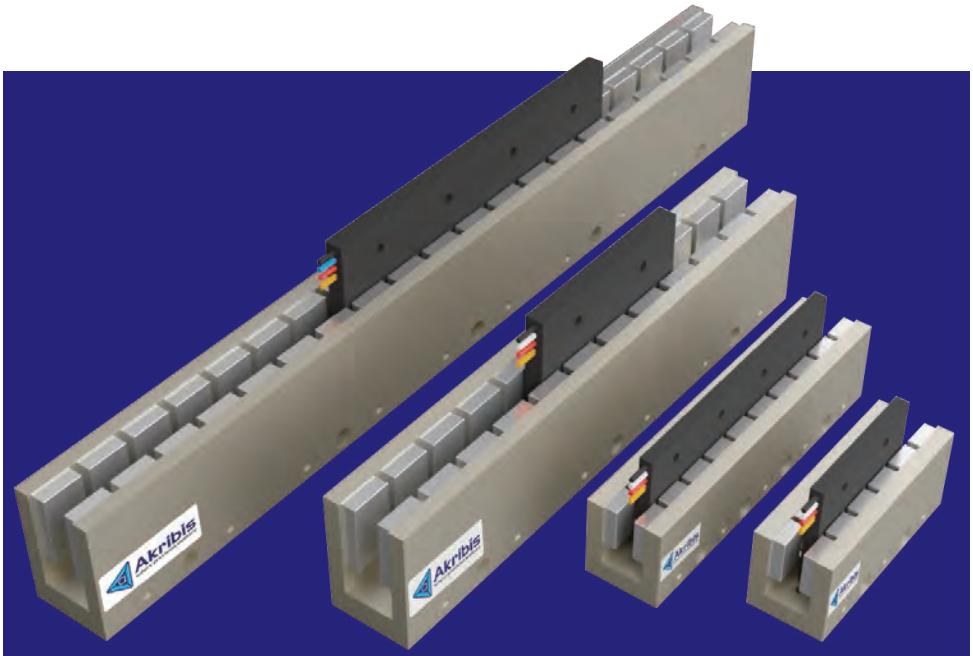


1. N = Natural Cooling
2. W = Water Cooling
3. DE = PT1000(RTD) + SNM(PTC)
4. NF = Without Built-in Hall Sensor C/W Flying Leads
5. 005 = 0.5 Meter
6. FF = With Ferrite Bead C/W Flying Leads
7. XW= Without Ferrite Bead C/W D-Sub 9W4 Male Connector
8. XF = Without Ferrite Bead C/W Flying Leads
9. 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)
10. 0UA = NRTL-Certified Model
11. 0RC = Standard Model (for more options, please consult cust-service@akribis-sys.com)

Motor Track



12. E = Epoxy cover



AWM SERIES

- Ironless technology
- Vacuum Compatible (RGA tested)
- Zero cogging force
- High Motor Constant
- High continuous force and peak force

EN-26.3.1

Introduction

AWM series linear motors are vacuum compatible ironless motors with no cogging force and high continuous/peak forces.

Continuous Force Fcn = 4.5N~769.1N

Peak Force Fpk = 22.3N~3845.3N

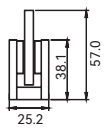
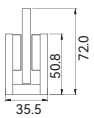
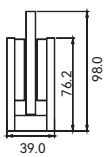
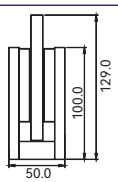
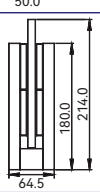
Features

- Vacuum compatible (RGA tested in 1×10^{-7} Torr vacuum)
- Ironless technology and no cogging force
- High continuous and peak force
- High motor constant
- Multiple coil lengths to select

Applications

Applicable to point-to-point micron/nanometer level positioning; unlimited travel stroke with top speed of 5m/s or faster; low velocity ripple during both fast and low speed scanning; precise force control with fine resolution.

Applications & Industries: front-end & back-end wafer handling and inspection, glass and LCD applications, and biomedical applications that require vacuum compatibility, high speed, precise motion and velocity control.

	Series	Coil Length (mm)	● Continuous Force (F_{cn}) / ■ PeakForce (F_{pk})[1] Unit: N 5 105 205 305 405 505 ....
	AWM1-S1	43	● 4.5 / ■ 22.3
	AWM1-S2	85	● 8.9 / ■ 44.7
	AWM1-S3	127	● 13.4 / ■ 67.0
	AWM2-S1	61	● 13.5 / ■ 67.4
	AWM2-S2	121	● 27.0 / ■ 134.9
	AWM2-S3	181	● 40.5 / ■ 202.3
	AWM3-S1	121	● 47.0 / ■ 240.1
	AWM3-S2	241	● 94.0 / ■ 480.2
	AWM3-S3	361	● 140.9 / ■ 720.4
	AWM4-S1	121	● 79.6 / ■ 397.9
	AWM4-S2	241	● 159.2 / ■ 795.8
	AWM4-S3	361	● 238.7 / ■ 1193.7
	AWM5-S1	169	● 138.3 / ■ 995.4
	AWM5-S2	337	● 276/ ■ 1990.9
	AWM5-S3	505	● 414.8 / ■ 2986.3
	AWM6-S1	169	● 256.4/ ■ 1281.8
	AWM6-S2	337	● 512.7 / ■ 2563.5
	AWM6-S3	505	● 769.1 / ■ 3845.3

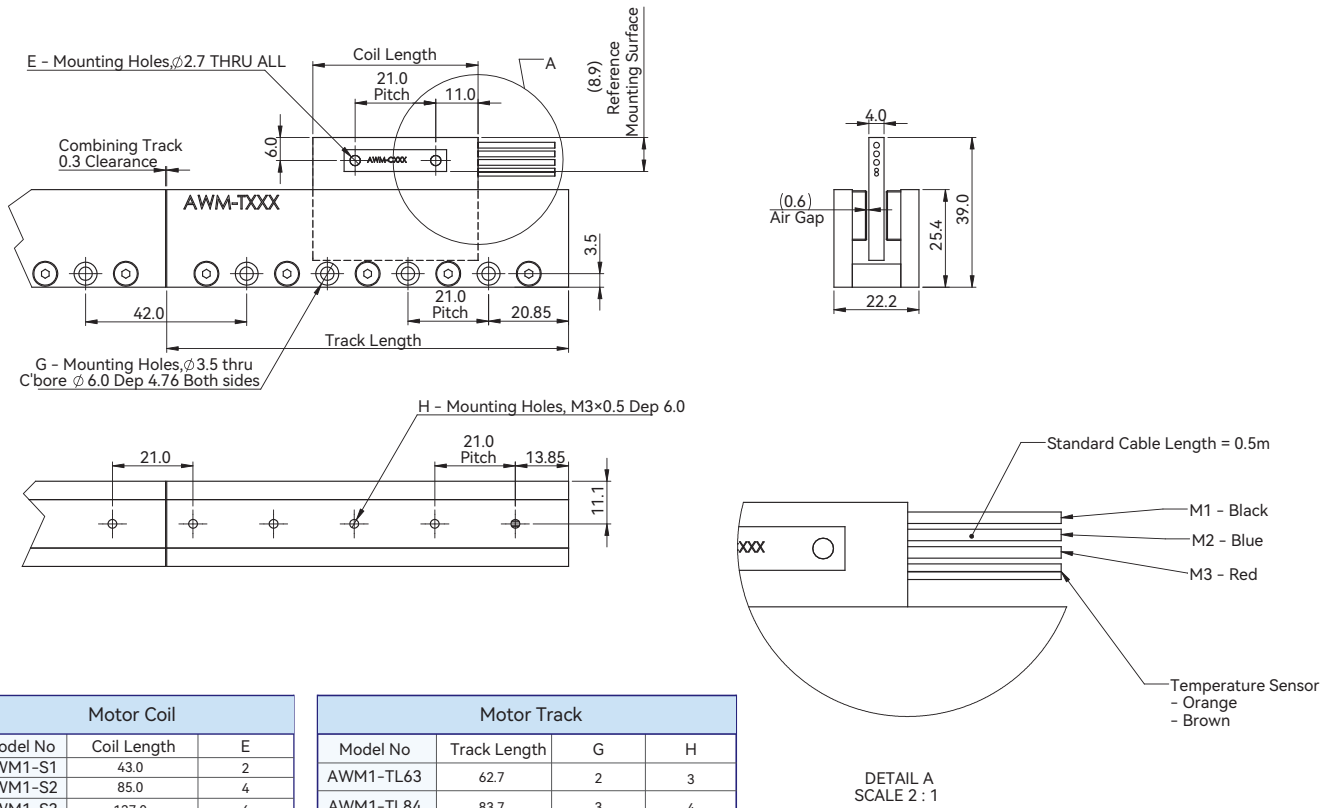
[1] Continuous force is measured under the condition of self-cooling.

AWM1

			AWM1-S1	AWM1-S2	AWM1-S3
Performance Parameters	Symbol	Unit	Series	Series	Series
Continuous Force (NC) @100°C ❶	F_{cn}	N	4.5	8.9	13.4
Peak Force	F_{pk}	N	22.3	44.7	67.0
Force Constant ±10%	K_f	N/Arms	2.6	5.3	7.9
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	2.1	4.3	6.4
Motor Constant @25°C	K_m	N/Sqrt(W)	1.9	2.7	3.3
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	1.3	2.5	3.75
Inductance (L-L) ±30% ❸	L	mH	0.2	0.4	0.6
Electrical Time Constant	τ_e	ms	0.2	0.2	0.2
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	1.7	1.7	1.7
Peak Current	I_{pk}	Arms	8.5	8.5	8.5
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	7.0	14.0	21.0
Max. Coil Temperature	t_{max}	°C	125.0	125.0	125.0
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	0.1	0.2	0.3
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	21.0	21.0	21.0
Attraction Force	F_a	kN	0.0	0.0	0.0
Mechanical Parameters					
Coil Mass (NC)	m_{cn}	kg	0.02	0.04	0.06
Coil Length (NC)	L_{cn}	mm	43.0	85.0	127.0
Track Mass Per Meter	m_{track}	kg/m	2.9	2.9	2.9
Other Information					
Insulation Class			Class B (130°C)		
Protection Grade			IP00		
Compliance with Global Standards			RoHS, CE		
Ambient Temperature	Operation		0°C to 40°C (non-freezing)		
	Storage		-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

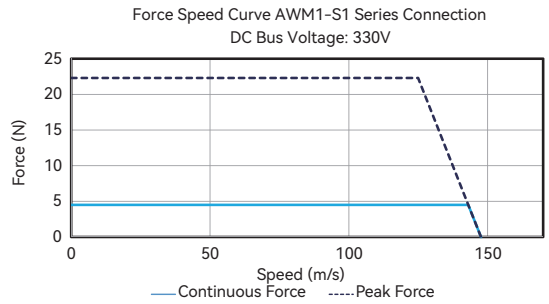
Dimension

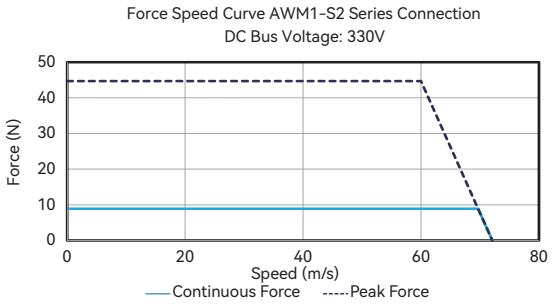


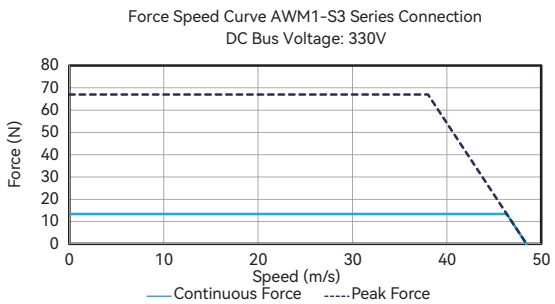
Motor Coil		
Model No	Coil Length	E
AWM1-S1	43.0	2
AWM1-S2	85.0	4
AWM1-S3	127.0	6

Motor Track			
Model No	Track Length	G	H
AWM1-TL63	62.7	2	3
AWM1-TL84	83.7	3	4
AWM1-TL105	104.7	4	5

Force-Speed Curve







Part Numbering

Motor Coil

AWM1-S-S1-K-0.5

- Motor Model: AWM1
- Winding Code: S = Series
- Coil Length: S1 / S2 / S3
- Thermal Sensor: K = PT100 (RTD)
- Cable Length: 0.5

Motor Track

AWM1-TL63

- Motor Model: AWM1
- Track Length: TL63 / TL84 / TL105

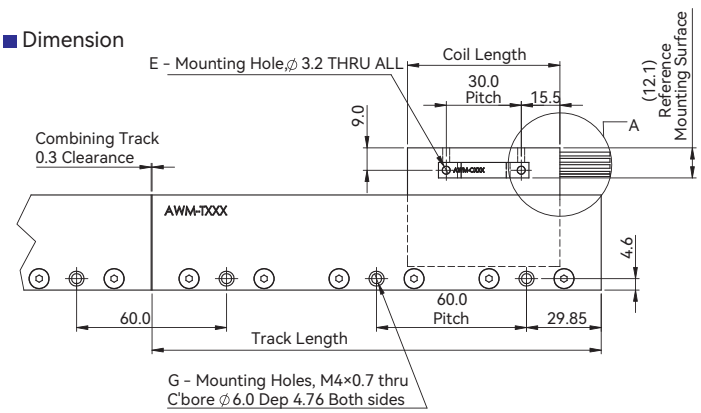
AWM2

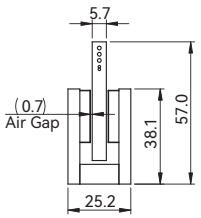
			AWM2-S1	AWM2-S2		AWM2-S3	
Performance Parameters	**Symbol**	**Unit**	**Series**	**Series**	**Parallel**	**Series**	**Parallel**
Continuous Force (NC) @100°C ❶	F_{cn}	N	13.5	27.0	27.0	40.5	40.5
Peak Force	F_{pk}	N	67.4	134.9	134.9	202.3	202.3
Force Constant ±10%	K_f	N/Arms	8.4	16.9	8.4	25.3	12.6
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	6.9	13.8	6.9	20.6	10.3
Motor Constant @25°C	K_m	N/Sqrt(W)	3.5	4.9	4.9	6.0	9.1
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	3.9	7.8	2.0	11.7	1.3
Inductance (L-L) ±30% ❸	L	mH	1.3	2.6	0.7	3.9	0.4
Electrical Time Constant	τ_e	ms	0.3	0.3	0.3	0.3	0.3
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	1.6	1.6	3.2	1.6	3.2
Peak Current	I_{pk}	Arms	8.0	8.0	16.0	8.0	16.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	19.3	38.6	38.6	57.9	25.7
Max. Coil Temperature	t_{max}	°C	125.0	125.0	125.0	125.0	125.0
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	0.3	0.5	0.5	0.8	0.3
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	30.0	30.0	30.0	30.0	30.0
Attraction Force	F_a	kN	0.0	0.0	0.0	0.0	0.0
Mechanical Parameters							
Coil Mass (NC)	m_{cn}	kg	0.06	0.13	0.13	0.19	0.19
Coil Length (NC)	L_{cn}	mm	61.0	121.0	121.0	181.0	181.0
Track Mass Per Meter	m_{track}	kg/m	4.9	4.9	4.9	4.9	4.9

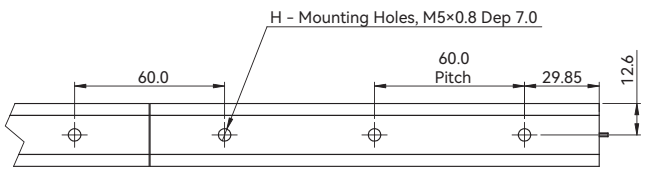
Other Information		
Insulation Class		Class B (130°C)
Protection Grade		IP00
Compliance with Global Standards		RoHS, CE
Ambient Temperature	Operation	0°C to 40°C (non-freezing)
	Storage	-15°C to 70°C (non-freezing)
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)
	Storage	10%RH to 90%RH (non-condensing)
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.

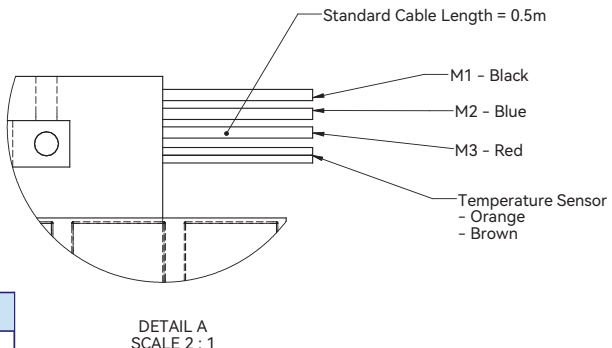
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Dimension







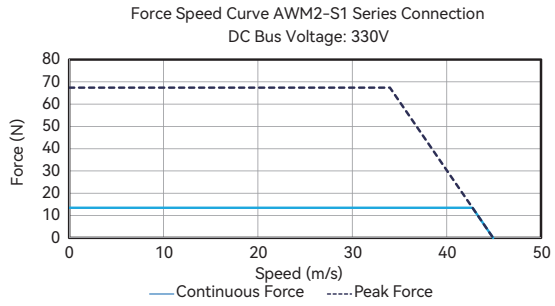


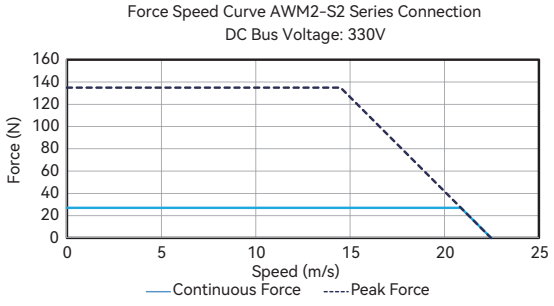
DETAIL A
SCALE 2 : 1

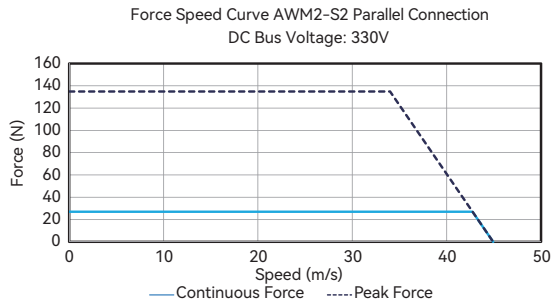
Motor Coil		
Model No	Coil Length	E
AWM2-S1	61.0	2
AWM2-S2	121.0	4
AWM2-S3	181.0	6

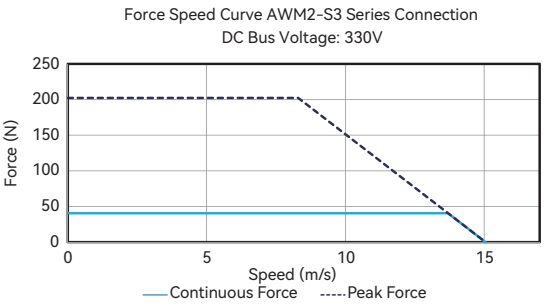
Motor Track			
Model No	Track Length	G	H
AWM2-TL120	119.7	2	2
AWM2-TL180	179.7	3	3
AWM2-TL240	239.7	4	4
AWM2-TL300	299.7	5	5

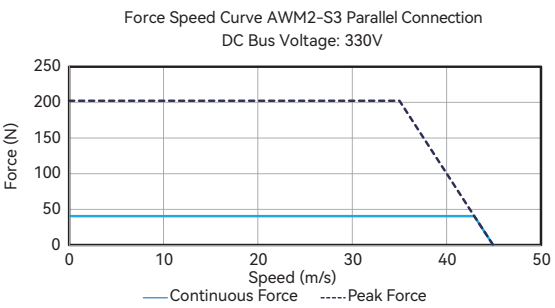
Force-Speed Curve











Part Numbering

Motor Coil

AWM2-S-S1-K-0.5

- Motor Model: AWM2
- Winding Code: S = Series / P = Parallel
- Coil Length: S1 / S2 / S3
- Thermal Sensor: K = PT100 (RTD)
- Cable Length: 0.5

Motor Track

AWM2-TL120

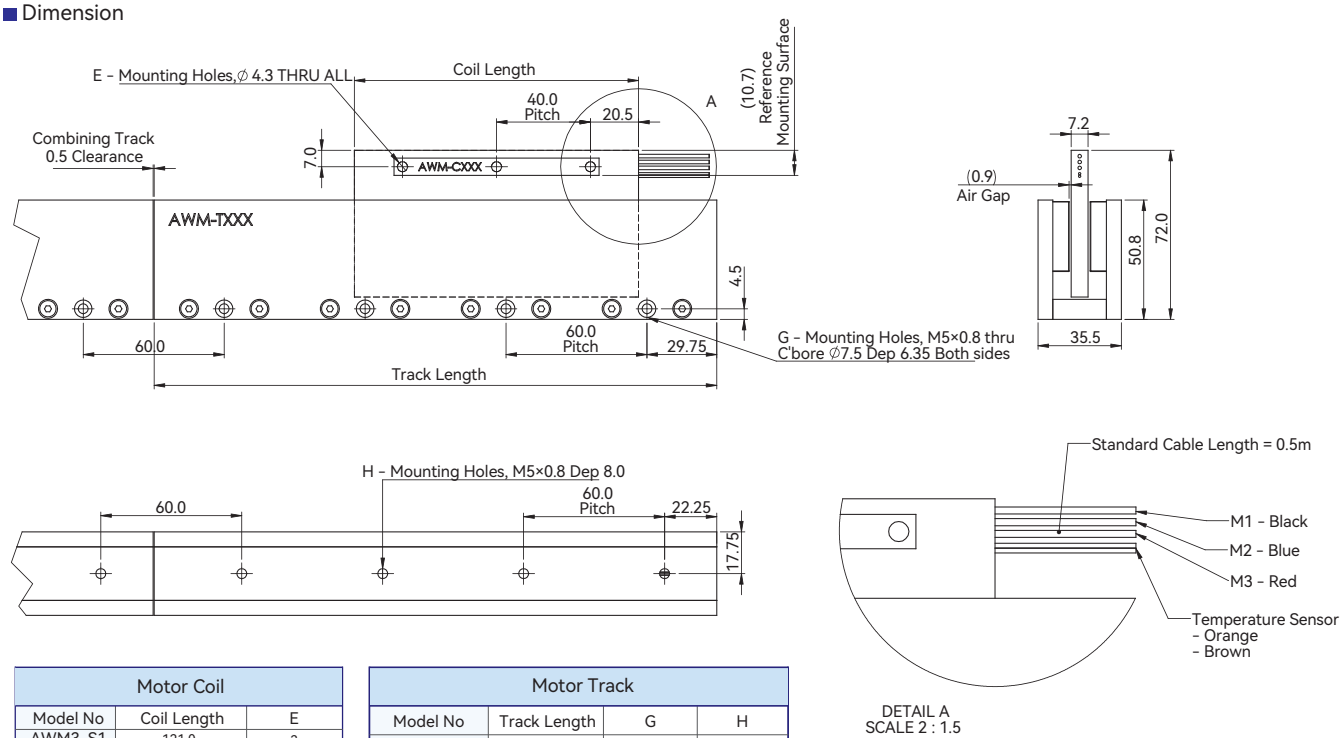
- Motor Model: AWM2
- Track Length: TL120 / TL180 / TL240 / TL300

AWM3

			AWM3-S1	AWM3-S2		AWM3-S3	
Performance Parameters	Symbol	Unit	Series	Series	Parallel	Series	Parallel
Continuous Force (NC) @100°C ❶	F_{cn}	N	47.0	94.0	94.0	140.9	140.9
Peak Force	F_{pk}	N	240.1	480.2	480.2	720.4	720.4
Force Constant ±10%	K_f	N/Arms	26.1	52.2	26.1	78.3	26.1
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	21.3	42.6	21.3	63.9	21.3
Motor Constant @25°C	K_m	N/Sqrt(W)	7.7	10.9	10.9	13.3	13.3
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	7.7	15.4	3.9	23.1	2.6
Inductance (L-L) ±30% ❸	L	mH	5.9	11.8	3.0	17.7	2.0
Electrical Time Constant	τ_e	ms	0.8	0.8	0.8	0.8	0.8
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	1.8	1.8	3.6	1.8	5.4
Peak Current	I_{pk}	Arms	9.2	9.2	18.4	9.2	27.6
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	48.2	96.5	96.5	178.4	178.4
Max. Coil Temperature	t_{max}	°C	125.0	125.0	125.0	125.0	125.0
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	0.6	1.3	1.3	2.4	2.4
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	60.0	60.0	60.0	60.0	60.0
Attraction Force	F_a	kN	0.0	0.0	0.0	0.0	0.0
Mechanical Parameters							
Coil Mass (NC)	m_{cn}	kg	0.24	0.48	0.48	0.71	0.71
Coil Length (NC)	L_{cn}	mm	121.0	241.0	241.0	361.0	361.0
Track Mass Per Meter	m_{track}	kg/m	8.75	8.75	8.75	8.75	8.75
Other Information							
Insulation Class			Class B (130°C)				
Protection Grade			IP00				
Compliance with Global Standards			RoHS, CE				
Ambient Temperature	Operation		0°C to 40°C (non-freezing)				
	Storage		-15°C to 70°C (non-freezing)				
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)				
	Storage		10%RH to 90%RH (non-condensing)				
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.				

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

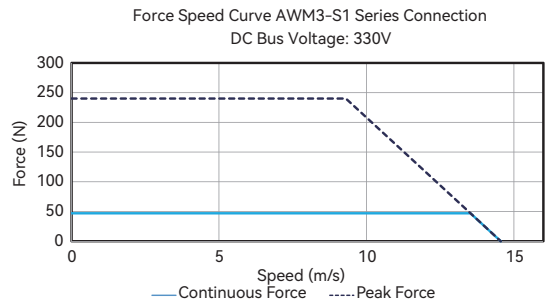
■ Dimension

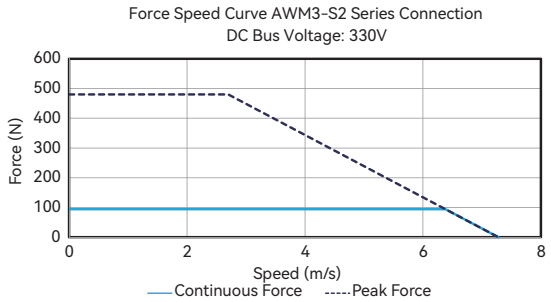


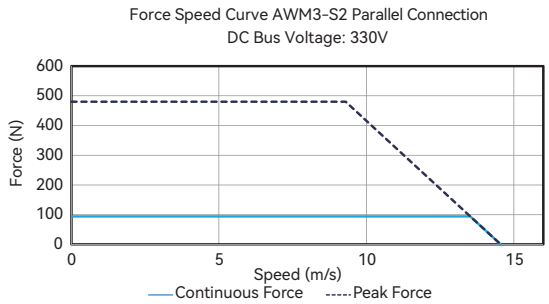
Motor Coil		
Model No	Coil Length	E
AWM3-S1	121.0	3
AWM3-S2	241.0	6
AWM3-S3	361.0	9

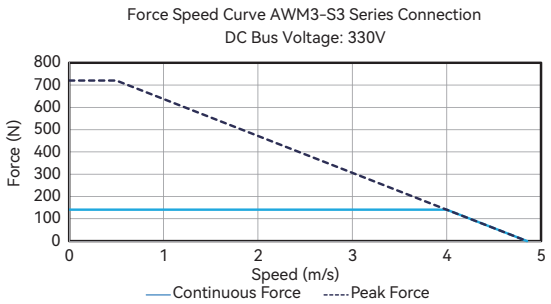
Motor Track			
Model No	Track Length	G	H
AWM3-TL180	179.5	3	3
AWM3-TL240	239.5	4	4
AWM3-TL300	299.5	5	5
AWM3-TL600	599.5	10	10

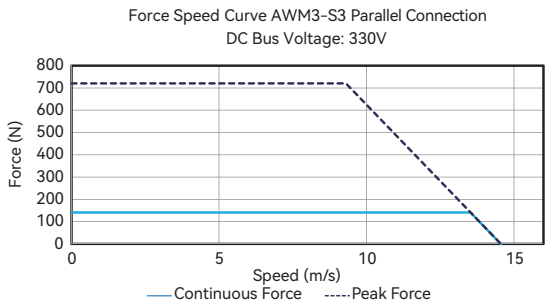
Force-Speed Curve











Part Numbering

Motor Coil

AWM3-S-S1-K-0.5

- Motor Model: AWM3
- Winding Code: S = Series / P = Parallel
- Cable Length: 0.5
- Thermal Sensor: K = PT100 (RTD)
- Coil Length: S1 / S2 / S3

Motor Track

AWM3-TL180

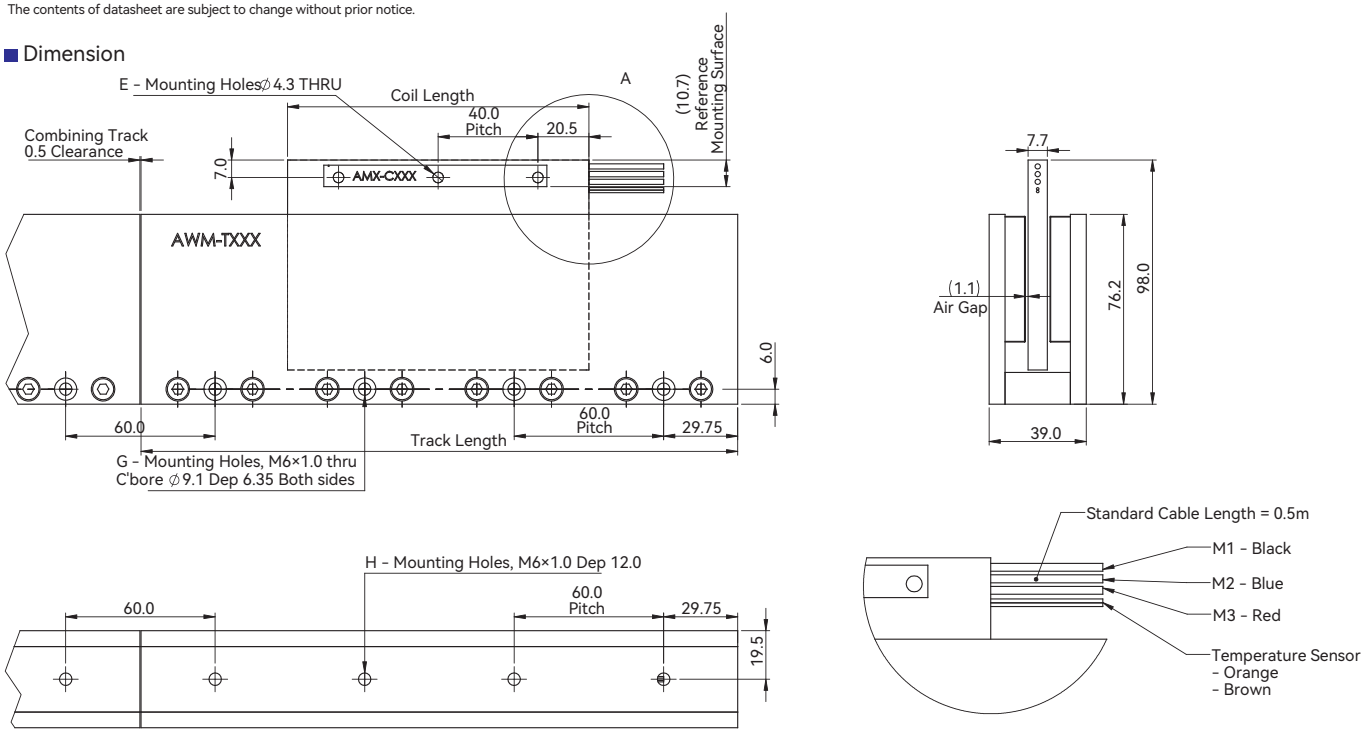
- Motor Model: AWM3
- Track Length: TL180 / TL240 / TL300 / TL600

AWM4

			AWM4-S1	AWM4-S2		AWM4-S3	
Performance Parameters	Symbol	Unit	Series	Series	Parallel	Series	Parallel
Continuous Force (NC) @100°C ❶	F_{cn}	N	79.6	159.2	159.2	238.7	238.7
Peak Force	F_{pk}	N	397.9	795.8	795.8	1193.7	1193.7
Force Constant ±10%	K_f	N/Arms	34.6	69.2	34.6	103.8	51.9
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	28.3	56.5	28.3	84.8	42.4
Motor Constant @25°C	K_m	N/Sqrt(W)	12.0	17.0	17.0	20.9	31.3
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	5.5	11.0	2.8	16.5	1.8
Inductance (L-L) ±30% ❸	L	mH	5.7	11.4	2.9	17.1	1.9
Electrical Time Constant	T_e	ms	1.0	1.0	1.0	1.0	1.0
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	2.3	2.3	4.6	2.3	4.6
Peak Current	I_{pk}	Arms	11.5	11.5	23.0	11.5	23.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	56.2	112.5	112.5	168.7	75.0
Max. Coil Temperature	t_{max}	°C	125.0	125.0	125.0	125.0	125.0
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	0.7	1.5	1.5	2.2	1.0
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	60.0	60.0	60.0	60.0	60.0
Attraction Force	F_a	kN	0.0	0.0	0.0	0.0	0.0
Mechanical Parameters							
Coil Mass (NC)	m_{cn}	kg	0.34	0.68	0.68	1.01	1.01
Coil Length (NC)	L_{cn}	mm	121.0	241.0	241.0	361.0	361.0
Track Mass Per Meter	m_{track}	kg/m	14.72	14.72	14.72	14.72	14.72
Other Information							
Insulation Class			Class B (130°C)				
Protection Grade			IP00				
Compliance with Global Standards			RoHS, CE				
Ambient Temperature	Operation		0°C to 40°C (non-freezing)				
	Storage		-15°C to 70°C (non-freezing)				
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)				
	Storage		10%RH to 90%RH (non-condensing)				
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.				

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Dimension

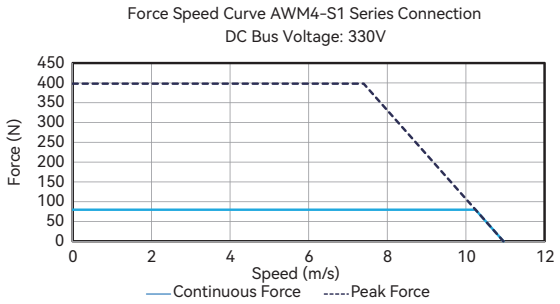


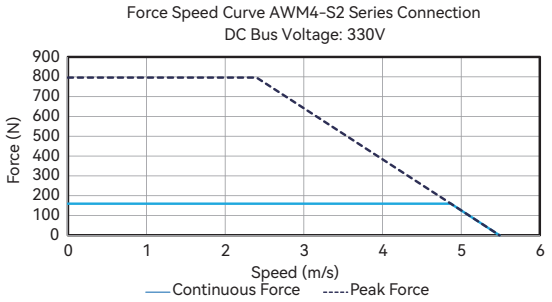
DETAIL A
SCALE 1 : 1

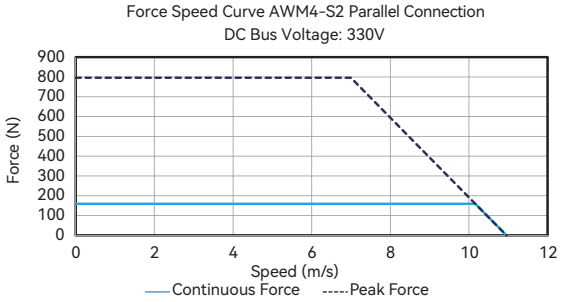
Motor Coil		
Model No	Coil Length	E
AWM4-S1	121.0	3
AWM4-S2	241.0	6
AWM4-S3	361.0	9

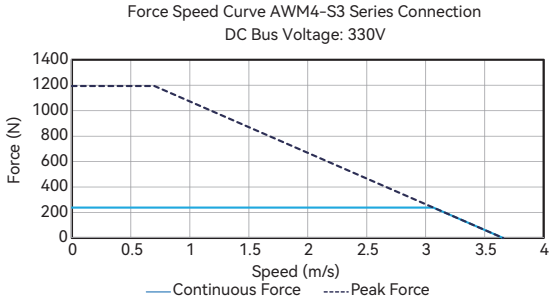
Motor Track			
Model No	Track Length	G	H
AWM4-TL180	179.5	3	3
AWM4-TL240	239.5	4	4
AWM4-TL300	299.5	5	5
AWM4-TL600	599.5	10	10

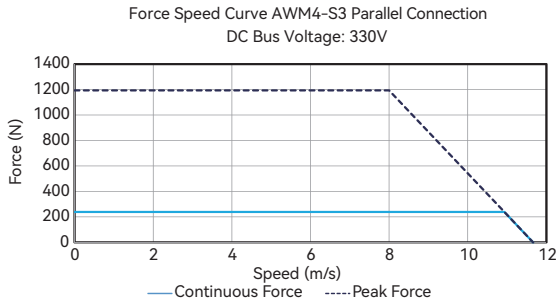
Force-Speed Curve











Part Numbering

Motor Coil

AWM4-S-S1-K-0.5

- Motor Model: AWM4
- Winding Code: S = Series / P = Parallel
- Cable Length: 0.5
- Thermal Sensor: K = PT100 (RTD)
- Coil Length: S1 / S2 / S3

Motor Track

AWM4-TL180

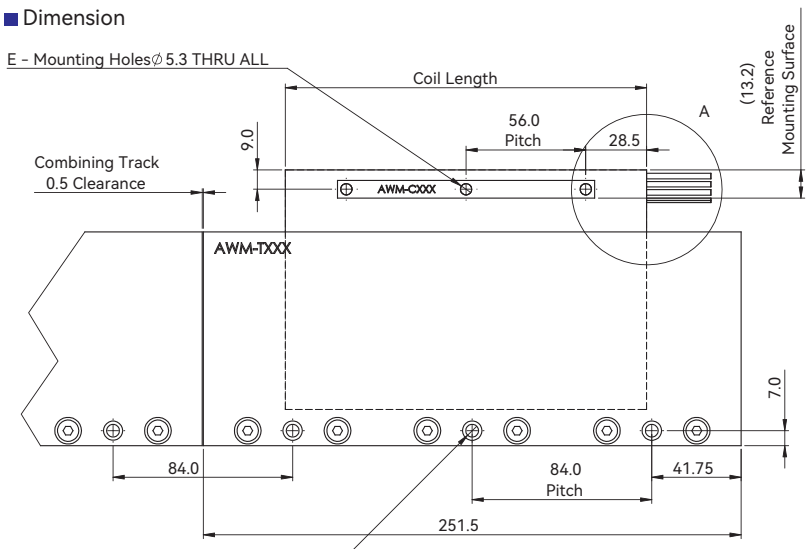
- Motor Model: AWM4
- Track Length: TL180 / TL240 / TL300 / TL600

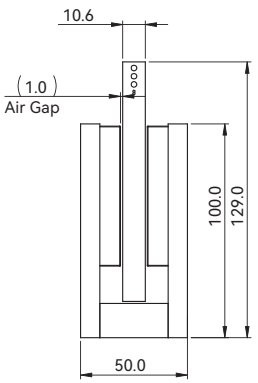
AWM5

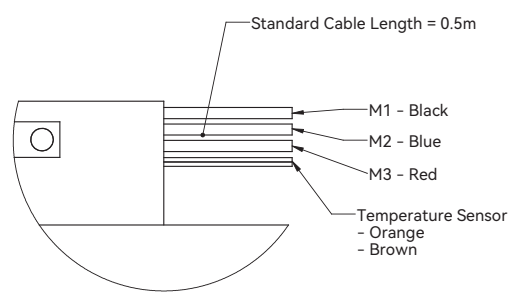
			AWM5-S1	AWM5-S2		AWM5-S3	
Performance Parameters	**Symbol**	**Unit**	**Series**	**Series**	**Parallel**	**Series**	**Parallel**
Continuous Force (NC) @100°C ❶	F_{cn}	N	138.3	276.5	276.5	414.8	414.8
Peak Force	F_{pk}	N	691.3	1382.5	1382.5	2073.8	2073.8
Force Constant ±10%	K_f	N/Arms	55.3	110.6	55.3	165.9	83.0
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	45.2	90.3	45.2	135.5	67.7
Motor Constant @25°C	K_m	N/Sqrt(W)	19.6	27.7	27.7	34.0	51.0
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	5.3	10.6	2.7	15.9	1.8
Inductance (L-L) ±30% ❸	L	mH	11.1	22.3	5.6	33.4	3.7
Electrical Time Constant	τ_e	ms	2.1	2.1	2.1	2.1	2.1
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	2.5	2.5	5.0	2.5	5.0
Peak Current	I_{pk}	Arms	12.5	12.5	25.0	12.5	25.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	64.0	128.1	128.1	192.1	85.4
Max. Coil Temperature	t_{max}	°C	125.0	125.0	125.0	125.0	125.0
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	0.9	1.7	1.7	2.6	1.1
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	84.0	84.0	84.0	84.0	84.0
Attraction Force	F_a	kN	0.0	0.0	0.0	0.0	0.0
Mechanical Parameters							
Coil Mass (NC)	m_{cn}	kg	0.88	1.76	1.76	2.64	2.64
Coil Length (NC)	L_{cn}	mm	169.0	337.0	337.0	505.0	505.0
Track Mass Per Meter	m_{track}	kg/m	25.08	25.08	25.08	25.08	25.08
Other Information							
Insulation Class			Class B (130°C)				
Protection Grade			IP00				
Compliance with Global Standards			RoHS, CE				
Ambient Temperature	Operation		0°C to 40°C (non-freezing)				
	Storage		-15°C to 70°C (non-freezing)				
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)				
	Storage		10%RH to 90%RH (non-condensing)				
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.				

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Dimension





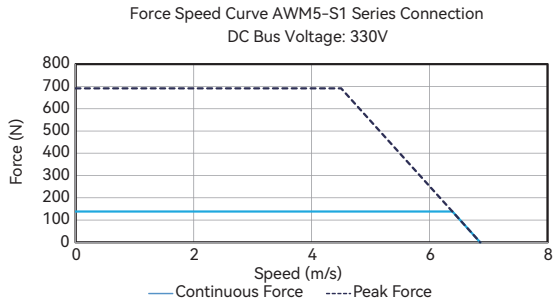


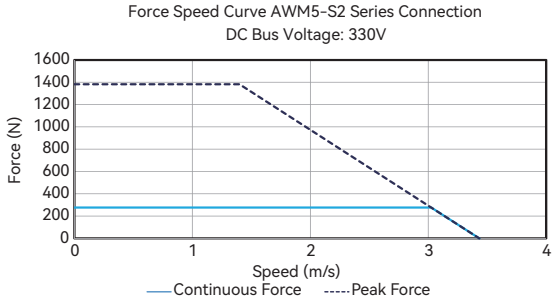
DETAIL A
SCALE 4 : 3.5

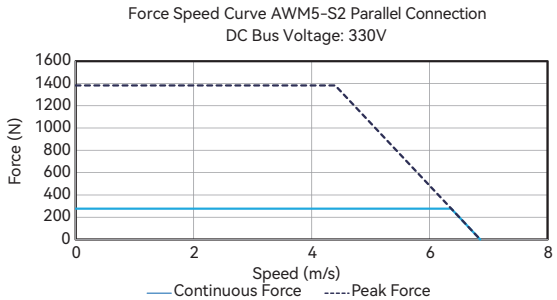
Motor Coil		
Model No	Coil Length	E
AWM5-S1	169.0	3
AWM5-S2	337.0	6
AWM5-S3	505.0	9

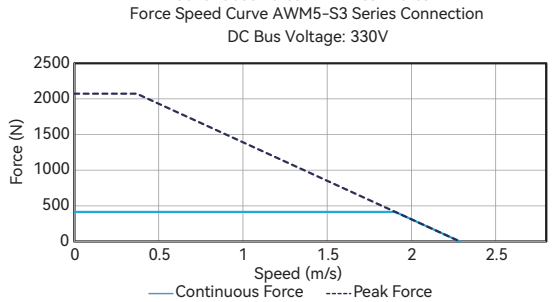
Motor Track			
Model No	Track Length	G	H
AWM5-TL252	251.5	3	3
AWM5-TL420	419.5	5	5
AWM5-TL588	587.5	7	7

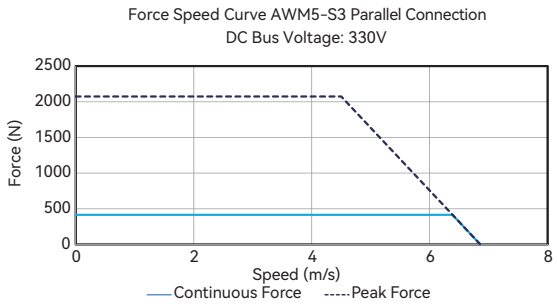
Force-Speed Curve











Part Numbering

Motor Coil

AWM5-S-S1-K-0.5

- Motor Model: AWM5
- Winding Code: S = Series / P = Parallel
- Coil Length: S1 / S2 / S3
- Thermal Sensor: K = PT100 (RTD)
- Cable Length: 0.5

Motor Track

AWM5-TL252

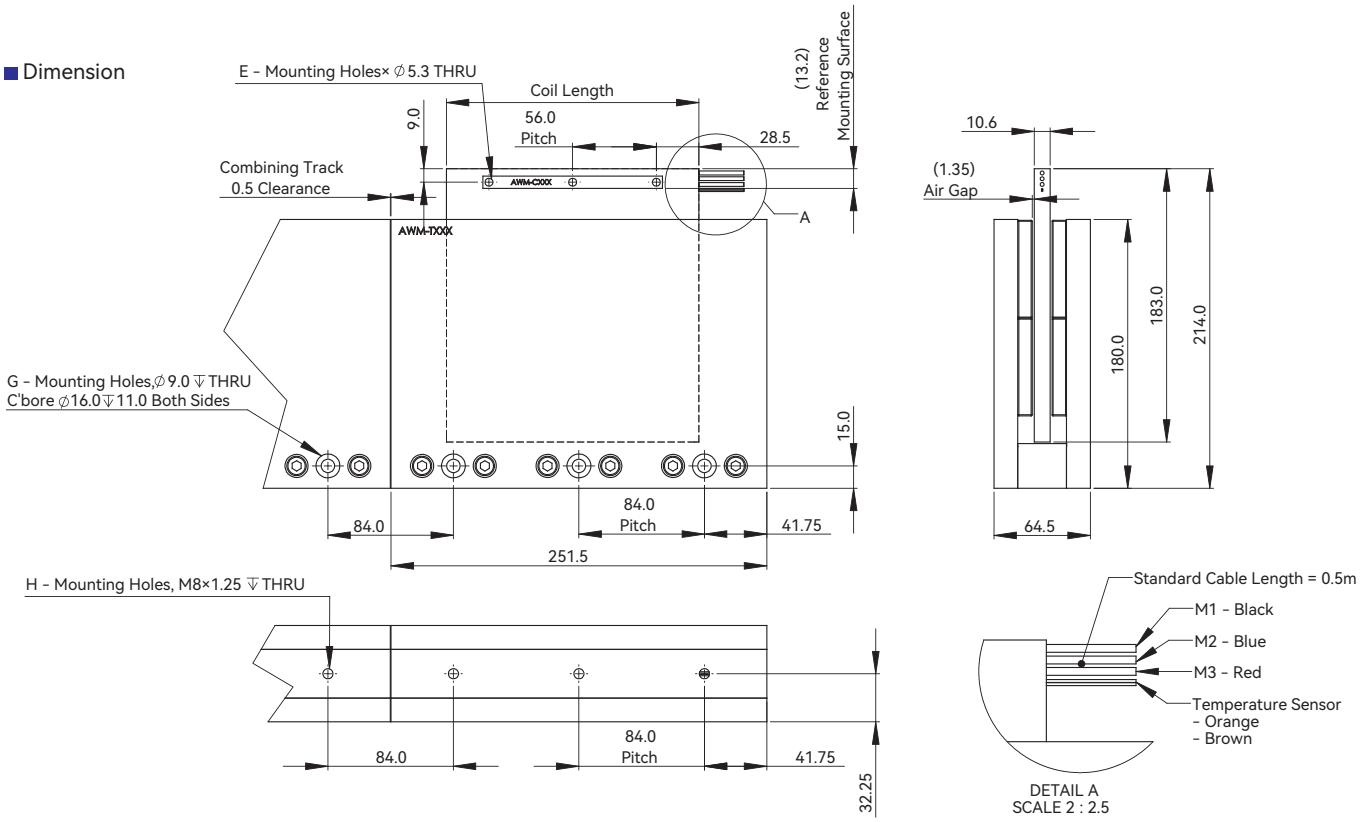
- Motor Model: AWM5
- Track Length: TL252 / TL420 / TL588

AWM6

			AWM6-S1	AWM6-S2		AWM6-S3
Performance Parameters	**Symbol**	**Unit**	**Series**	**Series**	**Parallel**	**Parallel**
Continuous Force (NC) @100°C ❶	F_{cn}	N	256.4	512.7	512.7	769.1
Peak Force	F_{pk}	N	1281.8	2563.5	2563.5	3845.3
Force Constant ±10%	K_f	N/Arms	106.8	213.63	106.8	160.2
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	87.2	174.4	87.2	130.8
Motor Constant @25°C	K_m	N/Sqrt(W)	28.8	40.7	40.7	74.7
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	9.2	18.4	4.6	3.1
Inductance (L-L) ±30% ❸	L	mH	23.0	46.0	11.5	7.7
Electrical Time Constant	τ_e	ms	2.5	2.5	2.5	2.5
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	2.4	2.4	4.8	4.8
Peak Current	I_{pk}	Arms	12.0	12.0	24.0	24.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	102.4	204.9	204.9	136.6
Max. Coil Temperature	t_{max}	°C	125.0	125.0	125.0	125.0
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/°C	1.4	2.7	2.7	1.8
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0	330.0	330.0
Magnetic Period	τ_{NN}	mm	84.0	84.0	84.0	84.0
Attraction Force	F_a	kN	0.0	0.0	0.0	0.0
Mechanical Parameters						
Coil Mass (NC)	m_{cn}	kg	1.8	3.7	3.7	5.5
Coil Length (NC)	L_{cn}	mm	169.0	337.0	337.0	505.0
Track Mass Per Meter	m_{track}	kg/m	66.7	66.7	66.7	66.7
Other Information						
Insulation Class			Class B (130°C)			
Protection Grade			IP00			
Compliance with Global Standards			RoHS, CE			
Ambient Temperature	Operation		0°C to 40°C (non-freezing)			
	Storage		-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)			
	Storage		10%RH to 90%RH (non-condensing)			
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

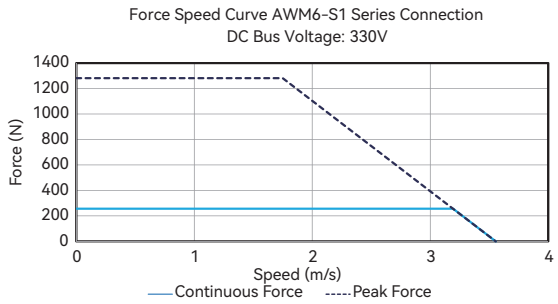
Dimension

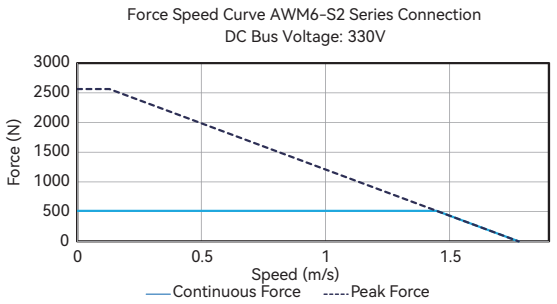


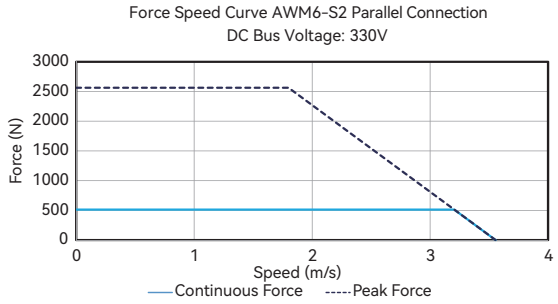
Motor Coil		
Model No	Coil Length	E
AWM6-S1	169.0	3
AWM6-S2	337.0	6
AWM6-S3	505.0	9

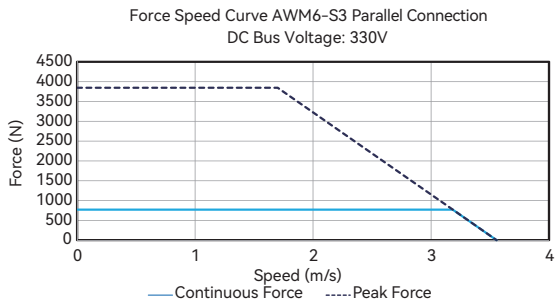
Motor Track			
Model No	Track Length	G	H
AWM6-TL252	251.5	3	3
AWM6-TL420	419.5	5	5
AWM6-TL588	587.5	7	7

Force-Speed Curve









Part Numbering

Motor Coil

AWM6-S-S1-K-0.5

- Motor Model: AWM6
- Winding Code: S = Series / P = Parallel
- Coil Length: S1 / S2 / S3
- Thermal Sensor: K = PT100 (RTD)
- Cable Length: 0.5

Motor Track

AWM6-TL252

- Motor Model: AWM6
- Track Length: TL252 / TL420 / TL588

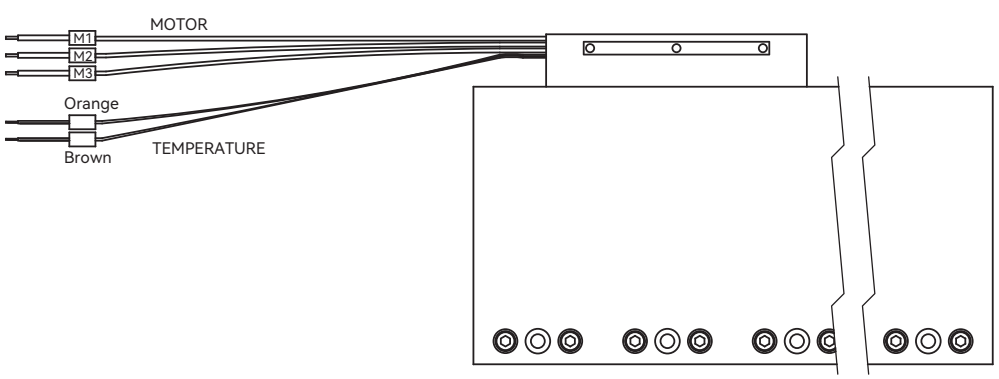
Motor Cable Connection

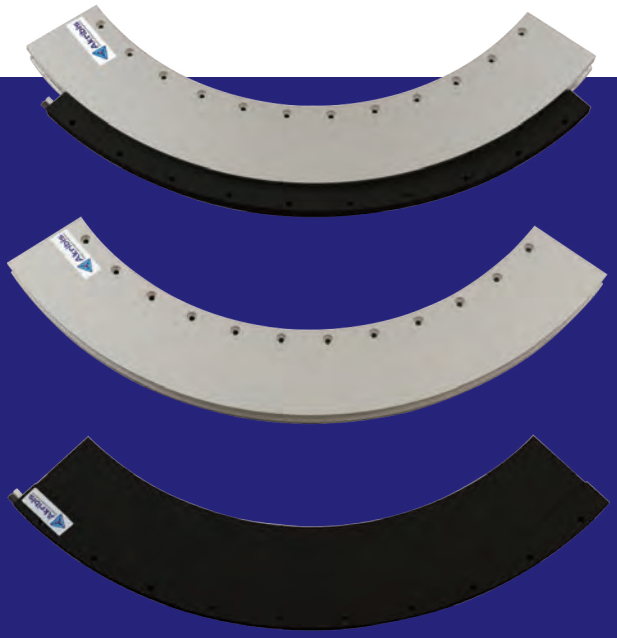
MOTOR CABLE

PIN	DESCRIPTION	COLOR
-	M1	BLACK
-	M2	BLUE
-	M3	RED

TEMPERATURE SENSOR CABLE

PIN	DESCRIPTION	COLOR
-	THERMAL	ORANGE
-	THERMAL	BROWN





ACR SERIES

- Small thickness and light weight
- Large center hole
- Integrated hall sensor and temperature sensor
- Direct drive with high torque without cogging effect
- Limit-angle or 360-degree operation
- Multi-coil and multi-track configurations

Introduction

Ironless ACR series arc motors are specifically desinged for angular motion with constrained rotation angles less than 360 degrees. Compared with DDR motors, Akribis's ACR series arc motors feature larger center holes, lower profile form factors, and higher stiffness. When coupled with larger radius circular encoder sacles and arc bearings, ACR motors can achieve better postioning, repeatability, and accuracy.

Continuous Torque T_{cn} = 19.8Nm ~ 460.7Nm

Peak Torque T_{pk} = 72.8Nm ~ 1382.2Nm

Features

- Ironless technology and no cogging force
- Thin coil design with low mass
- High motor constant
- Big center hole
- Integrated hall sensors
- Flexible configuration with multiple coils or tracks
- Multiple coils connected in series or parallel to increase torque output
- Multiple tracks attaching together to extend angle of rotation

Applications

In applications with limited angle of rotation where direct drive rotary motors are not necessary, ACR series arc motors can effectively lower cost and save space, particularly in systems with large radius of motion. Compared with conventional direct drive rotary motors, ACR arc motors can provide larger center hole, lower profile, and great torque output with optimized electromagnetic and mechanical design. ACR arc motors enable customers to develop more compact systems and to increase competitivity in the market.

Akribis ACR series arc motors are applicable to G2.5, G4.5, G6, G8.5, G10.5 and G11 LCD, 8-inch or 12-inch wafer processing and inspection equipment, as well as biomedical devices, precision assembly and industrial printing machines.

■ Limit-angle type

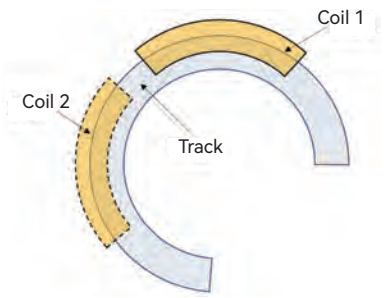
Model	Motion Radius (mm)
ACR240	240
ACR335	335
ACR820	820
ACR1240	1240
ACR1525	1525

■ 360° type

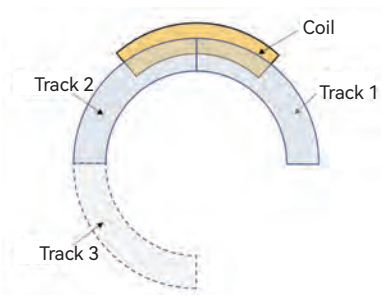
Model	Motion Radius (mm)
ACR240	240
ACR335	335
ACR820	820
ACR1240	1240
ACR1525	1525

Configurations

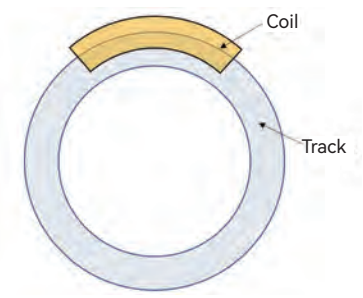
Akribis ACR series arc motors allow customers to flexibly configure systems based on their needs: multiple coils to increase torque output, or multiple tracks to increase range of motion. By attaching multiple tracks together, ACR motors can accomplish full 360° degrees of rotation.



Multi-Coil Configuration



Multi-Track Configuration



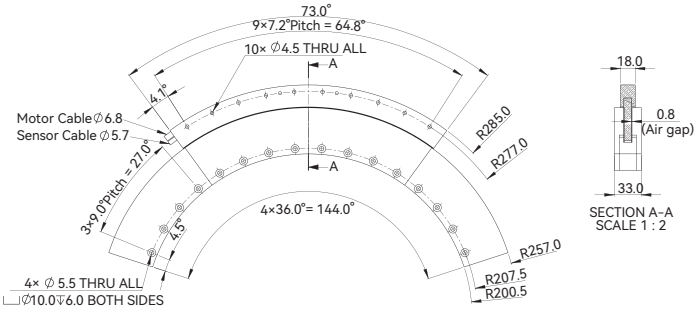
360° Configuration

ACR240-S5

ACR240-S5				
Performance Parameters		Symbol	Unit	Series
Continuous Torque (NC) @100°C [1]		T_{cn}	Nm	19.8
Peak Torque		T_{pk}	Nm	72.8
Torque Constant ±10%		K_t	Nm/Arms	19.77
Back EMF Constant ±10%		K_e	Vpeak/rpm	1.69
Motor Constant @25°C		K_m	Nm/Sqrt(W)	2.8
Resistance (L-L) 25°C ±10% [2]		R_{25}	Ω	35.2
Inductance (L-L) ±30% [3]		L	mH	19.5
Electrical Time Constant		τ_e	ms	0.6
Continuous Current (NC) @100°C [1]		I_{cn}	Arms	1.0
Peak Current		I_{pk}	Arms	3.7
Continuous Power Dissipation (NC) @100°C [1]		P_{cn}	W	68.0
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant (NC) [1]		K_{thn}	W/℃	0.9
Max. Bus Voltage		U_{bus}	Vdc	600
Magnetic Period		τ_{NN}	degree	7.2
Attraction Force		F_a	kN	0
Mechanical Parameters				
Coil Mass (NC)		m_{cn}	kg	1.1
Coil Length (NC)		L_{cn}	degree	73.0
Air Gap		δ	mm	0.8
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.
[2] Resistance is measured by DC current with standard 1m cable.
[3] Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

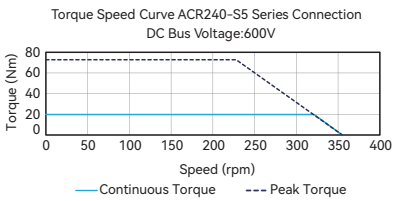
Dimension



Track Specifications

Parameter	Symbol	Unit	ACR240-TR36
Angle	L_{track}	degree	36
Mass	m_{track}	kg	1.4
Rotor Inertia	J_r	kg·m²	0.07

Torque-Speed Curve

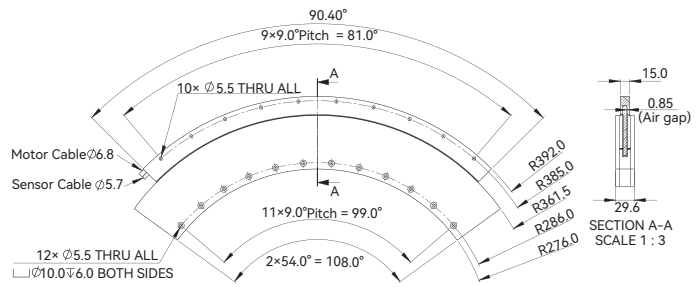


ACR335-S5

ACR335-S5				
Performance Parameters		Symbol	Unit	Series
Continuous Torque (NC) @100°C [1]		T_{cn}	Nm	92.3
Peak Torque		T_{pk}	Nm	276.9
Torque Constant ±10%		K_t	Nm/Arms	77.2
Back EMF Constant ±10%		K_e	Vpeak/rpm	6.6
Motor Constant @25°C		K_m	Nm/Sqrt(W)	7.7
Resistance (L-L) 25°C ±10% [2]		R_{25}	Ω	67.1
Inductance (L-L) ±30% [3]		L	mH	69.8
Electrical Time Constant		τ_e	ms	1.0
Continuous Current (NC) @100°C [1]		I_{cn}	Arms	1.2
Peak Current		I_{pk}	Arms	3.6
Continuous Power Dissipation (NC) @100°C [1]		P_{cn}	W	185.4
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant (NC) [1]		K_{thn}	W/℃	2.5
Max. Bus Voltage		U_{bus}	Vdc	600
Magnetic Period		τ_{NN}	degree	9.0
Attraction Force		F_a	kN	0
Mechanical Parameters				
Coil Mass (NC)		m_{cn}	kg	1.8
Coil Length (NC)		L_{cn}	degree	90.4
Air Gap		δ	mm	0.85
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.
[2] Resistance is measured by DC current with standard 1m cable.
[3] Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

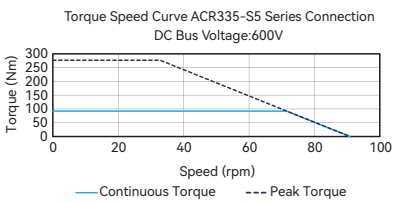
Dimension



Track Specifications

Parameter	Symbol	Unit	ACR335-TR36	ACR335-TR54
Angle	L_{track}	degree	36	54
Mass	m_{track}	kg	2.9	4.3
Rotor Inertia	J_r	kg·m²	0.29	0.44

Torque-Speed Curve

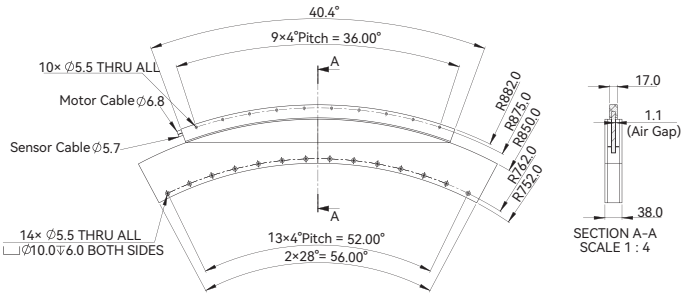


ACR820-S5

ACR820-S5				
Performance Parameters		Symbol	Unit	Series
Continuous Torque (NC) @100°C [1]		T_{cn}	Nm	331.5
Peak Torque		T_{pk}	Nm	994.5
Torque Constant ±10%		K_t	Nm/Arms	195.0
Back EMF Constant ±10%		K_e	Vpeak/rpm	16.7
Motor Constant @25°C		K_m	Nm/Sqrt(W)	26.2
Resistance (L-L) 25°C ±10% [2]		R_{25}	Ω	37.0
Inductance (L-L) ±30% [3]		L	mH	47.0
Electrical Time Constant		τ_e	ms	1.3
Continuous Current (NC) @100°C [1]		I_{cn}	Arms	1.7
Peak Current		I_{pk}	Arms	5.1
Continuous Power Dissipation (NC) @100°C [1]		P_{cn}	W	206.7
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant (NC) [1]		K_{thn}	W/°C	2.8
Max. Bus Voltage		U_{bus}	Vdc	600
Magnetic Period		τ_{NN}	degree	4.0
Attraction Force		F_a	kN	0
Mechanical Parameters				
Coil Mass (NC)		m_{cn}	kg	2.5
Coil Length (NC)		L_{cn}	degree	40.4
Air Gap		δ	mm	1.1
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.
[2] Resistance is measured by DC current with standard 1m cable.
[3] Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

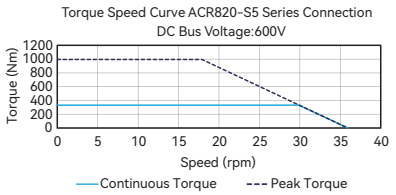
Dimension



Track Specifications

Parameter	Symbol	Unit	ACR820-TR24	ACR820-TR28
Angle	L_{track}	degree	24	28
Mass	m_{track}	kg	7.1	8.3
Rotor Inertia	J_r	kg·m²	4.5	5.3

Torque-Speed Curve

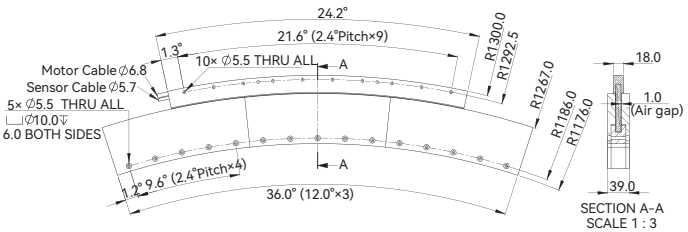


ACR1240-S5

ACR1240-S5				
Performance Parameters		Symbol	Unit	Series
Continuous Torque (NC) @100°C [1]		T_{cn}	Nm	334.95
Peak Torque		T_{pk}	Nm	1202.4
Torque Constant ±10%		K_t	Nm/Arms	257.7
Back EMF Constant ±10%		K_e	Vpeak/rpm	22.03
Motor Constant @25°C		K_m	Nm/Sqrt(W)	37
Resistance (L-L) 25°C ±10% [2]		R_{25}	Ω	37.5
Inductance (L-L) ±30% [3]		L	mH	43.5
Electrical Time Constant		τ_e	ms	1.2
Continuous Current (NC) @100°C [1]		I_{cn}	Arms	1.3
Peak Current		I_{pk}	Arms	4.6
Continuous Power Dissipation (NC) @100°C [1]		P_{cn}	W	122.5
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant (NC) [1]		K_{thn}	W/°C	1.6
Max. Bus Voltage		U_{bus}	Vdc	600
Magnetic Period		τ_{NN}	degree	4.0
Attraction Force		F_a	kN	0
Mechanical Parameters				
Coil Mass (NC)		m_{cn}	kg	2.6
Coil Length (NC)		L_{cn}	degree	24.2
Air Gap		δ	mm	1.0
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.
[2] Resistance is measured by DC current with standard 1m cable.
[3] Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

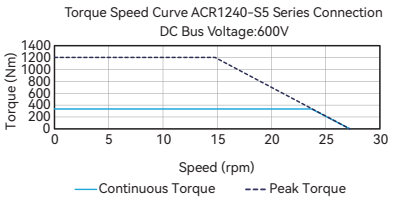
Dimension



Track Specifications

Parameter	Symbol	Unit	ACR1240-TR12
Angle	L_{track}	degree	12
Mass	m_{track}	kg	4.95
Rotor Inertia	J_r	kg·m²	7.5

Torque-Speed Curve

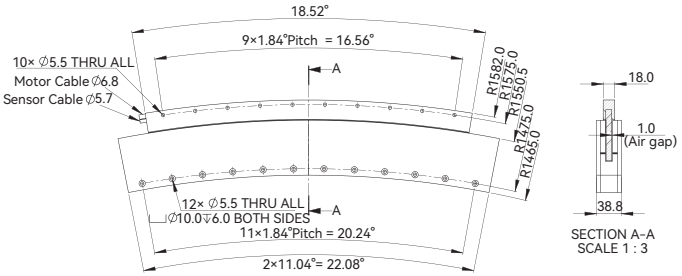


ACR1525-S5

ACR1525-S5				
Performance Parameters		Symbol	Unit	Series
Continuous Torque (NC) @100°C [1]		T_{cn}	Nm	460.7
Peak Torque		T_{pk}	Nm	1382.2
Torque Constant ±10%		K_t	Nm/Arms	257.3
Back EMF Constant ±10%		K_e	Vpeak/rpm	22.0
Motor Constant @25°C		K_m	Nm/Sqrt(W)	37.6
Resistance (L-L) 25°C ±10% [2]		R_{25}	Ω	31.2
Inductance (L-L) ±30% [3]		L	mH	37.5
Electrical Time Constant		τ_e	ms	1.2
Continuous Current (NC) @100°C [1]		I_{cn}	Arms	1.8
Peak Current		I_{pk}	Arms	5.4
Continuous Power Dissipation (NC) @100°C [1]		P_{cn}	W	193.4
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant (NC) [1]		K_{thn}	W/℃	2.6
Max. Bus Voltage		U_{bus}	Vdc	600
Magnetic Period		τ_{NN}	degree	1.84
Attraction Force		F_a	kN	0
Mechanical Parameters				
Coil Mass (NC)		m_{cn}	kg	2.2
Coil Length (NC)		L_{cn}	degree	18.52
Air Gap		δ	mm	1.0
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.
[2] Resistance is measured by DC current with standard 1m cable.
[3] Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

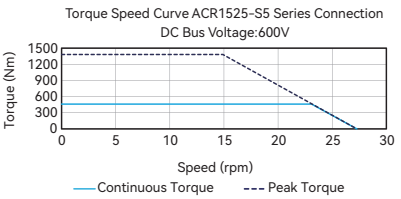
Dimension



Track Specifications

Parameter	Symbol	Unit	ACR1525-TR11.04
Angle	L_{track}	degree	11.04
Mass	m_{track}	kg	5.4
Rotor Inertia	J_r	kg·m²	12.3

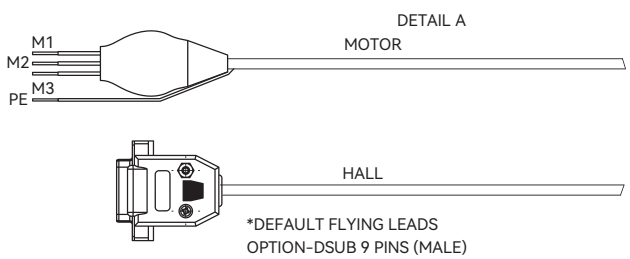
Torque-Speed Curve

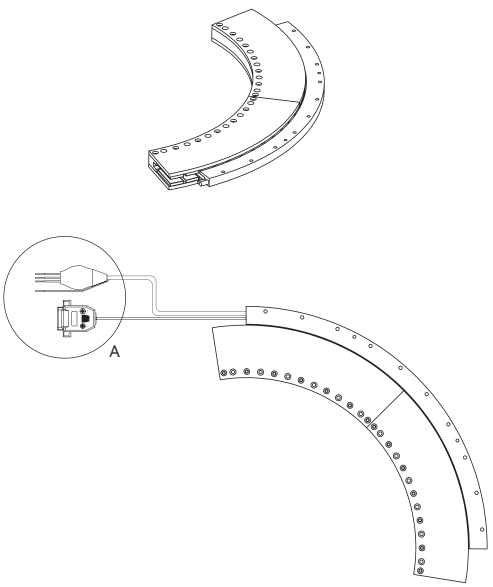


Motor Cable Connection

MOTOR CABLE

PIN	DESCRIPTION	COLOR
-	M1	BLACK1
-	M2	BLACK2
-	M3	BLACK3
-	PE	YELLOW/GREEN





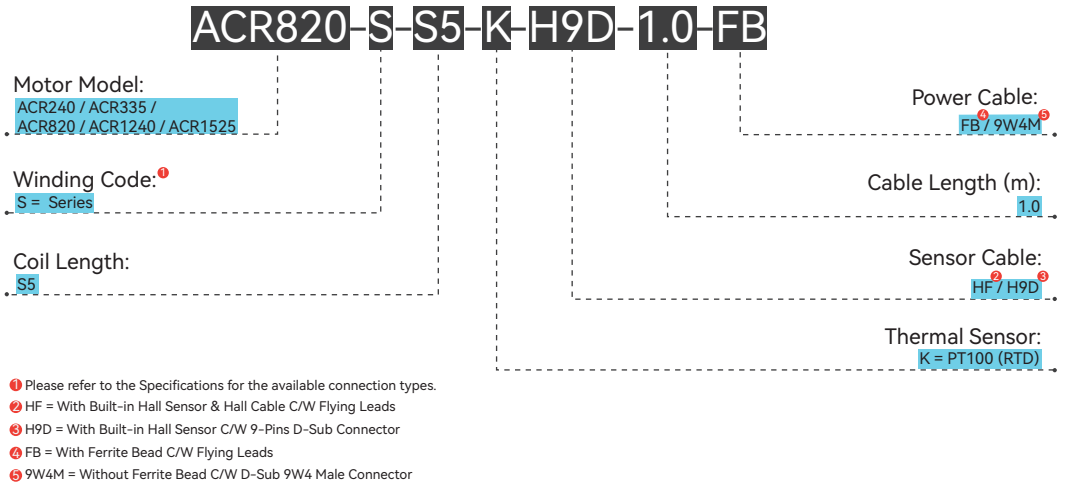
HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	5VDC	BROWN
5	0VDC	WHITE
8	T1	PINK
9	T2	BLUE

THERMAL SENSOR WIRE
(K TYPE - PT100)
(J TYPE - THERMOSTAT)

Part Numbering

Motor Coil

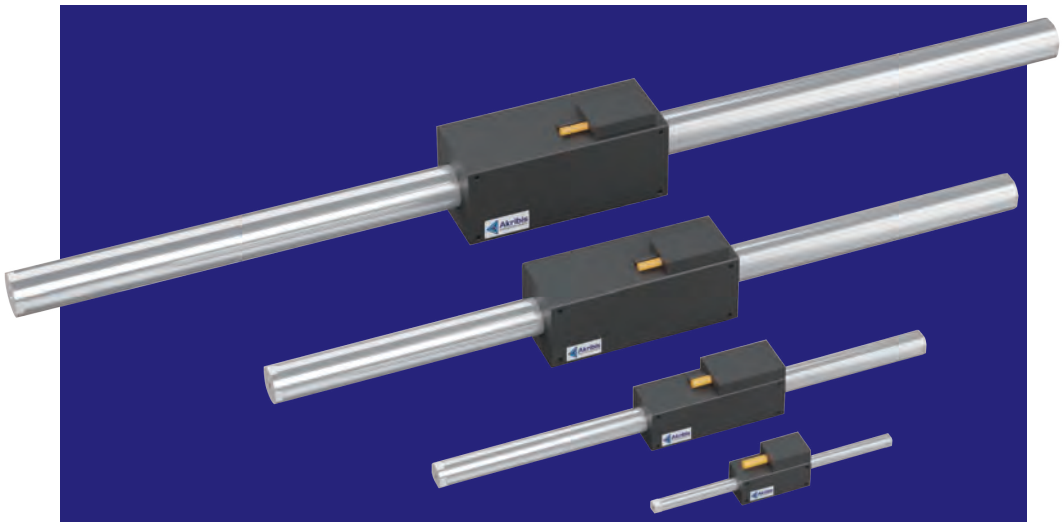


1 Please refer to the Specifications for the available connection types.
2 HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
3 H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
4 FB = With Ferrite Bead C/W Flying Leads
5 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector

Motor Track



6 Please refer to Dimensions for available tracks.



RDM-A SERIES

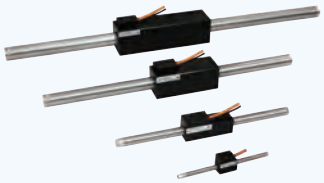
- Compact size
- Full utilization of flux lines
- Ironless, no cogging force
- Multi-mover on one track available

EN-26.3.1

Akribis systems

Introduction

RDM-A series is a kind of rod motor or shaft motor, since its magnet track is rod-shaped. Similar to other linear motors, RDM-A normally consists of a mover and a stator to realize a linear movement. Usually, the mover refers to motor coil, and the stator refers to magnet track. In some cases, the application of "mover" and "stator" can be reversed.

RDM-A Series	Mover (coil)	Stator (magnet track)
		

The magnetic flux is evenly distributed along the circumference of the magnets. The coils are round and arranged closely in the axial direction. For RDM-A series, there is an air gap between the coil and the magnet track to realize a non-contact axial linear movement.

Continuous Force Fcn = 2.1N~137.8N

Peak Force Fpk = 6.2N~413.4N

Features

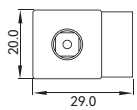
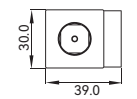
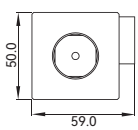
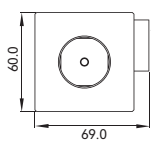
- Compact size, similar to ball screw shape, convenient to replace traditional transmission method
- Full utilization of flux lines
- Ironless, no attraction force between mover and stator, easy for assembly
- No cogging force, smooth operation (RDM-A series)
- Multi-mover on one track available, flexible configuration

Applications

The size of RDM-A varies from 20mm-width coil (8mm-diameter shaft) to 60mm-width coil (30mm-diameter shaft), and each size contains several options of coil lengths and track lengths, together there are over dozens of stroke choices.

The symmetrical and compact structure enables rod motor to become the best alternative to iterate or upgrade ball screw mechanism.

- High-speed printer
- Biomedical equipment
- Semiconductor equipment
- CNC (Wire cut EDM machine, etc.)
- Single/multi-axis module platform
- Counterpoint platform
- Z-axis pick-and-place module

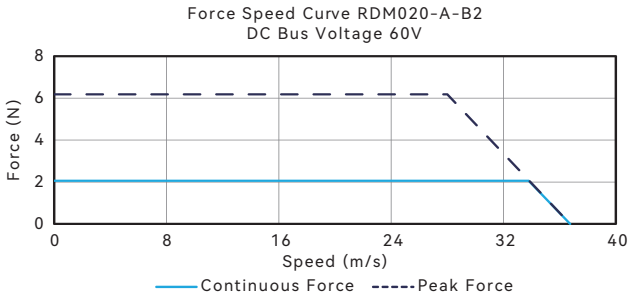
	Series	Coil Length (mm)	● Continuous Force (F_{cn}) / ■ PeakForce (F_{pk}) Unit: N 20 40 60 80 100 120 ....
	RDM020-A-B2	31.0	●2.1 / ■6.2
	RDM020-A-B3	46.0	●3.1 / ■9.3
	RDM020-A-B4	61.0	●4.1 / ■12.4
	RDM030-A-B2	61.0	●12.4 / ■37.2
	RDM030-A-B3	91.0	●18.6 / ■55.8
	RDM030-A-B4	121.0	●24.8 / ■74.5
	RDM050-A-B3	56.8	●25.8 / ■77.4
	RDM050-A-B5	94.0	●43.0 / ■129.0
	RDM050-A-B7	131.2	●60.2 / ■180.6
	RDM060-A-B4	145.0	●91.9 / ■275.6
	RDM060-A-B5	181.0	●114.8 / ■344.5
	RDM060-A-B6	217.0	●137.8 / ■413.4

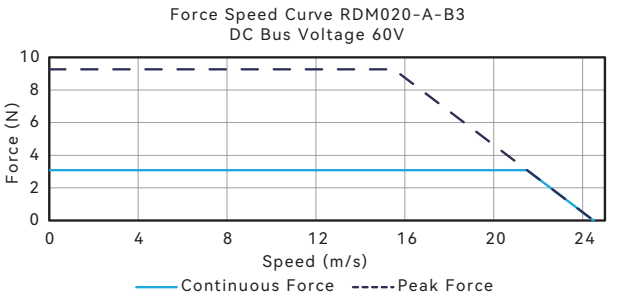
RDM020-A

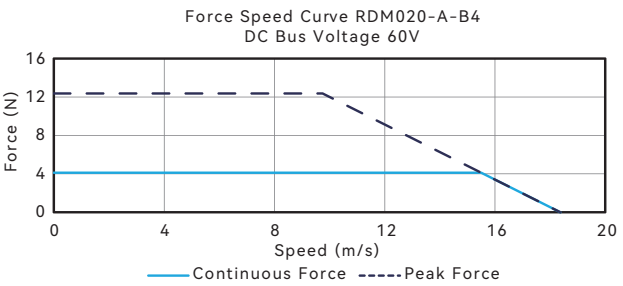
Performance Parameters	Symbol	Unit	B2	B3	B4
Continuous Force (NC) @100℃ ❶	F_{cn}	N	2.1	3.1	4.1
Peak Force	F_{pk}	N	6.2	9.3	12.4
Force Constant ±10%	K_f	N/Arms	2.00	3.00	4.00
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	1.63	2.45	3.27
Motor Constant @25℃	K_m	N/Sqrt(W)	0.94	1.16	1.35
Resistance (L-L)@25℃ ±10% ❷	R_{25}	Ω	3.03	4.47	5.88
Inductance (L-L)±20% ❸	L	mH	0.26	0.36	0.49
Electrical Time Constant	τ_e	ms	0.09	0.08	0.08
Continuous Current (NC) @100℃ ❶	I_{cn}	Arms	1.03	1.03	1.03
Peak Current	I_{pk}	Arms	3.09	3.09	3.09
Continuous Power Dissipation (NC) @100℃ ❶	P_{cn}	W	6.2	9.2	12.1
Max. Coil Temperature	T_{max}	℃	100	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.08	0.12	0.16
Max. Bus Voltage	U_{bus}	Vdc	60	60	60
Magnetic Period	τ_{NN}	mm	30.0	30.0	30.0
Attraction Force	F_a	N	0	0	0
Mechanical Parameters					
Coil Mass (NC)	m_{coil}	kg	0.070	0.084	0.100
Coil Length (NC)	L_{coil}	mm	31.0	46.0	61.0
Track Mass per Meter	m_{track}	kg/m	0.37	0.37	0.37
Other Information					
Insulation Class		Class B (130℃)			
Protection Grade		IP00			
Compliance with Global Standards		RoHS,CE			
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)			
	Storage	-15℃ to 70℃ (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust			

❶Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.
❷Resistance is measured by DC current with standard 0.5m cable.
❸Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

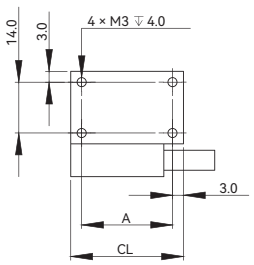
Force-Speed Curve

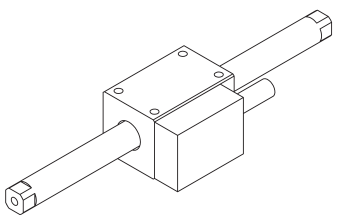






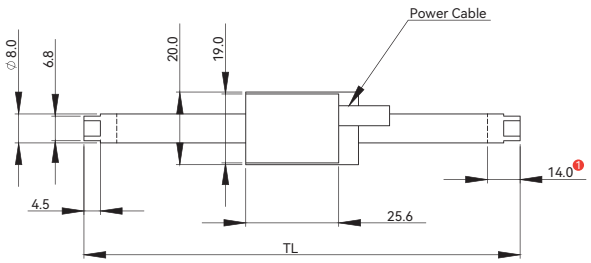
Dimensional Drawing

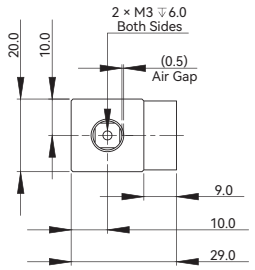




Motor Coil		
Model NO.	Coil Length "CL"	Hole Pitch "A"
RDM020-A-B2	31.0	25.0
RDM020-A-B3	46.0	40.0
RDM020-A-B4	61.0	55.0

Motor Track	
Model NO.	Track Length "TL"
RDM020-A-TL160	160.0
RDM020-A-TL235	235.0
RDM020-A-TL325	325.0





❶Non-effective stroke, both sides

Part Numbering

Motor Coil

RDM020-A-B3-N-KX-M-NF-005-XF-000

- Motor Model: RDM020-A
- Coil Length: B2 / B3 / B4
- Cooling Type: N[1]
- Thermal Sensor: KX[2] / XX[3]
- Winding Code: M[4]
- Sensor Cable: NF[5]
- Cable Length: 005[6]
- Power Cable: XF[7] / XL[8]
- Design Control Code: 000[9]

1. N = Natural Cooling
2. KX = PT100 (RTD)
3. XX = No Thermal Sensor
4. M = Mid Speed Winding
5. NF = Without Built-in Hall Sensor
6. 005 = 0.5m
7. XF = Without Ferrite Bead C/W Flying Leads
8. XL = Without Ferrite Bead C/W MATE-N-LOK Plug
9. 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)

Motor Track

RDM020-A-TL235-TS-000

- Motor Model: RDM020-A
- Track Length: TL160 / TL235 / TL325[10]
- Track Type and Cover: TS[11]
- Design Control Code: 000[12]

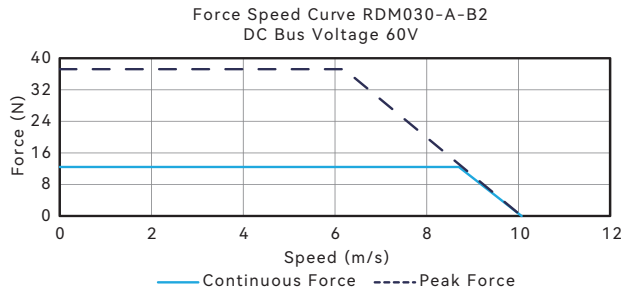
10. TLXXX = XXXmm
11. TS = Standard track, stainless steel cover
12. 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)

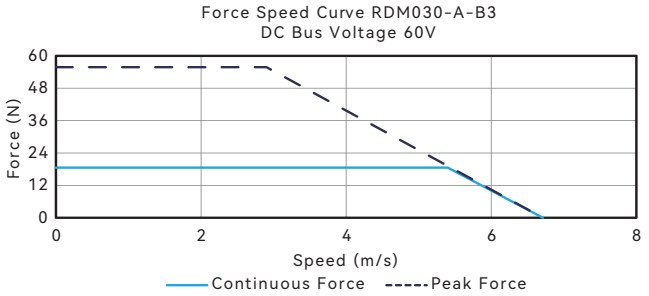
RDM030-A

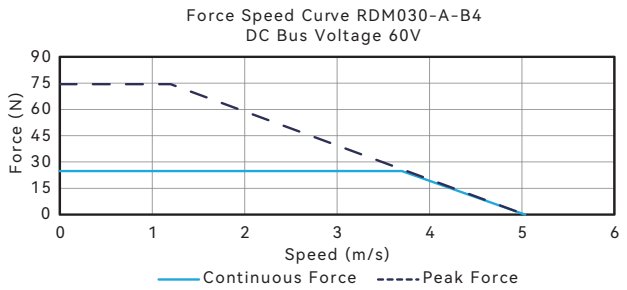
Performance Parameters	Symbol	Unit	B2	B3	B4
Continuous Force (NC) @100℃ ❶	F_{cn}	N	12.4	18.6	24.8
Peak Force	F_{pk}	N	37.2	55.8	74.5
Force Constant ±10%	K_f	N/Arms	7.3	11.0	14.6
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	5.96	8.94	11.92
Motor Constant @25℃	K_m	N/Sqrt(W)	3.56	4.37	5.05
Resistance (L-L)@25℃ ±10% ❷	R_{25}	Ω	2.81	4.19	5.57
Inductance (L-L)±20% ❸	L	mH	0.64	0.93	1.23
Electrical Time Constant	τ_e	ms	0.23	0.22	0.22
Continuous Current (NC) @100℃ ❶	I_{cn}	Arms	1.70	1.70	1.70
Peak Current	I_{pk}	Arms	5.10	5.10	5.10
Continuous Power Dissipation (NC) @100℃ ❶	P_{cn}	W	15.7	23.4	31.1
Max. Coil Temperature	T_{max}	℃	100	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.21	0.31	0.41
Max. Bus Voltage	U_{bus}	Vdc	60	60	60
Magnetic Period	τ_{NN}	mm	60.0	60.0	60.0
Attraction Force	F_a	N	0	0	0
Mechanical Parameters					
Coil Mass (NC)	m_{coil}	kg	0.20	0.27	0.34
Coil Length (NC)	L_{coil}	mm	61.0	91.0	121.0
Track Mass per Meter	m_{track}	kg/m	1.52	1.52	1.52
Other Information					
Insulation Class		Class B (130℃)			
Protection Grade		IP00			
Compliance with Global Standards		RoHS,CE			
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)			
	Storage	-15℃ to 70℃ (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust			

❶Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment. Abbreviations: NC-Natural Cooling.
❷Resistance is measured by DC current with standard 0.5m cable.
❸Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

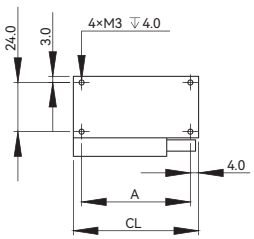
Force-Speed Curve

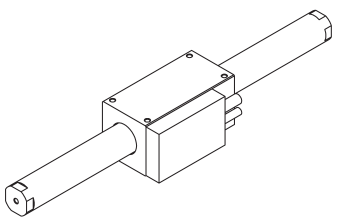






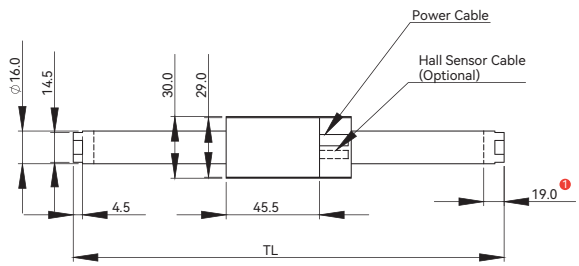
Dimensional Drawing

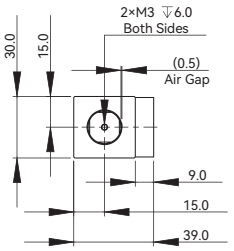




Motor Coil		
Model NO.	Coil Length "CL"	Hole Pitch "A"
RDM030-A-B2	61.0	53.0
RDM030-A-B3	91.0	83.0
RDM030-A-B4	121.0	113.0

Motor Track	
Model NO.	Track Length "TL"
RDM030-A-TL332	331.4
RDM030-A-TL422	421.4
RDM030-A-TL512	511.4





❶Non-effective stroke, both sides

Part Numbering

Motor Coil

RDM030-A-B3-N-KX-M-HF-005-XF-000

- Motor Model: RDM030-A
- Coil Length: B2 / B3 / B4
- Cooling Type: N[1]
- Thermal Sensor: KX[2] / XX[3]
- Winding Code: M[4]
- Sensor Cable: NF[5] / HF[6] / HL[7]
- Cable Length: 005[8]
- Power Cable: XF[9] / XL[10]
- Design Control Code: 000[11]

1. N = Natural Cooling
2. KX = PT100 (RTD)
3. XX = No Thermal Sensor
4. M = Mid Speed Winding
5. NF = Without Built-in Hall Sensor
6. HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
7. HL = With Built-in Hall Sensor C/W MATE-N-LOK Connector
8. 005 = 0.5m
9. XF = Without Ferrite Bead C/W Flying Leads
10. XL = Without Ferrite Bead C/W MATE-N-LOK Plug
11. 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)

Motor Track

RDM030-A-TL422-TS-000

- Motor Model: RDM030-A
- Track Length: TL332 / TL422 / TL512[12]
- Track Type and Cover: TS[13]
- Design Control Code: 000[14]

12. TLXXX = XXXmm
13. TS = Standard track, stainless steel cover
14. 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)

RDM050-A

Performance Parameters	Symbol	Unit	B3	B5	B7
Continuous Force (NC) @100°C❶	F_{cn}	N	25.8	43.0	60.2
Peak Force	F_{pk}	N	77.4	129.0	180.6
Force Constant ±10%	K_f	N/Arms	17.9	29.9	41.8
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	14.63	24.38	34.13
Motor Constant @25℃	K_m	N/Sqrt(W)	6.43	8.27	9.82
Resistance (L-L)@25℃ ±10% ❷	R_{25}	Ω	5.18	8.68	12.07
Inductance (L-L)±20% ❸	L	mH	1.34	2.21	3.13
Electrical Time Constant	τ_e	ms	0.26	0.25	0.26
Continuous Current (NC) @100°C❶	I_{cn}	Arms	1.44	1.44	1.44
Peak Current	I_{pk}	Arms	4.32	4.32	4.32
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	20.8	34.8	48.4
Max. Coil Temperature	T_{max}	℃	100	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.28	0.46	0.65
Max. Bus Voltage	U_{bus}	Vdc	330	330	330
Magnetic Period	τ_{NN}	mm	37.2	37.2	37.2
Attraction Force	F_a	N	0	0	0
Mechanical Parameters					
Coil Mass (NC)	m_{coil}	kg	0.40	0.63	0.85
Coil Length (NC)	L_{coil}	mm	56.8	94.0	131.2
Track Mass per Meter	m_{track}	kg/m	3.70	3.70	3.70
Other Information					
Insulation Class			Class B (130℃)		
Protection Grade			IP00		
Compliance with Global Standards			RoHS,CE		
Ambient Temperature	Operation		0℃ to 40℃ (non-freezing)		
	Storage		-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust		

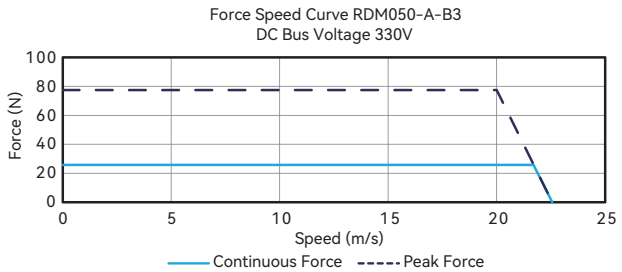
❶Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.

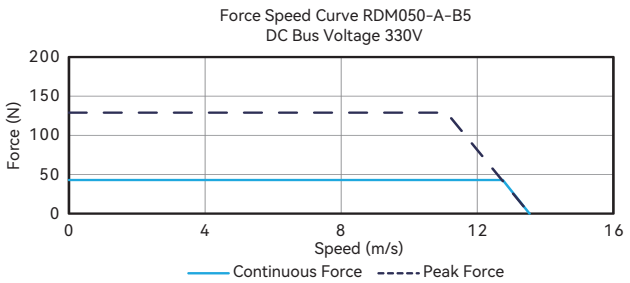
❷Resistance is measured by DC current with standard 0.5m cable.

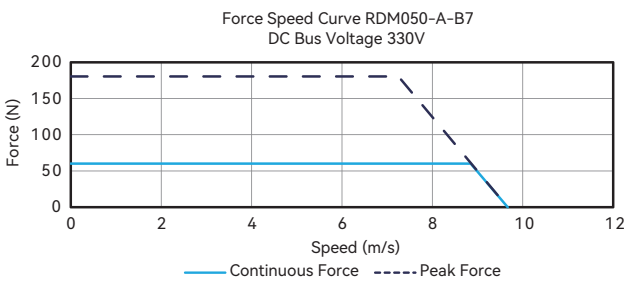
❸Inductance is measured by current frequency of 1 kHz.

The contents of datasheet are subject to change without prior notice.

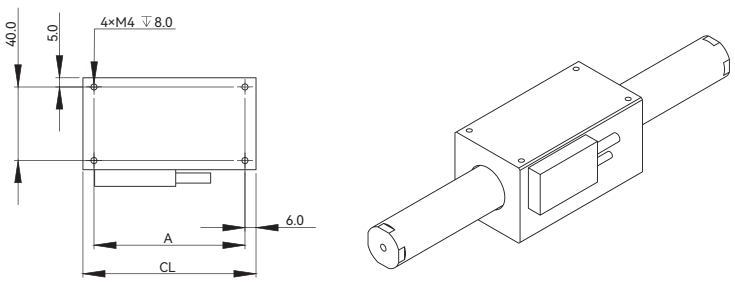
Force-Speed Curve



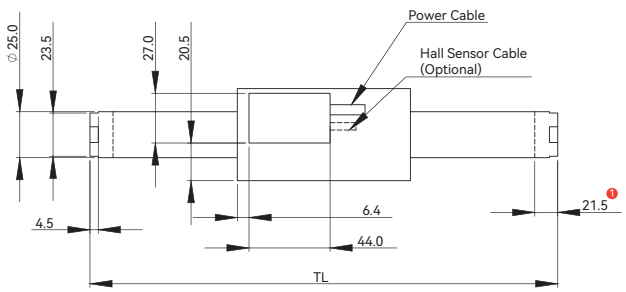


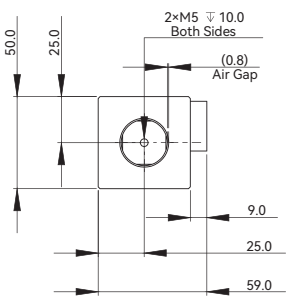


Dimensional Drawing



Motor Coil		
Model NO.	Coil Length "CL"	Hole Pitch "A"
RDM050-A-B3	56.8	44.8
RDM050-A-B5	94.0	82.0
RDM050-A-B7	131.2	119.2





Motor Track	
Model NO.	Track Length "TL"
RDM050-A-TL151	151.0
RDM050-A-TL337	337.0
RDM050-A-TL523	523.0
RDM050-A-TL709	709.0
RDM050-A-TL895	895.0

❶Non-effective stroke, both sides

Part Numbering

Motor Coil

RDM050-A-B5-N-KX-M-HF-005-XF-000

- Motor Model: RDM050-A
- Coil Length: B3 / B5 / B7
- Cooling Type: N[1]
- Thermal Sensor: KX[2] / XX[3]
- Winding Code: M[4]
- Sensor Cable: NF[5] / HF[6] / HL[7]
- Cable Length: 005
- Power Cable: XF[9] / XL[10]
- Design Control Code: 000[11]

1. N = Natural Cooling
2. KX = PT100 (RTD)
3. XX = No Thermal Sensor
4. M = Mid Speed Winding
5. NF = Without Built-in Hall Sensor
6. HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
7. HL = With Built-in Hall Sensor C/W MATE-N-LOK Connector
8. 005 = 0.5m
9. XF = Without Ferrite Bead C/W Flying Leads
10. XL = Without Ferrite Bead C/W MATE-N-LOK Plug
11. 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)

Motor Track

RDM050-A-TL151-TS-000

- Motor Model: RDM050-A
- Track Length: TL151 / TL337 / TL523 / TL709 / TL895[12]
- Track Type and Cover: TS[13]
- Design Control Code: 000[14]

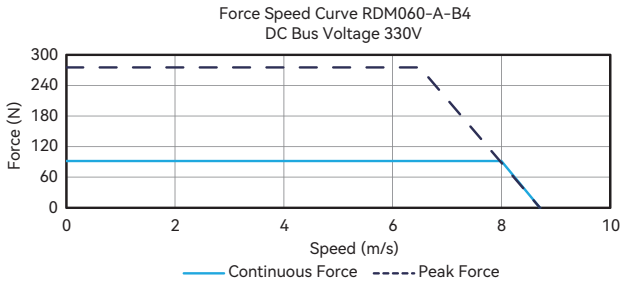
12. TLXXX = XXXmm
13. TS = Standard track, stainless steel cover
14. 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)

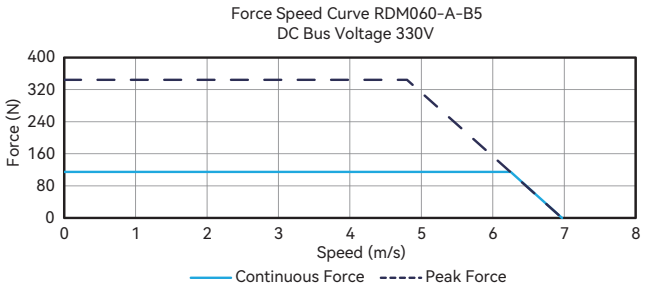
RDM060-A

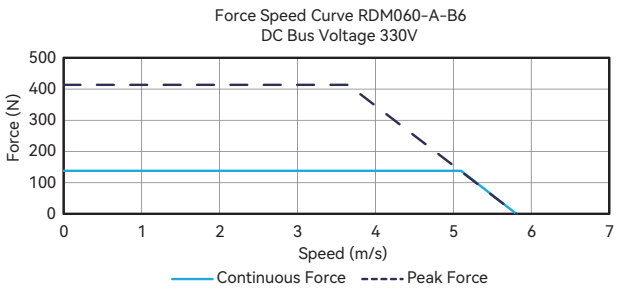
Performance Parameters	Symbol	Unit	B4	B5	B6
Continuous Force (NC) @100℃ ❶	F_{cn}	N	91.9	114.8	137.8
Peak Force	F_{pk}	N	275.6	344.5	413.4
Force Constant ±10%	K_f	N/Arms	46.4	58.0	69.6
Back EMF Constant ±10%	K_e	Vpeak/(m/s)	37.89	47.36	56.83
Motor Constant @25℃	K_m	N/Sqrt(W)	14.19	15.87	17.40
Resistance (L-L)@25℃ ±10% ❷	R_{25}	Ω	7.13	8.91	10.67
Inductance (L-L)±20% ❸	L	mH	3.69	4.57	5.51
Electrical Time Constant	τ_e	ms	0.52	0.51	0.52
Continuous Current (NC) @100℃ ❶	I_{cn}	Arms	1.98	1.98	1.98
Peak Current	I_{pk}	Arms	5.94	5.94	5.94
Continuous Power Dissipation (NC) @100℃ ❶	P_{cn}	W	54.0	67.5	80.9
Max. Coil Temperature	T_{max}	℃	100	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.72	0.90	1.08
Max. Bus Voltage	U_{bus}	Vdc	330	330	330
Magnetic Period	τ_{NN}	mm	72.0	72.0	72.0
Attraction Force	F_a	N	0	0	0
Mechanical Parameters					
Coil Mass (NC)	m_{coil}	kg	1.38	1.71	2.03
Coil Length (NC)	L_{coil}	mm	145.0	181.0	217.0
Track Mass per Meter	m_{track}	kg/m	5.37	5.37	5.37
Other Information					
Insulation Class			Class B (130℃)		
Protection Grade			IP00		
Compliance with Global Standards			RoHS,CE		
Ambient Temperature	Operation		0℃ to 40℃ (non-freezing)		
	Storage		-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust		

❶Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
Abbreviations: NC-Natural Cooling.
❷Resistance is measured by DC current with standard 0.5m cable.
❸Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

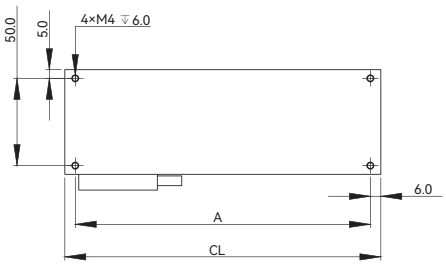
Force-Speed Curve

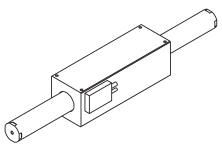




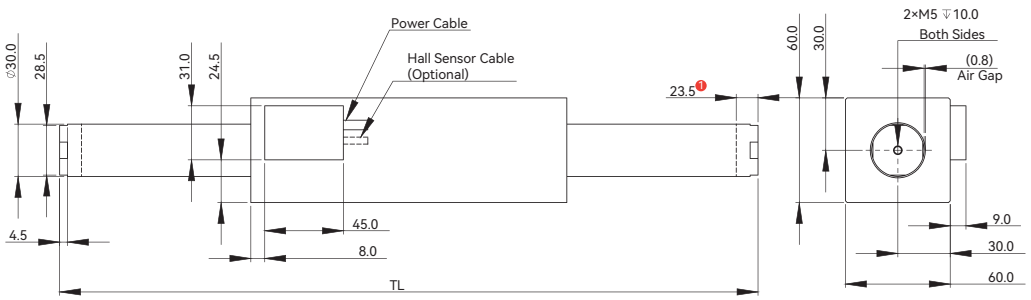


Dimensional Drawing





Motor Coil		
Model NO.	Coil Length "CL"	Hole Pitch "A"
RDM060-A-B4	145.0	133.0
RDM060-A-B5	181.0	169.0
RDM060-A-B6	217.0	205.0



Motor Track	
Model NO.	Track Length "TL"
RDM060-A-TL328	327.8
RDM060-A-TL544	543.8
RDM060-A-TL760	759.8
RDM060-A-TL976	975.8

❶Non-effective stroke, both sides

Part Numbering

Motor Coil

RDM060-A-B4-N-KX-M-HF-005-XF-000

- Motor Model: RDM060-A
- Coil Length: B4 / B5 / B6
- Cooling Type: N[1]
- Thermal Sensor: KX[2] / XX[3]
- Winding Code: M[4]
- Sensor Cable: NF[5] / HF[6] / HL[7]
- Cable Length: 005[8]
- Power Cable: XF[9] / XL[10]
- Design Control Code: 000[11]

1. N = Natural Cooling
2. KX = PT100 (RTD)
3. XX = No Thermal Sensor
4. M = Mid Speed Winding
5. NF = Without Built-in Hall Sensor
6. HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
7. HL = With Built-in Hall Sensor C/W MATE-N-LOK Connector
8. 005 = 0.5m
9. XF = Without Ferrite Bead C/W Flying Leads
10. XL = Without Ferrite Bead C/W MATE-N-LOK Plug
11. 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)

Motor Track

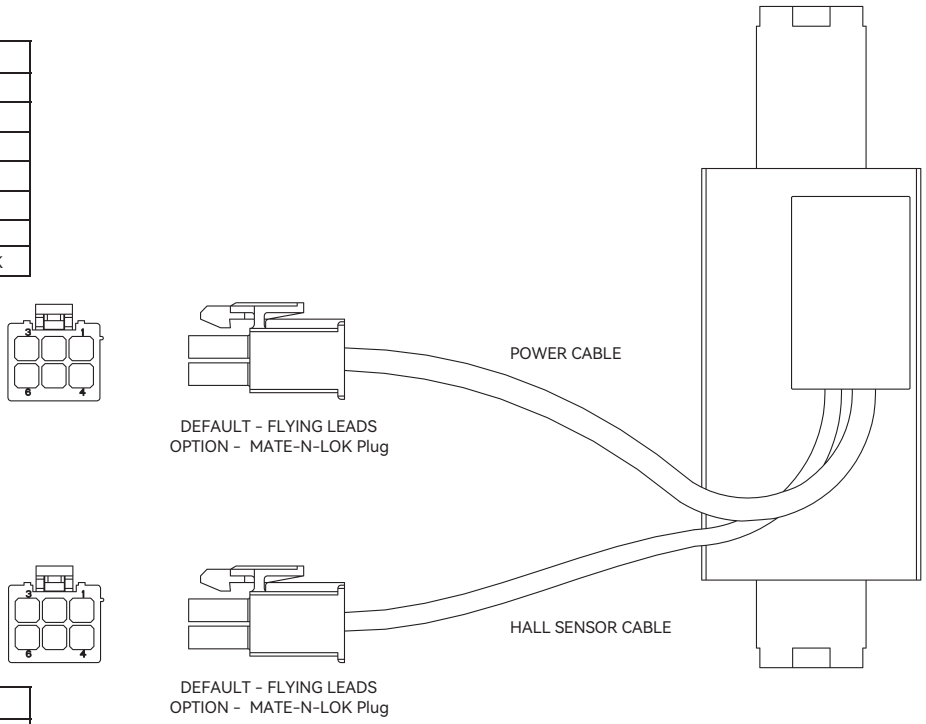
RDM060-A-TL328-TS-000

- Motor Model: RDM060-A
- Track Length: TL328 / TL544 / TL760 / TL976[12]
- Track Type and Cover: TS[13]
- Design Control Code: 000[14]

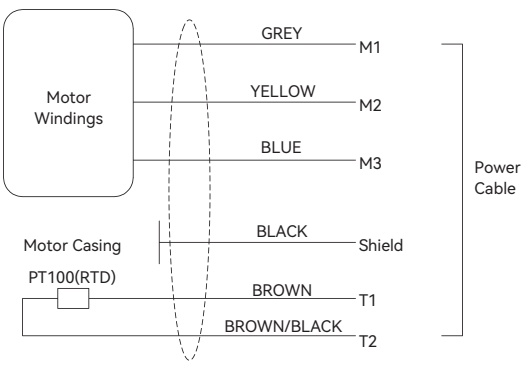
12. TLXXX = XXXmm
13. TS = Standard track, stainless steel cover
14. 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)

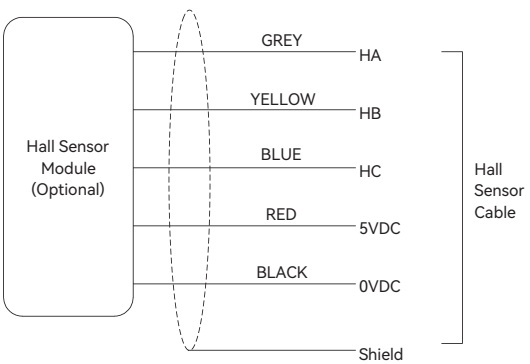
Motor Cable Connection

POWER CABLE		
PIN	DESCRIPTION	COLOR
1	M1	GREY
2	M2	YELLOW
3	M3	BLUE
4	PE	BLACK
5	T1	BROWN
6	T2	BROWN/BLACK



HALL SENSOR CABLE		
PIN	DESCRIPTION	COLOR
1	HA	GREY
2	HB	YELLOW
3	HC	BLUE
4	5VDC	RED
5	0VDC	BLACK





Motor Cable Specifications

Motor Type	Outer Diameter (mm)	Min.Bending Radius (Flexible Use)	Min.Bending Radius (Fixed Laying)
AUM1	4.1	12×outer diameter	5×outer diameter
AUM2 / 3 / 4 /5	6.0	10×outer diameter	5×outer diameter
AUM6	9.5	12×outer diameter	6×outer diameter
ALM015-T-B1 / B2	4.5	10×outer diameter	5×outer diameter
ALM016-T-B1	5.3	10×outer diameter	5×outer diameter
ALM016-T-B2	6.3	10×outer diameter	5×outer diameter
ALM021-T-B1 / B2 / B3 / B4	6.2	10×outer diameter	5×outer diameter
ALM028-T-B1 / B2 / B3 / B4 / B5	7.0	10×outer diameter	5×outer diameter
ALM038-T-B1 / B2 / B3 / B4 / B6	7.0	10×outer diameter	5×outer diameter
ALM048-T-B1 / B2 / B3 / B4 / B6	7.0	10×outer diameter	5×outer diameter
AJM、AQM	7.4	10×outer diameter	5×outer diameter
AKM30-B1 / B2 / B4	8.0	10×outer diameter	5×outer diameter
AKM50-B1 / B2 / B4	8.0	10×outer diameter	5×outer diameter
AKM100-B1 / B2 / B4	8.0	10×outer diameter	5×outer diameter
AKM150-B4 / B8	9.5	10×outer diameter	5×outer diameter
AKM200-B4 / B8	9.5	10×outer diameter	5×outer diameter
AWM1	1.5	10×outer diameter	5×outer diameter
AWM2	1.5	10×outer diameter	5×outer diameter
AWM3	1.5	10×outer diameter	5×outer diameter
AWM4	2.2	10×outer diameter	5×outer diameter
AWM5	2.6	10×outer diameter	5×outer diameter
ACR240	6.8	12×outer diameter	6×outer diameter
ACR335	6.8	12×outer diameter	6×outer diameter
ACR820	6.8	12×outer diameter	6×outer diameter
ACR1240	6.8	12×outer diameter	6×outer diameter
ACR1525	6.8	12×outer diameter	6×outer diameter
RDM-A	5.3	10×outer diameter	6×outer diameter

Temperature Sensor Cable Specifications

Motor Type	Outer Diameter (mm)	Min.Bending Radius (Flexible Use)	Min.Bending Radius (Fixed Laying)
ALM021-T-B1 / B2 / B3 / B4	3.5	10×outer diameter	5×outer diameter
ALM028-T-B1 / B2 / B3 / B4 / B5	4.4	10×outer diameter	5×outer diameter
ALM038-T-B1 / B2 / B3 / B4 / B6	4.4	10×outer diameter	5×outer diameter
ALM048-T-B1 / B2 / B3 / B4 / B6	4.4	10×outer diameter	5×outer diameter

Motor & Hall Cable Specifications

Hall Cable Specifications

Motor Type	Outer Diameter (mm)	Min.Bending Radius (Flexible Use)	Min.Bending Radius (Fixed Laying)
AUM1-5	3.8	10×outer diameter	5×outer diameter
AUM6	5.2	12×outer diameter	6×outer diameter
ALM-T	3.3	10×outer diameter	5×outer diameter
AJM	3.8	10×outer diameter	5×outer diameter
AKM	5.2	10×outer diameter	5×outer diameter
ACR240	5.7	12×outer diameter	6×outer diameter
ACR335	5.7	12×outer diameter	6×outer diameter
ACR820	5.7	12×outer diameter	6×outer diameter
ACR1240	5.7	12×outer diameter	6×outer diameter
ACR1525	5.7	12×outer diameter	6×outer diameter
RDM-A	3.6	10×outer diameter	5×outer diameter

VOICE COIL MOTORS

VOICE COIL MOTORS

Overview

Cylindrical Voice Coil Motors

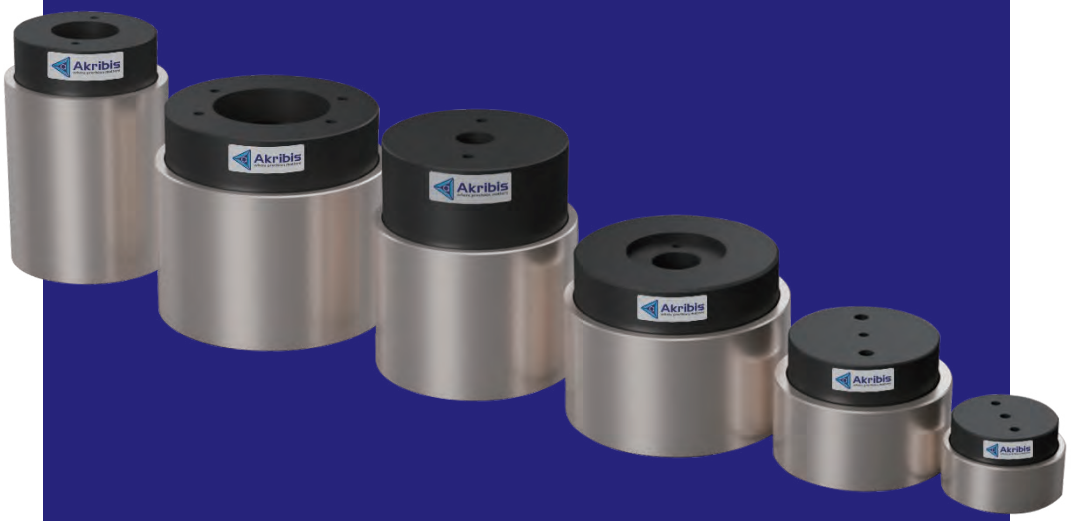
Model	Continuous Force (100℃)(N)	Peak Force (N)	Stroke (mm)	Diameter (mm)	Coil Weight (g)	Total Weight (g)	Motor Length ±Stroke/2(mm)	Max Voltage (V)
AVM12-6.4	0.86	3.33	6.4	12.7	5.0	12.3	20.4±3.2	60
AVM12-10	1.0	3.9	10	12.7	7.1	17.5	30.2±5	60
AVM12-20	1.0	3.8	20	12.7	8.5	25.8	45.3±10	60
AVM12-30	0.9	3.44	30	12.7	14.6	39.7	68.3±15	60
AVM14-10	1.05	3.12	10	14.2	3.0	16.6	28.8±5	60
AVM14-HF-5	2.27	6.81	5	14.2	7.0	20.7	25.0±2.5	60
AVM14-HF-10	3.22	9.65	10	14.2	10.1	32.5	40.5±5	60
AVM19-5	1.66	7.5	5	19.0	9.0	32.8	24.0±2.5	60
AVM20-10	1.53	7.42	10	20.0	11.0	56.1	31.0±5	60
AVM20-25	1.52	6.87	25	20.0	17.8	76.8	55.0±12.5	60
AVM20-HF-6	5.44	16.3	6	20.0	13.5	61.0	37.5±3	60
AVM20-HF-15	4.54	19.8	15	20.0	24.3	113.8	71.0±7.5	60
AVM20-HF-35	4.8	23.9	35	20.0	72.9	223.3	134.0±17.5	60
AVM24-5	2.13	11.7	5	24.0	12.0	41.7	19.7±2.5	60
AVM24-10	2.8	15.7	10	24.0	16.5	61.5	30.0±5	60
AVM24-HF-5	6.13	33.5	5	24.0	21.5	103.5	42.9±2.5	60
AVM24-HF-10	7.53	40.9	10	24.0	23.5	104.6	45.9±5	60
AVM30-7	5.62	24.9	7	30.0	18.4	104.6	28.3±3.5	60
AVM30-15	4.43	28.2	15	30.0	25.1	120.7	39.0±7.5	60
AVM30-30	4.65	13.9	30	30.0	48.3	198.9	61.5±15	60
AVM30-HF-4	7.23	46.1	4	30.0	27.7	126.4	34.5±2	60
AVM30-HF-8	9.99	51.9	8	30.0	30.9	225.7	59.5±4	60
AVM30-HF-12	12.9	81.8	12	30.0	57.5	268.0	70.0±6	60
AVM35-HF-7	14.8	73.0	7	35.0	53.0	199.8	45.3±3.5	60
AVM35-HF-8	30.5	152.4	8	35.0	85.2	456.6	88.5±4	60
AVM35-HF-10	19.0	95.1	10	35.0	78.0	363.7	65.0±5	60
AVM35-HF-15	20.5	103.0	15	35.0	78.0	340.7	67.5±7.5	60
AVM35-HF-25	27.9	139.5	25	35.0	123.0	481.8	96.3±12.5	60
AVM40-5	6.45	38.9	5	40.0	40.3	165.0	25.8±2.5	60
AVM40-13	9.27	54.9	13	40.0	50.0	225.1	37.8±6.5	60
AVM40-20	10.5	61.7	20	40.0	64.0	290.2	49.8±10	60
AVM40-30	11.1	65.3	30	40.0	82.0	370.6	64.8±15	60
AVM40-40	7.72	39.5	40	40.0	150.2	471.4	88.8±20	60
AVM40-HF-6.4	17.7	96.3	6.4	40.0	49.0	244.0	39.6±3.2	60
AVM40-HF-6.5	17.1	95.5	6.5	40.0	68.0	286.7	49.3±3.25	60
AVM40-HF-10	25.5	102.1	10	40.0	80.5	415.0	62.0±5	60
AVM40-HF-20	30.4	122.1	20	40.0	146.9	544.1	76.5±10	60
AVM50-HF-5	23.1	92.9	5	50.0	71.5	416.1	38.0±2.5	60
AVM50-HF-10	34.6	141.4	10	50.0	148.0	701.0	74.3±5	60
AVM50-HF-13	39.7	165.7	13	50.0	144.0	772.0	70.3±6.5	60
AVM50-HF-20	50.0	208.5	20	50.0	195.0	1126.1	104.3±10	60
AVM50-HF-30	46.1	202.3	30	50.0	376.3	1508.4	129.3±15	60
AVM60-12	21.4	98.7	12	60.0	130.0	610.0	44.0±6	60
AVM60-25	26.8	121.6	25	60.0	212.0	904.9	66.1±12.5	60
AVM60-40	29.0	131.1	40	60.0	446.9	1546.4	107.8±20	60
AVM60-HF-10	52.2	223.7	10	60.0	236.5	1233.5	89.0±5	60

Cylindrical Voice Coil Motors

Model	Continuous Force (100℃)(N)	Peak Force (N)	Stroke (mm)	Diameter (mm)	Coil Weight (g)	Total Weight (g)	Motor Length ±Stroke/2(mm)	Max Voltage (V)
AVM65-HF-20	47.8	143.6	20	65.0	365.5	1576.3	97.0±10	60
AVM75-38	48.6	209.9	38	75.0	534.0	1770.0	87.1±19	60
AVM75-HF-25	127.9	590.1	25	75.0	710.0	2650.0	109.5±12.5	60
AVM80-12	47.9	205.9	12	80.0	235.3	1500.3	60.75±6	60
AVM90-15	36.1	132.5	15	90.0	563.5	1395.4	51.4±7.5	120
AVM90-30	95.6	340.3	30	90.0	820.0	2459.0	83.3±15	120
AVM90-HF-5	61.6	218.6	5	90.0	427.2	1941.8	83.1±2.5	120
AVM90-HF-10	156.1	610.2	10	90.0	960.0	3360.0	109.4±5	120
AVM100-HF-10	193.6	763.7	10	99.0	1117.0	4417.0	109.4±5	120
AVM100-HF-30	309.5	1241.9	30	100.0	2012.9	7498.6	170.4±15	120
AVM130-HF-10	150.8	452.3	10	130.0	1080.0	6380.0	106.3±5	120
AVM130-HF-20	226.0	678.1	20	130.0	1955.5	8514.5	139.8±10	120
AVM130-HF-25	316.4	667.8	25	130.0	1550.0	10850.0	164.8±12.5	120
AVM150-HF-20	626.0	1882.5	20	150.0	1500.0	14600.0	146.0±10	120
AVM250-HF-20	1111.4	4715.2	20	260.0	5900.0	33100.0	120.0±10	120

Planar Voice Coil Motors

Model	Continuous Force (100℃)(N)	Peak Force (N)	Stroke (mm)	Dimensions (L×W×H)(mm)	Coil Weight (g)	Total Weight (g)	Max Voltage (V)
AVA1-20	3.84	11.5	20	74×39×16.6	17.0	203.0	60
AVA2-20	11.69	35.1	20	83×54×26.1	45.0	541.0	60
AVA3-20	26.32	79.0	20	91×69×32.1	72.0	1002.0	60



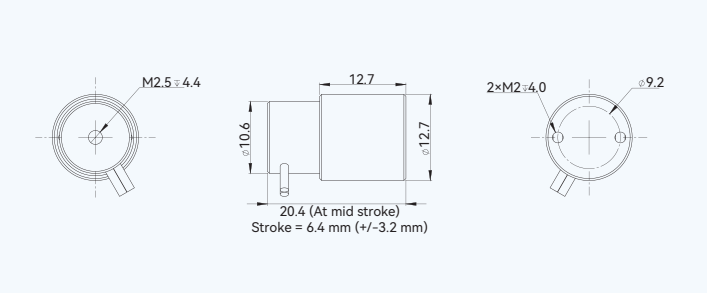
AVM SERIES

- Direct drive, zero cogging, zero backlash voice coil motors
- Low coil mass with very fast response and bandwidth
- No contact between coil and core movement (no wear and tear)
- Smooth motion at low speeds with limitless resolution (depends on feedback device)

AVM12-6.4

Performance Parameters		Symbol	Unit	AVM12-6.4
Stroke		S	mm	6.4
Continuous Force @100°C❶❷		F_c	N	0.86
Peak Force❷		F_{pk}	N	3.33
Force Constant ±10%❷		K_f	N/A	0.54
Back EMF Constant ±10%❷		K_e	V/(m/s)	0.54
Motor Constant @25°C❷		K_m	N/Sqrt(W)	0.51
Resistance @25°C ±10%❸		R_{25}	Ω	1.10
Inductance ±20%❹		L	mH	0.10
Electrical Time Constant		τ_e	ms	0.09
Continuous Current @100°C❶		I_c	A	1.6
Peak Current		I_{pk}	A	6.2
Continuous Power Dissipation @100°C❶		P_c	W	3.6
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.048
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	5.0
Core Mass		m_{core}	g	7.3
Running Clearance		L_{gap}	mm	0.35
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

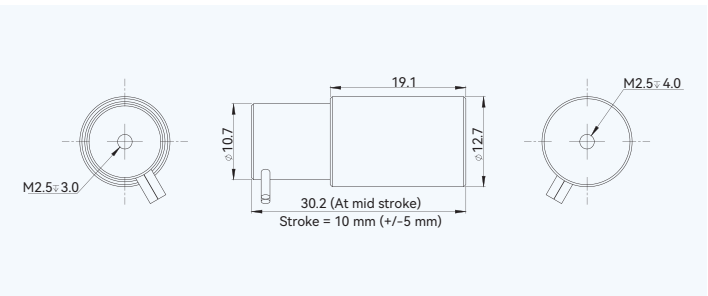


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM12-10

Performance Parameters		Symbol	Unit	AVM12-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	1.0
Peak Force❷		F_{pk}	N	3.9
Force Constant ±10%❷		K_f	N/A	0.55
Back EMF Constant ±10%❷		K_e	V/(m/s)	0.55
Motor Constant @25°C❷		K_m	N/Sqrt(W)	0.45
Resistance @25°C ±10%❸		R_{25}	Ω	1.50
Inductance ±20%❹		L	mH	0.16
Electrical Time Constant		τ_e	ms	0.11
Continuous Current @100°C❶		I_c	A	1.8
Peak Current		I_{pk}	A	7.0
Continuous Power Dissipation @100°C❶		P_c	W	6.3
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.084
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	7.1
Core Mass		m_{core}	g	10.4
Running Clearance		L_{gap}	mm	0.30
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

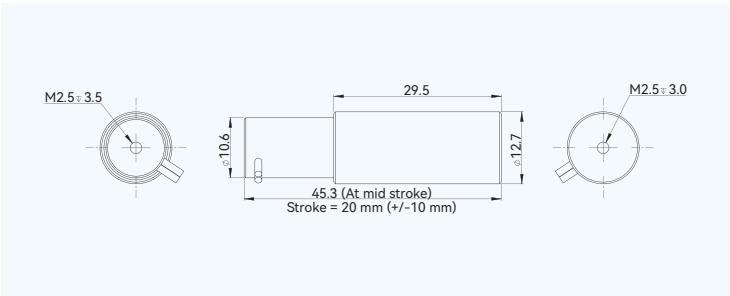


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM12-20

Performance Parameters		Symbol	Unit	AVM12-20
Stroke		S	mm	20.0
Continuous Force @100°C❶❷		F_c	N	1.0
Peak Force❷		F_{pk}	N	3.8
Force Constant ±10%❷		K_f	N/A	0.66
Back EMF Constant ±10%❷		K_e	V/(m/s)	0.66
Motor Constant @25°C❷		K_m	N/Sqrt(W)	0.37
Resistance @25°C ±10%❸		R_{25}	Ω	3.20
Inductance ±20%❹		L	mH	0.33
Electrical Time Constant		τ_e	ms	0.10
Continuous Current @100°C❶		I_c	A	1.5
Peak Current		I_{pk}	A	5.8
Continuous Power Dissipation @100°C❶		P_c	W	9.3
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.124
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	8.5
Core Mass		m_{core}	g	17.3
Running Clearance		L_{gap}	mm	0.35
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

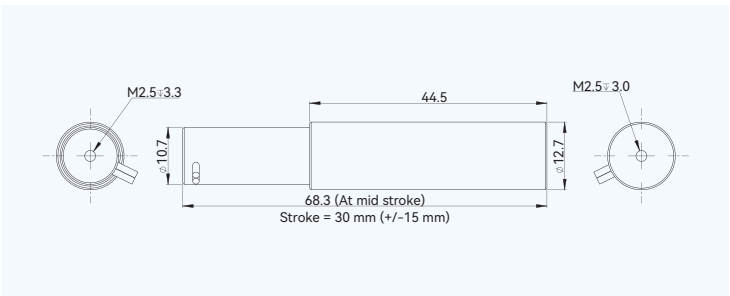


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM12-30

Performance Parameters		Symbol	Unit	AVM12-30
Stroke		S	mm	30.0
Continuous Force @100°C❶❷		F_c	N	0.90
Peak Force❷		F_{pk}	N	3.44
Force Constant ±10%❷		K_f	N/A	0.60
Back EMF Constant ±10%❷		K_e	V/(m/s)	0.60
Motor Constant @25°C❷		K_m	N/Sqrt(W)	0.31
Resistance @25°C ±10%❸		R_{25}	Ω	3.70
Inductance ±20%❹		L	mH	0.45
Electrical Time Constant		τ_e	ms	0.12
Continuous Current @100°C❶		I_c	A	1.5
Peak Current		I_{pk}	A	5.8
Continuous Power Dissipation @100°C❶		P_c	W	10.7
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.143
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	14.6
Core Mass		m_{core}	g	25.1
Running Clearance		L_{gap}	mm	0.30
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

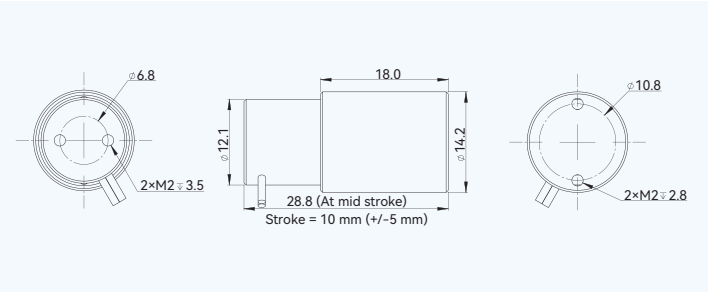


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM14-10

Performance Parameters		Symbol	Unit	AVM14-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	1.05
Peak Force❷		F_{pk}	N	3.12
Force Constant ±10%❷		K_f	N/A	0.87
Back EMF Constant ±10%❷		K_e	V/(m/s)	0.87
Motor Constant @25°C❷		K_m	N/Sqrt(W)	0.59
Resistance @25°C ±10%❸		R_{25}	Ω	2.22
Inductance ±20%❹		L	mH	0.24
Electrical Time Constant		τ_e	ms	0.11
Continuous Current @100°C❶		I_c	A	1.2
Peak Current		I_{pk}	A	3.6
Continuous Power Dissipation @100°C❶		P_c	W	4.1
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.055
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	3.0
Core Mass		m_{core}	g	13.6
Running Clearance		L_{gap}	mm	0.35
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

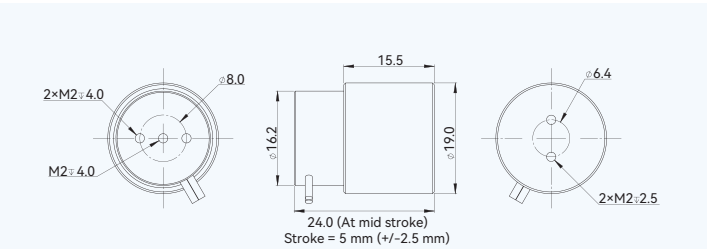


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM19-5

Performance Parameters		Symbol	Unit	AVM19-5
Stroke		S	mm	5.0
Continuous Force @100°C❶❷		F_c	N	1.66
Peak Force❷		F_{pk}	N	7.50
Force Constant ±10%❷		K_f	N/A	1.66
Back EMF Constant ±10%❷		K_e	V/(m/s)	1.66
Motor Constant @25°C❷		K_m	N/Sqrt(W)	1.11
Resistance @25°C ±10%❸		R_{25}	Ω	2.24
Inductance ±20%❹		L	mH	0.29
Electrical Time Constant		τ_e	ms	0.13
Continuous Current @100°C❶		I_c	A	1.0
Peak Current		I_{pk}	A	4.5
Continuous Power Dissipation @100°C❶		P_c	W	2.9
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.038
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	9.0
Core Mass		m_{core}	g	23.8
Running Clearance		L_{gap}	mm	0.40
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

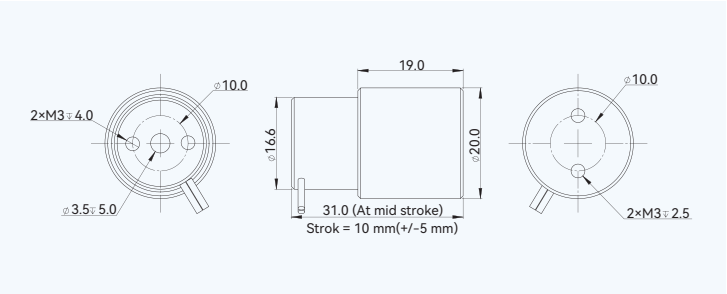


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM20-10

Performance Parameters		Symbol	Unit	AVM20-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	1.53
Peak Force❷		F_{pk}	N	7.42
Force Constant ±10%❷		K_f	N/A	1.97
Back EMF Constant ±10%❷		K_e	V/(m/s)	1.97
Motor Constant @25°C❷		K_m	N/Sqrt(W)	1.04
Resistance @25°C ±10%❸		R_{25}	Ω	3.59
Inductance ±20%❹		L	mH	0.55
Electrical Time Constant		τ_e	ms	0.15
Continuous Current @100°C❶		I_c	A	0.8
Peak Current		I_{pk}	A	3.8
Continuous Power Dissipation @100°C❶		P_c	W	2.8
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.038
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	11.0
Core Mass		m_{core}	g	45.1
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

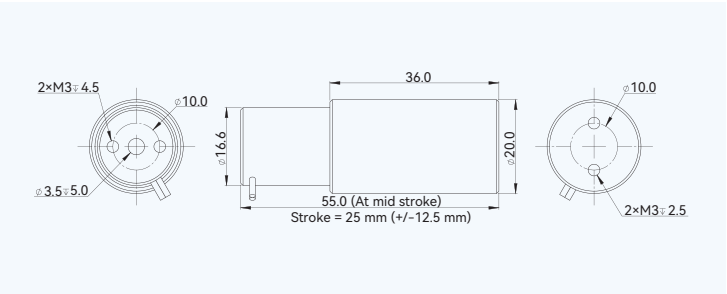


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM20-25

Performance Parameters		Symbol	Unit	AVM20-25
Stroke		S	mm	25.0
Continuous Force @100°C❶❷		F_c	N	1.52
Peak Force❷		F_{pk}	N	6.87
Force Constant ±10%❷		K_f	N/A	2.03
Back EMF Constant ±10%❷		K_e	V/(m/s)	2.03
Motor Constant @25°C❷		K_m	N/Sqrt(W)	0.80
Resistance @25°C ±10%❸		R_{25}	Ω	6.40
Inductance ±20%❹		L	mH	1.15
Electrical Time Constant		τ_e	ms	0.18
Continuous Current @100°C❶		I_c	A	0.8
Peak Current		I_{pk}	A	3.4
Continuous Power Dissipation @100°C❶		P_c	W	4.6
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.062
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	17.8
Core Mass		m_{core}	g	59.0
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

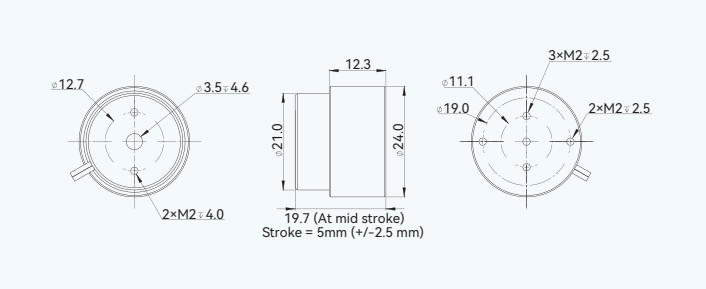


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM24-5

Performance Parameters		Symbol	Unit	AVM24-5
Stroke		S	mm	5.0
Continuous Force @100°C❶❷		F_c	N	2.13
Peak Force❷		F_{pk}	N	11.7
Force Constant ±10%❷		K_f	N/A	3.04
Back EMF Constant ±10%❷		K_e	V/(m/s)	3.04
Motor Constant @25°C❷		K_m	N/Sqrt(W)	1.71
Resistance @25°C ±10%❸		R_{25}	Ω	3.15
Inductance ±20%❹		L	mH	0.55
Electrical Time Constant		τ_e	ms	0.17
Continuous Current @100°C❶		I_c	A	0.7
Peak Current		I_{pk}	A	3.8
Continuous Power Dissipation @100°C❶		P_c	W	2.0
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.027
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	12.0
Core Mass		m_{core}	g	29.7
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

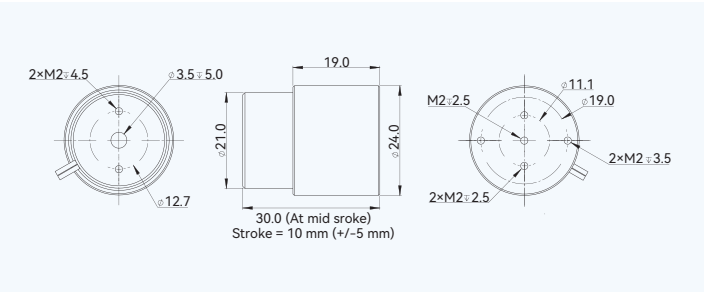


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM24-10

Performance Parameters		Symbol	Unit	AVM24-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	2.80
Peak Force❷		F_{pk}	N	15.7
Force Constant ±10%❷		K_f	N/A	4.12
Back EMF Constant ±10%❷		K_e	V/(m/s)	4.12
Motor Constant @25°C❷		K_m	N/Sqrt(W)	1.70
Resistance @25°C ±10%❸		R_{25}	Ω	5.86
Inductance ±20%❹		L	mH	1.34
Electrical Time Constant		τ_e	ms	0.23
Continuous Current @100°C❶		I_c	A	0.7
Peak Current		I_{pk}	A	3.8
Continuous Power Dissipation @100°C❶		P_c	W	3.5
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.047
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	16.5
Core Mass		m_{core}	g	45.0
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

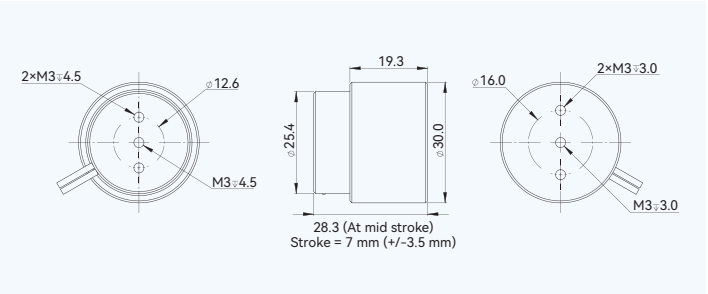


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM30-7

Performance Parameters		Symbol	Unit	AVM30-7
Stroke		S	mm	7.0
Continuous Force @100°C❶❷		F_c	N	5.62
Peak Force❷		F_{pk}	N	24.9
Force Constant ±10%❷		K_f	N/A	6.18
Back EMF Constant ±10%❷		K_e	V/(m/s)	6.18
Motor Constant @25°C❷		K_m	N/Sqrt(W)	2.53
Resistance @25°C ±10%❸		R_{25}	Ω	5.94
Inductance ±20%❹		L	mH	1.41
Electrical Time Constant		τ_e	ms	0.24
Continuous Current @100°C❶		I_c	A	0.9
Peak Current		I_{pk}	A	4.0
Continuous Power Dissipation @100°C❶		P_c	W	6.3
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.085
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	18.4
Core Mass		m_{core}	g	86.2
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class		Class A (105°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

Dimension

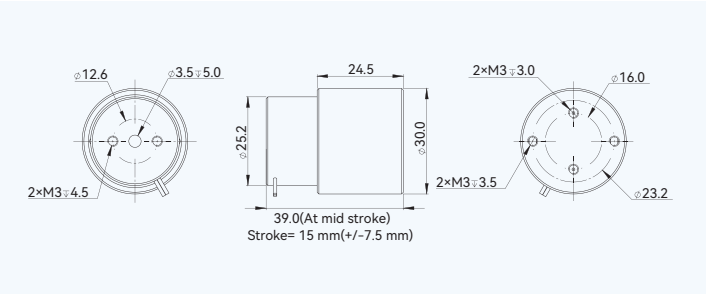


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM30-15

Performance Parameters		Symbol	Unit	AVM30-15
Stroke		S	mm	15.0
Continuous Force @100°C ❶❷		F_c	N	4.43
Peak Force❷		F_{pk}	N	28.2
Force Constant ±10%❷		K_f	N/A	7.03
Back EMF Constant ±10%❷		K_e	V/(m/s)	7.03
Motor Constant @25°C❷		K_m	N/Sqrt(W)	2.20
Resistance @25°C ±10%❸		R_{25}	Ω	10.24
Inductance ±20%❹		L	mH	2.82
Electrical Time Constant		τ_e	ms	0.28
Continuous Current @100°C❶		I_c	A	0.6
Peak Current		I_{pk}	A	4.0
Continuous Power Dissipation @100°C❶		P_c	W	5.2
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.070
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	25.1
Core Mass		m_{core}	g	95.6
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class		Class A (105°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

Dimension

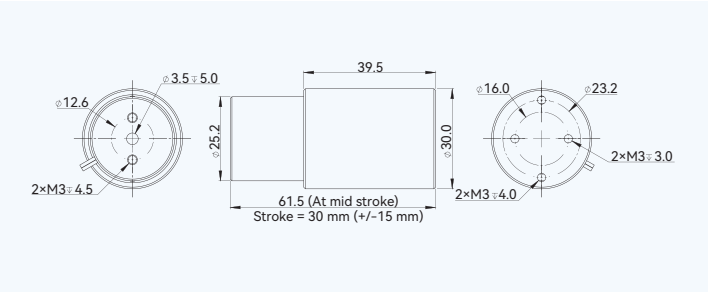


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM30-30

Performance Parameters		Symbol	Unit	AVM30-30
Stroke		S	mm	30.0
Continuous Force @100°C❶❷		F_c	N	4.65
Peak Force❷		F_{pk}	N	13.9
Force Constant ±10%❷		K_f	N/A	3.32
Back EMF Constant ±10%❷		K_e	V/(m/s)	3.32
Motor Constant @25°C❷		K_m	N/Sqrt(W)	1.80
Resistance @25°C ±10%❸		R_{25}	Ω	3.40
Inductance ±20%❹		L	mH	0.99
Electrical Time Constant		τ_e	ms	0.29
Continuous Current @100°C❶		I_c	A	1.4
Peak Current		I_{pk}	A	4.2
Continuous Power Dissipation @100°C❶		P_c	W	8.6
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.115
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	48.3
Core Mass		m_{core}	g	150.6
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class		Class A (105°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

Dimension

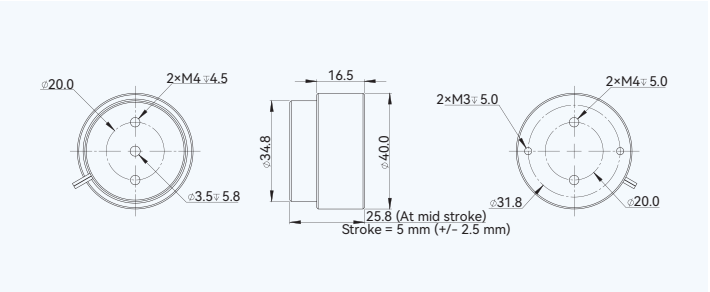


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM40-5

Performance Parameters		Symbol	Unit	AVM40-5
Stroke		S	mm	5.0
Continuous Force @100°C❶❷		F_c	N	6.45
Peak Force❷		F_{pk}	N	38.9
Force Constant ±10%❷		K_f	N/A	8.37
Back EMF Constant ±10%❷		K_e	V/(m/s)	8.37
Motor Constant @25°C❷		K_m	N/Sqrt(W)	3.90
Resistance @25°C ±10%❸		R_{25}	Ω	4.60
Inductance ±20%❹		L	mH	2.15
Electrical Time Constant		τ_e	ms	0.47
Continuous Current @100°C❶		I_c	A	0.8
Peak Current		I_{pk}	A	4.5
Continuous Power Dissipation @100°C❶		P_c	W	3.5
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.047
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	40.3
Core Mass		m_{core}	g	124.7
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class		Class A (105°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

Dimension

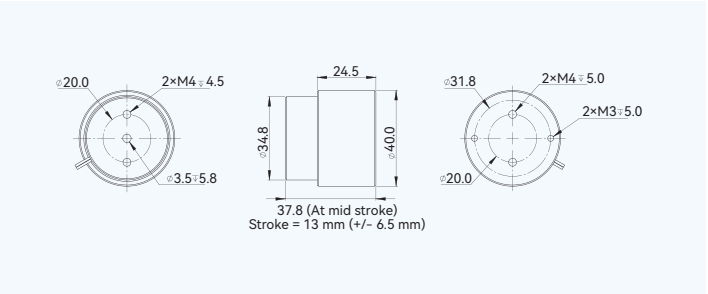


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM40-13

Performance Parameters		Symbol	Unit	AVM40-13
Stroke		S	mm	13.0
Continuous Force @100°C❶❷		F_c	N	9.27
Peak Force❷		F_{pk}	N	54.9
Force Constant ±10%❷		K_f	N/A	12.0
Back EMF Constant ±10%❷		K_e	V/(m/s)	12.0
Motor Constant @25°C❷		K_m	N/Sqrt(W)	4.26
Resistance @25°C ±10%❸		R_{25}	Ω	8.0
Inductance ±20%❹		L	mH	4.44
Electrical Time Constant		τ_e	ms	0.55
Continuous Current @100°C❶		I_c	A	0.8
Peak Current		I_{pk}	A	4.5
Continuous Power Dissipation @100°C❶		P_c	W	6.1
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.082
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	50.0
Core Mass		m_{core}	g	175.1
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

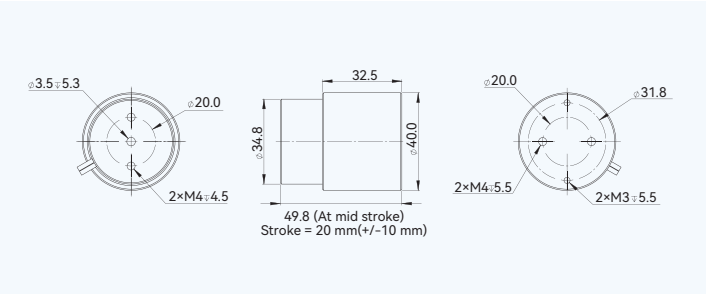


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM40-20

Performance Parameters		Symbol	Unit	AVM40-20
Stroke		S	mm	20.0
Continuous Force @100°C❶❷		F_c	N	10.5
Peak Force❷		F_{pk}	N	61.7
Force Constant ±10%❷		K_f	N/A	13.6
Back EMF Constant ±10%❷		K_e	V/(m/s)	13.6
Motor Constant @25°C❷		K_m	N/Sqrt(W)	4.02
Resistance @25°C ±10%❸		R_{25}	Ω	11.5
Inductance ±20%❹		L	mH	5.2
Electrical Time Constant		τ_e	ms	0.45
Continuous Current @100°C❶		I_c	A	0.8
Peak Current		I_{pk}	A	4.5
Continuous Power Dissipation @100°C❶		P_c	W	8.8
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.117
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	64.0
Core Mass		m_{core}	g	226.2
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

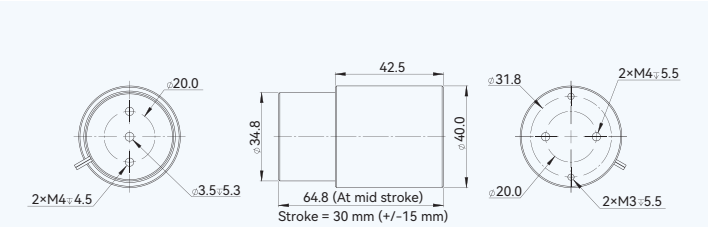


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM40-30

Performance Parameters		Symbol	Unit	AVM40-30
Stroke		S	mm	30.0
Continuous Force @100°C❶❷		F_c	N	11.1
Peak Force❷		F_{pk}	N	65.3
Force Constant ±10%❷		K_f	N/A	14.5
Back EMF Constant ±10%❷		K_e	V/(m/s)	14.5
Motor Constant @25°C❷		K_m	N/Sqrt(W)	3.64
Resistance @25°C ±10%❸		R_{25}	Ω	15.8
Inductance ±20%❹		L	mH	7.9
Electrical Time Constant		τ_e	ms	0.50
Continuous Current @100°C❶		I_c	A	0.8
Peak Current		I_{pk}	A	4.5
Continuous Power Dissipation @100°C❶		P_c	W	12.1
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.161
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	82.0
Core Mass		m_{core}	g	288.6
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

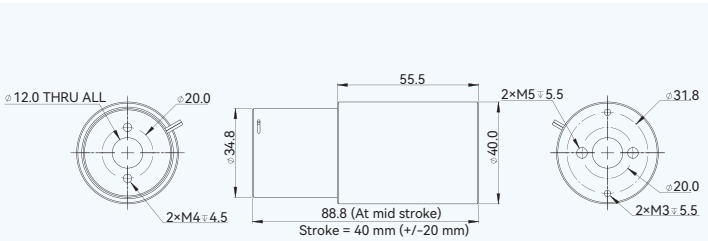


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM40-40

Performance Parameters		Symbol	Unit	AVM40-40
Stroke		S	mm	40.0
Continuous Force @100°C❶❷		F_c	N	7.72
Peak Force❷		F_{pk}	N	39.5
Force Constant ±10%❷		K_f	N/Arms	6.17
Back EMF Constant ±10%❷		K_e	Vpeak/(m/s)	6.17
Motor Constant @25°C❷		K_m	N/Sqrt(W)	2.50
Resistance @25°C ±10%❸		R_{25}	Ω	6.10
Inductance ±20%❹		L	mH	3.12
Electrical Time Constant		τ_e	ms	0.51
Continuous Current @100°C❶		I_c	Arms	1.3
Peak Current		I_{pk}	Arms	6.4
Continuous Power Dissipation @100°C❶		P_c	W	12.3
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.164
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	150.2
Core Mass		m_{core}	g	321.2
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

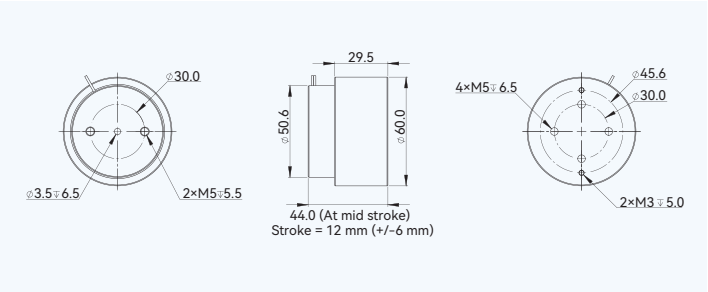


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM60-12

Performance Parameters		Symbol	Unit	AVM60-12
Stroke		S	mm	12.0
Continuous Force @100°C❶❷		F_c	N	21.4
Peak Force❷		F_{pk}	N	98.7
Force Constant ±10%❷		K_f	N/A	13.8
Back EMF Constant ±10%❷		K_e	V/(m/s)	13.8
Motor Constant @25°C❷		K_m	N/Sqrt(W)	7.72
Resistance @25°C ±10%❸		R_{25}	Ω	3.20
Inductance ±20%❹		L	mH	4.89
Electrical Time Constant		τ_e	ms	1.53
Continuous Current @100°C❶		I_c	A	1.6
Peak Current		I_{pk}	A	7.0
Continuous Power Dissipation @100°C❶		P_c	W	9.9
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.132
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	130.0
Core Mass		m_{core}	g	480.0
Running Clearance		L_{gap}	mm	0.70
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

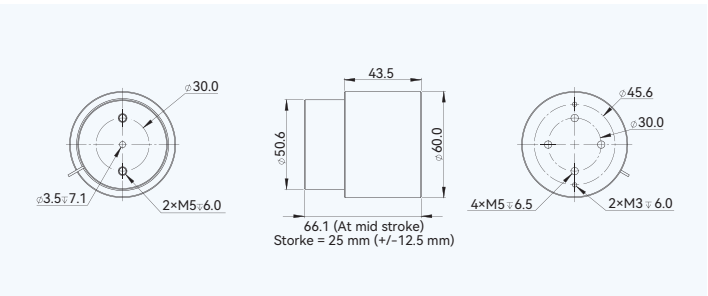


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM60-25

Performance Parameters		Symbol	Unit	AVM60-25
Stroke		S	mm	25.0
Continuous Force @100°C❶❷		F_c	N	26.8
Peak Force❷		F_{pk}	N	121.6
Force Constant ±10%❷		K_f	N/A	17.3
Back EMF Constant ±10%❷		K_e	V/(m/s)	17.3
Motor Constant @25°C❷		K_m	N/Sqrt(W)	7.47
Resistance @25°C ±10%❸		R_{25}	Ω	5.35
Inductance ±20%❹		L	mH	3.82
Electrical Time Constant		τ_e	ms	0.71
Continuous Current @100°C❶		I_c	A	1.6
Peak Current		I_{pk}	A	7.0
Continuous Power Dissipation @100°C❶		P_c	W	16.6
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.2
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	212.0
Core Mass		m_{core}	g	692.9
Running Clearance		L_{gap}	mm	0.7
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

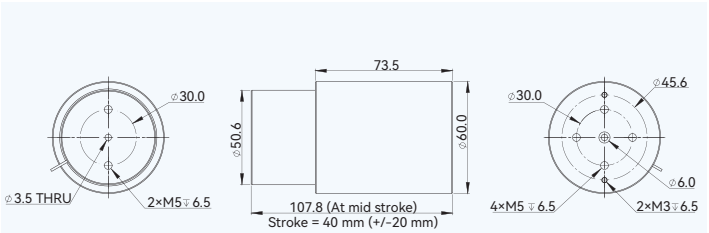


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM60-40

Performance Parameters		Symbol	Unit	AVM60-40
Stroke		S	mm	40.0
Continuous Force @100°C[1][2]		F_c	N	29.0
Peak Force[2]		F_{pk}	N	131.1
Force Constant ±10%[2]		K_f	N/A	18.7
Back EMF Constant ±10%[2]		K_e	V/(m/s)	18.7
Motor Constant @25°C[2]		K_m	N/Sqrt(W)	6.06
Resistance @25°C ±10%[3]		R_{25}	Ω	9.50
Inductance ±20%[4]		L	mH	8.32
Electrical Time Constant		τ_e	ms	0.88
Continuous Current @100°C[1]		I_c	A	1.6
Peak Current		I_{pk}	A	7.0
Continuous Power Dissipation @100°C[1]		P_c	W	29.4
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant[1]		K_{th}	W/°C	0.392
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	446.9
Core Mass		m_{core}	g	1099.5
Running Clearance		L_{gap}	mm	0.70
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

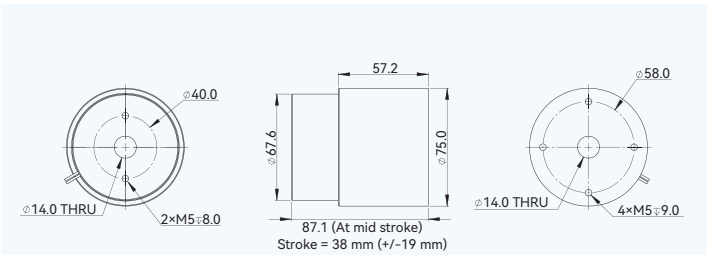


[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] The values are at mid stroke.
[3] Resistance is measured by DC current with standard 0.5 m lead wire.
[4] Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM75-38

Performance Parameters		Symbol	Unit	AVM75-38
Stroke		S	mm	38.0
Continuous Force @100°C[1][2]		F_c	N	48.6
Peak Force[2]		F_{pk}	N	209.9
Force Constant ±10%[2]		K_f	N/A	14.7
Back EMF Constant ±10%[2]		K_e	V/(m/s)	14.7
Motor Constant @25°C[2]		K_m	N/Sqrt(W)	9.9
Resistance @25°C ±10%[3]		R_{25}	Ω	2.20
Inductance ±20%[4]		L	mH	1.99
Electrical Time Constant		τ_e	ms	0.90
Continuous Current @100°C[1]		I_c	A	3.3
Peak Current		I_{pk}	A	14.0
Continuous Power Dissipation @100°C[1]		P_c	W	30.9
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant[1]		K_{th}	W/°C	0.41
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	534.0
Core Mass		m_{core}	g	1236.0
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

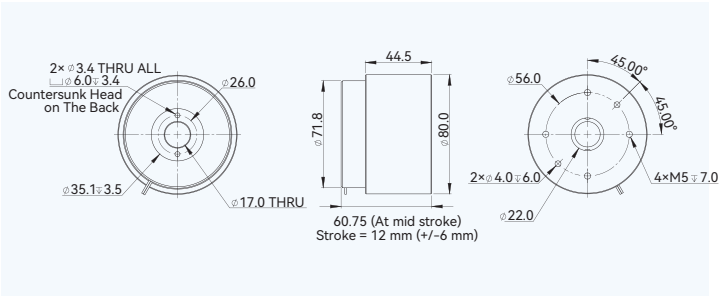


[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] The values are at mid stroke.
[3] Resistance is measured by DC current with standard 0.5 m lead wire.
[4] Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM80-12

Performance Parameters		Symbol	Unit	AVM80-12
Stroke		S	mm	12.0
Continuous Force @100°C❶❷		F_c	N	47.9
Peak Force❷		F_{pk}	N	205.9
Force Constant ±10%❷		K_f	N/A	32.8
Back EMF Constant ±10%❷		K_e	V/(m/s)	32.8
Motor Constant @25°C❷		K_m	N/Sqrt(W)	12.0
Resistance @25°C ±10%❸		R_{25}	Ω	7.50
Inductance ±20%❹		L	mH	1.70
Electrical Time Constant		τ_e	ms	0.23
Continuous Current @100°C❶		I_c	A	1.5
Peak Current		I_{pk}	A	6.2
Continuous Power Dissipation @100°C❶		P_c	W	20.6
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.275
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	235.3
Core Mass		m_{core}	g	1265.0
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

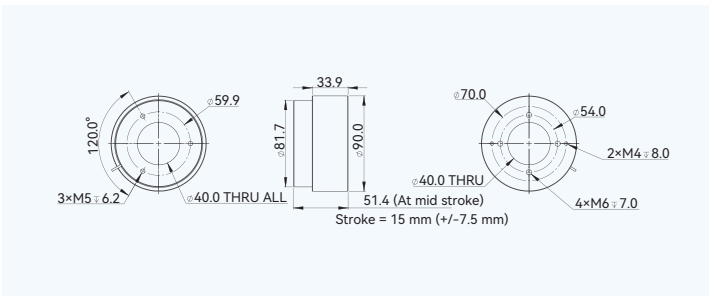


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM90-15

Performance Parameters		Symbol	Unit	AVM90-15
Stroke		S	mm	15.0
Continuous Force @100°C❶❷		F_c	N	36.1
Peak Force❷		F_{pk}	N	132.5
Force Constant ±10%❷		K_f	N/A	9.01
Back EMF Constant ±10%❷		K_e	V/(m/s)	9.01
Motor Constant @25°C❷		K_m	N/Sqrt(W)	7.62
Resistance @25°C ±10%❸		R_{25}	Ω	1.40
Inductance ±20%❹		L	mH	1.20
Electrical Time Constant		τ_e	ms	0.86
Continuous Current @100°C❶		I_c	A	4.0
Peak Current		I_{pk}	A	14.0
Continuous Power Dissipation @100°C❶		P_c	W	28.9
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.38
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	563.5
Core Mass		m_{core}	g	831.9
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

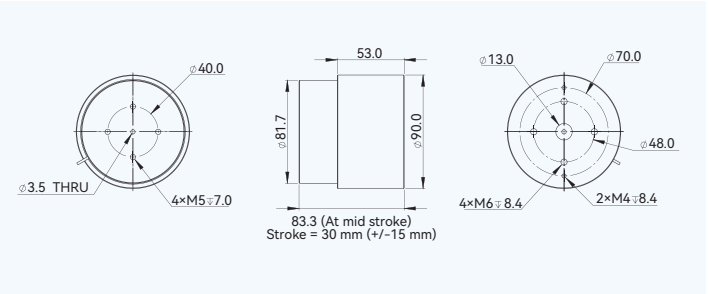


❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷The values are at mid stroke.
❸Resistance is measured by DC current with standard 0.5 m lead wire.
❹Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM90-30

Performance Parameters		Symbol	Unit	AVM90-30
Stroke		S	mm	30.0
Continuous Force @100°C[1][2]		F_c	N	95.6
Peak Force[2]		F_{pk}	N	340.3
Force Constant ±10%[2]		K_f	N/A	23.9
Back EMF Constant ±10%[2]		K_e	V/(m/s)	23.9
Motor Constant @25°C[2]		K_m	N/Sqrt(W)	14.5
Resistance @25°C ±10%[3]		R_{25}	Ω	2.73
Inductance ±20%[4]		L	mH	3.50
Electrical Time Constant		τ_e	ms	1.28
Continuous Current @100°C[1]		I_c	A	4.0
Peak Current		I_{pk}	A	14.0
Continuous Power Dissipation @100°C[1]		P_c	W	56.3
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant[1]		K_{th}	W/℃	0.751
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	820.0
Core Mass		m_{core}	g	1639.0
Running Clearance		L_{gap}	mm	0.65
Other Information				
Insulation Class		Class A (105°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

Dimension



[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] The values are at mid stroke.
[3] Resistance is measured by DC current with standard 0.5 m lead wire.
[4] Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Part Numbering

AVM40-20-0.5

Model and Diameter:
AVM40

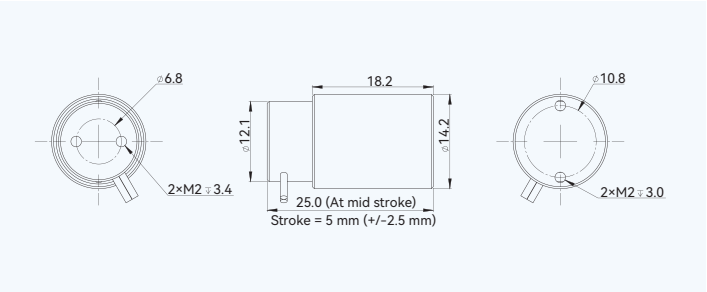
Stroke(mm):
20

Wire Length Option(m):
0.5

AVM14-HF-5

Performance Parameters		Symbol	Unit	AVM14-HF-5
Stroke		S	mm	5.0
Continuous Force @100°C ❶❷		F_c	N	2.27
Peak Force ❷		F_{pk}	N	6.81
Force Constant ±10% ❷		K_f	N/A	1.75
Back EMF Constant ±10% ❷		K_e	V/(m/s)	1.75
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	1.26
Resistance @25°C ±10% ❸		R_{25}	Ω	1.93
Inductance ±20% ❹		L	mH	0.14
Electrical Time Constant		τ_e	ms	0.07
Continuous Current @100°C ❶		I_c	A	1.3
Peak Current		I_{pk}	A	3.9
Continuous Power Dissipation @100°C ❶		P_c	W	4.2
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.056
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	7.0
Core Mass		m_{core}	g	13.7
Running Clearance		L_{gap}	mm	0.35
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

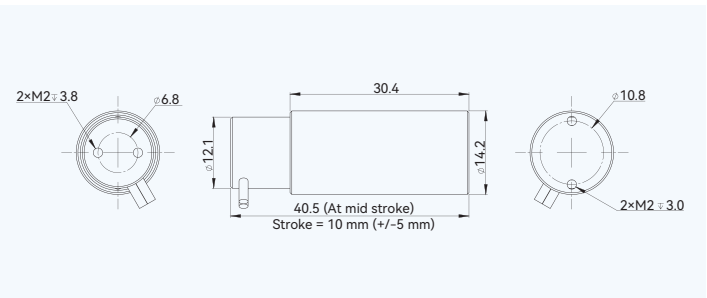


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM14-HF-10

Performance Parameters		Symbol	Unit	AVM14-HF-10
Stroke		S	mm	10.0
Continuous Force @100°C ❶❷		F_c	N	3.22
Peak Force ❷		F_{pk}	N	9.65
Force Constant ±10% ❷		K_f	N/A	2.48
Back EMF Constant ±10% ❷		K_e	V/(m/s)	2.48
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	1.30
Resistance @25°C ±10% ❸		R_{25}	Ω	3.60
Inductance ±20% ❹		L	mH	0.36
Electrical Time Constant		τ_e	ms	0.10
Continuous Current @100°C ❶		I_c	A	1.3
Peak Current		I_{pk}	A	3.9
Continuous Power Dissipation @100°C ❶		P_c	W	7.8
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.105
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	10.1
Core Mass		m_{core}	g	22.3
Running Clearance		L_{gap}	mm	0.35
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

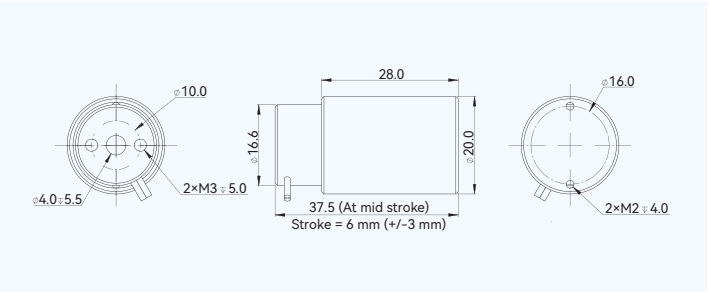


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM20-HF-6

Performance Parameters		Symbol	Unit	AVM20-HF-6
Stroke		S	mm	6.0
Continuous Force @100°C ❶❷		F_c	N	5.44
Peak Force ❷		F_{pk}	N	16.3
Force Constant ±10% ❷		K_f	N/A	4.54
Back EMF Constant ±10% ❷		K_e	V/(m/s)	4.54
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	2.06
Resistance @25°C ±10% ❸		R_{25}	Ω	4.84
Inductance ±20% ❹		L	mH	0.60
Electrical Time Constant		τ_e	ms	0.12
Continuous Current @100°C ❶		I_c	A	1.2
Peak Current		I_{pk}	A	3.6
Continuous Power Dissipation @100°C ❶		P_c	W	9.0
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.120
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	13.5
Core Mass		m_{core}	g	47.5
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

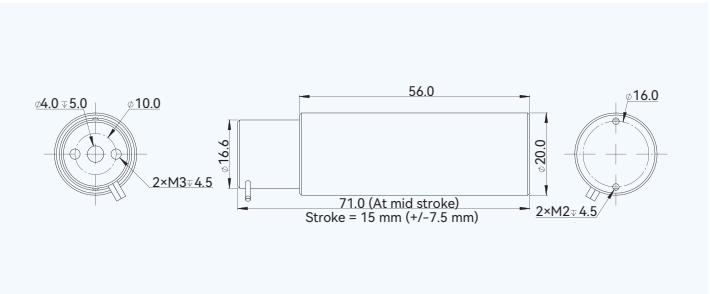


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM20-HF-15

Performance Parameters		Symbol	Unit	AVM20-HF-15
Stroke		S	mm	15.0
Continuous Force @100°C ❶❷		F_c	N	4.54
Peak Force ❷		F_{pk}	N	19.8
Force Constant ±10% ❷		K_f	N/A	5.83
Back EMF Constant ±10% ❷		K_e	V/(m/s)	5.83
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	1.96
Resistance @25°C ±10% ❸		R_{25}	Ω	8.80
Inductance ±20% ❹		L	mH	1.48
Electrical Time Constant		τ_e	ms	0.17
Continuous Current @100°C ❶		I_c	A	0.8
Peak Current		I_{pk}	A	3.4
Continuous Power Dissipation @100°C ❶		P_c	W	6.9
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.092
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	24.3
Core Mass		m_{core}	g	89.6
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

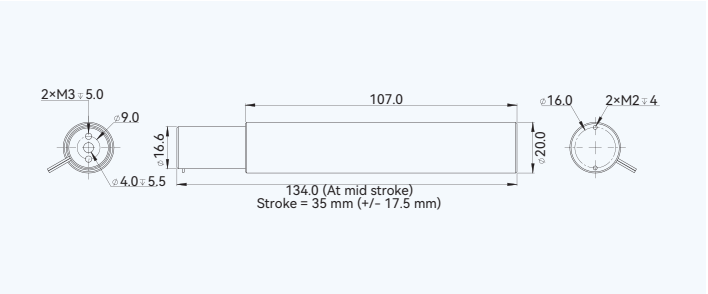


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM20-HF-35

Performance Parameters		Symbol	Unit	AVM20-HF-35
Stroke		S	mm	35.0
Continuous Force @100°C ❶❷		F_c	N	4.80
Peak Force ❷		F_{pk}	N	23.9
Force Constant ±10% ❷		K_f	N/A	3.43
Back EMF Constant ±10% ❷		K_e	V/(m/s)	3.43
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	1.56
Resistance @25°C ±10% ❸		R_{25}	Ω	4.80
Inductance ±20% ❹		L	mH	1.40
Electrical Time Constant		τ_e	ms	0.29
Continuous Current @100°C ❶		I_c	A	1.4
Peak Current		I_{pk}	A	7.0
Continuous Power Dissipation @100°C ❶		P_c	W	12.1
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant ❶		K_{th}	W/℃	0.162
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	72.9
Core Mass		m_{core}	g	150.4
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

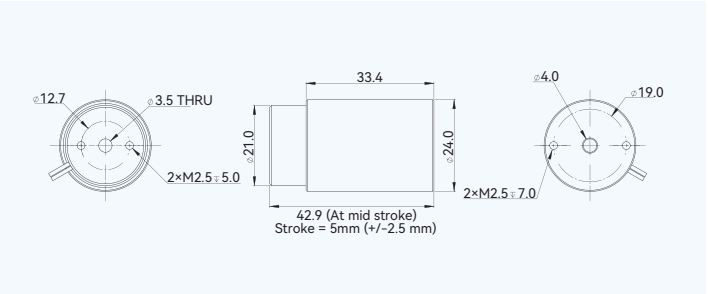


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM24-HF-5

Performance Parameters		Symbol	Unit	AVM24-HF-5
Stroke		S	mm	5.0
Continuous Force @100°C ❶❷		F_c	N	6.13
Peak Force ❷		F_{pk}	N	33.5
Force Constant ±10% ❷		K_f	N/A	8.76
Back EMF Constant ±10% ❷		K_e	V/(m/s)	8.76
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	3.03
Resistance @25°C ±10% ❸		R_{25}	Ω	8.35
Inductance ±20% ❹		L	mH	1.68
Electrical Time Constant		τ_e	ms	0.20
Continuous Current @100°C ❶		I_c	A	0.7
Peak Current		I_{pk}	A	3.8
Continuous Power Dissipation @100°C ❶		P_c	W	5.3
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant ❶		K_{th}	W/℃	0.070
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	21.5
Core Mass		m_{core}	g	82.0
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

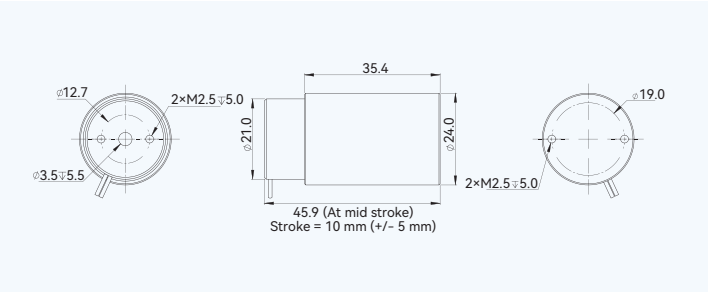


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM24-HF-10

Performance Parameters		Symbol	Unit	AVM24-HF-10
Stroke		S	mm	10.0
Continuous Force @100°C ❶❷		F_c	N	7.53
Peak Force ❷		F_{pk}	N	40.9
Force Constant ±10% ❷		K_f	N/A	10.8
Back EMF Constant ±10% ❷		K_e	V/(m/s)	10.8
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	3.45
Resistance @25°C ±10% ❸		R_{25}	Ω	9.70
Inductance ±20% ❹		L	mH	2.11
Electrical Time Constant		τ_e	ms	0.22
Continuous Current @100°C ❶		I_c	A	0.7
Peak Current		I_{pk}	A	3.8
Continuous Power Dissipation @100°C ❶		P_c	W	6.1
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.082
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	23.5
Core Mass		m_{core}	g	81.1
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

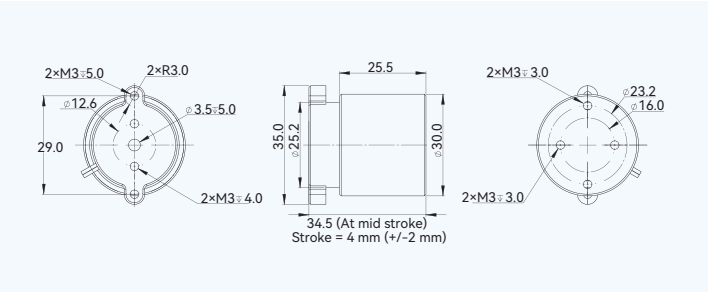


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM30-HF-4

Performance Parameters		Symbol	Unit	AVM30-HF-4
Stroke		S	mm	4.0
Continuous Force @100°C ❶❷		F_c	N	7.23
Peak Force ❷		F_{pk}	N	46.1
Force Constant ±10% ❷		K_f	N/Arms	11.5
Back EMF Constant ±10% ❷		K_e	Vpeak/(m/s)	11.5
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	4.06
Resistance @25°C ±10% ❸		R_{25}	Ω	8.0
Inductance ±20% ❹		L	mH	1.40
Electrical Time Constant		τ_e	ms	0.17
Continuous Current @100°C ❶		I_c	Arms	0.6
Peak Current		I_{pk}	Arms	4.0
Continuous Power Dissipation @100°C ❶		P_c	W	4.1
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.055
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	27.7
Core Mass		m_{core}	g	98.7
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

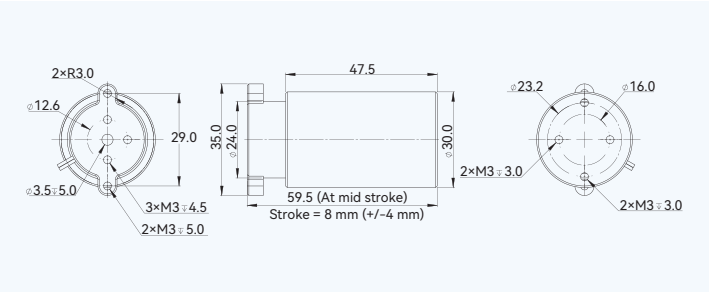


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM30-HF-8

Performance Parameters		Symbol	Unit	AVM30-HF-8
Stroke		S	mm	8.0
Continuous Force @100°C❶❷		F_c	N	9.99
Peak Force❷		F_{pk}	N	51.9
Force Constant ±10%❷		K_f	N/A	13.0
Back EMF Constant ±10%❷		K_e	V/(m/s)	13.0
Motor Constant @25°C❷		K_m	N/Sqrt(W)	4.14
Resistance @25°C ±10%❸		R_{25}	Ω	9.80
Inductance ±20%❹		L	mH	1.75
Electrical Time Constant		τ_e	ms	0.18
Continuous Current @100°C❶		I_c	A	0.8
Peak Current		I_{pk}	A	4.0
Continuous Power Dissipation @100°C❶		P_c	W	7.5
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.100
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	30.9
Core Mass		m_{core}	g	194.9
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

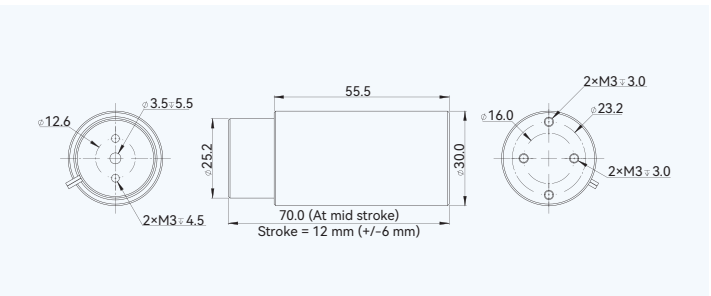


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM30-HF-12

Performance Parameters		Symbol	Unit	AVM30-HF-12
Stroke		S	mm	12.0
Continuous Force @100°C❶❷		F_c	N	12.9
Peak Force❷		F_{pk}	N	81.8
Force Constant ±10%❷		K_f	N/Arms	10.2
Back EMF Constant ±10%❷		K_e	Vpeak/(m/s)	10.2
Motor Constant @25°C❷		K_m	N/Sqrt(W)	4.52
Resistance @25°C ±10%❸		R_{25}	Ω	5.10
Inductance ±20%❹		L	mH	1.39
Electrical Time Constant		τ_e	ms	0.27
Continuous Current @100°C❶		I_c	Arms	1.3
Peak Current		I_{pk}	Arms	8.0
Continuous Power Dissipation @100°C❶		P_c	W	10.4
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.139
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	57.5
Core Mass		m_{core}	g	210.6
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

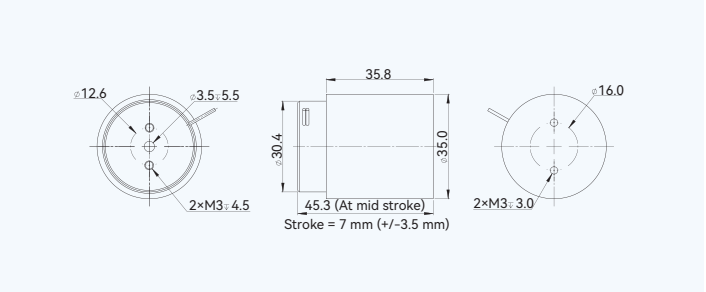


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM35-HF-7

Performance Parameters		Symbol	Unit	AVM35-HF-7
Stroke		S	mm	7.0
Continuous Force @100°C❶❷		F_c	N	14.8
Peak Force❷		F_{pk}	N	73.0
Force Constant ±10%❷		K_f	N/A	16.4
Back EMF Constant ±10%❷		K_e	V/(m/s)	16.4
Motor Constant @25°C❷		K_m	N/Sqrt(W)	5.39
Resistance @25°C ±10%❸		R_{25}	Ω	9.28
Inductance ±20%❹		L	mH	3.55
Electrical Time Constant		τ_e	ms	0.38
Continuous Current @100°C❶		I_c	A	0.9
Peak Current		I_{pk}	A	4.5
Continuous Power Dissipation @100°C❶		P_c	W	9.7
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.129
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	53.0
Core Mass		m_{core}	g	146.8
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

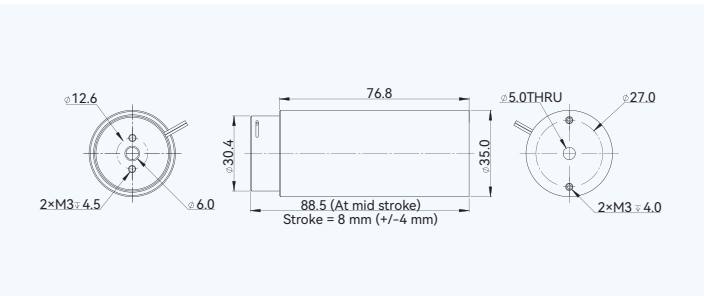


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM35-HF-8

Performance Parameters		Symbol	Unit	AVM35-HF-8
Stroke		S	mm	8.0
Continuous Force @100°C❶❷		F_c	N	30.5
Peak Force❷		F_{pk}	N	152.4
Force Constant ±10%❷		K_f	N/A	38.1
Back EMF Constant ±10%❷		K_e	V/(m/s)	38.1
Motor Constant @25°C❷		K_m	N/Sqrt(W)	9.24
Resistance @25°C ±10%❸		R_{25}	Ω	17.0
Inductance ±20%❹		L	mH	7.15
Electrical Time Constant		τ_e	ms	0.42
Continuous Current @100°C❶		I_c	A	0.8
Peak Current		I_{pk}	A	4.0
Continuous Power Dissipation @100°C❶		P_c	W	14.0
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.187
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	85.2
Core Mass		m_{core}	g	371.4
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

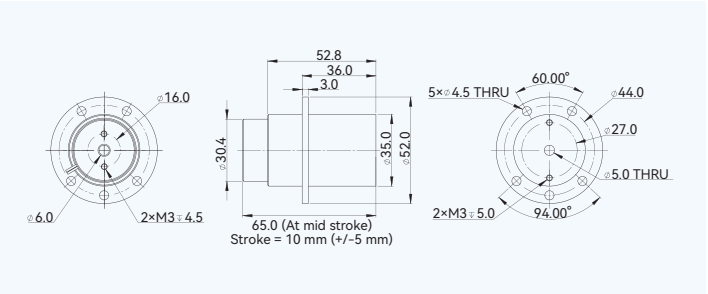


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM35-HF-10

Performance Parameters		Symbol	Unit	AVM35-HF-10
Stroke		S	mm	10.0
Continuous Force @100°C ❶❷		F_c	N	19.0
Peak Force ❷		F_{pk}	N	95.1
Force Constant ±10% ❷		K_f	N/A	23.8
Back EMF Constant ±10% ❷		K_e	V/(m/s)	23.8
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	6.79
Resistance @25°C ±10% ❸		R_{25}	Ω	12.2
Inductance ±20% ❹		L	mH	5.22
Electrical Time Constant		τ_e	ms	0.43
Continuous Current @100°C ❶		I_c	A	0.8
Peak Current		I_{pk}	A	4.0
Continuous Power Dissipation @100°C ❶		P_c	W	10.1
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.134
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	78.0
Core Mass		m_{core}	g	285.7
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

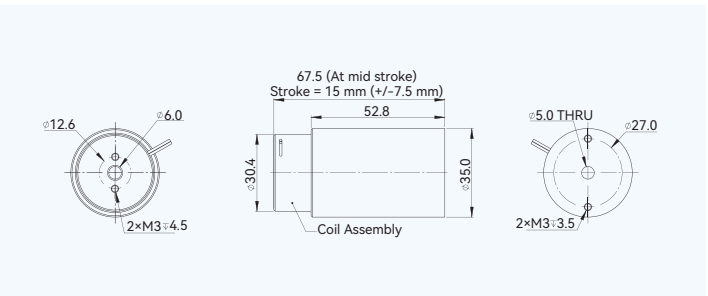


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM35-HF-15

Performance Parameters		Symbol	Unit	AVM35-HF-15
Stroke		S	mm	15.0
Continuous Force @100°C ❶❷		F_c	N	20.5
Peak Force ❷		F_{pk}	N	103.0
Force Constant ±10% ❷		K_f	N/A	25.7
Back EMF Constant ±10% ❷		K_e	V/(m/s)	25.7
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	6.48
Resistance @25°C ±10% ❸		R_{25}	Ω	15.7
Inductance ±20% ❹		L	mH	7.36
Electrical Time Constant		τ_e	ms	0.47
Continuous Current @100°C ❶		I_c	A	0.8
Peak Current		I_{pk}	A	4.0
Continuous Power Dissipation @100°C ❶		P_c	W	12.9
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.173
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	78.0
Core Mass		m_{core}	g	262.7
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

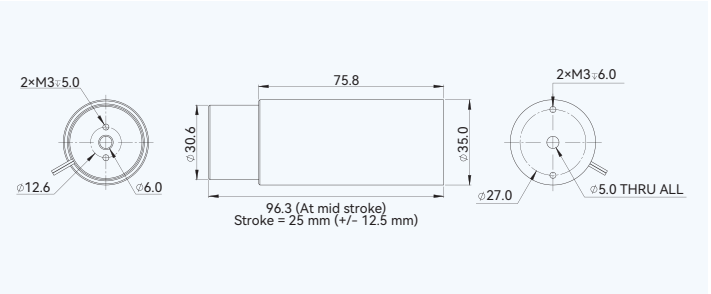


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM35-HF-25

Performance Parameters		Symbol	Unit	AVM35-HF-25
Stroke		S	mm	25.0
Continuous Force @100°C ❶❷		F_c	N	27.9
Peak Force ❷		F_{pk}	N	139.5
Force Constant ±10% ❷		K_f	N/A	13.9
Back EMF Constant ±10% ❷		K_e	V/(m/s)	13.9
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	6.11
Resistance @25°C ±10% ❸		R_{25}	Ω	5.20
Inductance ±20% ❹		L	mH	2.94
Electrical Time Constant		τ_e	ms	0.57
Continuous Current @100°C ❶		I_c	A	2.0
Peak Current		I_{pk}	A	10.0
Continuous Power Dissipation @100°C ❶		P_c	W	26.8
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.357
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	123.0
Core Mass		m_{core}	g	358.8
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

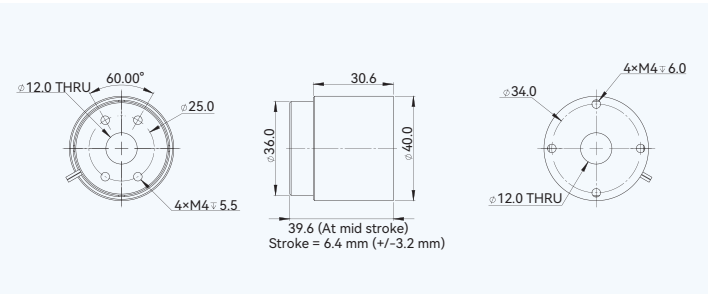


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM40-HF-6.4

Performance Parameters		Symbol	Unit	AVM40-HF-6.4
Stroke		S	mm	6.4
Continuous Force @100°C ❶❷		F_c	N	17.7
Peak Force ❷		F_{pk}	N	96.3
Force Constant ±10% ❷		K_f	N/A	13.6
Back EMF Constant ±10% ❷		K_e	V/(m/s)	13.6
Motor Constant @25°C ❷		K_m	N/Sqrt(W)	5.82
Resistance @25°C ±10% ❸		R_{25}	Ω	5.48
Inductance ±20% ❹		L	mH	1.44
Electrical Time Constant		τ_e	ms	0.26
Continuous Current @100°C ❶		I_c	A	1.3
Peak Current		I_{pk}	A	7.0
Continuous Power Dissipation @100°C ❶		P_c	W	11.9
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.159
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	49.0
Core Mass		m_{core}	g	195.0
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

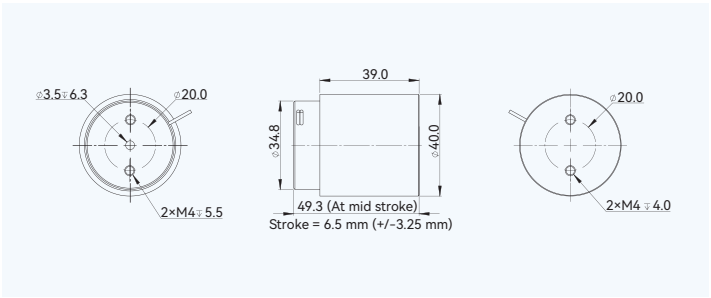


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM40-HF-6.5

Performance Parameters		Symbol	Unit	AVM40-HF-6.5
Stroke		S	mm	6.5
Continuous Force @100°C❶❷		F_c	N	17.1
Peak Force❷		F_{pk}	N	95.5
Force Constant ±10%❷		K_f	N/A	21.4
Back EMF Constant ±10%❷		K_e	V/(m/s)	21.4
Motor Constant @25°C❷		K_m	N/Sqrt(W)	6.59
Resistance @25°C ±10%❸		R_{25}	Ω	10.51
Inductance ±20%❹		L	mH	4.20
Electrical Time Constant		τ_e	ms	0.40
Continuous Current @100°C❶		I_c	A	0.8
Peak Current		I_{pk}	A	4.5
Continuous Power Dissipation @100°C❶		P_c	W	8.7
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.116
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	68.0
Core Mass		m_{core}	g	218.7
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

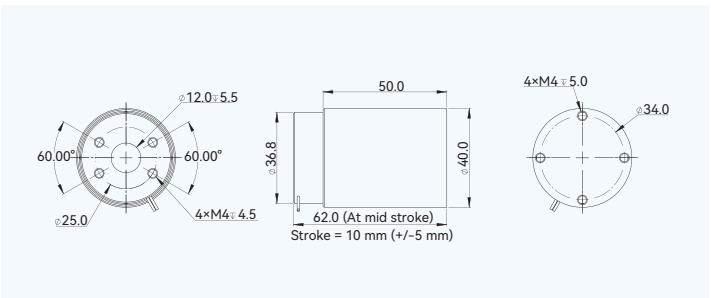


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM40-HF-10

Performance Parameters		Symbol	Unit	AVM40-HF-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	25.5
Peak Force❷		F_{pk}	N	102.1
Force Constant ±10%❷		K_f	N/A	19.6
Back EMF Constant ±10%❷		K_e	V/(m/s)	19.6
Motor Constant @25°C❷		K_m	N/Sqrt(W)	9.14
Resistance @25°C ±10%❸		R_{25}	Ω	4.60
Inductance ±20%❹		L	mH	1.96
Electrical Time Constant		τ_e	ms	0.43
Continuous Current @100°C❶		I_c	A	1.3
Peak Current		I_{pk}	A	5.2
Continuous Power Dissipation @100°C❶		P_c	W	10.0
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.134
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	80.5
Core Mass		m_{core}	g	334.5
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

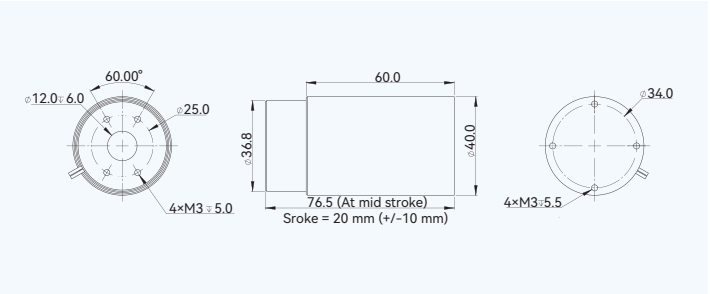


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM40-HF-20

Performance Parameters		Symbol	Unit	AVM40-HF-20
Stroke		S	mm	20.0
Continuous Force @100°C❶❷		F_c	N	30.4
Peak Force❷		F_{pk}	N	122.1
Force Constant ±10%❷		K_f	N/A	23.4
Back EMF Constant ±10%❷		K_e	V/(m/s)	23.4
Motor Constant @25°C❷		K_m	N/Sqrt(W)	8.78
Resistance @25°C ±10%❸		R_{25}	Ω	7.10
Inductance ±20%❹		L	mH	3.56
Electrical Time Constant		τ_e	ms	0.50
Continuous Current @100°C❶		I_c	A	1.3
Peak Current		I_{pk}	A	5.2
Continuous Power Dissipation @100°C❶		P_c	W	15.5
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.206
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	146.9
Core Mass		m_{core}	g	397.3
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

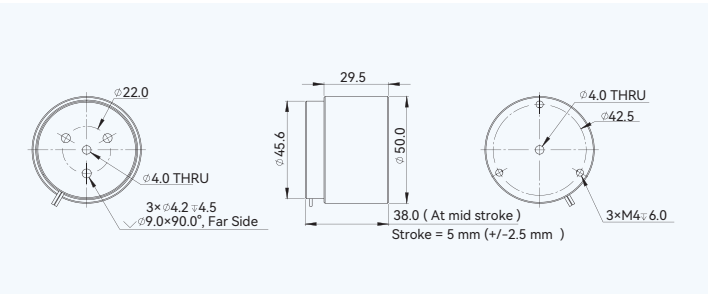


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM50-HF-5

Performance Parameters		Symbol	Unit	AVM50-HF-5
Stroke		S	mm	5.0
Continuous Force @100°C❶❷		F_c	N	23.1
Peak Force❷		F_{pk}	N	92.9
Force Constant ±10%❷		K_f	N/Arms	16.5
Back EMF Constant ±10%❷		K_e	Vpeak/(m/s)	16.5
Motor Constant @25°C❷		K_m	N/Sqrt(W)	8.96
Resistance @25°C ±10%❸		R_{25}	Ω	3.40
Inductance ±20%❹		L	mH	1.20
Electrical Time Constant		τ_e	ms	0.35
Continuous Current @100°C❶		I_c	Arms	1.4
Peak Current		I_{pk}	Arms	5.6
Continuous Power Dissipation @100°C❶		P_c	W	8.6
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.115
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	71.5
Core Mass		m_{core}	g	344.6
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

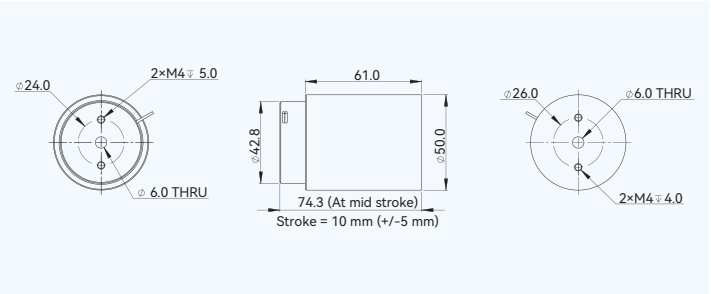


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM50-HF-10

Performance Parameters		Symbol	Unit	AVM50-HF-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	34.6
Peak Force❷		F_{pk}	N	141.4
Force Constant ±10%❷		K_f	N/A	28.8
Back EMF Constant ±10%❷		K_e	V/(m/s)	28.8
Motor Constant @25°C❷		K_m	N/Sqrt(W)	9.88
Resistance @25°C ±10%❸		R_{25}	Ω	8.50
Inductance ±20%❹		L	mH	5.20
Electrical Time Constant		τ_e	ms	0.61
Continuous Current @100°C❶		I_c	A	1.2
Peak Current		I_{pk}	A	5.0
Continuous Power Dissipation @100°C❶		P_c	W	15.8
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.210
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	148.0
Core Mass		m_{core}	g	553.0
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

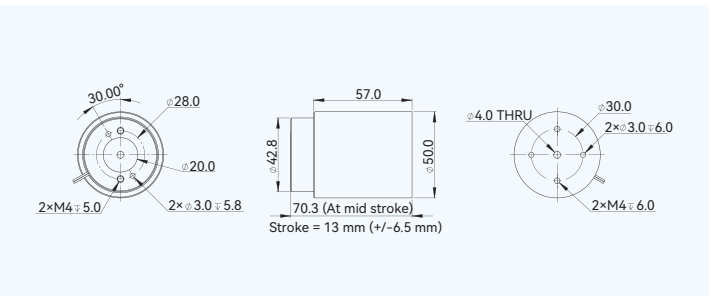


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM50-HF-13

Performance Parameters		Symbol	Unit	AVM50-HF-13
Stroke		S	mm	13.0
Continuous Force @100°C❶❷		F_c	N	39.7
Peak Force❷		F_{pk}	N	165.7
Force Constant ±10%❷		K_f	N/Arms	33.1
Back EMF Constant ±10%❷		K_e	Vpeak/(m/s)	33.1
Motor Constant @25°C❷		K_m	N/Sqrt(W)	11.11
Resistance @25°C ±10%❸		R_{25}	Ω	8.86
Inductance ±20%❹		L	mH	5.08
Electrical Time Constant		τ_e	ms	0.57
Continuous Current @100°C❶		I_c	Arms	1.2
Peak Current		I_{pk}	Arms	5.0
Continuous Power Dissipation @100°C❶		P_c	W	16.4
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.219
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	144.0
Core Mass		m_{core}	g	628.0
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

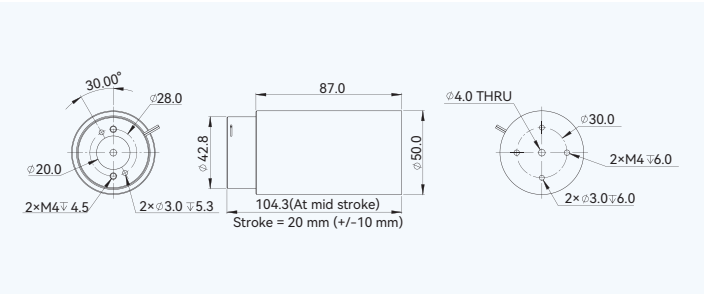


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM50-HF-20

Performance Parameters		Symbol	Unit	AVM50-HF-20
Stroke		S	mm	20.0
Continuous Force @100°C❶❷		F_c	N	50.0
Peak Force❷		F_{pk}	N	208.5
Force Constant ±10%❷		K_f	N/A	41.6
Back EMF Constant ±10%❷		K_e	V/(m/s)	41.6
Motor Constant @25°C❷		K_m	N/Sqrt(W)	12.0
Resistance @25°C ±10%❸		R_{25}	Ω	11.9
Inductance ±20%❹		L	mH	7.5
Electrical Time Constant		τ_e	ms	0.63
Continuous Current @100°C❶		I_c	A	1.2
Peak Current		I_{pk}	A	5.0
Continuous Power Dissipation @100°C❶		P_c	W	22.2
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.295
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	195.0
Core Mass		m_{core}	g	931.1
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

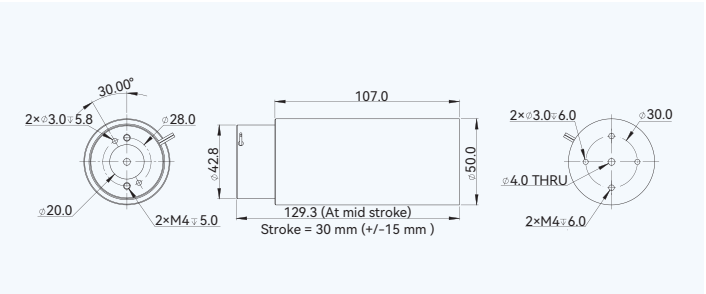


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM50-HF-30

Performance Parameters		Symbol	Unit	AVM50-HF-30
Stroke		S	mm	30.0
Continuous Force @100°C❶❷		F_c	N	46.1
Peak Force❷		F_{pk}	N	202.3
Force Constant ±10%❷		K_f	N/A	25.6
Back EMF Constant ±10%❷		K_e	V/(m/s)	25.6
Motor Constant @25°C❷		K_m	N/Sqrt(W)	10.7
Resistance @25°C ±10%❸		R_{25}	Ω	5.70
Inductance ±20%❹		L	mH	8.15
Electrical Time Constant		τ_e	ms	1.43
Continuous Current @100°C❶		I_c	A	1.8
Peak Current		I_{pk}	A	7.9
Continuous Power Dissipation @100°C❶		P_c	W	23.8
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant❶		K_{th}	W/°C	0.317
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	376.3
Core Mass		m_{core}	g	1132.1
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

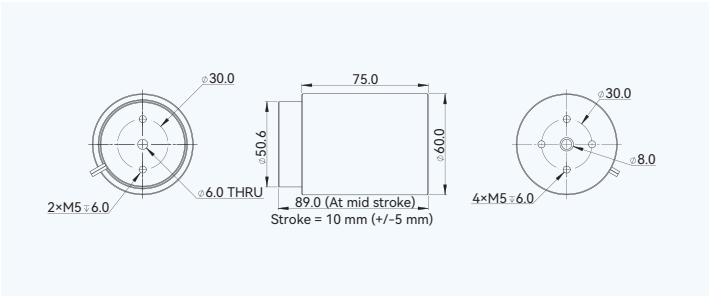


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM60-HF-10

Performance Parameters		Symbol	Unit	AVM60-HF-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	52.2
Peak Force❷		F_{pk}	N	223.7
Force Constant ±10%❷		K_f	N/A	32.6
Back EMF Constant ±10%❷		K_e	V/(m/s)	32.6
Motor Constant @25°C❷		K_m	N/Sqrt(W)	13.3
Resistance @25°C ±10%❸		R_{25}	Ω	5.98
Inductance ±20%❹		L	mH	4.33
Electrical Time Constant		τ_e	ms	0.72
Continuous Current @100°C❶		I_c	A	1.6
Peak Current		I_{pk}	A	7.0
Continuous Power Dissipation @100°C❶		P_c	W	19.7
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.263
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	236.5
Core Mass		m_{core}	g	997.0
Running Clearance		L_{gap}	mm	0.70
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

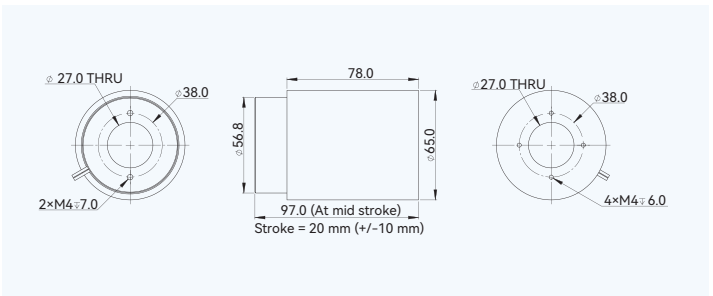


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM65-HF-20

Performance Parameters		Symbol	Unit	AVM65-HF-20
Stroke		S	mm	20.0
Continuous Force @100°C❶❷		F_c	N	47.8
Peak Force❷		F_{pk}	N	143.6
Force Constant ±10%❷		K_f	N/A	31.9
Back EMF Constant ±10%❷		K_e	V/(m/s)	31.9
Motor Constant @25°C❷		K_m	N/Sqrt(W)	11.9
Resistance @25°C ±10%❸		R_{25}	Ω	7.20
Inductance ±20%❹		L	mH	8.66
Electrical Time Constant		τ_e	ms	1.20
Continuous Current @100°C❶		I_c	A	1.5
Peak Current		I_{pk}	A	4.5
Continuous Power Dissipation @100°C❶		P_c	W	20.9
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.278
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	365.5
Core Mass		m_{core}	g	1210.8
Running Clearance		L_{gap}	mm	0.60
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

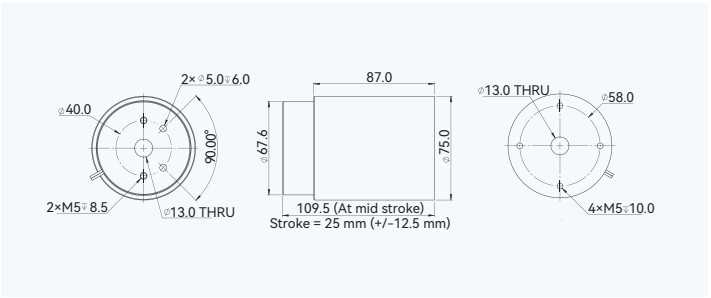


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM75-HF-25

Performance Parameters		Symbol	Unit	AVM75-HF-25
Stroke		S	mm	25.0
Continuous Force @100°C❶❷		F_c	N	127.9
Peak Force❷		F_{pk}	N	590.1
Force Constant ±10%❷		K_f	N/A	34.6
Back EMF Constant ±10%❷		K_e	V/(m/s)	34.6
Motor Constant @25°C❷		K_m	N/Sqrt(W)	20.6
Resistance @25°C ±10%❸		R_{25}	Ω	2.83
Inductance ±20%❹		L	mH	2.76
Electrical Time Constant		τ_e	ms	0.98
Continuous Current @100°C❶		I_c	A	3.7
Peak Current		I_{pk}	A	17.0
Continuous Power Dissipation @100°C❶		P_c	W	49.8
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.665
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	710.0
Core Mass		m_{core}	g	1940.0
Running Clearance		L_{gap}	mm	0.50
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

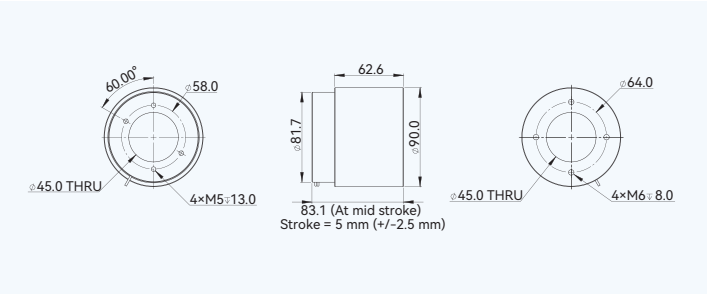


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM90-HF-5

Performance Parameters		Symbol	Unit	AVM90-HF-5
Stroke		S	mm	5.0
Continuous Force @100°C❶❷		F_c	N	61.6
Peak Force❷		F_{pk}	N	218.6
Force Constant ±10%❷		K_f	N/A	15.5
Back EMF Constant ±10%❷		K_e	V/(m/s)	15.5
Motor Constant @25°C❷		K_m	N/Sqrt(W)	14.2
Resistance @25°C ±10%❸		R_{25}	Ω	1.20
Inductance ±20%❹		L	mH	0.75
Electrical Time Constant		τ_e	ms	0.63
Continuous Current @100°C❶		I_c	A	4.0
Peak Current		I_{pk}	A	14.0
Continuous Power Dissipation @100°C❶		P_c	W	24.3
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.323
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	427.2
Core Mass		m_{core}	g	1514.6
Running Clearance		L_{gap}	mm	0.65
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

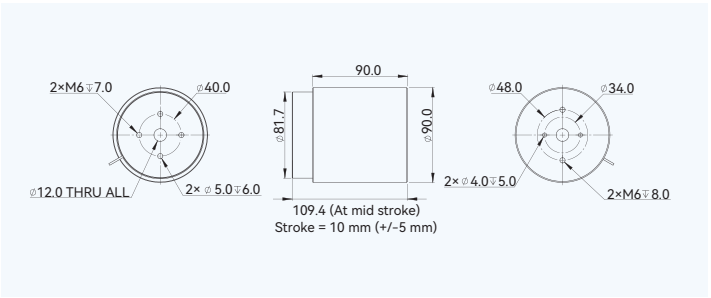


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM90-HF-10

Performance Parameters		Symbol	Unit	AVM90-HF-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	156.1
Peak Force❷		F_{pk}	N	610.2
Force Constant ±10%❷		K_f	N/A	44.6
Back EMF Constant ±10%❷		K_e	V/(m/s)	44.6
Motor Constant @25°C❷		K_m	N/Sqrt(W)	25.3
Resistance @25°C ±10%❸		R_{25}	Ω	3.10
Inductance ±20%❹		L	mH	4.02
Electrical Time Constant		τ_e	ms	1.30
Continuous Current @100°C❶		I_c	A	3.5
Peak Current		I_{pk}	A	14.0
Continuous Power Dissipation @100°C❶		P_c	W	48.9
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.653
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	960.0
Core Mass		m_{core}	g	2400.0
Running Clearance		L_{gap}	mm	0.65
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

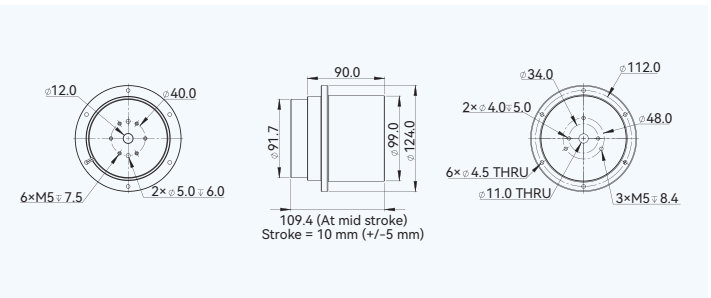


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM100-HF-10

Performance Parameters		Symbol	Unit	AVM100-HF-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	193.6
Peak Force❷		F_{pk}	N	763.7
Force Constant ±10%❷		K_f	N/A	55.3
Back EMF Constant ±10%❷		K_e	V/(m/s)	55.3
Motor Constant @25°C❷		K_m	N/Sqrt(W)	30.0
Resistance @25°C ±10%❸		R_{25}	Ω	3.40
Inductance ±20%❹		L	mH	4.43
Electrical Time Constant		τ_e	ms	1.30
Continuous Current @100°C❶		I_c	A	3.5
Peak Current		I_{pk}	A	14.0
Continuous Power Dissipation @100°C❶		P_c	W	53.7
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.716
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	1117.0
Core Mass		m_{core}	g	3300.0
Running Clearance		L_{gap}	mm	0.65
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

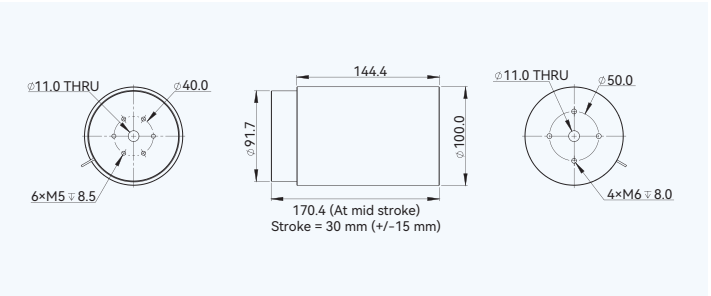


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM100-HF-30

Performance Parameters		Symbol	Unit	AVM100-HF-30
Stroke		S	mm	30.0
Continuous Force @100°C❶❷		F_c	N	309.5
Peak Force❷		F_{pk}	N	1241.9
Force Constant ±10%❷		K_f	N/A	88.4
Back EMF Constant ±10%❷		K_e	V/(m/s)	88.4
Motor Constant @25°C❷		K_m	N/Sqrt(W)	39.2
Resistance @25°C ±10%❸		R_{25}	Ω	5.10
Inductance ±20%❹		L	mH	7.78
Electrical Time Constant		τ_e	ms	1.53
Continuous Current @100°C❶		I_c	A	3.5
Peak Current		I_{pk}	A	14.0
Continuous Power Dissipation @100°C❶		P_c	W	80.5
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	1.074
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	2012.9
Core Mass		m_{core}	g	5485.7
Running Clearance		L_{gap}	mm	0.65
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

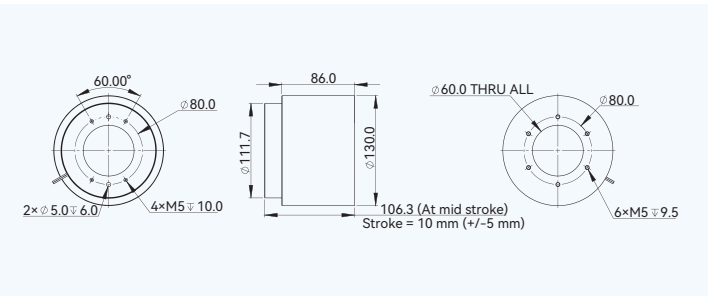


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM130-HF-10

Performance Parameters		Symbol	Unit	AVM130-HF-10
Stroke		S	mm	10.0
Continuous Force @100°C❶❷		F_c	N	150.8
Peak Force❷		F_{pk}	N	452.3
Force Constant ±10%❷		K_f	N/A	22.8
Back EMF Constant ±10%❷		K_e	V/(m/s)	22.8
Motor Constant @25°C❷		K_m	N/Sqrt(W)	26.4
Resistance @25°C ±10%❸		R_{25}	Ω	0.75
Inductance ±20%❹		L	mH	0.75
Electrical Time Constant		τ_e	ms	1.00
Continuous Current @100°C❶		I_c	A	6.6
Peak Current		I_{pk}	A	19.8
Continuous Power Dissipation @100°C❶		P_c	W	42.1
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.56
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	1080.0
Core Mass		m_{core}	g	5300.0
Running Clearance		L_{gap}	mm	0.55
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

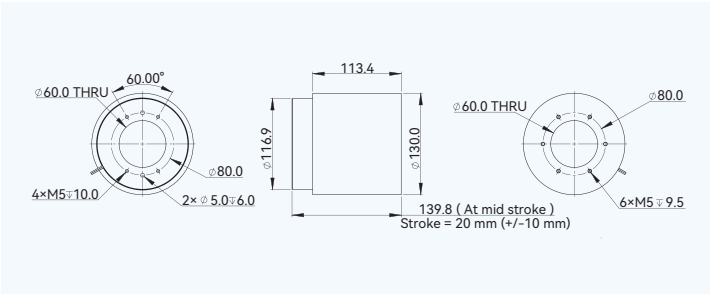


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM130-HF-20

Performance Parameters		Symbol	Unit	AVM130-HF-20
Stroke		S	mm	20.0
Continuous Force @100°C❶❷		F_c	N	226.0
Peak Force❷		F_{pk}	N	678.1
Force Constant ±10%❷		K_f	N/A	70.6
Back EMF Constant ±10%❷		K_e	V/(m/s)	70.6
Motor Constant @25°C❷		K_m	N/Sqrt(W)	30.8
Resistance @25°C ±10%❸		R_{25}	Ω	5.27
Inductance ±20%❹		L	mH	7.83
Electrical Time Constant		τ_e	ms	1.49
Continuous Current @100°C❶		I_c	A	3.2
Peak Current		I_{pk}	A	9.6
Continuous Power Dissipation @100°C❶		P_c	W	69.5
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	0.927
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	1955.5
Core Mass		m_{core}	g	6559.0
Running Clearance		L_{gap}	mm	0.55
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

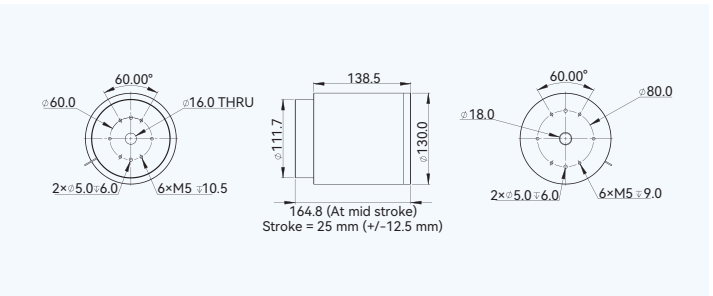


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM130-HF-25

Performance Parameters		Symbol	Unit	AVM130-HF-25
Stroke		S	mm	25.0
Continuous Force @100°C❶❷		F_c	N	316.4
Peak Force❷		F_{pk}	N	667.8
Force Constant ±10%❷		K_f	N/A	47.9
Back EMF Constant ±10%❷		K_e	V/(m/s)	47.9
Motor Constant @25°C❷		K_m	N/Sqrt(W)	40.2
Resistance @25°C ±10%❸		R_{25}	Ω	1.42
Inductance ±20%❹		L	mH	1.59
Electrical Time Constant		τ_e	ms	1.12
Continuous Current @100°C❶		I_c	A	6.6
Peak Current		I_{pk}	A	14.0
Continuous Power Dissipation @100°C❶		P_c	W	79.7
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	1.063
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	1550.0
Core Mass		m_{core}	g	9300.0
Running Clearance		L_{gap}	mm	0.55
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

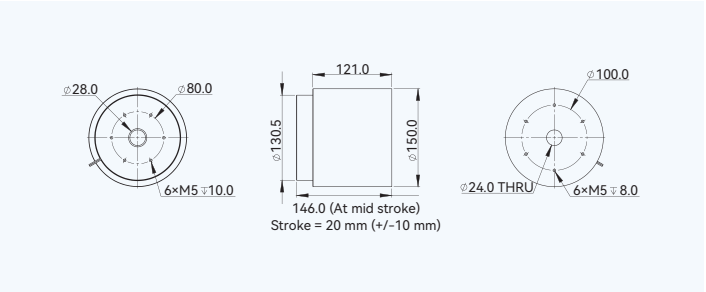


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM150-HF-20

Performance Parameters		Symbol	Unit	AVM150-HF-20
Stroke		S	mm	20.0
Continuous Force @100°C❶❷		F_c	N	626.0
Peak Force ❷		F_{pk}	N	1882.5
Force Constant ±10%❷		K_f	N/A	104.3
Back EMF Constant ±10%❷		K_e	V/(m/s)	104.3
Motor Constant @25°C❷		K_m	N/Sqrt(W)	61.3
Resistance @25°C ±10%❸		R_{25}	Ω	2.90
Inductance ±20%❹		L	mH	2.10
Electrical Time Constant		τ_e	ms	0.72
Continuous Current @100°C❶		I_c	A	6.0
Peak Current		I_{pk}	A	18.0
Continuous Power Dissipation @100°C❶		P_c	W	134.5
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	1.794
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	1500.0
Core Mass		m_{core}	g	13100.0
Running Clearance		L_{gap}	mm	0.75
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension

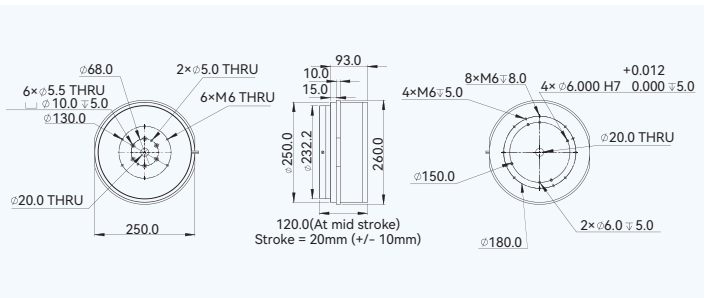


❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVM250-HF-20

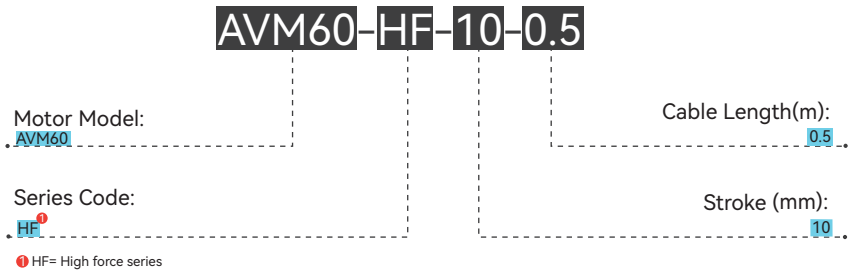
Performance Parameters		Symbol	Unit	AVM250-HF-20
Stroke		S	mm	20.0
Continuous Force @100°C❶❷		F_c	N	1111.4
Peak Force ❷		F_{pk}	N	4715.2
Force Constant ±10%❷		K_f	N/A	168.4
Back EMF Constant ±10%❷		K_e	V/(m/s)	168.4
Motor Constant @25°C❷		K_m	N/Sqrt(W)	87.5
Resistance @25°C ±10%❸		R_{25}	Ω	3.70
Inductance ±20%❹		L	mH	5.32
Electrical Time Constant		τ_e	ms	1.44
Continuous Current @100°C❶		I_c	A	6.6
Peak Current		I_{pk}	A	28.0
Continuous Power Dissipation @100°C❶		P_c	W	207.7
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant❶		K_{th}	W/℃	2.769
Max.Voltage		U_{max}	Vdc	120
Mechanical Parameters				
Coil Mass		m_{coil}	g	5900.0
Core Mass		m_{core}	g	27200.0
Running Clearance		L_{gap}	mm	0.90
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP00	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

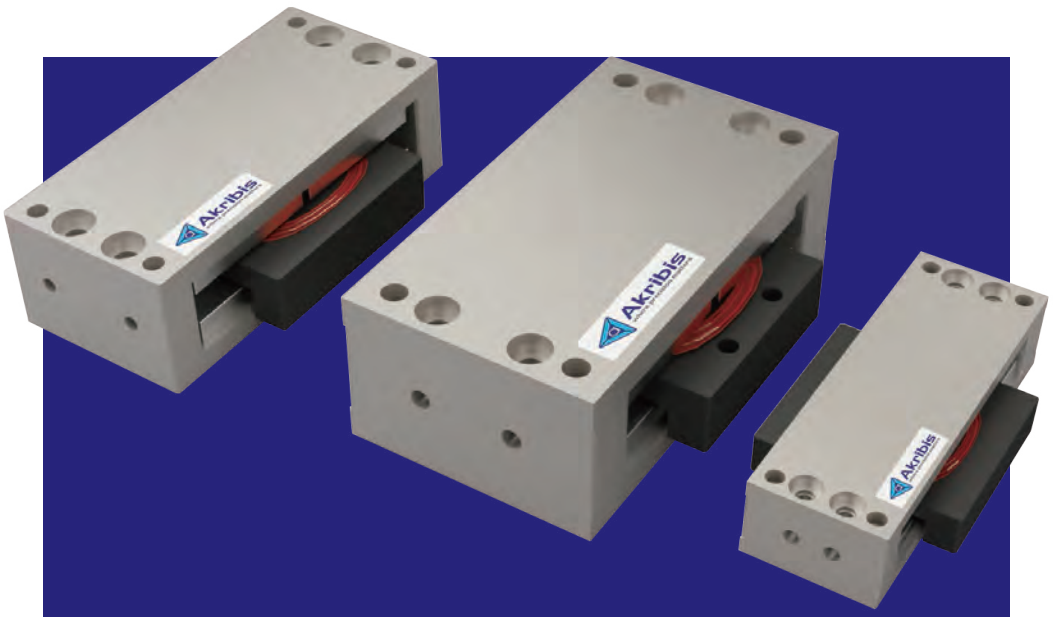
Dimension



❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Part Numbering





AVA SERIES

- Direct drive, zero cogging, zero backlash voice coil motors
- Low coil mass with very fast response and bandwidth
- No contact between coil and core movement (no wear and tear)
- Smooth motion at low speeds with limitless resolution (depends on feedback device)

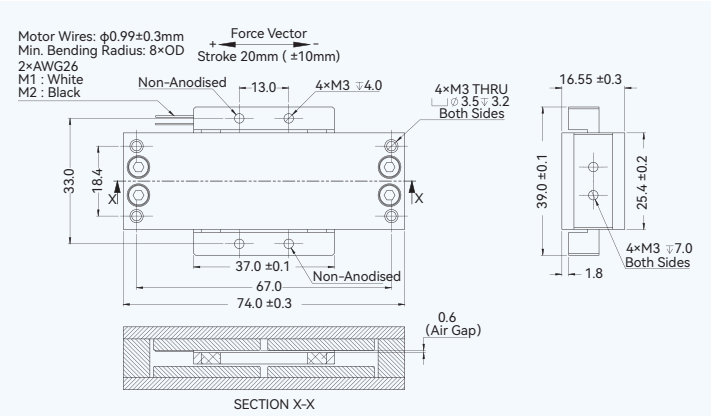
EN-26.3.1

Akribis systems

AVA1-20

Performance Parameters		Symbol	Unit	AVA1-20
Stroke		S	mm	20
Continuous Force @100℃ ❶❷		F_c	N	3.84
Peak Force ❷		F_{pk}	N	11.5
Force Constant ±10% ❷		K_f	N/A	1.92
Back EMF Constant ±10% ❷		K_e	V/(m/s)	1.92
Motor Constant @25℃❷		K_m	N/Sqrt(W)	1.62
Resistance @25℃ ±10% ❸		R_{25}	Ω	1.40
Inductance ±20% ❹		L	mH	0.27
Electrical Time Constant		τ_e	ms	0.19
Continuous Current @100℃ ❶		I_c	A	2.0
Peak Current		I_{pk}	A	6.0
Continuous Power Dissipation @100℃ ❶		P_c	W	7.2
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant ❶		K_{th}	W/℃	0.096
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	17
Core Mass		m_{core}	g	186
Running Clearance		L_{gap}	mm	0.6
Other Information				
Insulation Class			Class A (105℃)	
Protection Grade			IP20	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0℃ to 40℃ (non-freezing)	
	Storage		-15℃ to 70℃ (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension



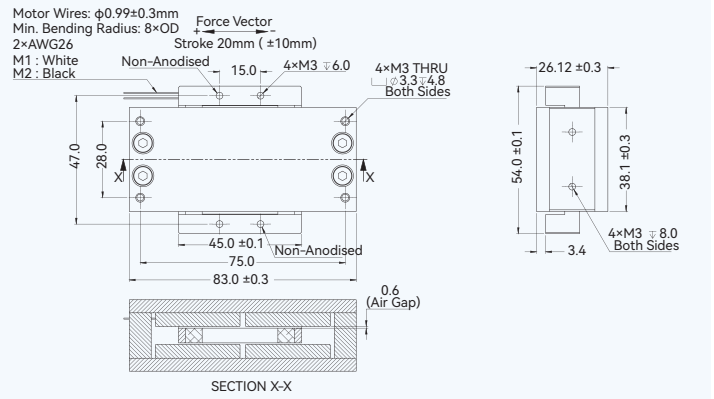
NOTE:
1. User to ensure the coil is shielded/ grounded through the 2 pcs of non-anodised tap holes.
2. The default cable length is 0.5m; comes with flying leads.
3. A positive (+ve) voltage applied to the white lead will product a force on the coil assembly in the positive (+ve) force vector direction.

❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVA2-20

Performance Parameters		Symbol	Unit	AVA2-20
Stroke		S	mm	20
Continuous Force @100℃ ❶❷		F_c	N	11.69
Peak Force ❷		F_{pk}	N	35.1
Force Constant ±10% ❷		K_f	N/A	8.35
Back EMF Constant ±10% ❷		K_e	V/(m/s)	8.35
Motor Constant @25℃❷		K_m	N/Sqrt(W)	4.34
Resistance @25℃ ±10% ❸		R_{25}	Ω	3.7
Inductance ±20% ❹		L	mH	1.24
Electrical Time Constant		τ_e	ms	0.34
Continuous Current @100℃ ❶		I_c	A	1.4
Peak Current		I_{pk}	A	4.2
Continuous Power Dissipation @100℃ ❶		P_c	W	9.3
Max. Coil Temperature		t_{max}	℃	100
Thermal Dissipation Constant ❶		K_{th}	W/℃	0.125
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	45
Core Mass		m_{core}	g	496
Running Clearance		L_{gap}	mm	0.6
Other Information				
Insulation Class			Class A (105℃)	
Protection Grade			IP20	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0℃ to 40℃ (non-freezing)	
	Storage		-15℃ to 70℃ (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension



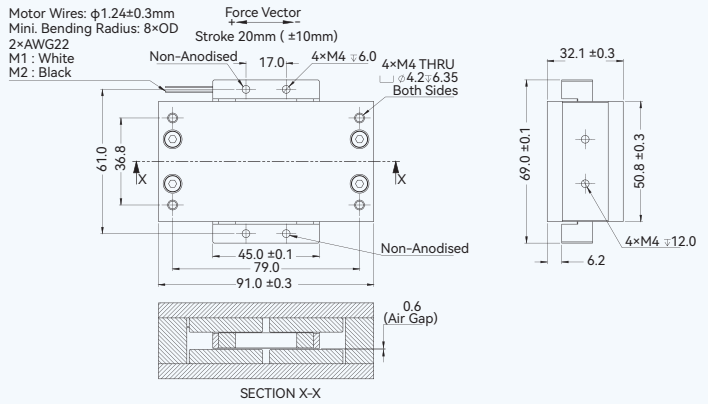
NOTE:
1. User to ensure the coil is shielded/ grounded through the 2 pcs of non-anodised tap holes.
2. The default cable length is 0.5m; comes with flying leads.
3. A positive (+ve) voltage applied to the white lead will product a force on the coil assembly in the positive (+ve) force vector direction.

❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

AVA3-20

Performance Parameters		Symbol	Unit	AVA3-20
Stroke		S	mm	20
Continuous Force @100°C ❶❷		F_c	N	26.32
Peak Force ❷		F_{pk}	N	79.0
Force Constant ±10% ❷		K_f	N/A	9.40
Back EMF Constant ±10% ❷		K_e	V/(m/s)	9.40
Motor Constant @25°C❷		K_m	N/Sqrt(W)	7.43
Resistance @25°C ±10% ❸		R_{25}	Ω	1.6
Inductance ±20% ❹		L	mH	0.7
Electrical Time Constant		τ_e	ms	0.44
Continuous Current @100°C ❶		I_c	A	2.8
Peak Current		I_{pk}	A	8.4
Continuous Power Dissipation @100°C ❶		P_c	W	16.2
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{th}	W/°C	0.216
Max.Voltage		U_{max}	Vdc	60
Mechanical Parameters				
Coil Mass		m_{coil}	g	72
Core Mass		m_{core}	g	930
Running Clearance		L_{gap}	mm	0.6
Other Information				
Insulation Class			Class A (105°C)	
Protection Grade			IP20	
Compliance with Global Standards			RoHS	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Dimension



NOTE:
1. User to ensure the coil is shielded / grounded thorough the 2 pcs of non-anodized threaded holes.
2. The default cable length is 0.5m; coming with flying leads.
3. A positive (+ve) voltage applied to the white lead will product a force on the coil assembly in the positive (+ve) force vector direction.

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ The values are at mid stroke.
❸ Resistance is measured by DC current with standard 0.5 m lead wire.
❹ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Part Numbering

AVA1-20-0.5

Motor Model:
AVA1 / AVA2 / AVA3

Stroke(mm):
20

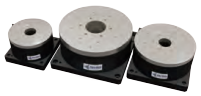
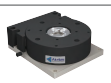
Cable Length (m):
0.5

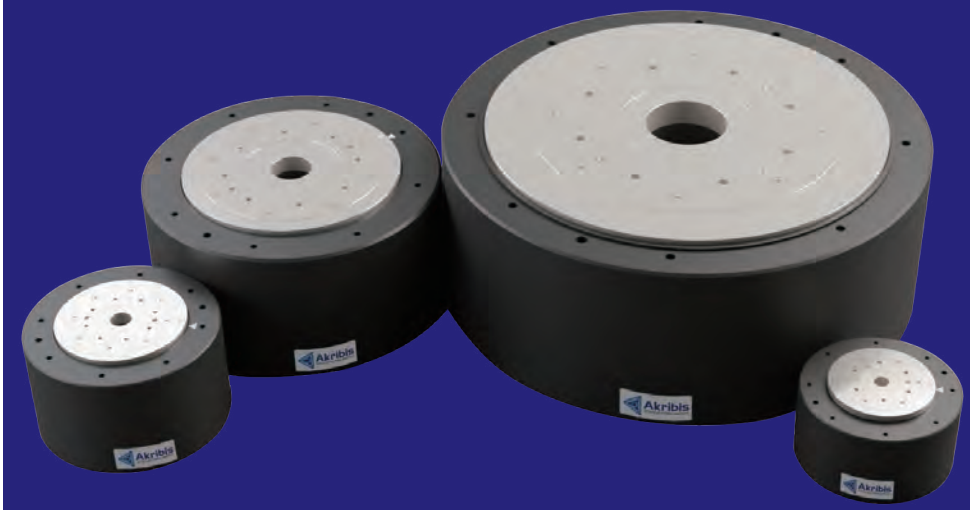
DIRECT DRIVE ROTARY MOTORS

DIRECT DRIVE ROTARY MOTORS

DDR Motors	Model	● Continuous Torque(T_{cn}) / ■ Peak Torque(T_{pk}) Unit: Nm													Repeatability (arc sec)
		2.5	5	10	30	50	100	150	200	250	300	500	1000	1500	
 ADR-A Series	ADR110-A75	●1.9 /■ 5.3													±2.7
	ADR110-A98		●4.2 /■ 11.3												±2.7
	ADR135-A90			●5.3 /■ 14.3											±2.7
	ADR135-A115				●11.0 /■ 29.8										±2.7
	ADR175-A102				●16.0 /■ 43.2										±2
	ADR175-A138					●30.2 /■ 81.4									±2
	ADR220-A120						●43.3 /■ 116.9								±2
	ADR220-A165							●77.9 /■ 210.3							±2
	ADR360-A150								●184.2 /■ 497.2						±2
	ADR360-A215											●407.2 /■ 1017.9			±2
 ADR-B Series	ADR110-B113	●1.9 /■ 5.3													±2.7
	ADR110-B136		●4.2 /■ 11.3												±2.7
	ADR135-B121			●5.3 /■ 14.3											±2
	ADR135-B148				●11.0 /■ 29.8										±2
	ADR175-B143				●16.0 /■ 43.2										±2
	ADR175-B180					●30.2 /■ 81.4									±2
	ADR220-B167						●43.3 /■ 116.9								±2
	ADR220-B217							●78.2 /■ 211.2							±2
 ADR-P Series	ADR110-P-22	●1.9 /■ 5.3													-
	ADR110-P-45		●4.2 /■ 11.3												-
	ADR135-P-27			●4.6 /■ 12.4											-
	ADR135-P-54				●10.1 /■ 27.3										-
	ADR175-P-36				●14.4 /■ 38.9										-
	ADR175-P-72					●28.8 /■ 77.8									-
	ADR220-P-50						●40.7 /■ 109.9								-
	ADR220-P-100							●75.9 /■ 204.9							-
	ADR280-P-40						●50.7 /■ 137.0								-
	ADR320-P-80							●108.4 /■ 292.6							-
	ADR360-P-70								●176.7 /■ 477.0						-
	ADR360-P140											●365.0 /■ 985.5			-
		● Continuous Torque(T_{cn}) / ■ Peak Torque(T_{pk}) Unit: Nm													
		0.1	0.2	0.3	0.4	0.5	0.75	1	1.5	2	2.5	3	4	5	7.5	10	12.5	15	
 ADR -F Series	ADR45-F-5	●0.05 /■ 0.13																	-
	ADR45-F-10		●0.09 /■ 0.26																-
	ADR60-F-10			●0.30 /■ 0.86															-
	ADR60-F-20					●0.59 /■ 1.73													-
	ADR75-F-15						●0.80 /■ 2.41												-
	ADR75-F-30									●1.61 /■ 4.82									-
 ADR -T Series	ADR80-F-20								●1.41 /■ 4.22										-
	ADR90-F-20										●1.88 /■ 5.61								-
	ADR90-F-40													●3.75 /■ 11.22					-
	ADR50-T-14					●0.48 /■ 1.44													-
	ADR80-T-20								●1.41 /■ 4.22										-
		● Continuous Torque(T_{cn}) / ■ Peak Torque(T_{pk}) Unit: Nm																	
		0.1	0.2	0.3	0.4	0.5	0.75	2	2.5	5	7.5	10	12.5	15	17.5	20	22.5	25	
 ACD Series	ACD62-60		●0.115 /■ 0.40																±3
	ACD62-84				●0.341 /■ 1.19														±3
	ACD120-80							●1.85 /■ 6.46											±3
	ACD120-175												●9.22 /■ 32.25						±3
 ACD-P Series	ACD62-P-10		●0.115 /■ 0.40																-
	ACD62-P-30				●0.341 /■ 1.19														-
	ACD85-P-15					●0.54 /■ 2.19													-
	ACD120-P-20							●1.85 /■ 6.46											-

Overview

DDR Motors	Model	● Continuous Torque(T_{cn}) / ■ Peak Torque(T_{pk}) Unit: Nm																Repeatability (arc sec)
		2.5	5	7.5	10	20	30	50	75	100	150	200	250	300	350	400	450	500	
 ACW Series	ACW120-37	●0.6 /■2.3																	±4
	ACW170-37		●2.8 /■9.7																±3
	ACW220-42				●7.4 /■25.9														±3
 AXD Series	AXD80-56	●0.9 /■2.6																	±6
	AXD120-61		●3.2 /■9.5																±3
	AXD160-67					●9.4 /■27.0													±2.5
	AXD200-77						●18.8 /■54.3												±2
	AXD280-100								●51.1 /■150.3										±2
	AXD400-155												●250.6 /■648.9						±2
 AMR Series		● Continuous Torque(T_{cn}) / ■ Peak Torque(T_{pk}) Unit: Nm																	
		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8			
	AMR65			●0.13 /■0.51															±5
 AXM Series	AMR80					●0.2 /■0.79													±5
	AXM40-43			●0.11 /■0.3															±10
	AXM60-50																●0.71/■2.0		±10



ADR-A SERIES

- Direct drive brushless motor
- Fully integrated with encoder and bearing
- Low cogging torque
- Precise homing through index pulse
- Low and high speed windings are optional

EN-26.3.1

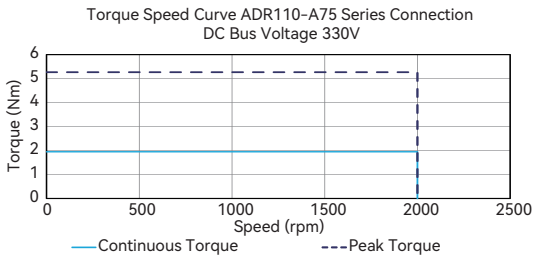
Akribis systems

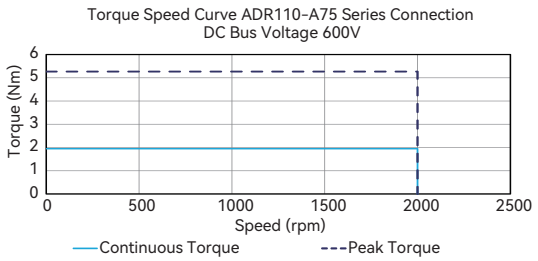
ADR110-A75

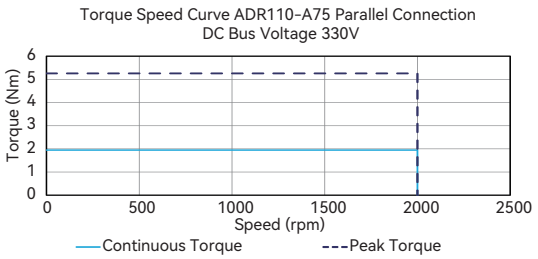
ADR110-A75				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	1.9	1.9
Peak Torque	T_{pk}	Nm	5.3	5.3
Torque Constant ±10%	K_t	Nm/Arms	0.65	0.32
Back EMF constant ±10%	K_e	Vpeak/rpm	0.055	0.028
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.30	0.29
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	3.20	0.86
Inductance (L-L) ±20% ❸	L	mH	11.00	2.70
Electrical time constant	τ_e	ms	3.44	3.14
Continuous Current @100°C ❶	I_{cn}	Arms	3.0	6.0
Peak Current	I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation @100°C ❶	P_{cn}	W	55.7	59.9
Max. Coil Temperature	T_{max}	℃	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/℃	0.7	0.8
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	2000	2000
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	2000	2000
Mechanical Parameters				
Overall Mass	m_n	kg	3.20	3.20
Rotor Inertia	J_r	$kg \cdot m^2$	3.086E-04	3.086E-04
Axial Runout ❺	-	μm	15 (10,5)	15 (10,5)
Radial Runout ❺	-	μm	15 (10,5)	15 (10,5)
Max Axial Load (Upright Mounting) ❻	-	N	700	700
Max Axial Load (Inverted / Wall mounting)	-	N	150	150
Max Moment Load (Upright Mounting)	-	Nm	20	20
Max Moment Load (Inverted / Wall Mounting)	-	Nm	2.2	2.2
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	3005	3005
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	240400	240400
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	480800	480800
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	1202000	1202000
ATOM DX Optical Incremental Encoder	-	lines / rev	5870	5870
ATOM DX Optical Incremental Encoder (80x)	-	counts / rev	469600	469600
Accuracy with Error Mapping ❼	-	arc sec	+/-5.4	+/-5.4
Repeatability ❼	-	arc sec	+/-2.7	+/-2.7
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE, UL (option)	
Ambient Temperature		Operation	0°C to 40°C (non-freezing)	
		Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity		Operation	10%RH to 80%RH (non-condensing)	
		Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

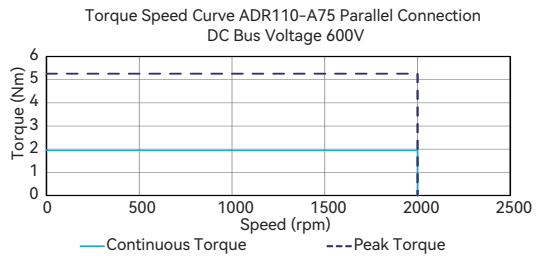
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

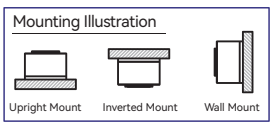
Torque-Speed Curve



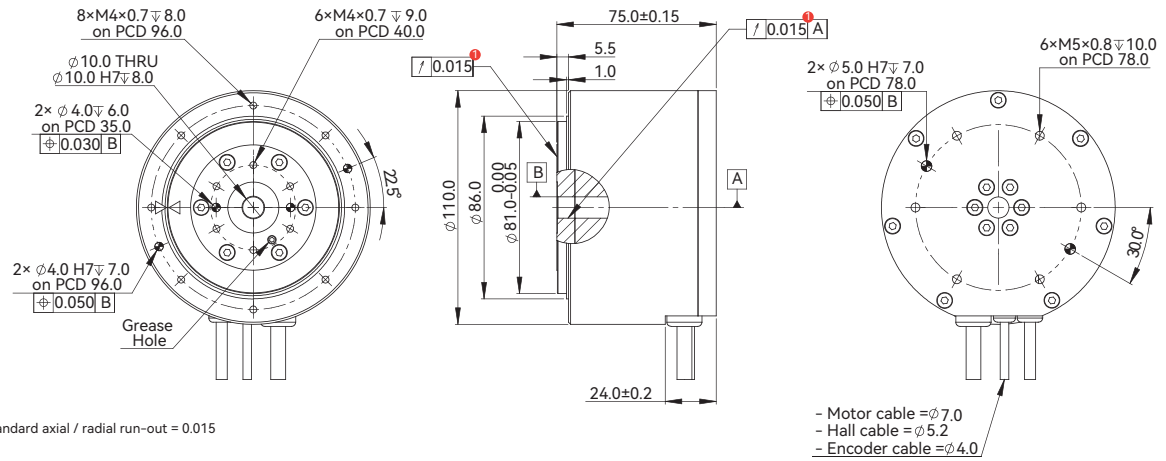








Dimension



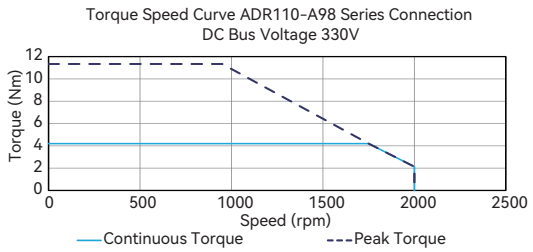
❶ Standard axial / radial run-out = 0.015

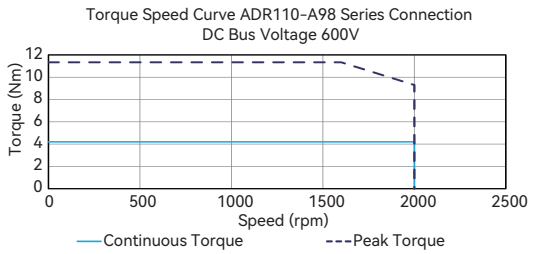
ADR110-A98

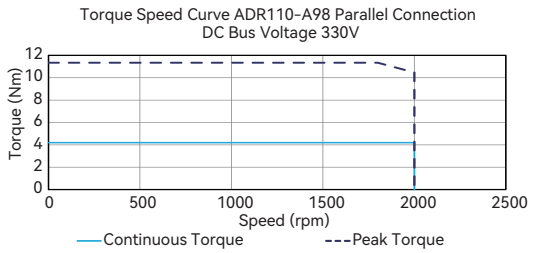
ADR110-A98		Symbol	Unit	Series	Parallel
Performance Parameters					
Continuous Torque @100°C ❶		T_{cn}	Nm	4.2	4.2
Peak Torque		T_{pk}	Nm	11.3	11.3
Torque Constant ±10%		K_t	Nm/Arms	1.40	0.70
Back EMF constant ±10%		K_e	Vpeak/rpm	0.119	0.060
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.51	0.49
Resistance (L-L) @25°C ±10% ❷		R_{25}	Ω	4.90	1.37
Inductance (L-L) ±20% ❸		L	mH	23.5	6.49
Electrical time constant		τ_e	ms	4.80	4.73
Continuous Current @100°C ❶		I_{cn}	Arms	3.0	6.0
Peak Current		I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation @100°C ❶		P_{cn}	W	85.3	95.4
Max. Coil Temperature		T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶		K_{thn}	W/°C	1.1	1.3
Max. Bus Voltage		U_{bus}	Vdc	600.0	600.0
Pole Number		2P	-	16	16
Rec. Max Speed @Peak Torque ❹		Ω_{max}	rpm	1600	2000
Rec. Max Speed @Continuous Torque ❹		Ω_{max}	rpm	2000	2000
Mechanical Parameters					
Overall Mass		m_n	kg	4.60	4.60
Rotor Inertia		J_r	$kg \cdot m^2$	4.419E-04	4.419E-04
Axial Runout ❺		-	μm	15 (10,5)	15 (10,5)
Radial Runout ❺		-	μm	15 (10,5)	15 (10,5)
Max Axial Load (Upright Mounting) ❻		-	N	700	700
Max Axial Load (Inverted / Wall mounting)		-	N	150	150
Max Moment Load (Upright Mounting)		-	Nm	20	20
Max Moment Load (Inverted / Wall Mounting)		-	Nm	2.2	2.2
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	3005	3005
ABI Optical Incremental Encoder Digital Resolution (80x)		-	counts / rev	240400	240400
ABI Optical Incremental Encoder Digital Resolution (160x)		-	counts / rev	480800	480800
ABI Optical Incremental Encoder Digital Resolution (400x)		-	counts / rev	1202000	1202000
ATOM DX Optical Incremental Encoder		-	lines / rev	5870	5870
ATOM DX Optical Incremental Encoder(80x)		-	counts / rev	469600	469600
Accuracy with Error Mapping ❼		-	arc sec	+/-5.4	+/-5.4
Repeatability ❼		-	arc sec	+/-2.7	+/-2.7
Other Information					
Insulation Class				Class B (130°C)	
Protection Grade				IP40	
Compliance with Global Standards				RoHS, CE, UL (option)	
Ambient Temperature	Operation			0°C to 40°C (non-freezing)	
	Storage			-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation			10%RH to 80%RH (non-condensing)	
	Storage			10%RH to 90%RH (non-condensing)	
Recommended Ambience				Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

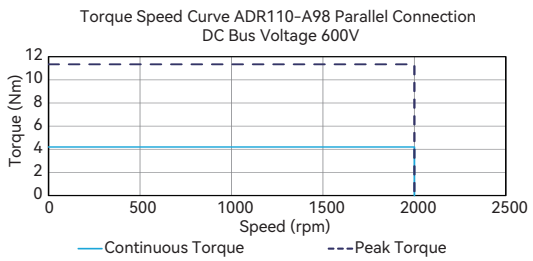
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

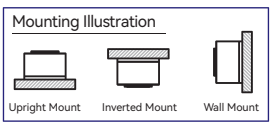
Torque-Speed Curve



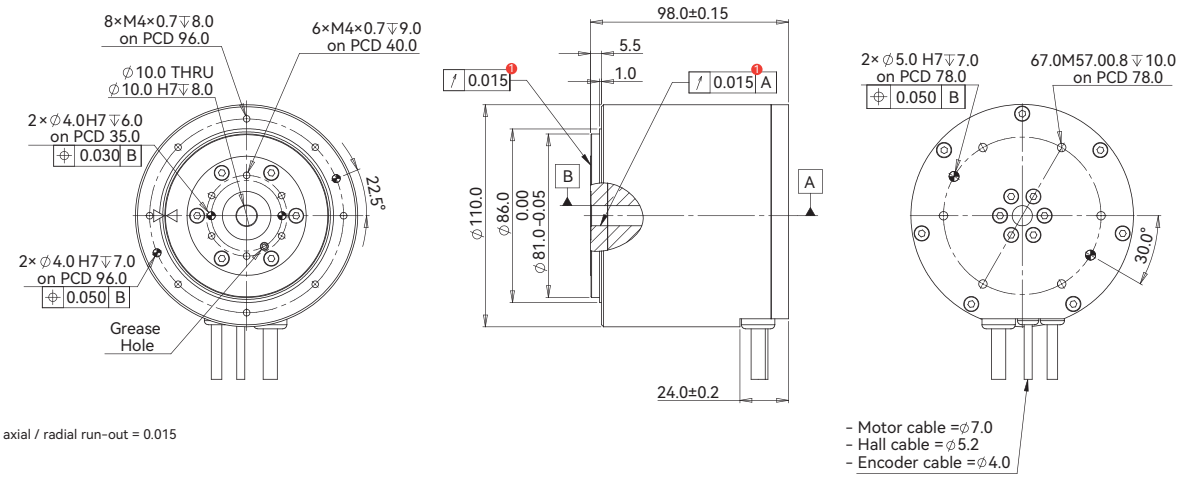








Dimension



❶ Standard axial / radial run-out = 0.015

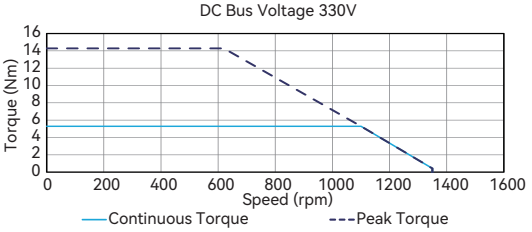
ADR135-A90

ADR135-A90				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	5.3	5.3
Peak Torque	T_{pk}	Nm	14.3	14.3
Torque Constant ±10%	K_t	Nm/Arms	2.3	1.1
Back EMF constant ±10%	K_e	Vpeak/rpm	0.197	0.098
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.73	0.73
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	6.60	1.65
Inductance (L-L) ±20% ❸	L	mH	45.30	11.20
Electrical time constant	τ_e	ms	6.86	6.79
Continuous Current @100°C ❶	I_{cn}	Arms	2.3	4.6
Peak Current	I_{pk}	Arms	6.9	13.8
Continuous Power Dissipation @100°C ❶	P_{cn}	W	67.5	67.5
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	0.9	0.9
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	1050	1350
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	1350	1350
Mechanical Parameters				
Overall Mass	m_n	kg	4.80	4.80
Rotor Inertia	J_r	$kg \cdot m^2$	9.916E-04	9.916E-04
Axial Runout ❺	-	μm	15 (10,5)	15 (10,5)
Radial Runout ❺	-	μm	15 (10,5)	15 (10,5)
Max Axial Load (Upright Mounting) ❻	-	N	1050	1050
Max Axial Load (Inverted / Wall mounting)	-	N	180	180
Max Moment Load (Upright Mounting)	-	Nm	35	35
Max Moment Load (Inverted / Wall Mounting)	-	Nm	3.9	3.9
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	3005	3005
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	240400	240400
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	480800	480800
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	1202000	1202000
ATOM DX Optical Incremental Encoder	-	lines / rev	5870	5870
ATOM DX Optical Incremental Encoder (80x)	-	counts / rev	469600	469600
Accuracy with Error Mapping ❼	-	arc sec	+/-5.4	+/-5.4
Repeatability ❼	-	arc sec	+/-2.7	+/-2.7
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE, UL (option)	
Ambient Temperature		Operation	0°C to 40°C (non-freezing)	
		Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity		Operation	10%RH to 80%RH (non-condensing)	
		Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

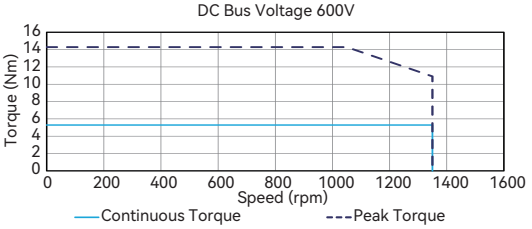
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

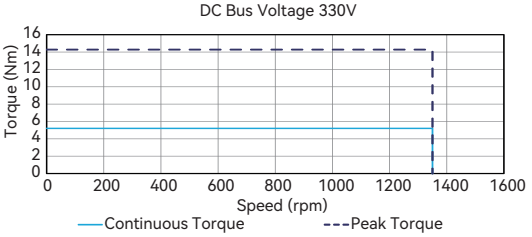
Torque Speed Curve ADR135-A90 Series Connection
DC Bus Voltage 330V



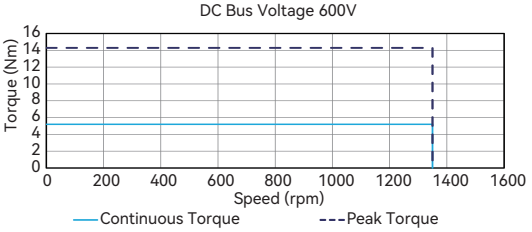
Torque Speed Curve ADR135-A90 Series Connection
DC Bus Voltage 600V



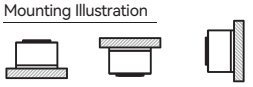
Torque Speed Curve ADR135-A90 Parallel Connection
DC Bus Voltage 330V



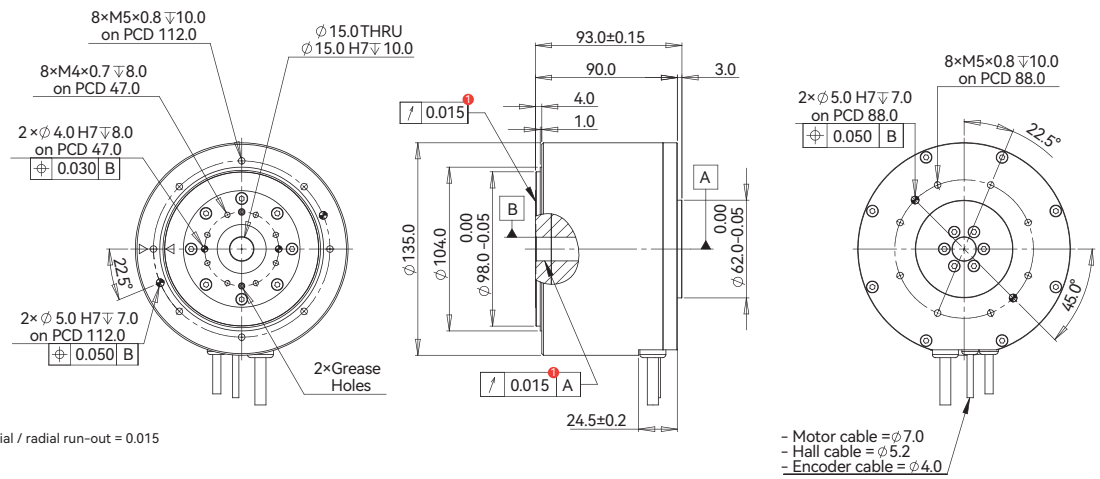
Torque Speed Curve ADR135-A90 Parallel Connection
DC Bus Voltage 600V



Mounting Illustration



Dimension



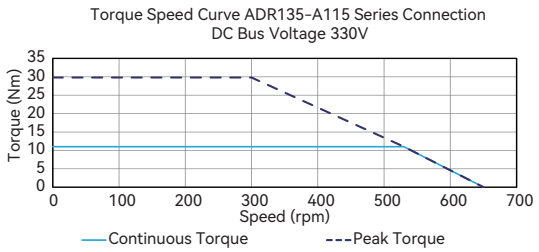
❶ Standard axial / radial run-out = 0.015

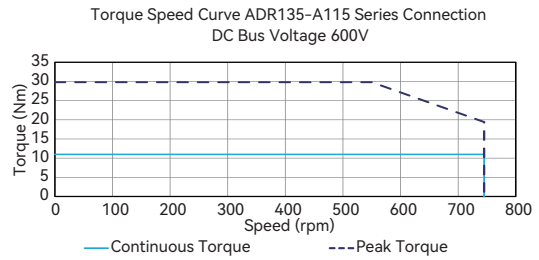
ADR135-A115

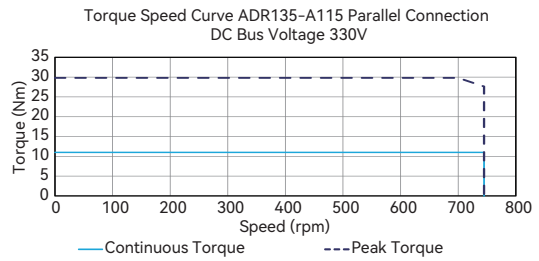
ADR135-A115				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	11.0	11.0
Peak Torque	T_{pk}	Nm	29.8	29.8
Torque Constant ±10%	K_t	Nm/Arms	4.8	2.4
Back EMF constant ±10%	K_e	Vpeak/rpm	0.41	0.21
Motor Constant @25°C	K_m	Nm/Sqrt(W)	1.2	1.2
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	10.70	2.70
Inductance (L-L) ±20% ❸	L	mH	72.76	18.63
Electrical time constant	τ_e	ms	6.80	6.90
Continuous Current @100°C ❶	I_{cn}	Arms	2.3	4.6
Peak Current	I_{pk}	Arms	6.9	13.8
Continuous Power Dissipation @100°C ❶	P_{cn}	W	109.4	110.5
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	1.5	1.5
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	550	745
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	745	745
Mechanical Parameters				
Overall Mass	m_n	kg	4.90	4.90
Rotor Inertia	J_r	kg·m²	1.332E-03	1.332E-03
Axial Runout ❺	-	μm	15 (10,5)	15 (10,5)
Radial Runout ❺	-	μm	15 (10,5)	15 (10,5)
Max Axial Load (Upright Mounting) ❻	-	N	1050	1050
Max Axial Load (Inverted / Wall mounting)	-	N	180	180
Max Moment Load (Upright Mounting)	-	Nm	35	35
Max Moment Load (Inverted / Wall Mounting)	-	Nm	3.9	3.9
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	3005	3005
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	240400	240400
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	480800	480800
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	1202000	1202000
ATOM DX Optical Incremental Encoder	-	lines / rev	5870	5870
ATOM DX Optical Incremental Encoder (80x)	-	counts / rev	469600	469600
Accuracy with Error Mapping ❼	-	arc sec	+/-5.4	+/-5.4
Repeatability ❼	-	arc sec	+/-2.7	+/-2.7
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP40		
Compliance with Global Standards		RoHS, CE, UL (option)		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

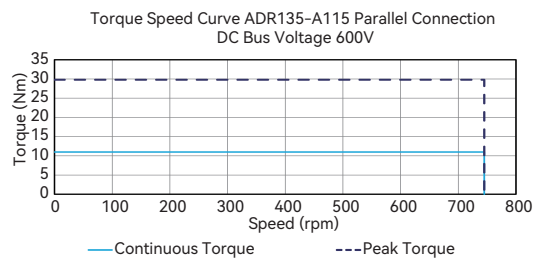
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

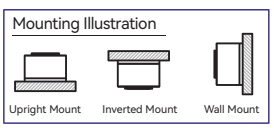
Torque-Speed Curve



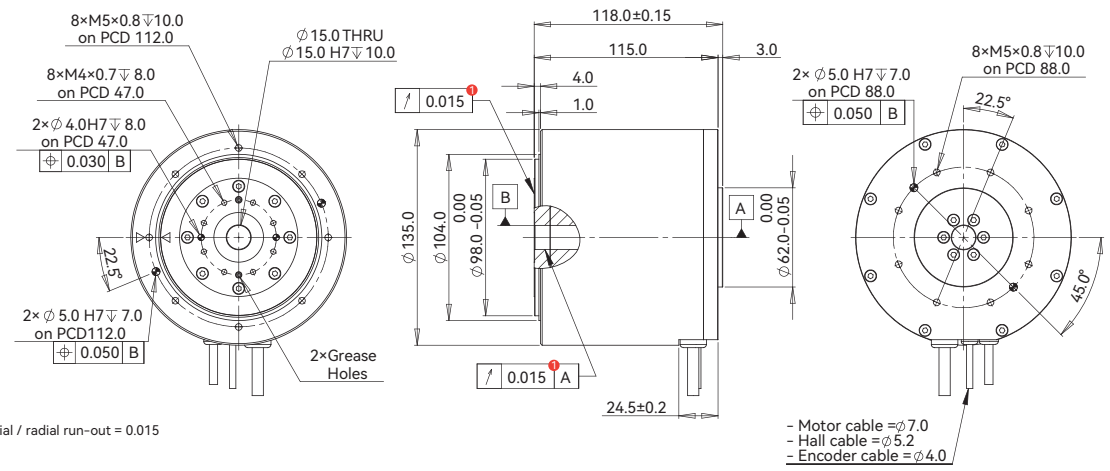








Dimension



❶ Standard axial / radial run-out = 0.015

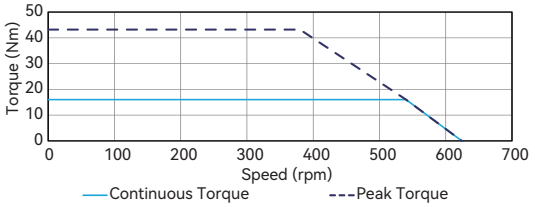
ADR175-A102

ADR175-A102					
Performance Parameters		**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶		T_{cn}	Nm	16.0	16.0
Peak Torque		T_{pk}	Nm	43.2	43.2
Torque Constant ±10%		K_t	Nm/Arms	5.0	2.5
Back EMF constant ±10%		K_e	Vpeak/rpm	0.43	0.21
Motor Constant @25°C		K_m	Nm/Sqrt(W)	1.78	1.79
Resistance (L-L) @25°C ±10% ❷		R_{25}	Ω	5.27	1.30
Inductance (L-L) ±20% ❸		L	mH	37.00	9.70
Electrical time constant		τ_e	ms	7.02	7.46
Continuous Current @100°C ❶		I_{cn}	Arms	3.2	6.4
Peak Current		I_{pk}	Arms	9.6	19.2
Continuous Power Dissipation @100°C ❶		P_{cn}	W	104.4	103.0
Max. Coil Temperature		T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶		K_{thn}	W/°C	1.4	1.4
Max. Bus Voltage		U_{bus}	Vdc	600.0	600.0
Pole Number		2P	-	16	16
Rec. Max Speed @Peak Torque ❹		Ω_{max}	rpm	660	880
Rec. Max Speed @Continuous Torque ❹		Ω_{max}	rpm	880	880
Mechanical Parameters					
Overall Mass		m_n	kg	8.5	8.5
Rotor Inertia		J_r	$kg \cdot m^2$	5.422E-03	5.422E-03
Axial Runout ❺		-	μm	20 (15,10)	20 (15,10)
Radial Runout ❺		-	μm	20 (15,10)	20 (15,10)
Max Axial Load (Upright Mounting) ❻		-	N	2310	2310
Max Axial Load (Inverted / Wall mounting)		-	N	240	240
Max Moment Load (Upright Mounting)		-	Nm	53	53
Max Moment Load (Inverted / Wall Mounting)		-	Nm	5.8	5.8
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	4103	4103
ABI Optical Incremental Encoder Digital Resolution (80x)		-	counts / rev	328240	328240
ABI Optical Incremental Encoder Digital Resolution (160x)		-	counts / rev	656480	656480
ABI Optical Incremental Encoder Digital Resolution (400x)		-	counts / rev	1641200	1641200
ATOM DX Optical Incremental Encoder		-	lines / rev	8192	8192
ATOM DX Optical Incremental Encoder (200x)		-	counts / rev	1638400	1638400
Accuracy with Error Mapping ❼		-	arc sec	+/-4	+/-4
Repeatability ❼		-	arc sec	+/-2	+/-2
Other Information					
Insulation Class				Class B (130°C)	
Protection Grade				IP40	
Compliance with Global Standards				RoHS, CE, UL (option)	
Ambient Temperature	Operation			0°C to 40°C (non-freezing)	
	Storage			-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation			10%RH to 80%RH (non-condensing)	
	Storage			10%RH to 90%RH (non-condensing)	
Recommended Ambience				Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

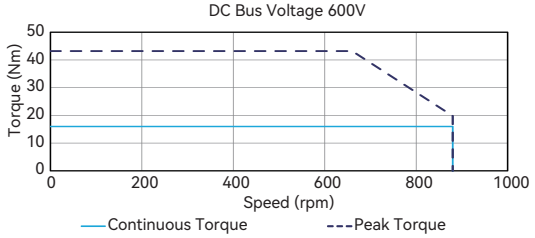
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

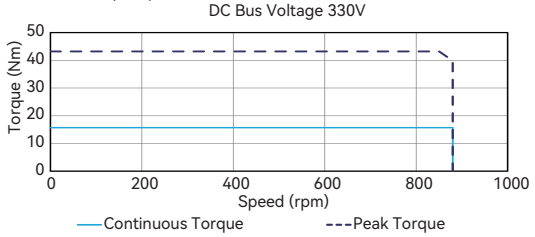
Torque Speed Curve ADR175-A102 Series Connection
DC Bus Voltage 330V



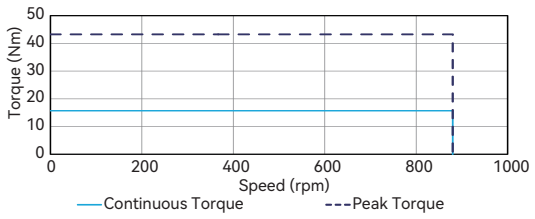
Torque Speed Curve ADR175-A102 Series Connection
DC Bus Voltage 600V



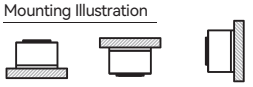
Torque Speed Curve ADR175-A102 Parallel Connection
DC Bus Voltage 330V



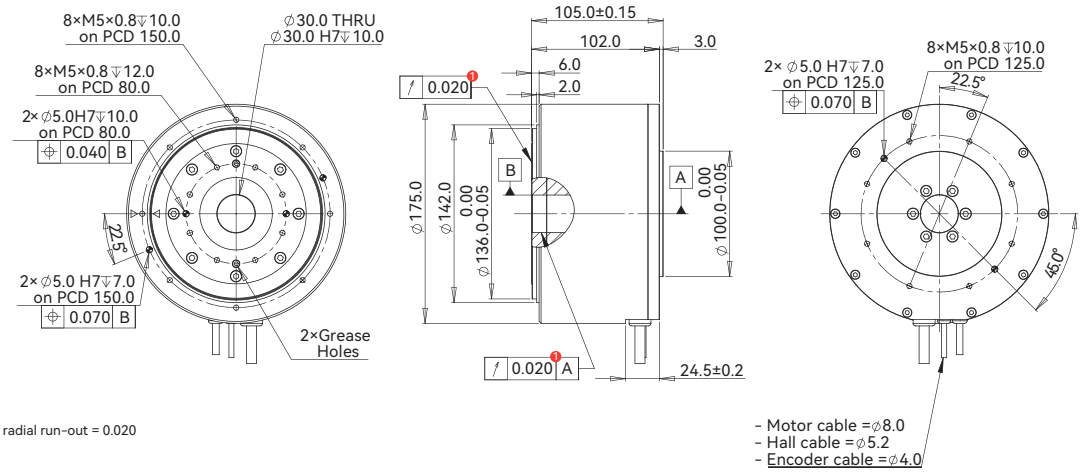
Torque Speed Curve ADR175-A102 Parallel Connection
DC Bus Voltage 600V



Mounting Illustration



Dimension



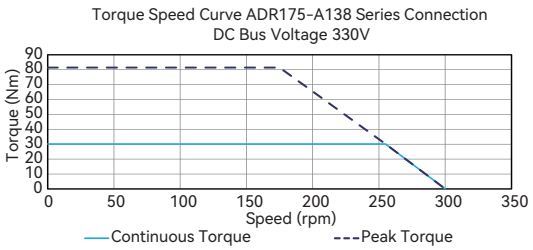
❶ Standard axial / radial run-out = 0.020

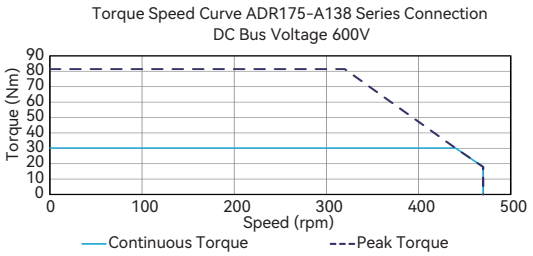
ADR175-A138

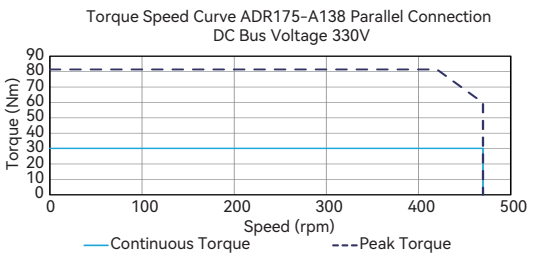
ADR175-A138				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	30.2	30.2
Peak Torque	T_{pk}	Nm	81.4	81.4
Torque Constant ±10%	K_t	Nm/Arms	10.4	5.2
Back EMF constant ±10%	K_e	Vpeak/rpm	0.89	0.44
Motor Constant @25°C	K_m	Nm/Sqrt(W)	2.95	2.91
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	8.30	2.13
Inductance (L-L) ±20% ❸	L	mH	72.00	18.51
Electrical time constant	τ_e	ms	8.67	8.67
Continuous Current @100°C ❶	I_{cn}	Arms	2.9	5.8
Peak Current	I_{pk}	Arms	8.7	17.4
Continuous Power Dissipation @100°C ❶	P_{cn}	W	135.0	138.9
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	1.8	1.9
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	320	470
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	440	470
Mechanical Parameters				
Overall Mass	m_n	kg	12.7	12.7
Rotor Inertia	J_r	$kg \cdot m^2$	7.621E-03	7.621E-03
Axial Runout ❺	-	μm	20 (15,10)	20 (15,10)
Radial Runout ❺	-	μm	20 (15,10)	20 (15,10)
Max Axial Load (Upright Mounting) ❻	-	N	2310	2310
Max Axial Load (Inverted / Wall mounting)	-	N	240	240
Max Moment Load (Upright Mounting)	-	Nm	53	53
Max Moment Load (Inverted / Wall Mounting)	-	Nm	5.8	5.8
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	4103	4103
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	328240	328240
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	656480	656480
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	1641200	1641200
ATOM DX Optical Incremental Encoder	-	lines / rev	8192	8192
ATOM DX Optical Incremental Encoder (200x)	-	counts / rev	1638400	1638400
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE, UL (option)	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

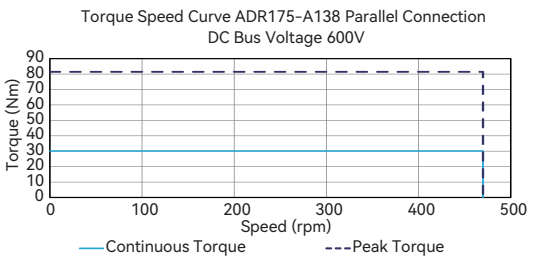
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

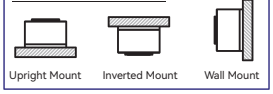




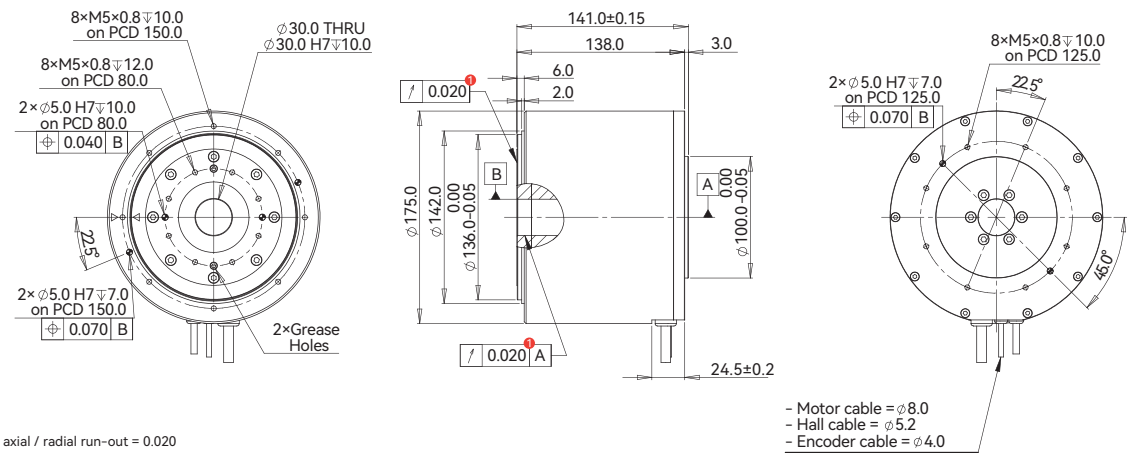




Mounting Illustration



Dimension



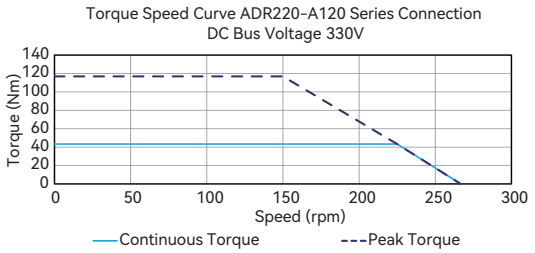
❶ Standard axial / radial run-out = 0.020

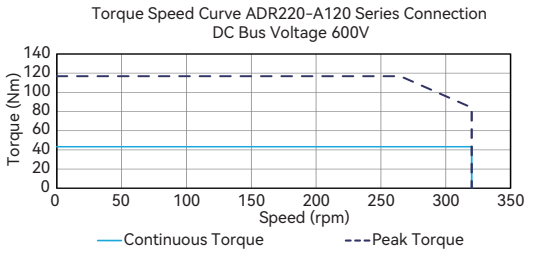
ADR220-A120

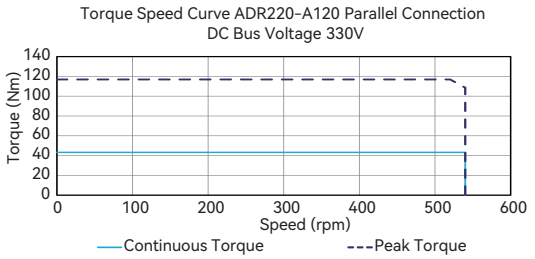
ADR220-A120					
Performance Parameters		**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶		T_{cn}	Nm	43.3	43.3
Peak Torque		T_{pk}	Nm	116.9	116.9
Torque Constant ±10%		K_t	Nm/Arms	11.7	3.9
Back EMF constant ±10%		K_e	Vpeak/rpm	1.00	0.33
Motor Constant @25°C		K_m	Nm/Sqrt(W)	3.94	3.70
Resistance (L-L) @25°C ±10% ❷		R_{25}	Ω	5.87	0.74
Inductance (L-L) ±20% ❸		L	mH	53.60	6.30
Electrical time constant		τ_e	ms	9.13	8.51
Continuous Current @100°C ❶		I_{cn}	Arms	3.7	11.1
Peak Current		I_{pk}	Arms	11.1	33.3
Continuous Power Dissipation @100°C ❶		P_{cn}	W	155.4	176.3
Max. Coil Temperature		T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶		K_{thn}	W/°C	2.1	2.4
Max. Bus Voltage		U_{bus}	Vdc	600.0	600.0
Pole Number		2P	-	24	24
Rec. Max Speed @Peak Torque ❹		Ω_{max}	rpm	265	540
Rec. Max Speed @Continuous Torque ❹		Ω_{max}	rpm	320	540
Mechanical Parameters					
Overall Mass		m_n	kg	18.3	18.3
Rotor Inertia		J_r	kg·m²	1.786E-02	1.786E-02
Axial Runout ❺		-	μm	25 (10)	25 (10)
Radial Runout ❺		-	μm	25 (10)	25 (10)
Max Axial Load (Upright Mounting) ❻		-	N	2800	2800
Max Axial Load (Inverted / Wall mounting)		-	N	300	300
Max Moment Load (Upright Mounting)		-	Nm	72	72
Max Moment Load (Inverted / Wall Mounting)		-	Nm	7.9	7.9
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	4103	4103
ABI Optical Incremental Encoder Digital Resolution (80x)		-	counts / rev	328240	328240
ABI Optical Incremental Encoder Digital Resolution (160x)		-	counts / rev	656480	656480
ABI Optical Incremental Encoder Digital Resolution (400x)		-	counts / rev	1641200	1641200
ATOM DX Optical Incremental Encoder		-	lines / rev	8192	8192
ATOM DX Optical Incremental Encoder(200x)		-	counts / rev	1638400	1638400
Accuracy with Error Mapping ❼		-	arc sec	+/-4	+/-4
Repeatability ❼		-	arc sec	+/-2	+/-2
Other Information					
Insulation Class			Class B (130°C)		
Protection Grade			IP40		
Compliance with Global Standards			RoHS, CE, UL (option)		
Ambient Temperature	Operation		0°C to 40°C (non-freezing)		
	Storage		-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

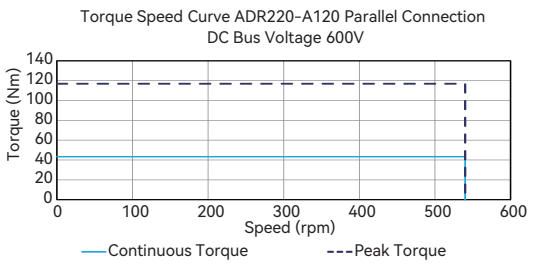
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve





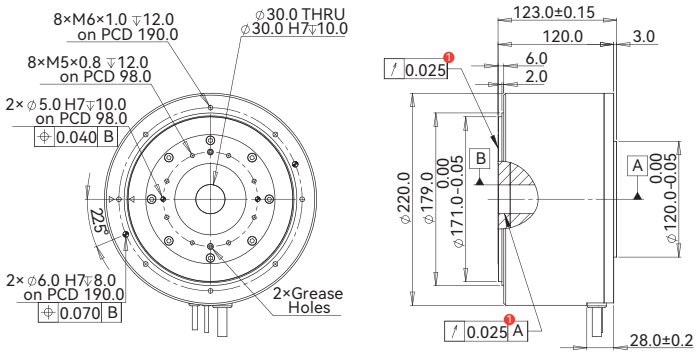


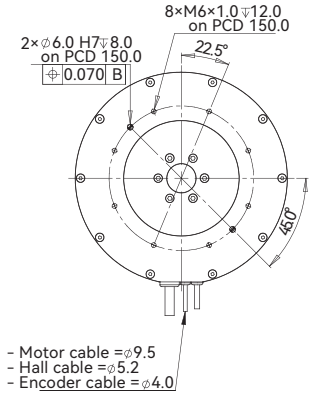


Mounting Illustration



Dimension





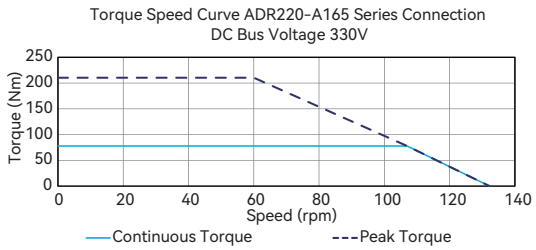
❶ Standard axial / radial run-out = 0.025

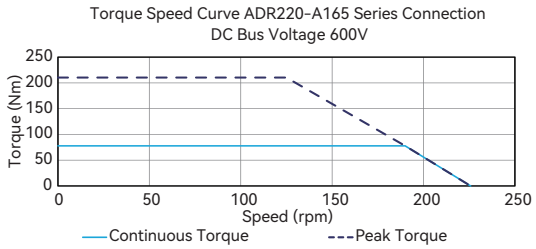
ADR220-A165

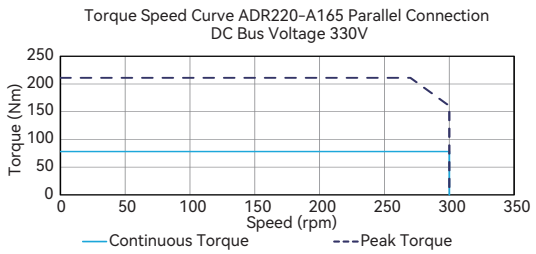
ADR220-A165				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	77.9	78.2
Peak Torque	T_{pk}	Nm	210.3	211.2
Torque Constant ±10%	K_t	Nm/Arms	23.6	7.9
Back EMF constant ±10%	K_e	Vpeak/rpm	2.02	0.68
Motor Constant @25°C	K_m	Nm/Sqrt(W)	6.00	5.89
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	10.32	1.20
Inductance (L-L) ±20% ❸	L	mH	106.70	11.90
Electrical time constant	τ_e	ms	10.34	9.92
Continuous Current @100°C ❶	I_{cn}	Arms	3.3	9.9
Peak Current	I_{pk}	Arms	9.9	29.7
Continuous Power Dissipation @100°C ❶	P_{cn}	W	217.3	227.4
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	2.9	3.0
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	24	24
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	125	300
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	190	300
Mechanical Parameters				
Overall Mass	m_n	kg	24.1	24.1
Rotor Inertia	J_r	$kg \cdot m^2$	2.522E-02	2.522E-02
Axial Runout ❺	-	μm	25 (10)	25 (10)
Radial Runout ❺	-	μm	25 (10)	25 (10)
Max Axial Load (Upright Mounting) ❻	-	N	2800	2800
Max Axial Load (Inverted / Wall mounting)	-	N	300	300
Max Moment Load (Upright Mounting)	-	Nm	72	72
Max Moment Load (Inverted / Wall Mounting)	-	Nm	7.9	7.9
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	4103	4103
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	328240	328240
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	656480	656480
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	1641200	1641200
ATOM DX Optical Incremental Encoder	-	lines / rev	8192	8192
ATOM DX Optical Incremental Encoder(200x)	-	counts / rev	1638400	1638400
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE, UL (option)	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

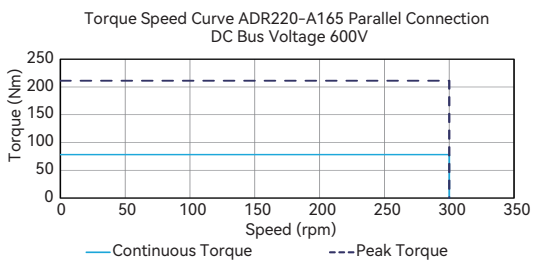
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

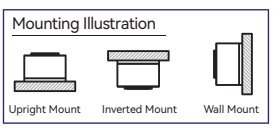
Torque-Speed Curve



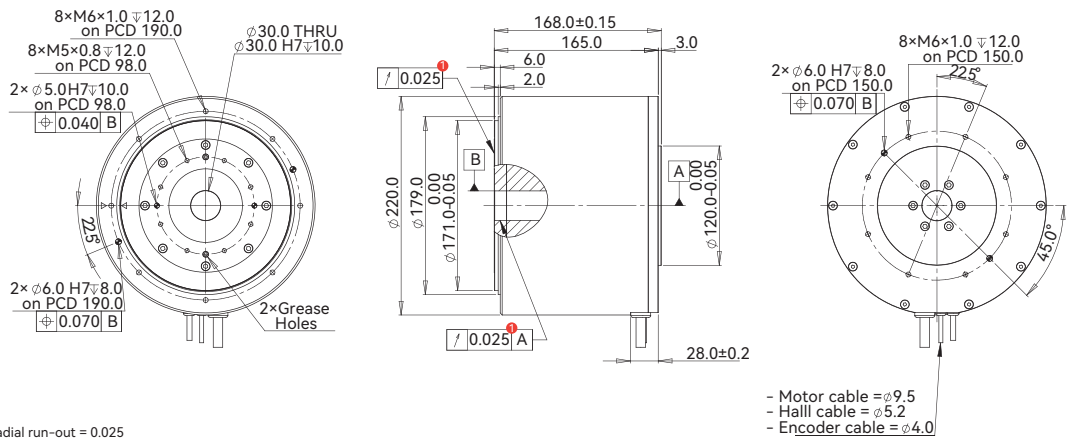








Dimension



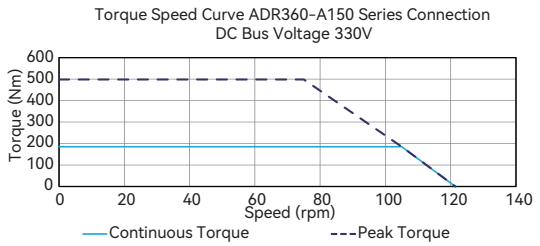
❶ Standard axial / radial run-out = 0.025

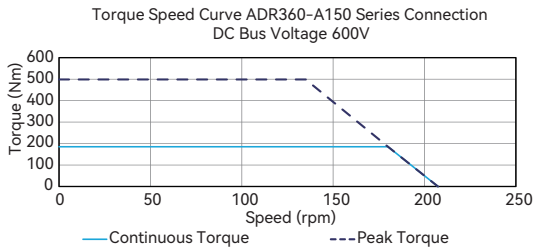
ADR360-A150

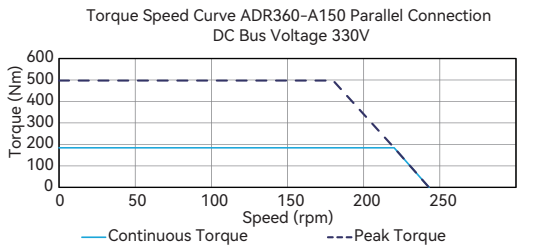
ADR360-A150				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	184.2	184.2
Peak Torque	T_{pk}	Nm	497.2	497.2
Torque Constant ±10%	K_t	Nm/Arms	25.4	12.7
Back EMF constant ±10%	K_e	Vpeak/rpm	2.2	1.1
Motor Constant @25°C	K_m	Nm/Sqrt(W)	11.88	11.88
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	3.05	0.76
Inductance (L-L) ±20% ❸	L	mH	31.70	7.92
Electrical time constant	τ_e	ms	10.40	10.40
Continuous Current @100°C ❶	I_{cn}	Arms	7.3	14.5
Peak Current	I_{pk}	Arms	21.8	43.5
Continuous Power Dissipation @100°C ❶	P_{cn}	W	309.7	309.7
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	4.1	4.1
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	32	32
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	135	240
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	180	240
Mechanical Parameters				
Overall Mass	m_n	kg	56.0	56.0
Rotor Inertia	J_r	kg·m²	2.046E-01	2.046E-01
Axial Runout ❺	-	μm	40 (15)	40 (15)
Radial Runout ❺	-	μm	40 (15)	40 (15)
Max Axial Load (Upright Mounting) ❻	-	N	11200	11200
Max Axial Load (Inverted / Wall mounting)	-	N	350	350
Max Moment Load (Upright Mounting)	-	Nm	245	245
Max Moment Load (Inverted / Wall Mounting)	-	Nm	27.0	27.0
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	7500	7500
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	600000	600000
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	1200000	1200000
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	3000000	3000000
ATOM DX Optical Incremental Encoder	-	lines / rev	15000	15000
ATOM DX Optical Incremental Encoder(200x)	-	counts / rev	3000000	3000000
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE, UL (option)	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

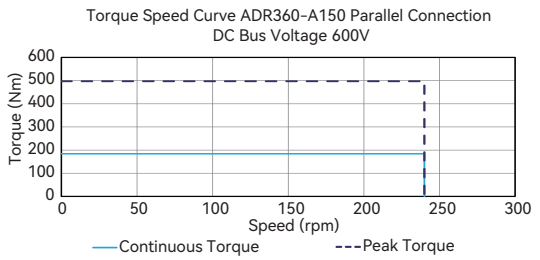
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under maximum bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

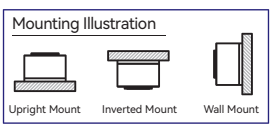
Torque-Speed Curve



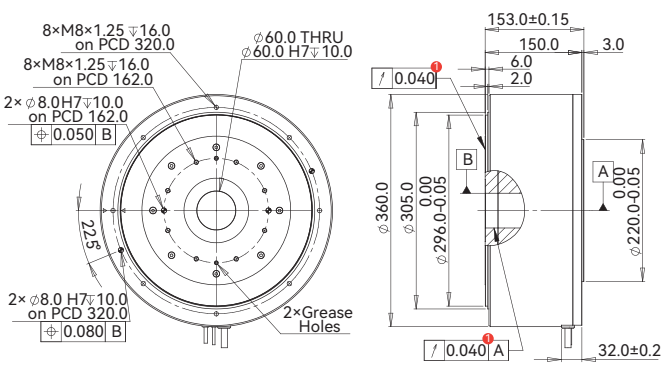


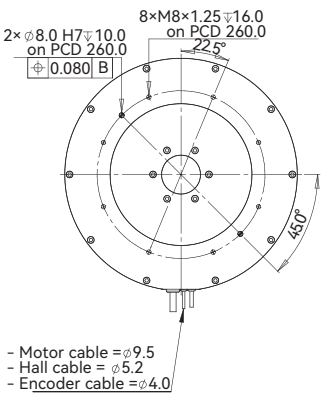






Dimension





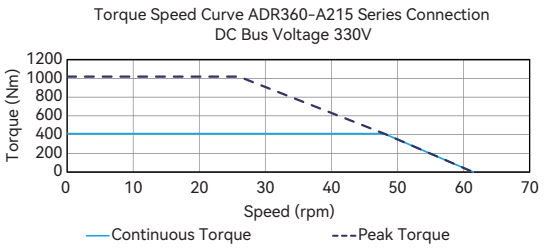
❶ Standard axial / radial run-out = 0.040

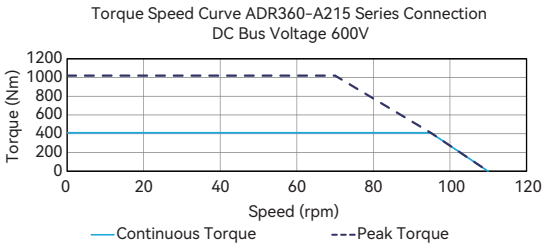
ADR360-A215

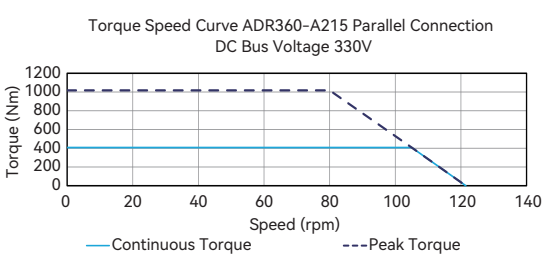
ADR360-A215				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	407.2	407.2
Peak Torque	T_{pk}	Nm	1017.9	1017.9
Torque Constant ±10%	K_t	Nm/Arms	56.2	28.1
Back EMF constant ±10%	K_e	Vpeak/rpm	4.8	2.4
Motor Constant @25°C	K_m	Nm/Sqrt(W)	19.99	20.51
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	5.26	1.25
Inductance (L-L) ±20% ❸	L	mH	54.74	13.00
Electrical time constant	τ_e	ms	10.40	10.40
Continuous Current @100°C ❶	I_{cn}	Arms	7.3	14.5
Peak Current	I_{pk}	Arms	21.8	43.5
Continuous Power Dissipation @100°C ❶	P_{cn}	W	535.0	508.2
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	7.1	6.8
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	32	32
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	70	165
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	95	200
Mechanical Parameters				
Overall Mass	m_n	kg	71.0	71.0
Rotor Inertia	J_r	$kg \cdot m^2$	3.223E-01	3.223E-01
Axial Runout ❺	-	μm	40 (15)	40 (15)
Radial Runout ❺	-	μm	40 (15)	40 (15)
Max Axial Load (Upright Mounting) ❻	-	N	11200	11200
Max Axial Load (Inverted / Wall mounting)	-	N	350	350
Max Moment Load (Upright Mounting)	-	Nm	245	245
Max Moment Load (Inverted / Wall Mounting)	-	Nm	27.0	27.0
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	7500	7500
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	600000	600000
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	1200000	1200000
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	3000000	3000000
ATOM DX Optical Incremental Encoder	-	lines / rev	15000	15000
ATOM DX Optical Incremental Encoder(200x)	-	counts / rev	3000000	3000000
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP40		
Compliance with Global Standards		RoHS, CE, UL (option)		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

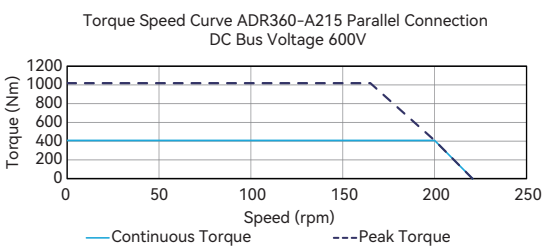
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under maximum bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve





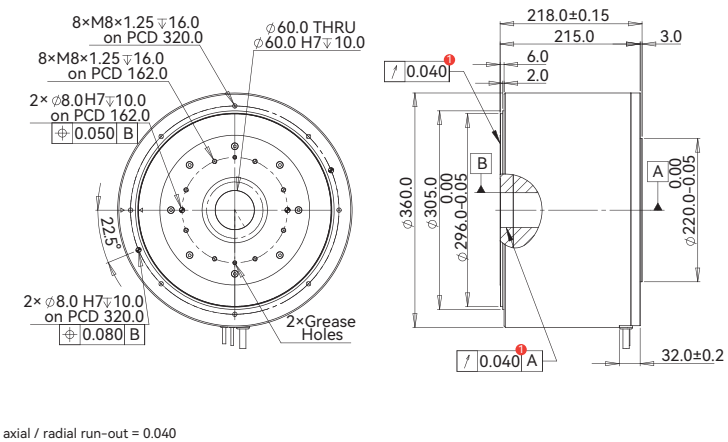


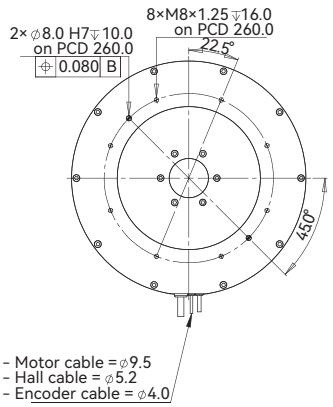


Mounting Illustration



Dimension

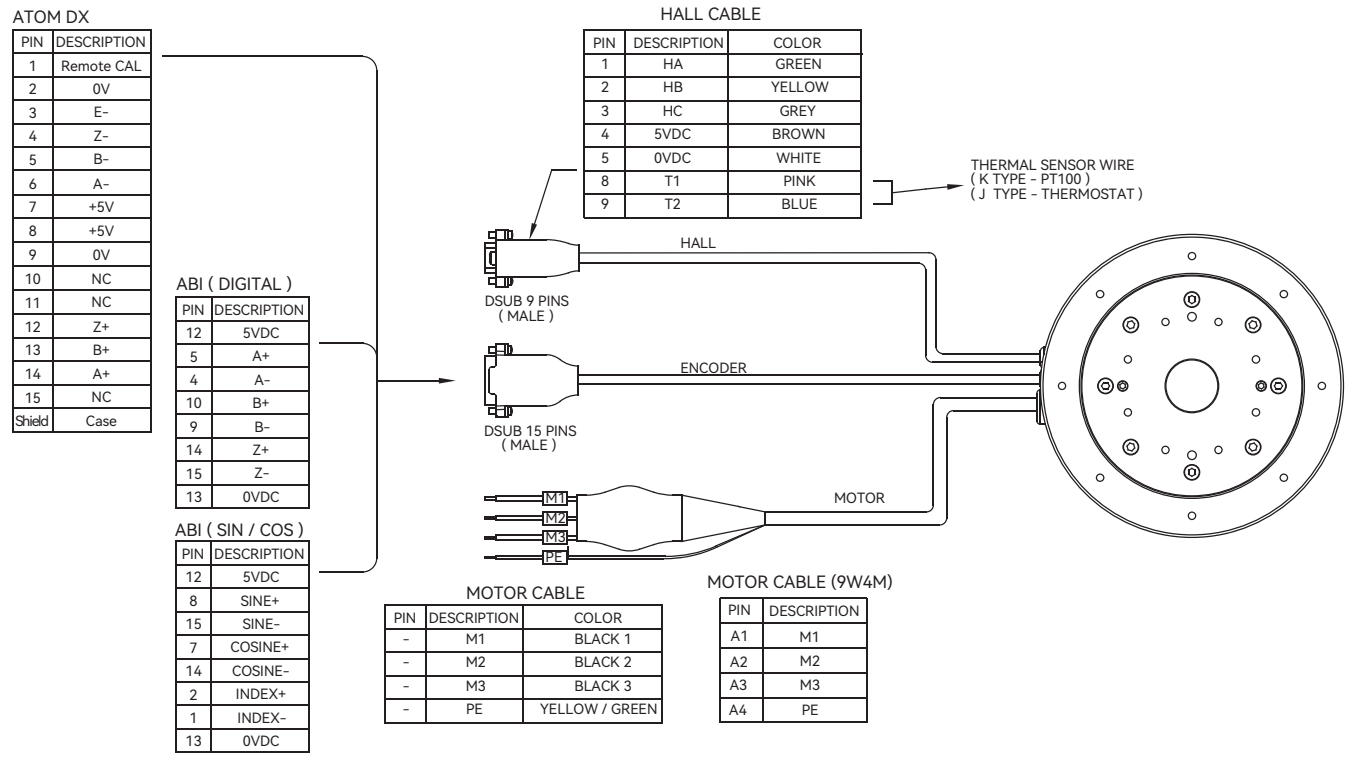




- Motor cable = ∅9.5
- Hall cable = ∅5.2
- Encoder cable = ∅4.0

❶ Standard axial / radial run-out = 0.040

Motor Cable Connection



PIN	DESCRIPTION
1	Remote CAL
2	0V
3	E-
4	Z-
5	B-
6	A-
7	+5V
8	+5V
9	0V
10	NC
11	NC
12	Z+
13	B+
14	A+
15	NC
Shield	Case

PIN	DESCRIPTION
12	5VDC
5	A+
4	A-
10	B+
9	B-
14	Z+
15	Z-
13	0VDC

PIN	DESCRIPTION
12	5VDC
8	SINE+
15	SINE-
7	COSINE+
14	COSINE-
2	INDEX+
1	INDEX-
13	0VDC

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	5VDC	BROWN
5	0VDC	WHITE
8	T1	PINK
9	T2	BLUE

MOTOR CABLE

PIN	DESCRIPTION	COLOR
-	M1	BLACK 1
-	M2	BLACK 2
-	M3	BLACK 3
-	PE	YELLOW / GREEN

MOTOR CABLE (9W4M)

PIN	DESCRIPTION
A1	M1
A2	M2
A3	M3
A4	PE

Part Numbering

ADR110-A98-S-J-H9D-0.5-FB-AB-3005-SINCOS-P15-0RB

- Motor Model: ADR110 / ADR135
- Motor Height: ADR110-A75 / A98; ADR135-A90 / A115
- Winding Code: S = Series / P = Parallel
- Thermal Sensor: J = Thermostat / K = PT100(RTD)
- Sensor Cable: H9D[1] / NH[2]
- Design Control Code: 0RB[7] / 0UA[8]
- Runout[6]: P5 / P10 / P15
- Interpolation[5]: SINCOS / 80X / 160X / 400X
- Encoder: ABI:AB-3005 / ATOM DX:R5F2
- Power Cable: FB[3] / 9W4M[4]
- Cable Length(m): 0.5

1. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
2. NH = Without Built-in Hall Sensor C/W Flying Leads
3. FB = With Ferrite Bead C/W Flying Leads
4. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
5. This item should be empty when ATOM encoder is selected
6. P5 = Axial Runout 5μm, Radial Runout is 5μm
   P10 = Axial Runout 10μm, Radial Runout is 10μm
   P15 = Axial Runout 15μm, Radial Runout is 15μm
7. 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)
8. 0UA = UL-certified Model (for more options, please consult cust-service@akribis-sys.com)

ADR175-A138-S-J-H9D-0.5-FB-AB-4103-80X-P10-0RB

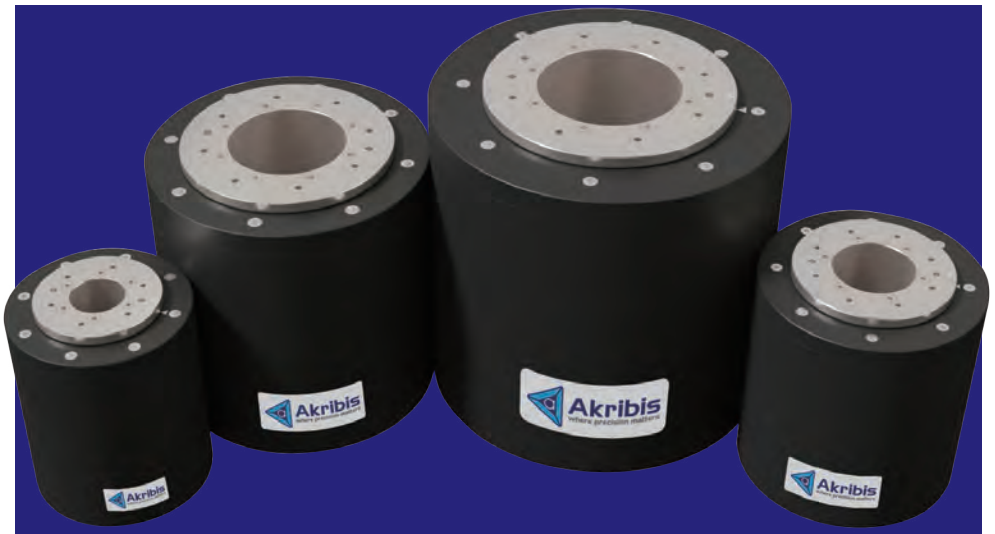
- Motor Model: ADR175 / ADR220
- Motor Height: ADR175-A102 / A138; ADR220-A120 / A165
- Winding Code: S = Series / P = Parallel
- Thermal Sensor: J = Thermostat / K = PT100(RTD)
- Sensor Cable: H9D[1] / NH[2]
- Cable Length (m): 0.5
- Power Cable: FB[3] / 9W4M[4]
- Encoder: ABI:AB-4103 / ATOM DX:R5G2
- Interpolation:[5] SINCOS / 80X 160X / 200X / 400X
- Runout:[6] P10 / P15 / P20 / P25
- Design Control Code: 0RB[7] / 0UA[8]

1. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
2. NH = Without Built-in Hall Sensor C/W Flying Leads
3. FB = With Ferrite Bead C/W Flying Leads
4. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
5. This item should be empty when ATOM encoder is selected
6. ADR175 / ADR220 : P10 = Axial Runout 10μm, Radial Runout is 10μm
   ADR175 : P15=Axial Runout 15μm, Radial Runout is 15μm
   ADR175 : P20 = Axial Runout 20μm, Radial Runout is 20μm
   ADR220 : P25 = Axial Runout 25μm, Radial Runout is 25μm
7. 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)
8. 0UA = UL-certified Model (for more options, please consult cust-service@akribis-sys.com)

ADR360-A150-S-J-H9D-0.5-FB-AB-7500-400X-P15-0RB

- Motor Model: ADR360
- Motor Height: A150 / A215
- Winding Code: S = Series / P = Parallel
- Thermal Sensor: J = Thermostat / K = PT100(RTD)
- Sensor Cable: H9D[1] / NH[2]
- Cable Length (m): 0.5
- Power Cable: FB[3] / 9W4M[4]
- Encoder: ABI:AB-7500 / ATOM DX:R5G2
- Interpolation:[5] SINCOS / 80X 160X / 200X / 400X
- Runout:[6] P15 / P40
- Design Control Code: 0RB[7] / 0UA[8]

1. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
2. NH = Without Built-in Hall Sensor C/W Flying Leads
3. FB = With Ferrite Bead C/W Flying Leads
4. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
5. This item should be empty when ATOM encoder is selected
6. P15=Axial Runout 15μm, Radial Runout is 15μm
   P40=Axial Runout 40μm, Radial Runout is 40μm
7. 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)
8. 0UA = UL-certified Model (for more options, please consult cust-service@akribis-sys.com)



ADR-B SERIES

- Large center bore
- Direct drive brushless motor
- Fully integrated with encoder and bearing
- Low cogging torque
- Precise homing through index pulse
- Low speed and high speed windings

EN-26.3.1

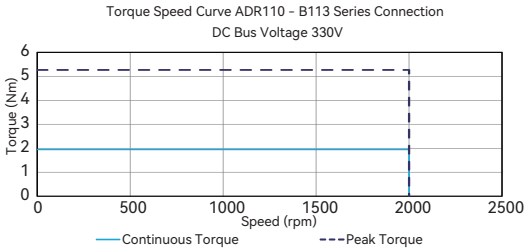
Akribis systems

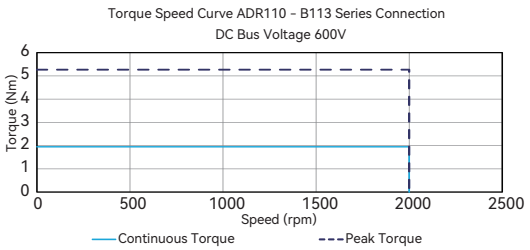
ADR110-B113

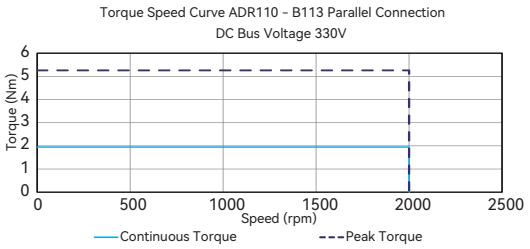
ADR110-B113				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	1.9	1.9
Peak Torque	T_{pk}	Nm	5.3	5.3
Torque Constant ±10%	K_t	Nm/Arms	0.65	0.32
Back EMF constant ±10%	K_e	Vpeak/rpm	0.055	0.028
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.30	0.29
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	3.20	0.86
Inductance (L-L) ±20% ❸	L	mH	11.00	2.70
Electrical time constant	T_e	ms	3.44	3.14
Continuous Current @100°C ❶	I_{cn}	Arms	3.0	6.0
Peak Current	I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation @100°C ❶	P_{cn}	W	55.7	59.9
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	0.7	0.8
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	2000	2000
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	2000	2000
Mechanical Parameters				
Overall Mass	m_n	kg	3.20	3.20
Rotor Inertia	J_r	$kg \cdot m^2$	3.086E-04	3.086E-04
Axial Runout ❺	-	μm	15	15
Radial Runout ❺	-	μm	15	15
Max Axial Load (Upright Mounting) ❻	-	N	439	439
Max Axial Load (Inverted / Wall mounting)	-	N	35	35
Max Moment Load (Upright Mounting)	-	Nm	25	25
Max Moment Load (Inverted / Wall Mounting)	-	Nm	2.8	2.8
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	3005	3005
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	240400	240400
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	480800	480800
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	1202000	1202000
ATOM DX Optical Incremental Encoder	-	lines / rev	5870	5870
ATOM DX Optical Incremental Encoder (80x)	-	counts / rev	469600	469600
Accuracy with Error Mapping ❼	-	arc sec	+/-5.4	+/-5.4
Repeatability ❼	-	arc sec	+/-2.7	+/-2.7
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP40		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

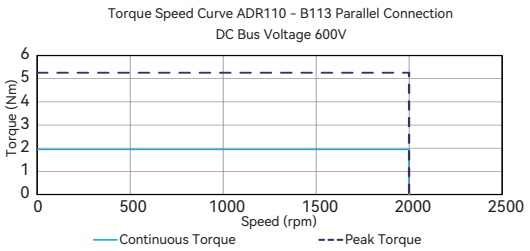
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

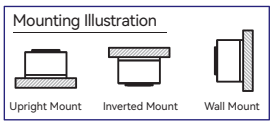
Torque-Speed Curve



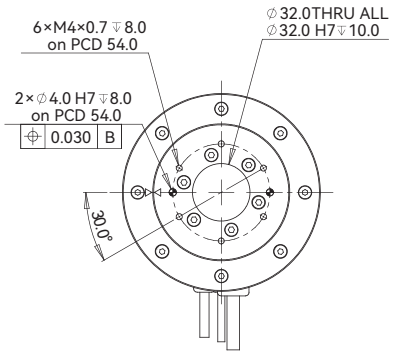


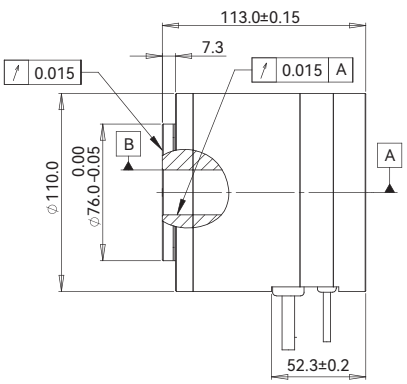


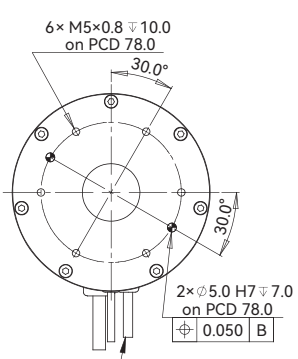




Dimension







- Motor cable =∅7.0
- Hall cable =∅5.2
- Encoder cable =∅4.0
(Refer to Wiring Diagram for Detail)

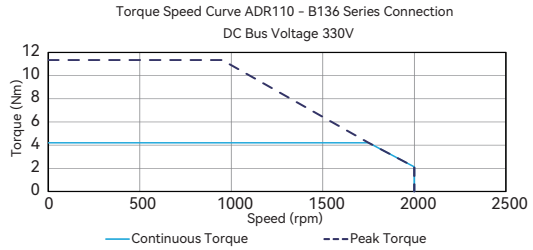
ADR110-B136

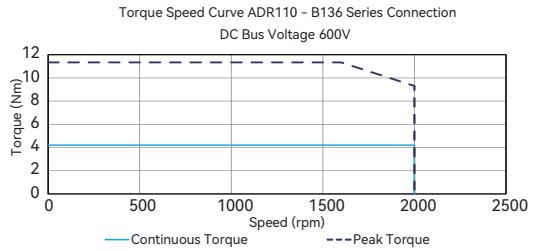
ADR110-B136					
Performance Parameters		**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶		T_{cn}	Nm	4.2	4.2
Peak Torque		T_{pk}	Nm	11.3	11.3
Torque Constant ±10%		K_t	Nm/Arms	1.40	0.70
Back EMF constant ±10%		K_e	Vpeak/rpm	0.119	0.060
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.51	0.49
Resistance (L-L) @25°C ±10% ❷		R_{25}	Ω	4.90	1.37
Inductance (L-L) ±20% ❸		L	mH	23.50	6.49
Electrical time constant		τ_e	ms	4.80	4.73
Continuous Current @100°C ❶		I_{cn}	Arms	3.0	6.0
Peak Current		I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation @100°C ❶		P_{cn}	W	85.3	95.4
Max. Coil Temperature		T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶		K_{thn}	W/°C	1.1	1.3
Max. Bus Voltage		U_{bus}	Vdc	600.0	600.0
Pole Number		2P	-	16	16
Rec. Max Speed @Peak Torque ❹		Ω_{max}	rpm	1600	2000
Rec. Max Speed @Continuous Torque ❹		Ω_{max}	rpm	2000	2000
Mechanical Parameters					
Overall Mass		m_n	kg	4.60	4.60
Rotor Inertia		J_r	$kg \cdot m^2$	4.419E-04	4.419E-04
Axial Runout ❺		-	μm	15	15
Radial Runout ❺		-	μm	15	15
Max Axial Load (Upright Mounting) ❻		-	N	439	439
Max Axial Load (Inverted / Wall mounting)		-	N	35	35
Max Moment Load (Upright Mounting)		-	Nm	25	25
Max Moment Load (Inverted / Wall Mounting)		-	Nm	2.8	2.8
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	3005	3005
ABI Optical Incremental Encoder Digital Resolution (80x)		-	counts / rev	240400	240400
ABI Optical Incremental Encoder Digital Resolution (160x)		-	counts / rev	480800	480800
ABI Optical Incremental Encoder Digital Resolution (400x)		-	counts / rev	1202000	1202000
ATOM DX Optical Incremental Encoder		-	lines / rev	5870	5870
ATOM DX Optical Incremental Encoder (80x)		-	counts / rev	469600	469600
Accuracy with Error Mapping ❼		-	arc sec	+/-5.4	+/-5.4
Repeatability ❼		-	arc sec	+/-2.7	+/-2.7
Other Information					
Insulation Class				Class B (130°C)	
Protection Grade				IP40	
Compliance with Global Standards				RoHS, CE	
Ambient Temperature	Operation			0°C to 40°C (non-freezing)	
	Storage			-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation			10%RH to 80%RH (non-condensing)	
	Storage			10%RH to 90%RH (non-condensing)	
Recommended Ambience				Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

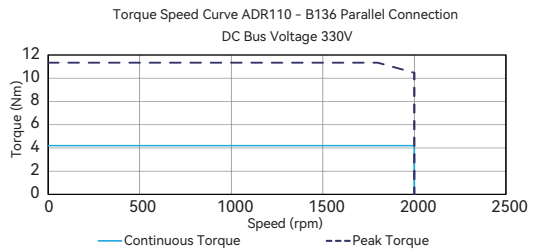
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.

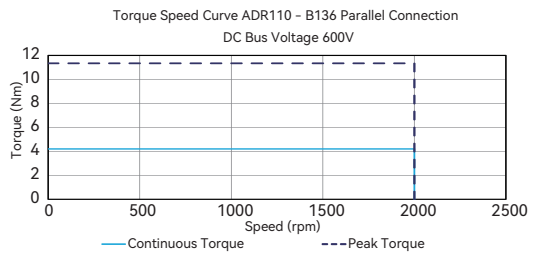
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

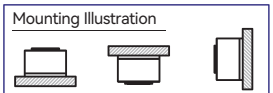




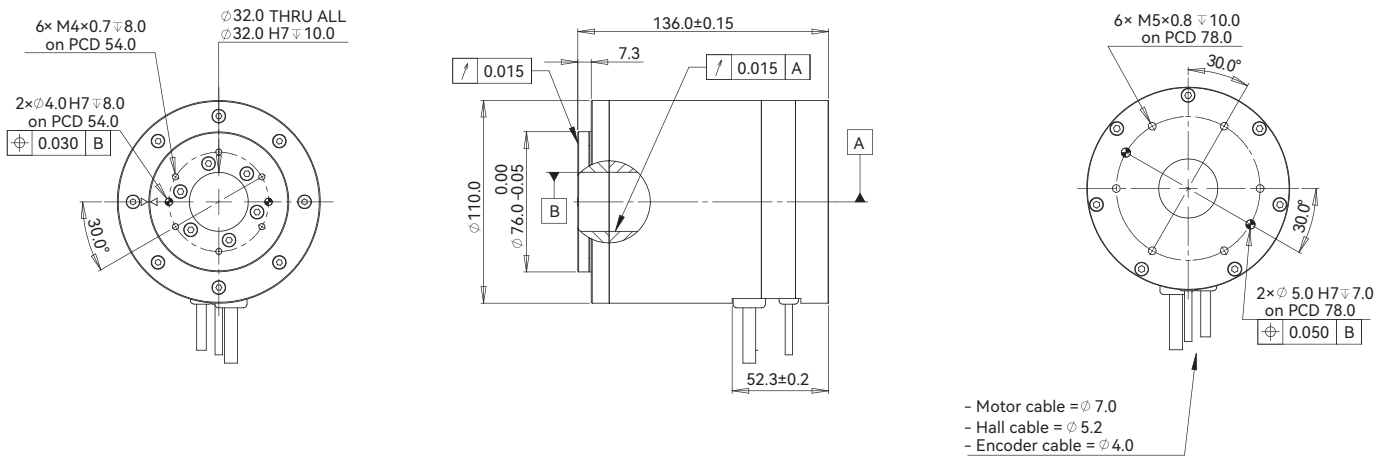




Mounting Illustration



Dimension

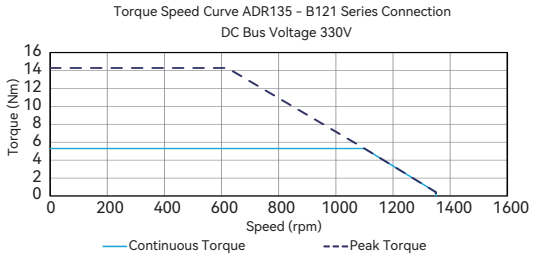


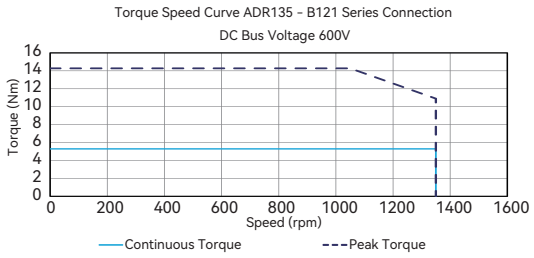
ADR135-B121

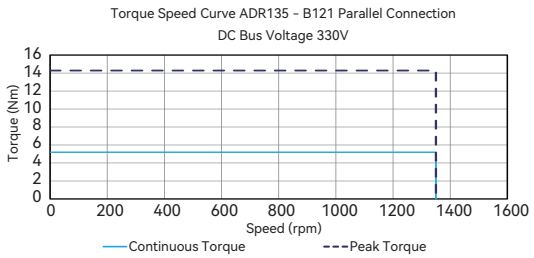
ADR135-B121				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	5.3	5.3
Peak Torque	T_{pk}	Nm	14.3	14.3
Torque Constant ±10%	K_t	Nm/Arms	2.3	1.1
Back EMF constant ±10%	K_e	Vpeak/rpm	0.197	0.098
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.73	0.73
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	6.60	1.65
Inductance (L-L) ±20% ❸	L	mH	45.30	11.20
Electrical time constant	τ_e	ms	6.86	6.79
Continuous Current @100°C ❶	I_{cn}	Arms	2.3	4.6
Peak Current	I_{pk}	Arms	6.9	13.8
Continuous Power Dissipation @100°C ❶	P_{cn}	W	67.5	67.5
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	0.9	0.9
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	1050	1350
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	1350	1350
Mechanical Parameters				
Overall Mass	m_n	kg	3.90	3.90
Rotor Inertia	J_r	kg·m²	9.916E-04	9.916E-04
Axial Runout ❺	-	μm	15	15
Radial Runout ❺	-	μm	15	15
Max Axial Load (Upright Mounting) ❻	-	N	604	604
Max Axial Load (Inverted / Wall mounting)	-	N	56	56
Max Moment Load (Upright Mounting)	-	Nm	45	45
Max Moment Load (Inverted / Wall Mounting)	-	Nm	5.0	5.0
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	4103	4103
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	328240	328240
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	656480	656480
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	1641200	1641200
ATOM DX Optical Incremental Encoder	-	lines / rev	8192	8192
ATOM DX Optical Incremental Encoder (200x)	-	counts / rev	1638400	1638400
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE	
Ambient Temperature		Operation	0°C to 40°C (non-freezing)	
		Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity		Operation	10%RH to 80%RH (non-condensing)	
		Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

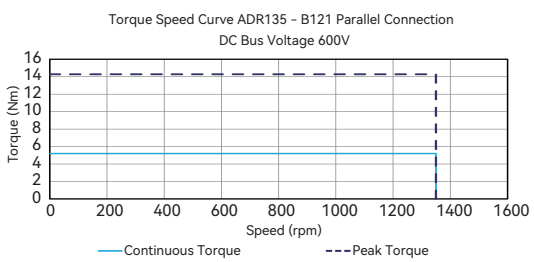
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

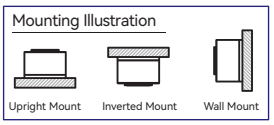
Torque-Speed Curve



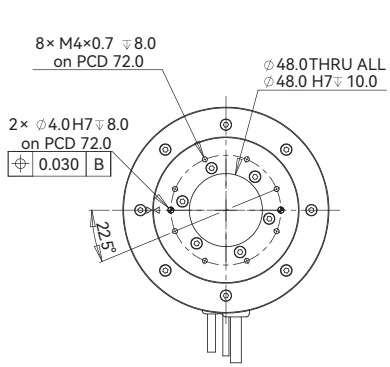


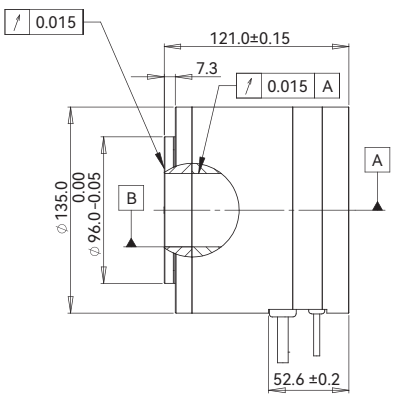


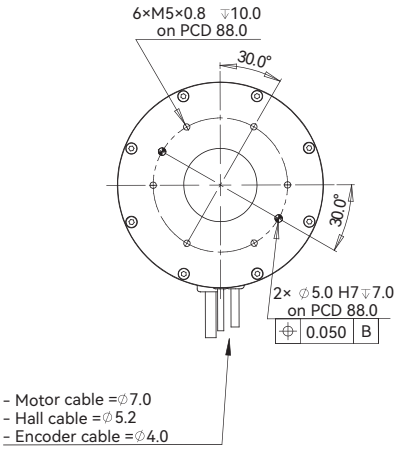




Dimension







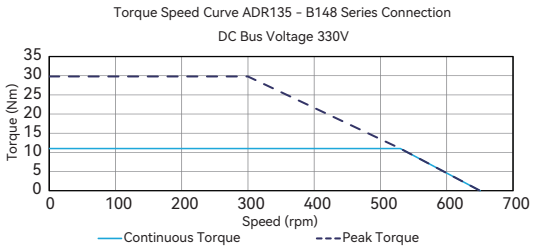
ADR135-B148

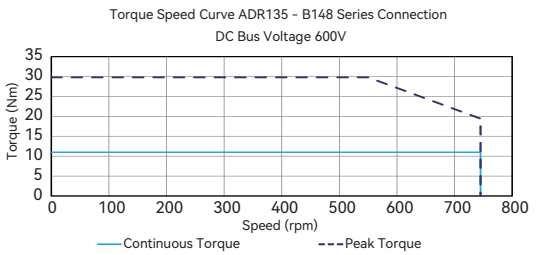
ADR135-B148				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	11.0	11.0
Peak Torque	T_{pk}	Nm	29.8	29.8
Torque Constant ±10%	K_t	Nm/Arms	4.8	2.4
Back EMF constant ±10%	K_e	Vpeak/rpm	0.41	0.21
Motor Constant @25°C	K_m	Nm/Sqrt(W)	1.2	1.2
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	10.70	2.70
Inductance (L-L) ±20% ❸	L	mH	72.76	18.63
Electrical time constant	τ_e	ms	6.80	6.90
Continuous Current @100°C ❶	I_{cn}	Arms	2.3	4.6
Peak Current	I_{pk}	Arms	6.9	13.8
Continuous Power Dissipation @100°C ❶	P_{cn}	W	109.4	110.5
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	1.5	1.5
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	550	745
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	745	745
Mechanical Parameters				
Overall Mass	m_n	kg	5.70	5.70
Rotor Inertia	J_r	$kg \cdot m^2$	1.332E-03	1.332E-03
Axial Runout ❺	-	μm	15	15
Radial Runout ❺	-	μm	15	15
Max Axial Load (Upright Mounting) ❻	-	N	604	604
Max Axial Load (Inverted / Wall mounting)	-	N	56	56
Max Moment Load (Upright Mounting)	-	Nm	45	45
Max Moment Load (Inverted / Wall Mounting)	-	Nm	5.0	5.0
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	4103	4103
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	328240	328240
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	656480	656480
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	1641200	1641200
ATOM DX Optical Incremental Encoder	-	lines / rev	8192	8192
ATOM DX Optical Incremental Encoder (200x)	-	counts / rev	1638400	1638400
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE	
Ambient Temperature		Operation	0°C to 40°C (non-freezing)	
		Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity		Operation	10%RH to 80%RH (non-condensing)	
		Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

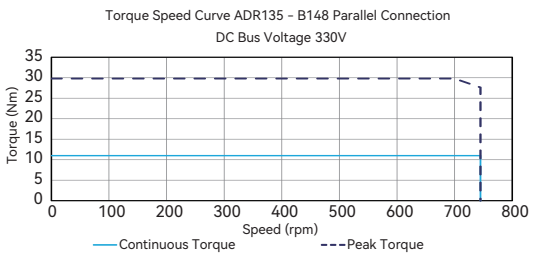
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.

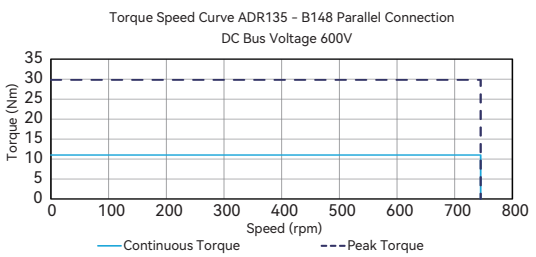
The contents of datasheet are subject to change without prior notice.

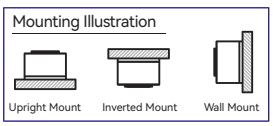
Torque-Speed Curve



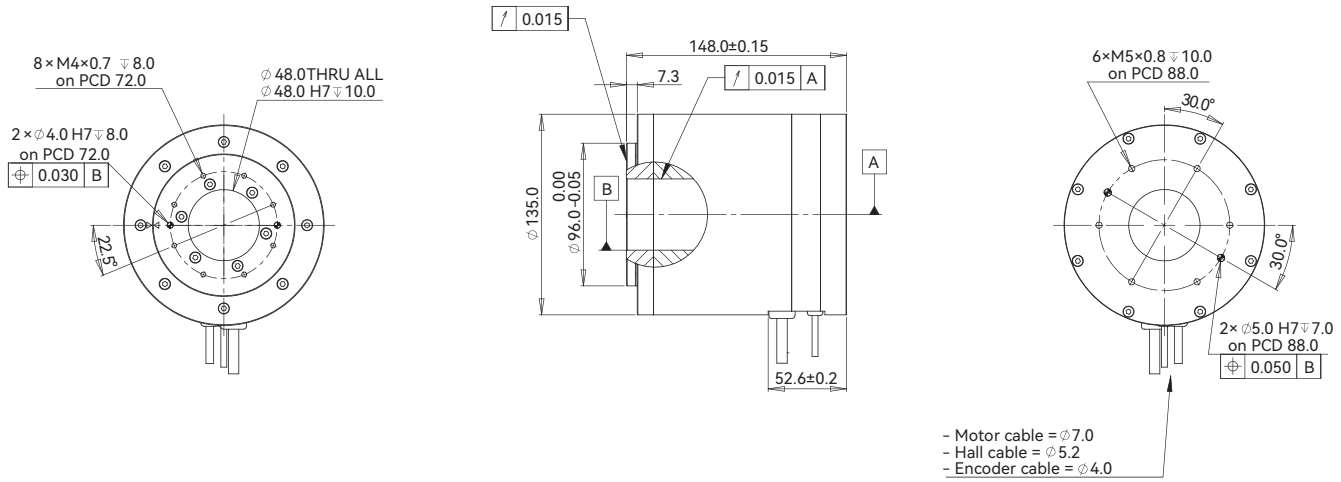








Dimension



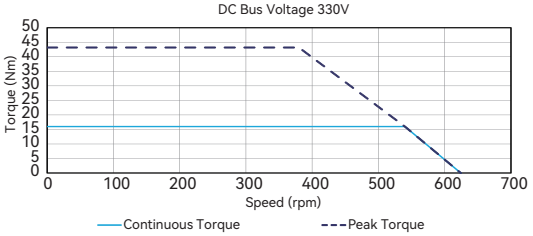
ADR175-B143

ADR175-B143				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	16.0	16.0
Peak Torque	T_{pk}	Nm	43.2	43.2
Torque Constant ±10%	K_t	Nm/Arms	5.0	2.5
Back EMF constant ±10%	K_e	Vpeak/rpm	0.43	0.21
Motor Constant @25°C	K_m	Nm/Sqrt(W)	1.78	1.79
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	5.27	1.30
Inductance (L-L) ±20% ❸	L	mH	37.00	9.70
Electrical time constant	τ_e	ms	7.02	7.46
Continuous Current @100°C ❶	I_{cn}	Arms	3.2	6.4
Peak Current	I_{pk}	Arms	9.6	19.2
Continuous Power Dissipation @100°C ❶	P_{cn}	W	104.4	103.0
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	1.4	1.4
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	660	880
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	880	880
Mechanical Parameters				
Overall Mass	m_n	kg	10.0	10.0
Rotor Inertia	J_r	kg·m²	5.422E-03	5.422E-03
Axial Runout ❺	-	μm	20	20
Radial Runout ❺	-	μm	20	20
Max Axial Load (Upright Mounting) ❻	-	N	1256	1256
Max Axial Load (Inverted / Wall mounting)	-	N	84	84
Max Moment Load (Upright Mounting)	-	Nm	65	65
Max Moment Load (Inverted / Wall Mounting)	-	Nm	7.2	7.2
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	5071	5071
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	405680	405680
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	811360	811360
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	2028400	2028400
ATOM DX Optical Incremental Encoder	-	lines / rev	10200	10200
ATOM DX Optical Incremental Encoder (80x)	-	counts / rev	816000	816000
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP40		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

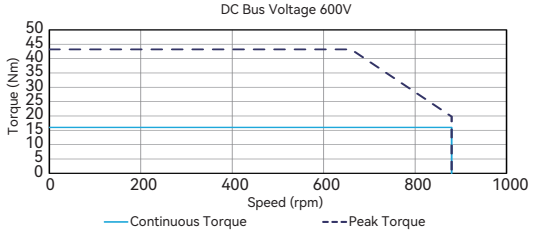
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

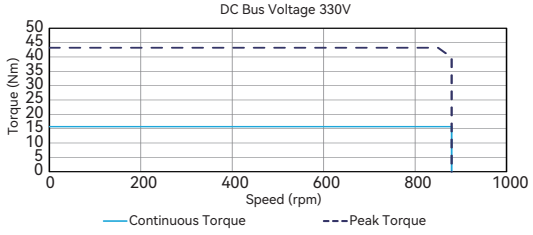
Torque Speed Curve ADR175 - B143 Series Connection
DC Bus Voltage 330V



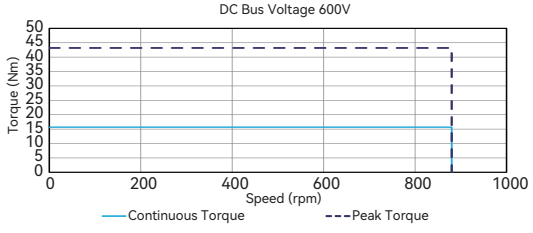
Torque Speed Curve ADR175 - B143 Series Connection
DC Bus Voltage 600V



Torque Speed Curve ADR175 - B143 Parallel Connection
DC Bus Voltage 330V



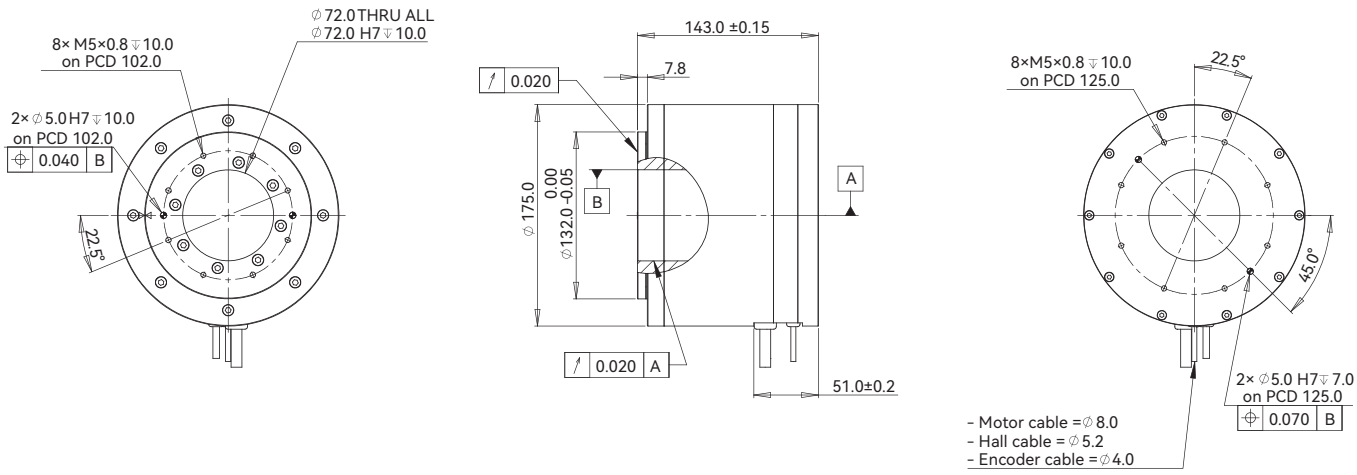
Torque Speed Curve ADR175 - B143 Parallel Connection
DC Bus Voltage 600V



Mounting Illustration



Dimension



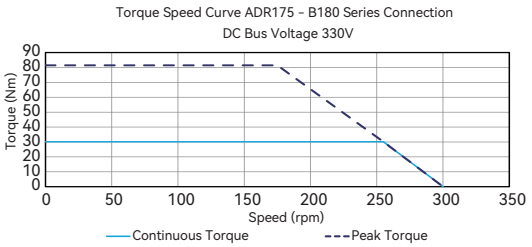
ADR175-B180

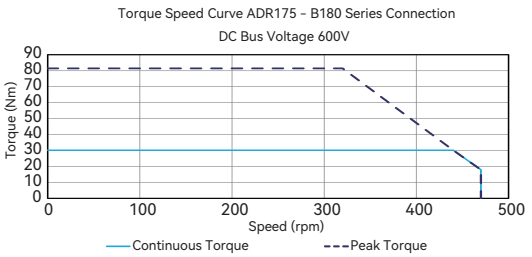
ADR175-B180				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	30.2	30.2
Peak Torque	T_{pk}	Nm	81.4	81.4
Torque Constant ±10%	K_t	Nm/Arms	10.4	5.2
Back EMF constant ±10%	K_e	Vpeak/rpm	0.89	0.44
Motor Constant @25°C	K_m	Nm/Sqrt(W)	2.95	2.91
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	8.30	2.13
Inductance (L-L) ±20% ❸	L	mH	72.00	18.51
Electrical time constant	τ_e	ms	8.67	8.67
Continuous Current @100°C ❶	I_{cn}	Arms	2.9	5.8
Peak Current	I_{pk}	Arms	8.7	17.4
Continuous Power Dissipation @100°C ❶	P_{cn}	W	135.0	138.9
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	1.8	1.9
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	320	470
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	440	470
Mechanical Parameters				
Overall Mass	m_n	kg	11.6	11.6
Rotor Inertia	J_r	kg·m²	7.621E-03	7.621E-03
Axial Runout ❺	-	μm	20	20
Radial Runout ❺	-	μm	20	20
Max Axial Load (Upright Mounting) ❻	-	N	1256	1256
Max Axial Load (Inverted / Wall mounting)	-	N	84	84
Max Moment Load (Upright Mounting)	-	Nm	65	65
Max Moment Load (Inverted / Wall Mounting)	-	Nm	7.2	7.2
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	5071	5071
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	405680	405680
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	811360	811360
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	2028400	2028400
ATOM DX Optical Incremental Encoder	-	lines / rev	10200	10200
ATOM DX Optical Incremental Encoder (80x)	-	counts / rev	816000	816000
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE	
Ambient Temperature		Operation	0°C to 40°C (non-freezing)	
		Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity		Operation	10%RH to 80%RH (non-condensing)	
		Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

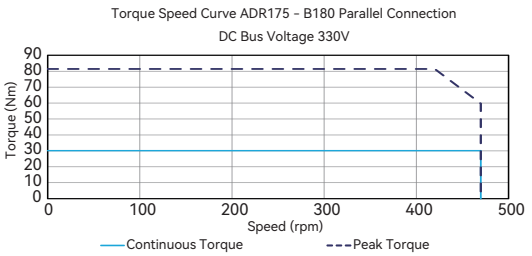
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.

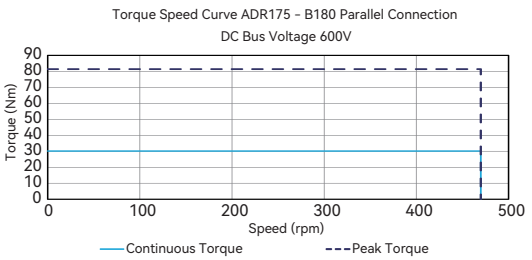
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

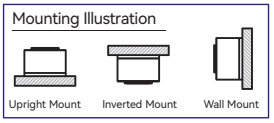




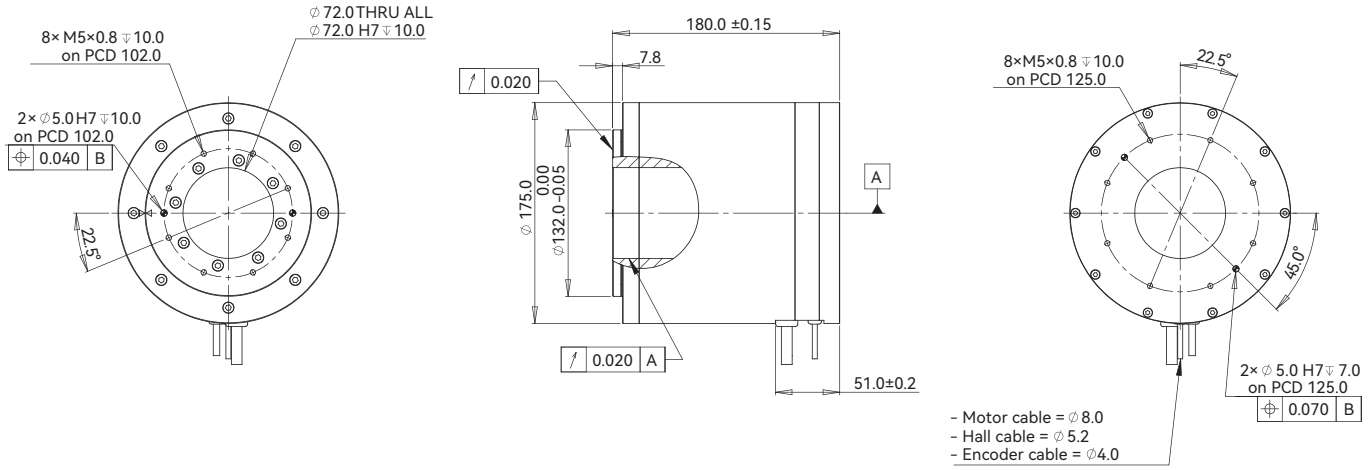




Mounting Illustration



Dimension



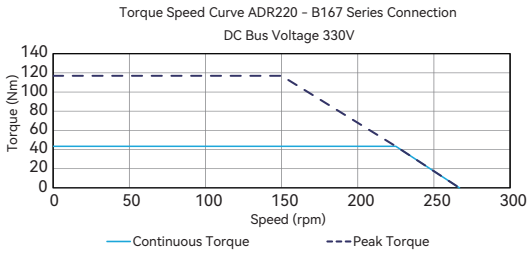
ADR220-B167

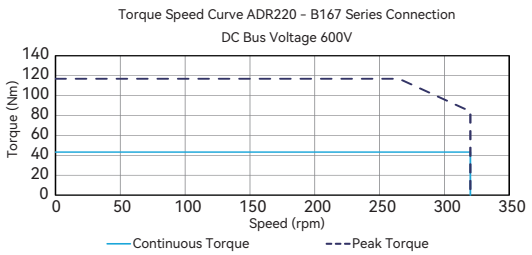
ADR220-B167				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	43.3	43.3
Peak Torque	T_{pk}	Nm	116.9	116.9
Torque Constant ±10%	K_t	Nm/Arms	11.7	3.9
Back EMF constant ±10%	K_e	Vpeak/rpm	1.00	0.33
Motor Constant @25°C	K_m	Nm/Sqrt(W)	3.94	3.70
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	5.87	0.74
Inductance (L-L) ±20% ❸	L	mH	53.60	6.30
Electrical time constant	τ_e	ms	9.13	8.51
Continuous Current @100°C ❶	I_{cn}	Arms	3.7	11.1
Peak Current	I_{pk}	Arms	11.1	33.3
Continuous Power Dissipation @100°C ❶	P_{cn}	W	155.4	176.3
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	2.1	2.4
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	24	24
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	265	540
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	320	540
Mechanical Parameters				
Overall Mass	m_n	kg	15.6	15.6
Rotor Inertia	J_r	kg·m²	1.786E-02	1.786E-02
Axial Runout ❺	-	μm	25	25
Radial Runout ❺	-	μm	25	25
Max Axial Load (Upright Mounting) ❻	-	N	1669	1669
Max Axial Load (Inverted / Wall mounting)	-	N	105	105
Max Moment Load (Upright Mounting)	-	Nm	85	85
Max Moment Load (Inverted / Wall Mounting)	-	Nm	9.4	9.4
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	5071	5071
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	405680	405680
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	811360	811360
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	2028400	2028400
ATOM DX Optical Incremental Encoder	-	lines / rev	10200	10200
ATOM DX Optical Incremental Encoder (80x)	-	counts / rev	81600	81600
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

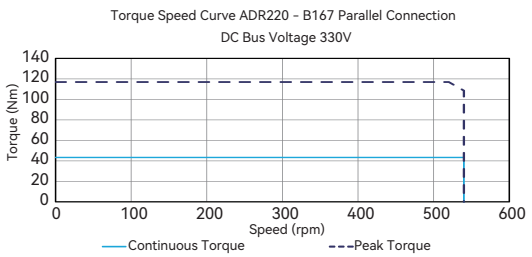
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.

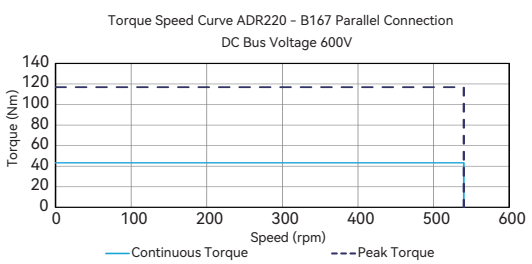
The contents of datasheet are subject to change without prior notice.

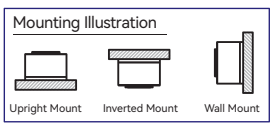
Torque-Speed Curve



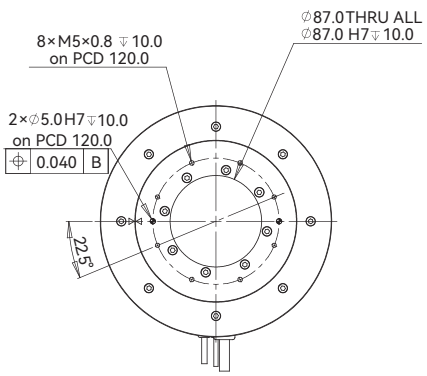


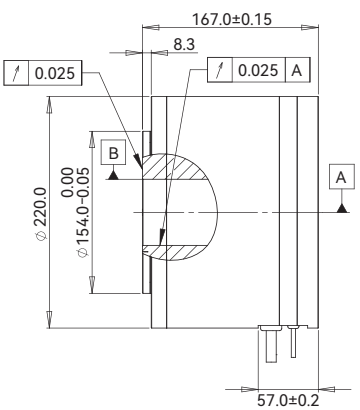


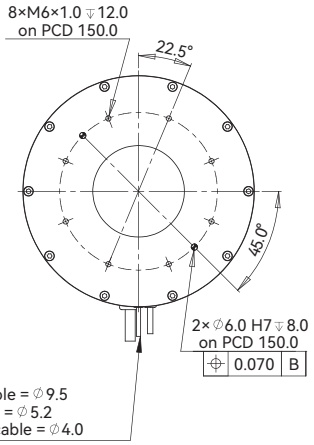




Dimension







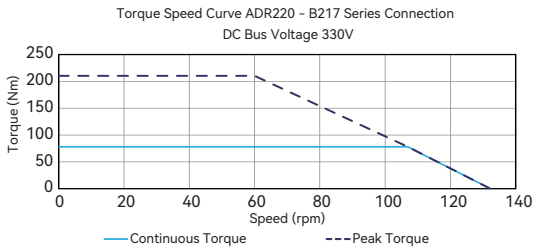
ADR220-B217

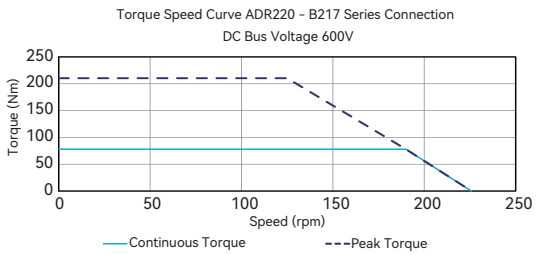
ADR220-B217				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100°C ❶	T_{cn}	Nm	77.9	78.2
Peak Torque	T_{pk}	Nm	210.3	211.2
Torque Constant ±10%	K_t	Nm/Arms	23.6	7.9
Back EMF constant ±10%	K_e	Vpeak/rpm	2.02	0.68
Motor Constant @25°C	K_m	Nm/Sqrt(W)	6.00	5.89
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	10.32	1.20
Inductance (L-L) ±20% ❸	L	mH	106.70	11.90
Electrical time constant	τ_e	ms	10.34	9.92
Continuous Current @100°C ❶	I_{cn}	Arms	3.3	9.9
Peak Current	I_{pk}	Arms	9.9	29.7
Continuous Power Dissipation @100°C ❶	P_{cn}	W	217.3	227.4
Max. Coil Temperature	T_{max}	°C	100.0	100.0
Thermal Dissipation Constant ❶	K_{thn}	W/°C	2.9	3.0
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	24	24
Rec. Max Speed @Peak Torque ❹	Ω_{max}	rpm	125	300
Rec. Max Speed @Continuous Torque ❹	Ω_{max}	rpm	190	300
Mechanical Parameters				
Overall Mass	m_n	kg	23.4	23.4
Rotor Inertia	J_r	kg·m²	2.522E-02	2.522E-02
Axial Runout ❺	-	μm	25	25
Radial Runout ❺	-	μm	25	25
Max Axial Load (Upright Mounting) ❻	-	N	1669	1669
Max Axial Load (Inverted / Wall mounting)	-	N	105	105
Max Moment Load (Upright Mounting)	-	Nm	85	85
Max Moment Load (Inverted / Wall Mounting)	-	Nm	9.4	9.4
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	5071	5071
ABI Optical Incremental Encoder Digital Resolution (80x)	-	counts / rev	405680	405680
ABI Optical Incremental Encoder Digital Resolution (160x)	-	counts / rev	811360	811360
ABI Optical Incremental Encoder Digital Resolution (400x)	-	counts / rev	2028400	2028400
ATOM DX Optical Incremental Encoder	-	lines / rev	10200	10200
ATOM DX Optical Incremental Encoder (80x)	-	counts / rev	816000	816000
Accuracy with Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE	
Ambient Temperature		Operation	0°C to 40°C (non-freezing)	
		Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity		Operation	10%RH to 80%RH (non-condensing)	
		Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

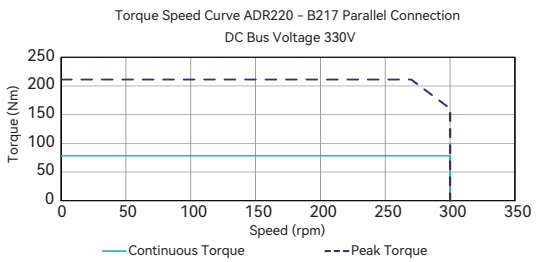
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under 330V bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.

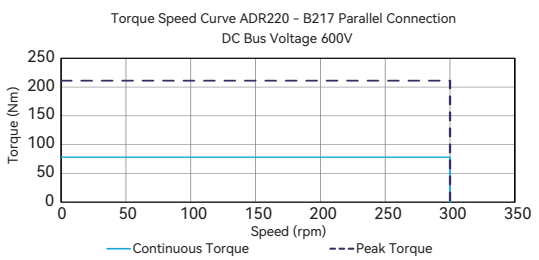
The contents of datasheet are subject to change without prior notice.

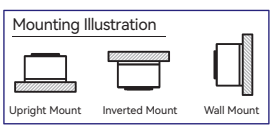
Torque-Speed Curve



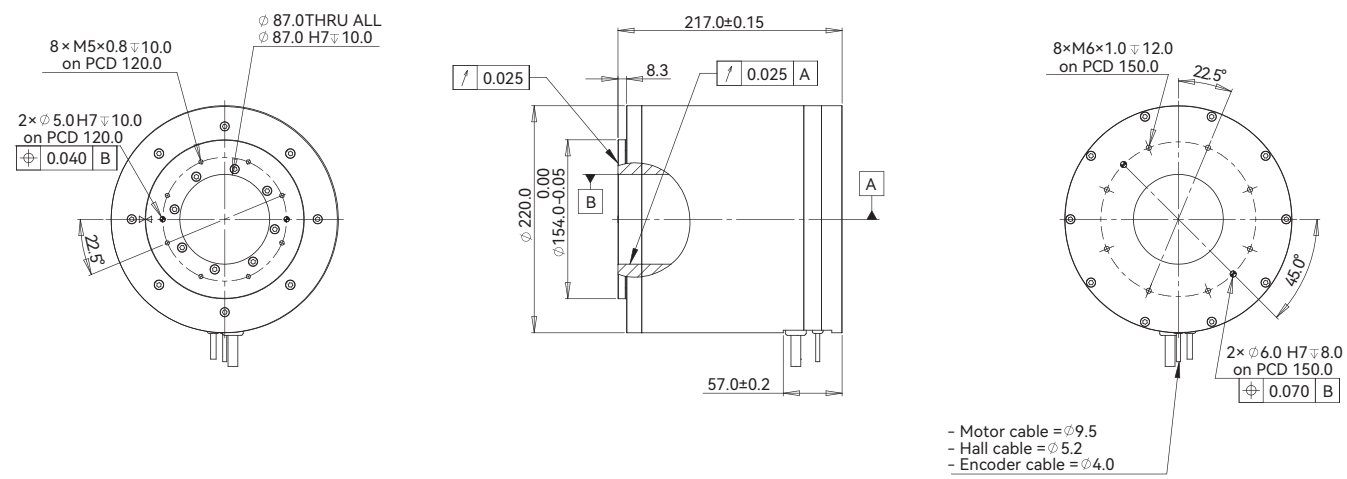








Dimension



Motor Cable Connection

ATOM DX

PIN	DESCRIPTION
1	Remote CAL
2	0V
3	E-
4	Z-
5	B-
6	A-
7	+5V
8	+5V
9	0V
10	NC
11	NC
12	Z+
13	B+
14	A+
15	NC
Shield	Case

ABI (DIGITAL)

PIN	DESCRIPTION
12	5VDC
5	A+
4	A-
10	B+
9	B-
14	Z+
15	Z-
13	0VDC

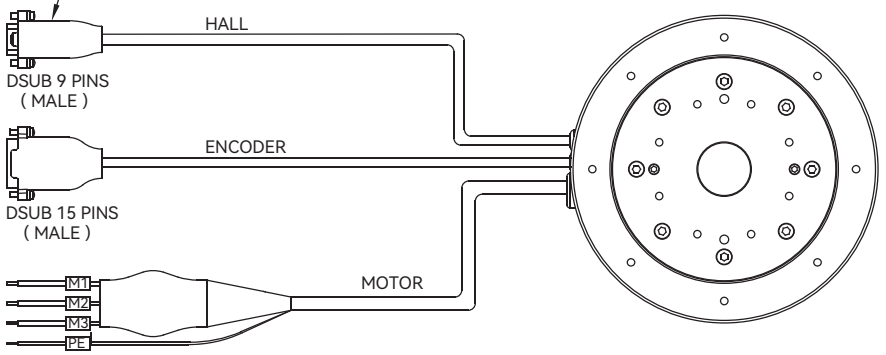
ABI (SIN / COS)

PIN	DESCRIPTION
12	5VDC
8	SINE+
15	SINE-
7	COSINE+
14	COSINE-
2	INDEX+
1	INDEX-
13	0VDC

HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	5VDC	BROWN
5	0VDC	WHITE
8	T1	PINK
9	T2	BLUE

THERMAL SENSOR WIRE
(K TYPE - PT100)
(J TYPE - THERMOSTAT)



MOTOR CABLE

PIN	DESCRIPTION	COLOR
-	M1	BLACK 1
-	M2	BLACK 2
-	M3	BLACK 3
-	PE	YELLOW / GREEN

MOTOR CABLE (9W4M)

PIN	DESCRIPTION
A1	M1
A2	M2
A3	M3
A4	PE

Part Numbering

ADR110-B136-S-J-H9D-0.5-FB-AB-3005-SINCOS-P15-0RB

Motor Model: ADR110

Motor Height: B113 / B136

Winding Code: S = Series / P = Parallel

Thermal Sensor: J = Thermostat / K = PT100(RTD)

Sensor Cable: H9D[1] / NH[2]

Design Control Code: 0RB[7]

Runout: P15[6]

Interpolation:[5] SINCOS / 80X / 160X / 400X

Encoder: ABI:AB-3005 / ATOM DX:R5F2

Power Cable: FB[3] / 9W4M[4]

Cable Length (m): 0.5

❶ H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
❷ NH = Without Built-in Hall Sensor C/W Flying Leads
❸ FB = With Ferrite Bead C/W Flying Leads
❹ 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
❺ This item should be empty when ATOM encoder is selected
❻ P15 = Axial Runout 15μm, Radial Runout is 15μm
❼ 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)

ADR-B Series

ADR135-B121-S-J-H9D-0.5-FB-AB-4103-SINCOS-P15-0RB

Motor Model: ADR135

Motor Height: B121 / B148

Winding Code: S = Series / P = Parallel

Thermal Sensor: J = Thermostat / K = PT100(RTD)

Sensor Cable: H9D[1] / NH[2]

Design Control Code: 0RB[7]

Runout:[6] P15

Interpolation:[5] SINCOS / 80X / 160X / 400X

Encoder: ABI:AB-4103 / ATOM DX:R5G2

Power Cable: FB[3] / 9W4M[4]

Cable Length (m): 0.5

1. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
2. NH = Without Built-in Hall Sensor C/W Flying Leads
3. FB = With Ferrite Bead C/W Flying Leads
4. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
5. This item should be empty when ATOM encoder is selected
6. P15 = Axial Runout 15μm, Radial Runout is 15μm
7. 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)

ADR175-B180-P-J-NH-0.5-FB-AB-5071-SINCOS-P20-0RB

Motor Model: ADR175 / ADR220

Motor Height: ADR175-B143 / B180
ADR220-B167 / B217

Winding Code: S = Series / P = Parallel

Thermal Sensor: J = Thermostat / K = PT100(RTD)

Sensor Cable: H9D[1] / NH[2]

Design Control Code: 0RB[7]

Runout:[6] P20 / P25

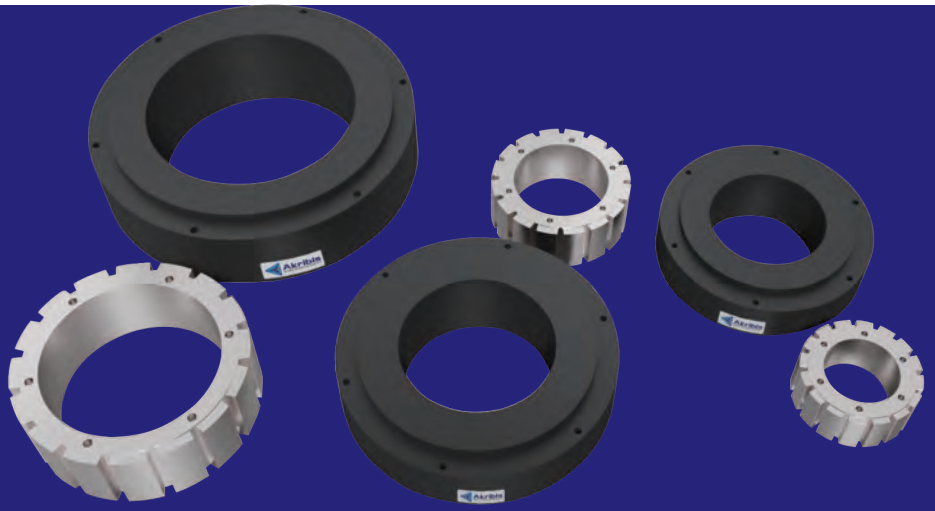
Interpolation:[5] SINCOS / 80X / 160X / 400X

Encoder: ABI:AB-5071 / ATOM DX:R5F2

Power Cable: FB[3] / 9W4M[4]

Cable Length (m): 0.5

1. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
2. NH = Without Built-in Hall Sensor C/W Flying Leads
3. FB = With Ferrite Bead C/W Flying Leads
4. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
5. This item should be empty when ATOM encoder is selected
6. ADR175 : P20 = Axial Runout 20μm, Radial Runout is 20μm
   ADR220 : P25 = Axial Runout 25μm, Radial Runout is 25μm
7. 0RB = Standard Model (for more options, please consult cust-service@akribis-sys.com)



ADR-P SERIES

- Ironcore technology with low cogging torque
- Low speed and high speed windings
- Direct drive brushless frameless motor
- High torque density

EN-26.3.1

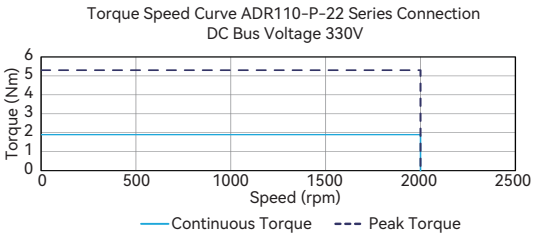
Akribis systems

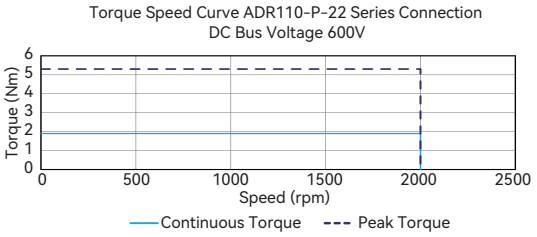
ADR110-P-22

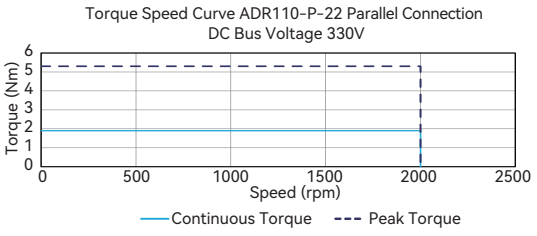
ADR110-P-22				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100℃ ❶	T_{cn}	Nm	1.9	1.9
Peak Torque	T_{pk}	Nm	5.3	5.3
Torque Constant ±10%	K_t	Nm/Arms	0.65	0.32
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.055	0.028
Motor Constant @25℃	K_m	Nm/Sqrt(W)	0.32	0.29
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	2.74	0.86
Inductance (L-L) ±20% ❸	L	mH	10.2	2.7
Electrical Time Constant	τ_e	ms	3.7	3.1
Continuous Current @100℃ ❶	I_{cn}	Arms	3.0	6.0
Peak Current	I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	47.7	59.9
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	0.64	0.79
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Mechanical Parameters				
Rotor Mass	m	kg	0.25	0.25
Stator Mass	m	kg	0.88	0.88
Rotor Inertia	J_r	kg·m²	1.463E-04	1.463E-04
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

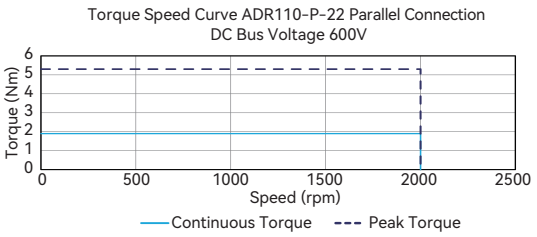
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

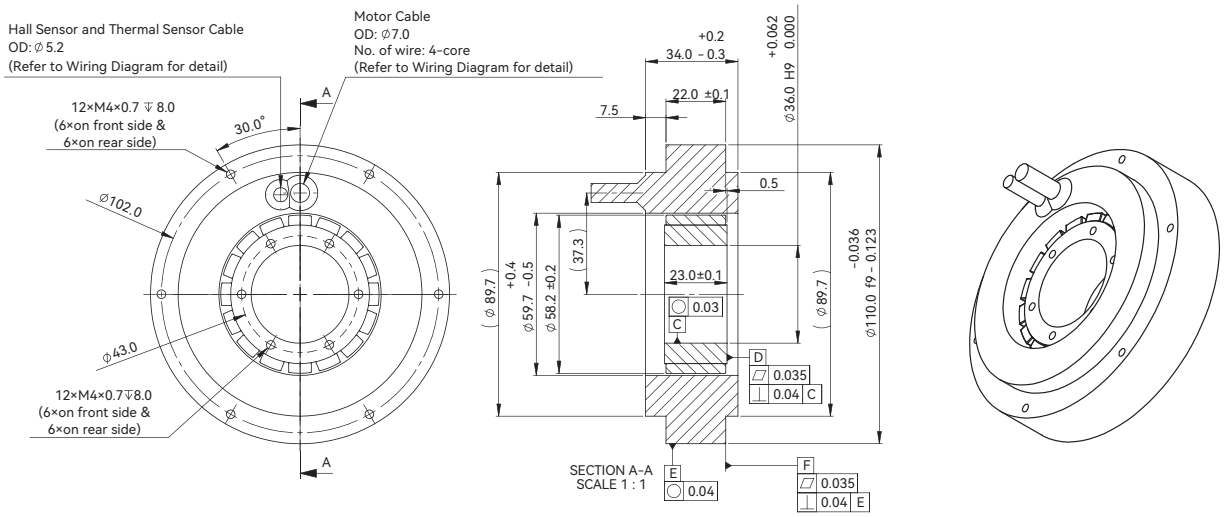








Dimension



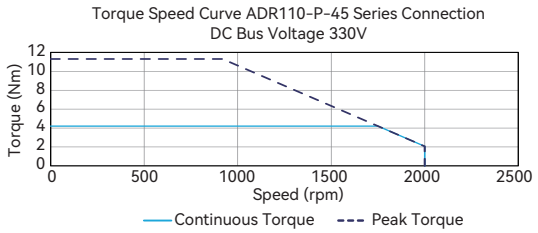
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

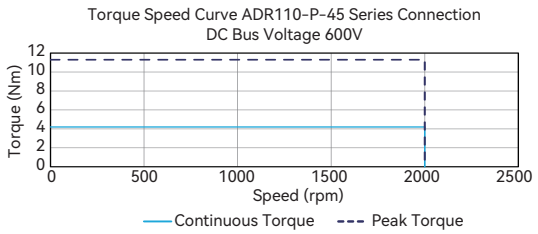
ADR110-P-45

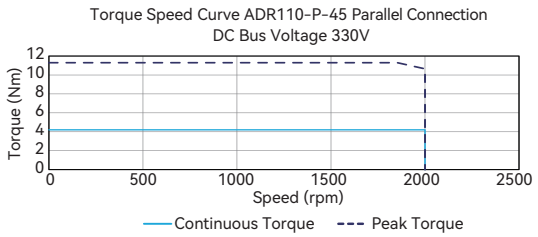
ADR110-P-45				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100℃ ❶	T_{cn}	Nm	4.2	4.2
Peak Torque	T_{pk}	Nm	11.3	11.3
Torque Constant ±10%	K_t	Nm/Arms	1.40	0.70
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.119	0.060
Motor Constant @25℃	K_m	Nm/Sqrt(W)	0.51	0.49
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	4.90	1.37
Inductance (L-L) ±20% ❸	L	mH	23.50	6.49
Electrical Time Constant	τ_e	ms	4.80	4.73
Continuous Current @100℃ ❶	I_{cn}	Arms	3.0	6.0
Peak Current	I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	85.3	95.4
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	1.137	1.271
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Mechanical Parameters				
Rotor Mass	m	kg	0.40	0.40
Stator Mass	m	kg	1.80	1.80
Rotor Inertia	J_r	$kg{\cdot}m^2$	2.990E-04	2.990E-04
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

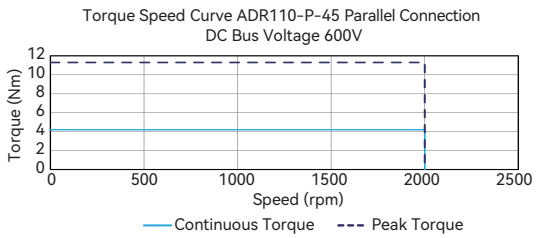
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

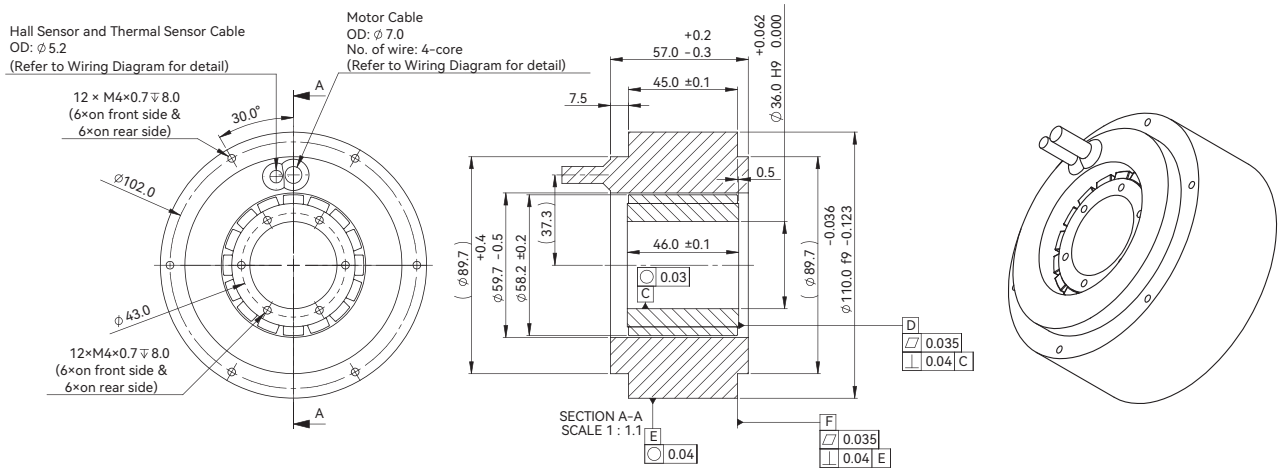








Dimension



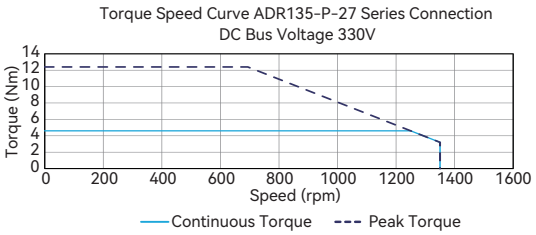
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

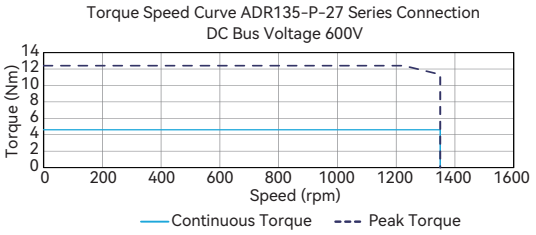
ADR135-P-27

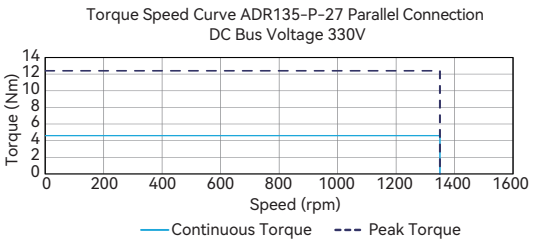
ADR135-P-27				
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque @100℃ ❶	T_{cn}	Nm	4.6	4.6
Peak Torque	T_{pk}	Nm	12.4	12.4
Torque Constant ±10%	K_t	Nm/Arms	2.0	1.0
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.171	0.086
Motor Constant @25℃	K_m	Nm/Sqrt(W)	0.68	0.65
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	5.81	1.59
Inductance (L-L) ±20% ❸	L	mH	39.51	10.47
Electrical Time Constant	τ_e	ms	6.8	6.6
Continuous Current @100℃ ❶	I_{cn}	Arms	2.3	4.6
Peak Current	I_{pk}	Arms	6.9	13.8
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	59.4	65.0
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	0.79	0.87
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Mechanical Parameters				
Rotor Mass	m	kg	0.45	0.45
Stator Mass	m	kg	1.45	1.45
Rotor Inertia	J_r	$kg{\cdot}m^2$	4.243E-04	4.243E-04
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

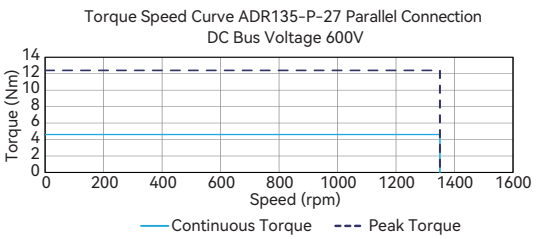
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

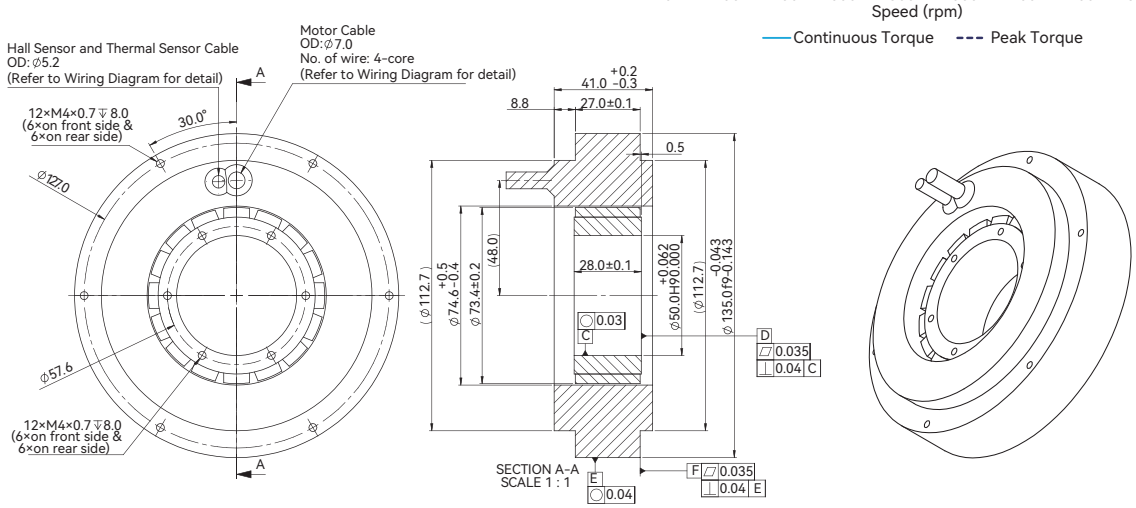








Dimension



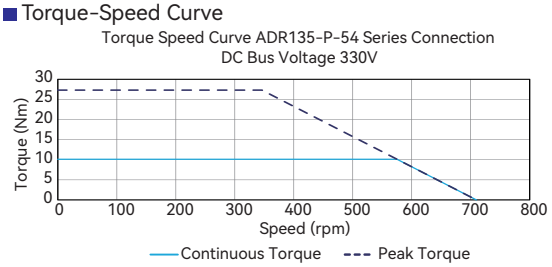
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

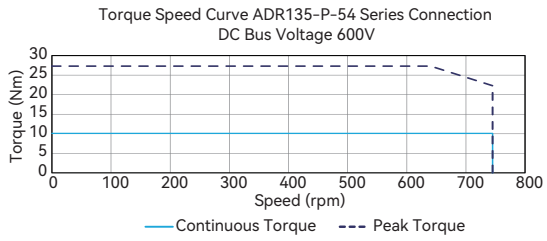
ADR135-P-54

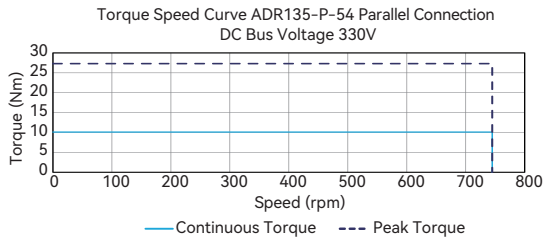
ADR135-P-54				
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque @100℃ ❶	T_{cn}	Nm	10.1	10.1
Peak Torque	T_{pk}	Nm	27.3	27.3
Torque Constant ±10%	K_t	Nm/Arms	4.4	2.2
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.376	0.188
Motor Constant @25℃	K_m	Nm/Sqrt(W)	1.12	1.11
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	10.32	2.63
Inductance (L-L) ±20% ❸	L	mH	89.98	21.84
Electrical Time Constant	τ_e	ms	8.7	8.3
Continuous Current @100℃ ❶	I_{cn}	Arms	2.3	4.6
Peak Current	I_{pk}	Arms	6.9	13.8
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	106.0	108.0
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	1.41	1.44
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Mechanical Parameters				
Rotor Mass	m	kg	0.90	0.90
Stator Mass	m	kg	3.00	3.00
Rotor Inertia	J_r	kg·m²	8.463E-04	8.463E-04
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

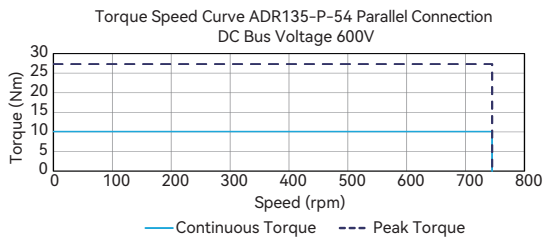
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

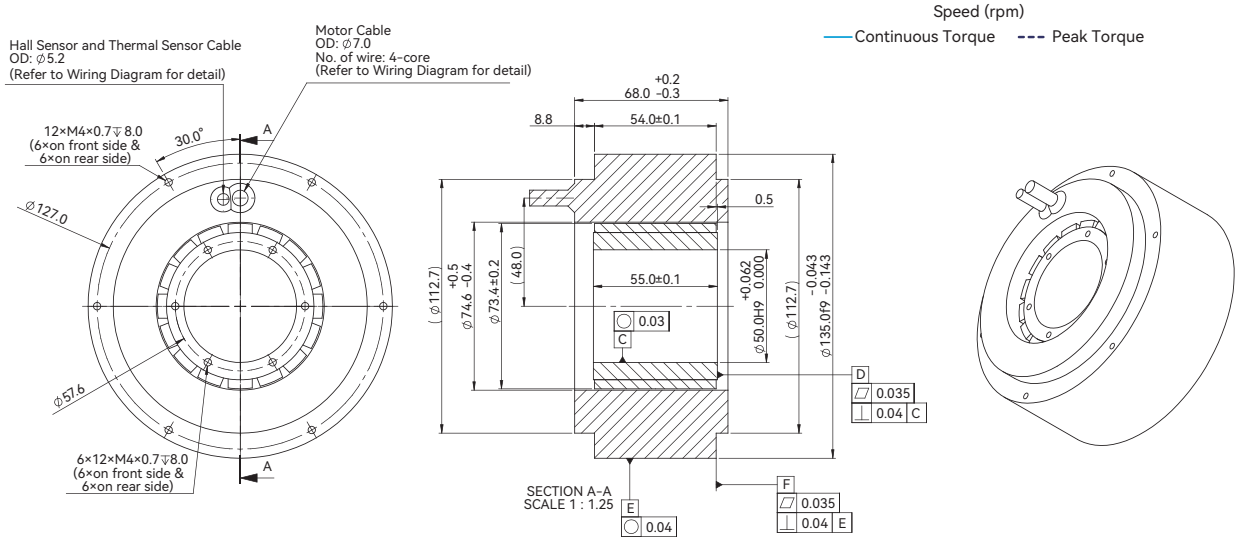








Dimension



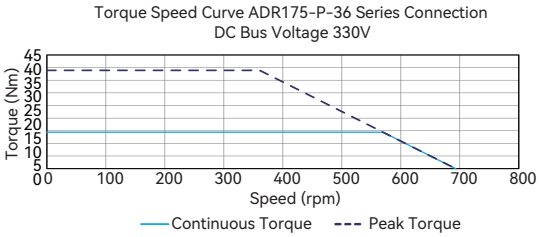
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

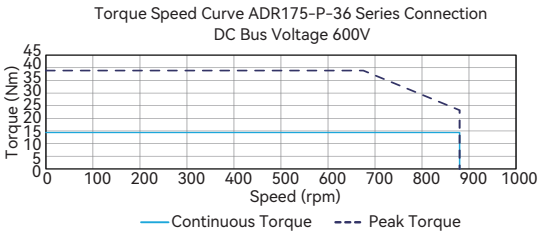
ADR175-P-36

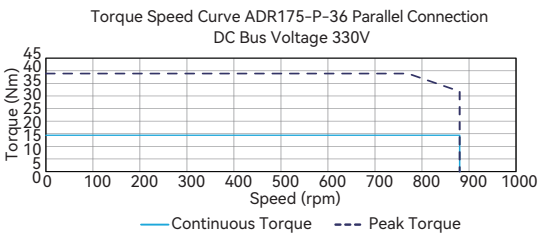
ADR175-P-36				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100℃ ❶	T_{cn}	Nm	14.4	14.4
Peak Torque	T_{pk}	Nm	38.9	38.9
Torque Constant ±10%	K_t	Nm/Arms	4.5	2.3
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.385	0.192
Motor Constant @25℃	K_m	Nm/Sqrt(W)	1.66	1.66
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	4.91	1.23
Inductance (L-L) ±20% ❸	L	mH	42.57	10.64
Electrical Time Constant	τ_e	ms	8.67	8.67
Continuous Current @100℃ ❶	I_{cn}	Arms	3.2	6.4
Peak Current	I_{pk}	Arms	9.6	19.2
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	97.2	97.2
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	1.30	1.30
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Mechanical Parameters				
Rotor Mass	m	kg	1.10	1.10
Stator Mass	m	kg	3.50	3.50
Rotor Inertia	J_r	kg·m²	2.453E-03	2.453E-03
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

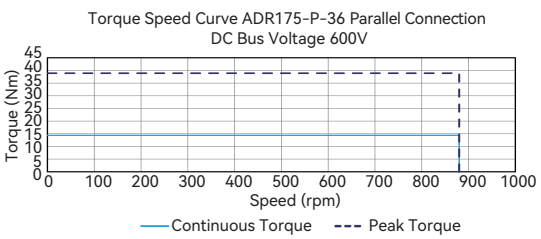
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

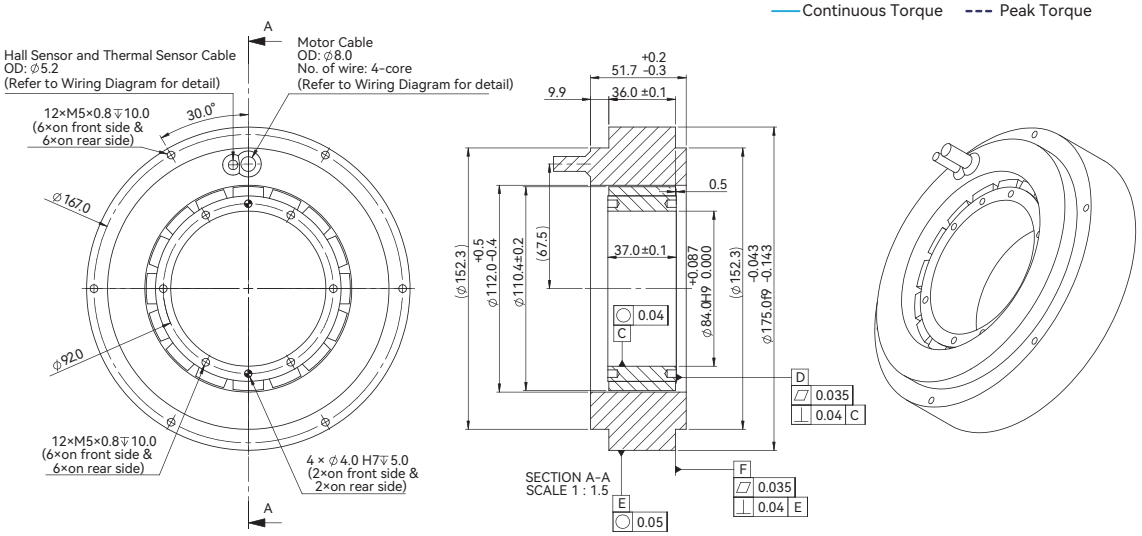








Dimension



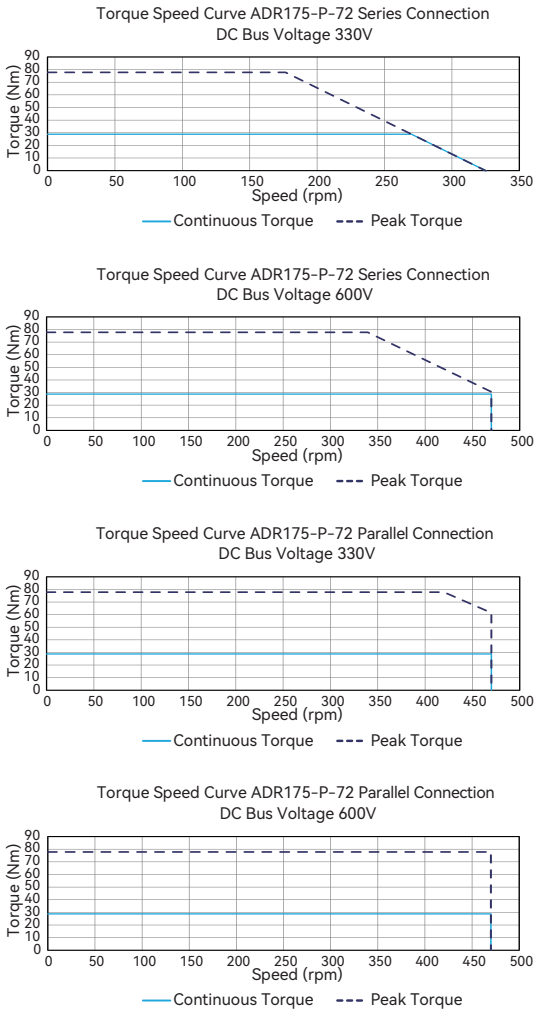
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

ADR175-P-72

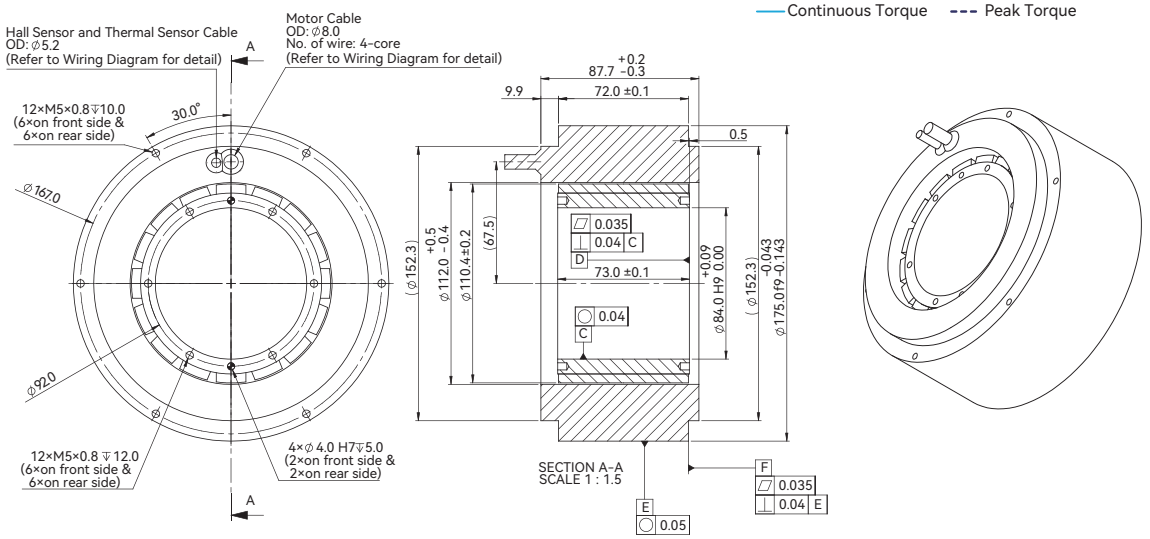
ADR175-P-72				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100℃ ❶	T_{cn}	Nm	28.8	28.8
Peak Torque	T_{pk}	Nm	77.8	77.8
Torque Constant ±10%	K_t	Nm/Arms	9.6	4.8
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.821	0.410
Motor Constant @25℃	K_m	Nm/Sqrt(W)	2.74	2.74
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	8.18	2.05
Inductance (L-L) ±20% ❸	L	mH	70.92	17.73
Electrical Time Constant	τ_e	ms	8.67	8.67
Continuous Current @100℃ ❶	I_{cn}	Arms	3.0	6.0
Peak Current	I_{pk}	Arms	9.0	18.0
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	142.3	142.3
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	1.90	1.90
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	16	16
Mechanical Parameters				
Rotor Mass	m	kg	2.10	2.10
Stator Mass	m	kg	5.90	5.90
Rotor Inertia	J_r	kg·m²	4.892E-03	4.892E-03
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve



Dimension



Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

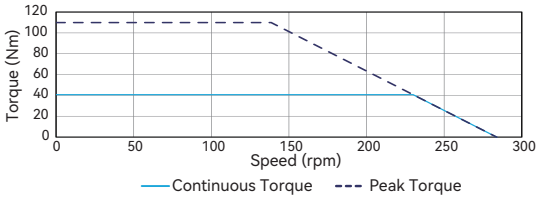
ADR220-P-50

ADR220-P-50				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100℃ ❶	T_{cn}	Nm	40.7	40.7
Peak Torque	T_{pk}	Nm	109.9	109.9
Torque Constant ±10%	K_t	Nm/Arms	11.0	3.7
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.94	0.31
Motor Constant @25℃	K_m	Nm/Sqrt(W)	3.73	3.73
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	5.81	0.65
Inductance (L-L) ±20% ❸	L	mH	57.62	6.40
Electrical Time Constant	τ_e	ms	9.92	9.92
Continuous Current @100℃ ❶	I_{cn}	Arms	3.7	11.1
Peak Current	I_{pk}	Arms	11.1	33.3
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	153.8	153.8
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	2.1	2.1
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	24	24
Mechanical Parameters				
Rotor Mass	m	kg	2.30	2.30
Stator Mass	m	kg	7.50	7.50
Rotor Inertia	J_r	kg·m²	9.249E-03	9.249E-03
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

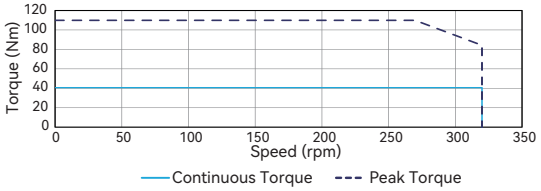
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

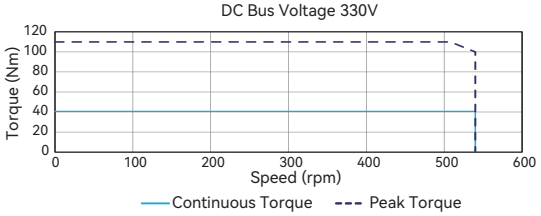
Torque Speed Curve ADR220-P-50 Series Connection
DC Bus Voltage 330V



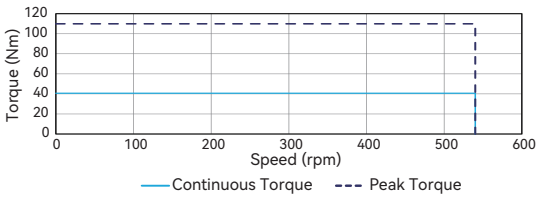
Torque Speed Curve ADR220-P-50 Series Connection
DC Bus Voltage 600V



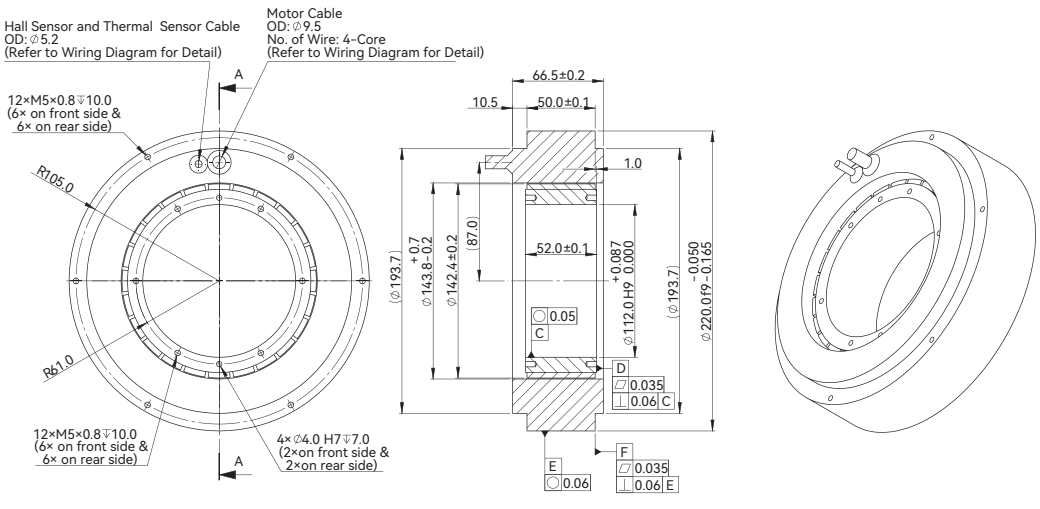
Torque Speed Curve ADR220-P-50 Parallel Connection
DC Bus Voltage 330V



Torque Speed Curve ADR220-P-50 Parallel Connection
DC Bus Voltage 600V



Dimension



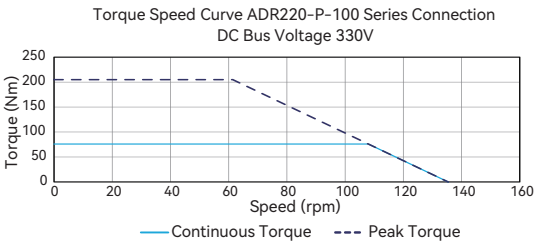
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

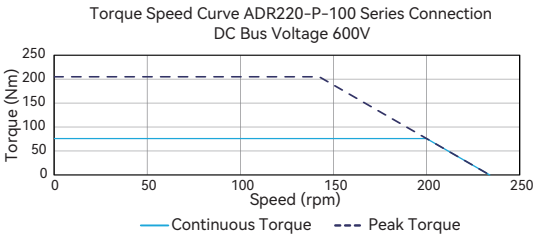
ADR220-P-100

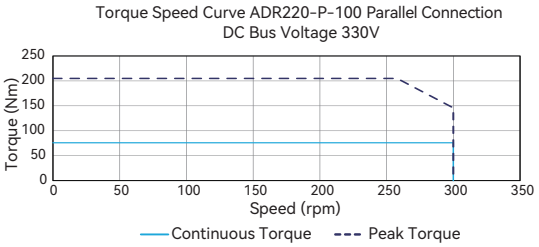
ADR220-P-100				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100℃ ❶	T_{cn}	Nm	75.9	75.9
Peak Torque	T_{pk}	Nm	204.9	204.9
Torque Constant ±10%	K_t	Nm/Arms	23.0	7.7
Back EMF Constant ±10%	K_e	Vpeak/rpm	1.97	0.66
Motor Constant @25℃	K_m	Nm/Sqrt(W)	5.99	5.99
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	9.83	1.09
Inductance (L-L) ±20% ❸	L	mH	97.48	10.83
Electrical Time Constant	τ_e	ms	9.92	9.92
Continuous Current @100℃ ❶	I_{cn}	Arms	3.3	9.9
Peak Current	I_{pk}	Arms	9.9	29.7
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	207.0	207.0
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	2.8	2.8
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	24	24
Mechanical Parameters				
Rotor Mass	m	kg	4.50	4.50
Stator Mass	m	kg	15.00	15.00
Rotor Inertia	J_r	kg·m²	1.831E-02	1.831E-02
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

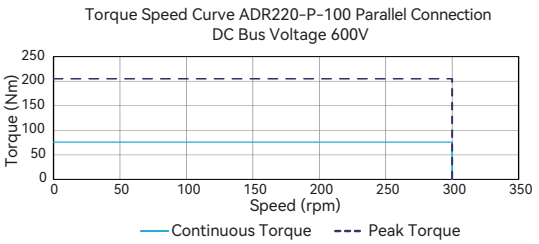
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

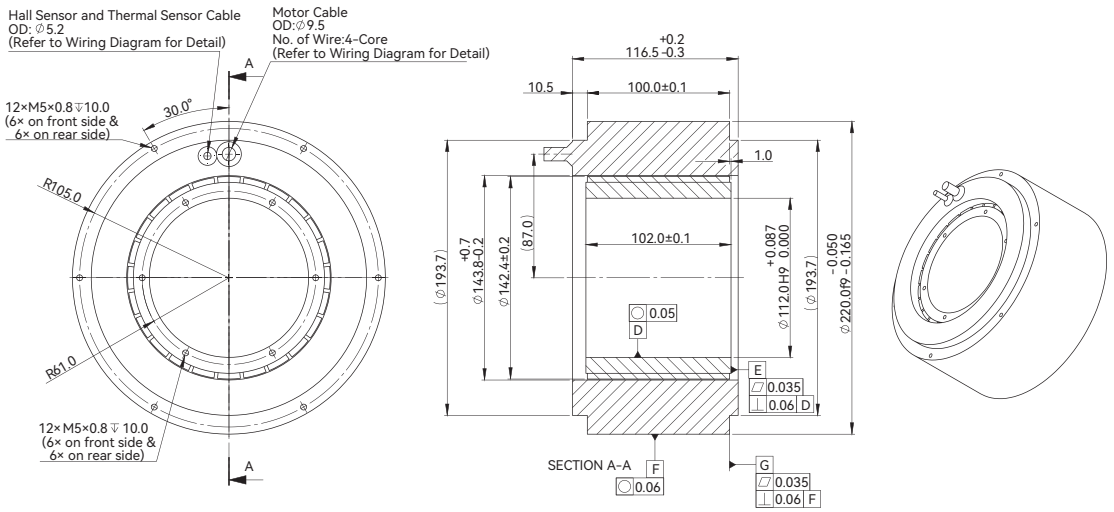








Dimension



Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

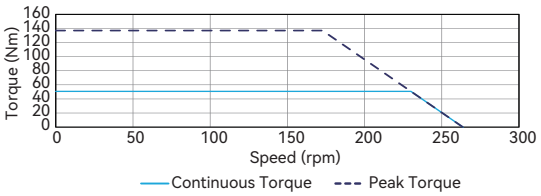
ADR280-P-40

ADR280-P-40				
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque @100℃ ❶	T_{cn}	Nm	50.7	50.7
Peak Torque	T_{pk}	Nm	137.0	137.0
Torque Constant ±10%	K_t	Nm/Arms	11.8	5.9
Back EMF Constant ±10%	K_e	Vpeak/rpm	1.0	0.5
Motor Constant @25℃	K_m	Nm/Sqrt(W)	4.6	4.6
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	4.4	1.1
Inductance (L-L) ±20% ❸	L	mH	25.2	6.6
Electrical Time Constant	τ_e	ms	5.7	6.0
Continuous Current @100℃ ❶	I_{cn}	Arms	4.3	8.6
Peak Current	I_{pk}	Arms	12.9	25.8
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	157.3	157.3
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	2.1	2.1
Max. Bus Voltage	U_{bus}	Vdc	600	600
Pole Number	2P	-	28	28
Mechanical Parameters				
Rotor Mass	m	kg	2.50	2.50
Stator Mass	m	kg	7.51	7.51
Rotor Inertia	J_r	kg·m²	2.147E-02	2.147E-02
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

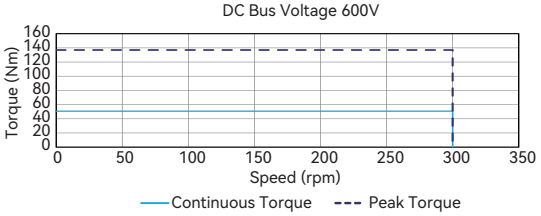
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

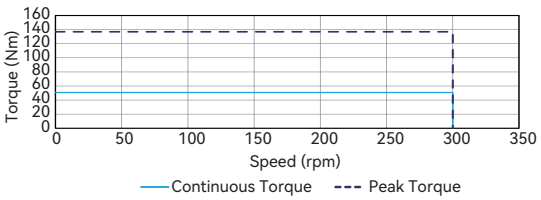
Torque Speed Curve ADR280-P-40 Series Connection
DC Bus Voltage 330V



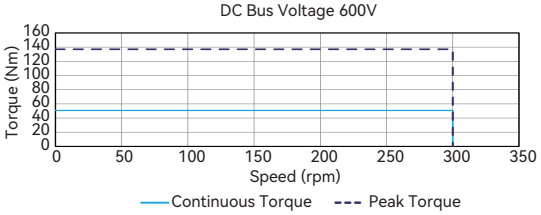
Torque Speed Curve ADR280-P-40 Series Connection
DC Bus Voltage 600V



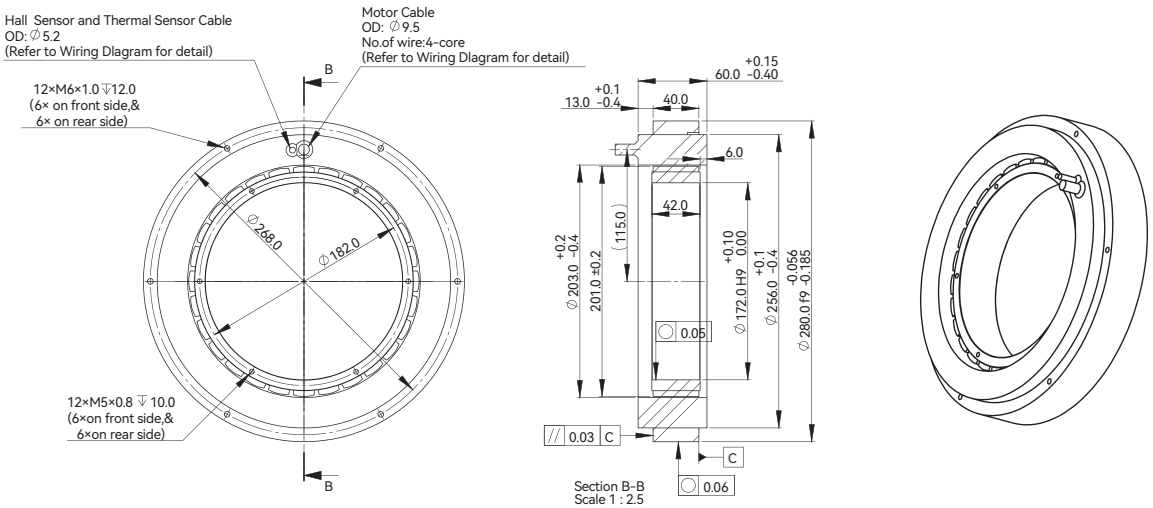
Torque Speed Curve ADR280-P-40 Parallel Connection
DC Bus Voltage 330V



Torque Speed Curve ADR280-P-40 Parallel Connection
DC Bus Voltage 600V



Dimension



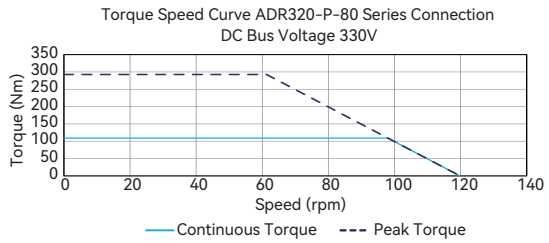
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

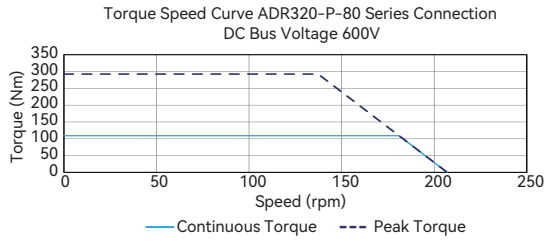
ADR320-P-80

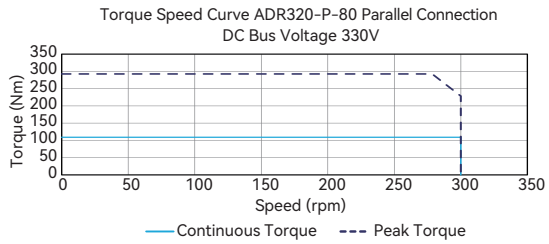
ADR320-P-80				
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque @100℃ ❶	T_{cn}	Nm	108.4	108.4
Peak Torque	T_{pk}	Nm	292.6	292.6
Torque Constant ±10%	K_t	Nm/Arms	25.2	8.4
Back EMF Constant ±10%	K_e	Vpeak/rpm	2.2	0.7
Motor Constant @25℃	K_m	Nm/Sqrt(W)	7.6	7.6
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	7.3	0.8
Inductance (L-L) ±20% ❸	L	mH	30.0	3.3
Electrical Time Constant	τ_e	ms	4.1	4.1
Continuous Current @100℃ ❶	I_{cn}	Arms	4.3	12.9
Peak Current	I_{pk}	Arms	12.9	38.7
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	260.6	260.6
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	3.5	3.5
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	42	42
Mechanical Parameters				
Rotor Mass	m	kg	6.5	6.5
Stator Mass	m	kg	15.5	15.5
Rotor Inertia	J_r	kg·m²	8.15E-02	8.15E-02
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

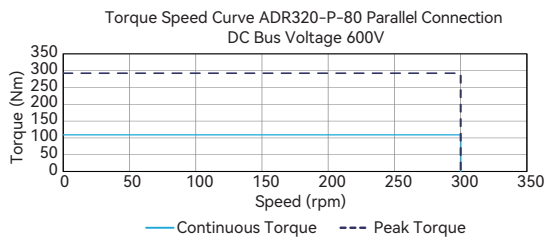
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

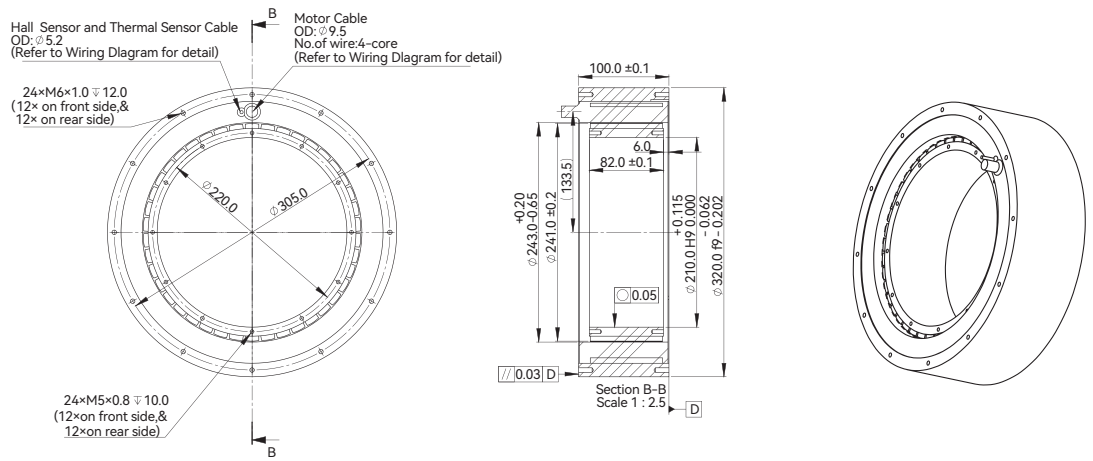








Dimension



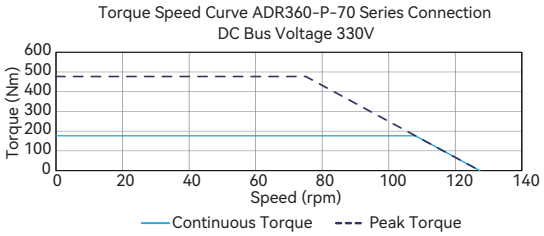
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

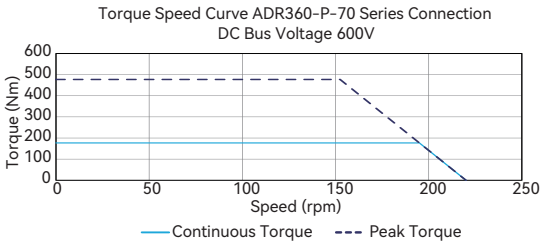
ADR360-P-70

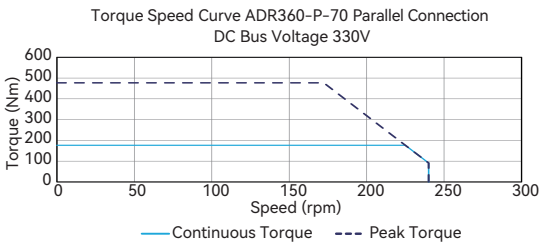
ADR360-P-70				
Performance Parameters	**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque @100℃ ❶	T_{cn}	Nm	176.7	176.7
Peak Torque	T_{pk}	Nm	477.0	477.0
Torque Constant ±10%	K_t	Nm/Arms	24.2	12.1
Back EMF Constant ±10%	K_e	Vpeak/rpm	2.07	1.03
Motor Constant @25℃	K_m	Nm/Sqrt(W)	11.56	11.56
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	2.92	0.73
Inductance (L-L) ±20% ❸	L	mH	30.37	7.59
Electrical Time Constant	τ_e	ms	10.40	10.40
Continuous Current @100℃ ❶	I_{cn}	Arms	7.3	14.6
Peak Current	I_{pk}	Arms	21.9	43.8
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	300.9	300.9
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	4.0	4.0
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	32	32
Mechanical Parameters				
Rotor Mass	m	kg	7.30	7.30
Stator Mass	m	kg	17.50	17.50
Rotor Inertia	J_r	$kg{\cdot}m^2$	1.145E-01	1.145E-01
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

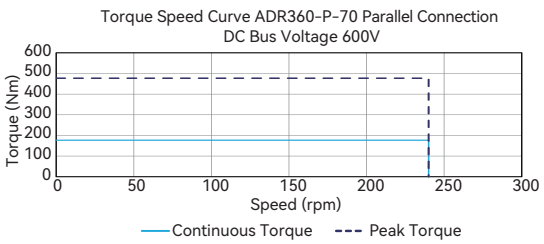
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

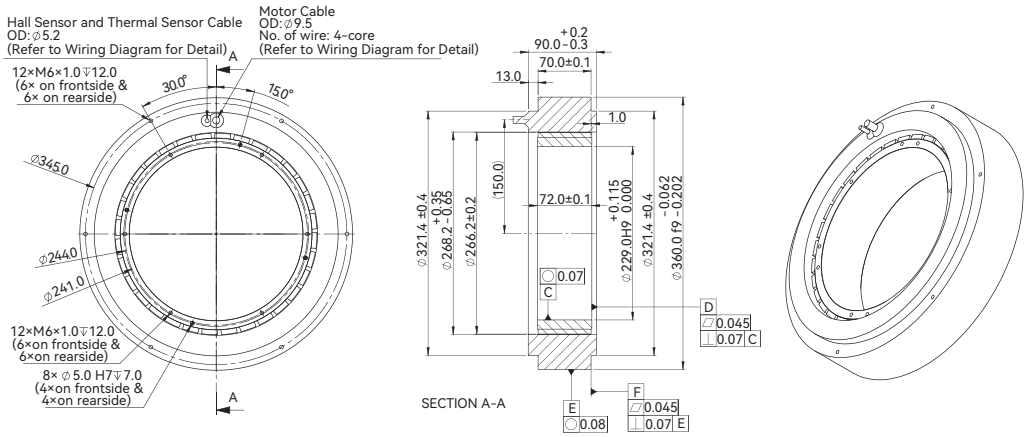








Dimension



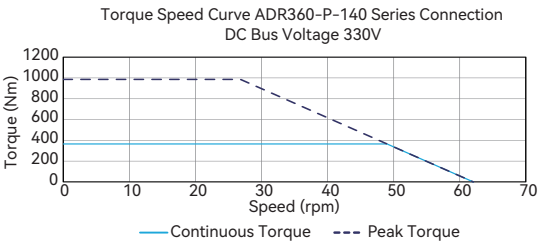
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

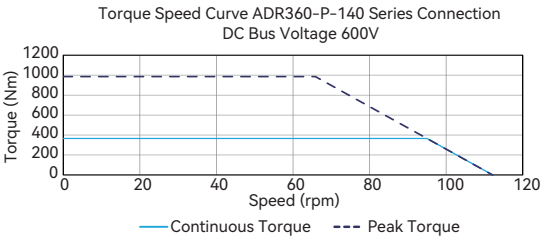
ADR360-P-140

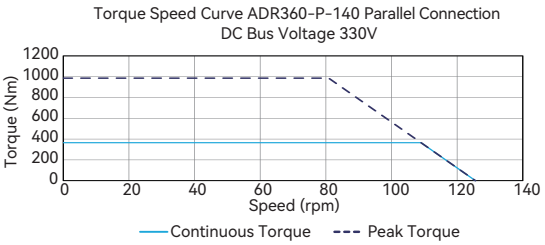
ADR360-P-140				
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque @100℃ ❶	T_{cn}	Nm	365.0	365.0
Peak Torque	T_{pk}	Nm	985.5	985.5
Torque Constant ±10%	K_t	Nm/Arms	50.0	25.0
Back EMF Constant ±10%	K_e	Vpeak/rpm	4.3	2.1
Motor Constant @25℃	K_m	Nm/Sqrt(W)	18.0	18.0
Resistance (L-L) @25℃ ±10% ❷	R_{25}	Ω	5.14	1.29
Inductance (L-L) ±20% ❸	L	mH	53.46	13.36
Electrical Time Constant	τ_e	ms	10.40	10.40
Continuous Current @100℃ ❶	I_{cn}	Arms	7.3	14.6
Peak Current	I_{pk}	Arms	21.9	43.8
Continuous Power Dissipation @100℃ ❶	P_{cn}	W	529.6	529.6
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{th}	W/℃	7.1	7.1
Max. Bus Voltage	U_{bus}	Vdc	600.0	600.0
Pole Number	2P	-	32	32
Mechanical Parameters				
Rotor Mass	m	kg	13.80	13.80
Stator Mass	m	kg	33.00	33.00
Rotor Inertia	J_r	$kg{\cdot}m^2$	2.272E-01	2.272E-01
Other Information				
Insulation Class		Class B (130℃)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0℃ to 40℃ (non-freezing)		
	Storage	-15℃ to 70℃ (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

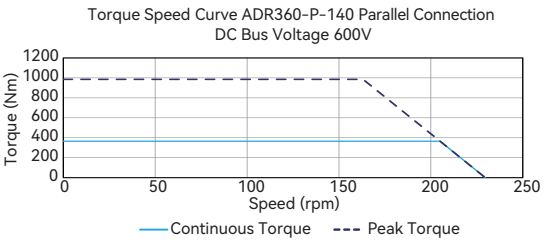
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

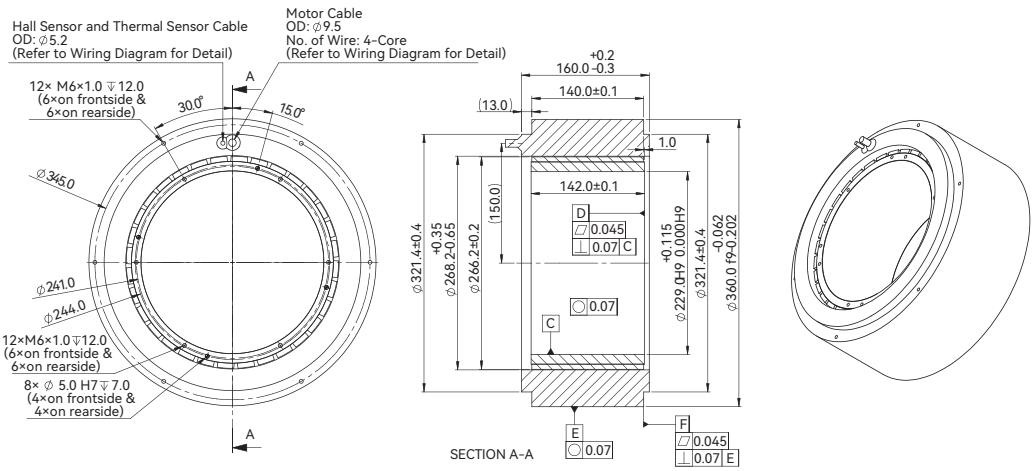








Dimension



Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

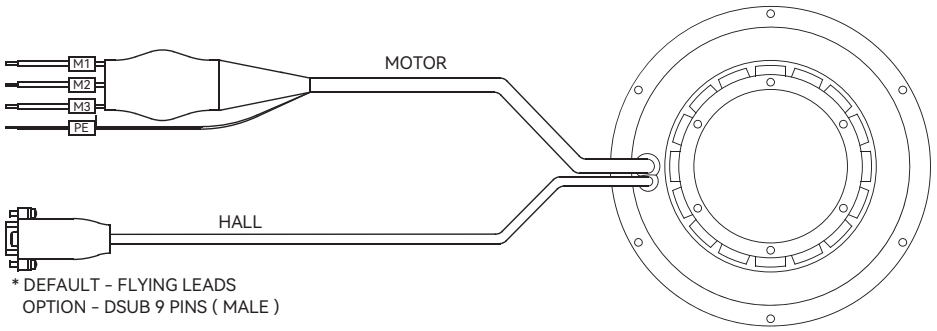
Motor Cable Connection

MOTOR CABLE (9W4M)

PIN	DESCRIPTION
A1	M1
A2	M2
A3	M3
A4	PE

MOTOR CABLE

PIN	DESCRIPTION	COLOR
-	M1	BLACK 1
-	M2	BLACK 2
-	M3	BLACK 3
-	PE	YELLOW / GREEN



* DEFAULT - FLYING LEADS
OPTION - DSUB 9 PINS (MALE)

HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	5VDC	BROWN
5	0VDC	WHITE
8	T1	PINK
9	T2	BLUE

THERMAL SENSOR WIRE
(K TYPE - PT100)
(J TYPE - THERMOSTAT)

Part Numbering

ADR175-P-36-S-J-NH-0.5-FB

Motor Model:
ADR110-P-22 / ADR110-P-45
ADR135-P-27 / ADR135-P-54
ADR175-P-36 / ADR175-P-72
ADR 220-P-50 / ADR220-P-100
ADR280-P-40 / ADR320-P-80
ADR 360-P-70 / ADR360-P-140

Winding Code:
S = Series / P = Parallel

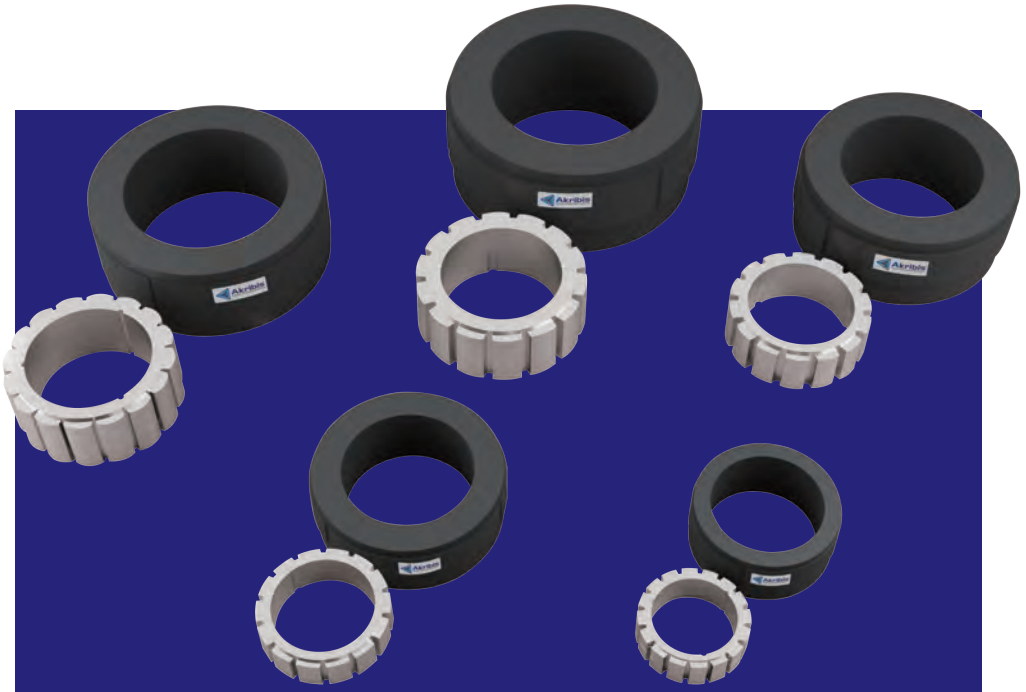
Thermal Sensor:
J = Thermostat (Standard)
/ K = PT100(RTD)

Power Cable:
❹ FB / ❺ NFB / ❻ 9W4M

Cable Length (m):
0.5

Sensor Cable:
❶ HF / ❷ NH / ❸ H9D

❶ HF = With Built-in Hall Sensor & Hall Cable C/W Flying Leads
❷ NH = Without Built-in Hall Sensor C/W Flying Leads
❸ H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
❹ FB = With Ferrite Bead C/W Flying Leads
❺ NFB = Without Ferrite Bead C/W Flying Leads
❻ 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector



ADR-F SERIES

- High torque density
- Low cogging torque
- Small volume and compact design
- Optional for low speed and high speed windings
- Suitable for robotic application

EN-26.3.1

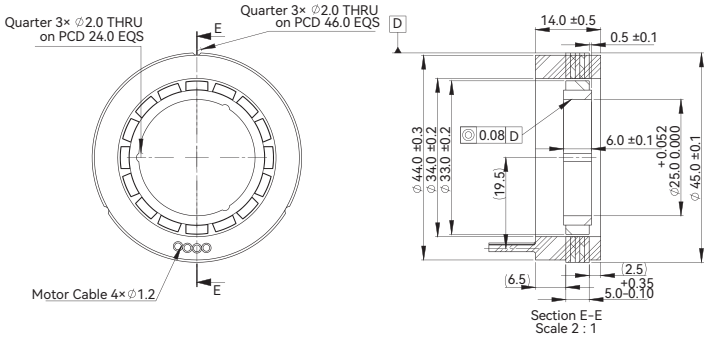
Akribis systems

ADR045-F-005

ADR045-F-005					
Performance Parameters		**Symbol**	**Unit**	**L**	**H**
Continuous Torque (NC) @100°C ❶		T_{cn}	Nm	0.05	0.05
Peak Torque		T_{pk}	Nm	0.13	0.13
Torque Constant ±10%		K_t	Nm/Arms	0.08	0.04
Back EMF Constant ±10%		K_e	Vpeak/rpm	6.50E-03	3.25E-03
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.03	0.03
Resistance (L-L) 25°C ±10% ❷		R_{25}	Ω	3.65	0.91
Inductance (L-L) ±20% ❸		L	mH	0.79	0.20
Electrical Time Constant		τ_e	ms	0.22	0.22
Continuous Current (NC) @100°C ❶		I_{cn}	Arms	0.6	1.2
Peak Current		I_{pk}	Arms	2.0	4.0
Continuous Power Dissipation (NC) @100°C ❶		P_{cn}	W	2.6	2.6
Max. Coil Temperature		t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶		K_{thn}	W/℃	0.03	0.03
Max. Bus Voltage		U_{bus}	Vdc	48	48
Pole Number		2_P	-	16	16
Max. Speed @continuous torque ❹		Ω_{max}	rpm	3000	3000
Max. Speed @peak torque ❹		Ω_{max}	rpm	3000	3000
Mechanical Parameters					
Overall Mass (NC)		m_n	kg	0.08	0.08
Rotor Inertia		J_r	kg·m²	2.60E-06	2.60E-06
Other Information					
Insulation Class			Class B (130°C)		
Protection Grade			IP00		
Compliance with Global Standards			RoHS		
Ambient Temperature	Operation		0°C to 40°C (non-freezing)		
	Storage		-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

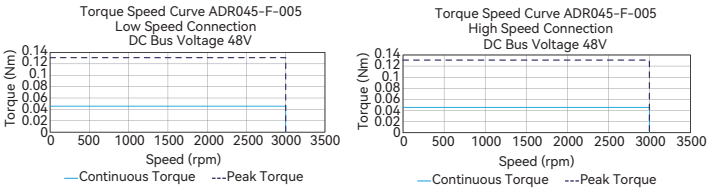
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ The value is based on max. bus voltage.
The contents of datasheet are subject to change without prior notice.

Dimension



Note:
❶ The concentricity of stator and rotor to be within 0.1mm when mounted;
❷ User to ensure flatness of mounting surface within 0.01/300mm;
❸ Comes without temperature sensor;
❹ Motor must be used with a Variable Frequency Driver;
❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;
❻ Certain specifications in the drawing are subject to change.

Torque-Speed Curve

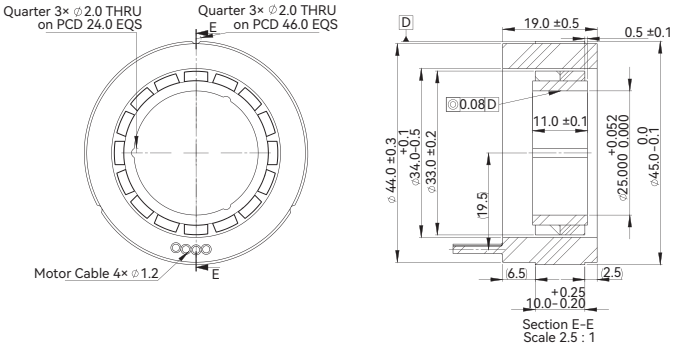


ADR045-F-010

ADR045-F-010					
Performance Parameters		**Symbol**	**Unit**	**L**	**H**
Continuous Torque (NC) @100°C ❶		T_{cn}	Nm	0.09	0.09
Peak Torque		T_{pk}	Nm	0.26	0.26
Torque Constant ±10%		K_t	Nm/Arms	0.15	0.08
Back EMF Constant ±10%		K_e	Vpeak/rpm	1.30E-02	6.50E-03
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.05	0.05
Resistance (L-L) 25°C ±10% ❷		R_{25}	Ω	5.40	1.35
Inductance (L-L) ±20% ❸		L	mH	1.30	0.33
Electrical Time Constant		τ_e	ms	0.24	0.24
Continuous Current (NC) @100°C ❶		I_{cn}	Arms	0.6	1.2
Peak Current		I_{pk}	Arms	2.0	4.0
Continuous Power Dissipation (NC) @100°C ❶		P_{cn}	W	3.8	3.8
Max. Coil Temperature		t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶		K_{thn}	W/℃	0.05	0.05
Max. Bus Voltage		U_{bus}	Vdc	48	48
Pole Number		2_P	-	16	16
Max. Speed @continuous torque ❹		Ω_{max}	rpm	3000	3000
Max. Speed @peak torque ❹		Ω_{max}	rpm	2400	3000
Mechanical Parameters					
Overall Mass (NC)		m_n	kg	0.11	0.11
Rotor Inertia		J_r	kg·m²	5.20E-06	5.20E-06
Other Information					
Insulation Class			Class B (130°C)		
Protection Grade			IP00		
Compliance with Global Standards			RoHS		
Ambient Temperature	Operation		0°C to 40°C (non-freezing)		
	Storage		-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

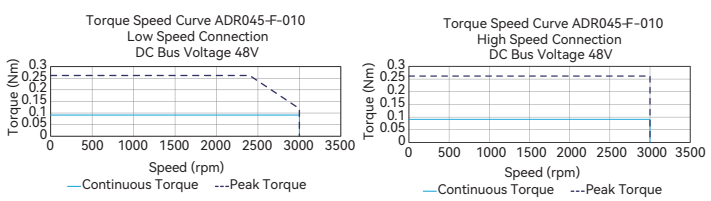
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ The value is based on max. bus voltage.
The contents of datasheet are subject to change without prior notice.

Dimension



Note:
❶ The concentricity of stator and rotor to be within 0.1mm when mounted;
❷ User to ensure flatness of mounting surface within 0.01/300mm;
❸ Comes without temperature sensor;
❹ Motor must be used with a Variable Frequency Driver;
❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;
❻ Certain specifications in the drawing are subject to change.

Torque-Speed Curve



ADR060-F-010

ADR060-F-010				
Performance Parameters	Symbol	Unit	L	H
Continuous Torque (NC) @100°C ❶	T_{cn}	Nm	0.30	0.30
Peak Torque	T_{pk}	Nm	0.86	0.86
Torque Constant ±10%	K_t	Nm/Arms	0.10	0.05
Back EMF Constant ±10%	K_e	Vpeak/rpm	8.20E-03	4.10E-03
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.10	0.09
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	0.65	0.20
Inductance (L-L) ±20% ❸	L	mH	0.47	0.12
Electrical Time Constant	τ_e	ms	0.72	0.59
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	3.1	6.2
Peak Current	I_{pk}	Arms	10.9	21.7
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	12.1	14.9
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.16	0.20
Max. Bus Voltage	U_{bus}	Vdc	48	48
Pole Number	2_P	-	14	14
Max. Speed @continuous torque ❹	Ω_{max}	rpm	3000	3000
Max. Speed @peak torque ❹	Ω_{max}	rpm	3000	3000
Mechanical Parameters				
Overall Mass (NC)	m_n	kg	0.22	0.22
Rotor Inertia	J_r	kg·m²	1.02E-05	1.02E-05
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling

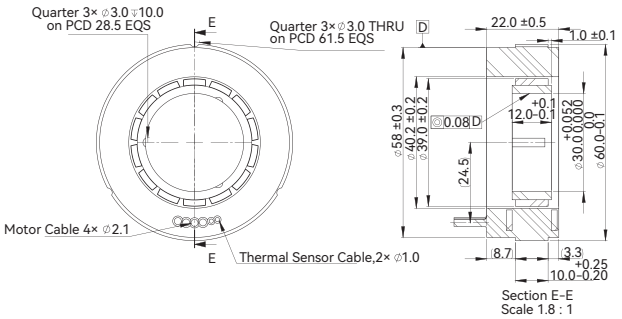
❷Resistance is measured by DC current with standard 0.5 m cable.

❸Inductance is measured by current frequency of 1 kHz.

❹The value is based on max. bus voltage.

The contents of datasheet are subject to change without prior notice.

Dimension



Note:

❶ The concentricity of stator and rotor to be within 0.1mm when mounted;

❷ User to ensure flatness of mounting surface within 0.01/300mm;

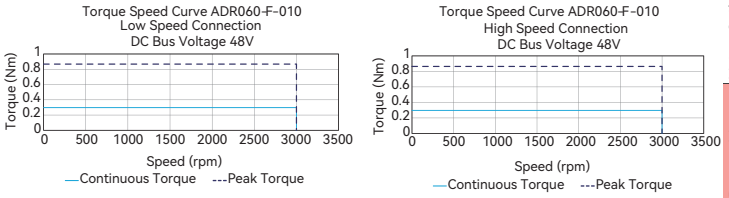
❸ With temperature sensor;

❹ Motor must be used with a Variable Frequency Driver;

❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;

❻ Certain specifications in the drawing are subject to change.

Torque-Speed Curve



ADR060-F-020

ADR060-F-020				
Performance Parameters	Symbol	Unit	L	H
Continuous Torque (NC) @100°C ❶	T_{cn}	Nm	0.59	0.59
Peak Torque	T_{pk}	Nm	1.73	1.73
Torque Constant ±10%	K_t	Nm/Arms	0.19	0.10
Back EMF Constant ±10%	K_e	Vpeak/rpm	1.64E-02	8.20E-03
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.15	0.14
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	1.10	0.30
Inductance (L-L) ±20% ❸	L	mH	0.81	0.20
Electrical Time Constant	τ_e	ms	0.74	0.68
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	3.1	6.2
Peak Current	I_{pk}	Arms	10.9	21.8
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	20.5	22.4
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.27	0.30
Max. Bus Voltage	U_{bus}	Vdc	48	48
Pole Number	2_P	-	14	14
Max. Speed @continuous torque ❹	Ω_{max}	rpm	2200	3000
Max. Speed @peak torque ❹	Ω_{max}	rpm	1500	3000
Mechanical Parameters				
Overall Mass (NC)	m_n	kg	0.35	0.35
Rotor Inertia	J_r	kg·m²	2.03E-05	2.03E-05
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling

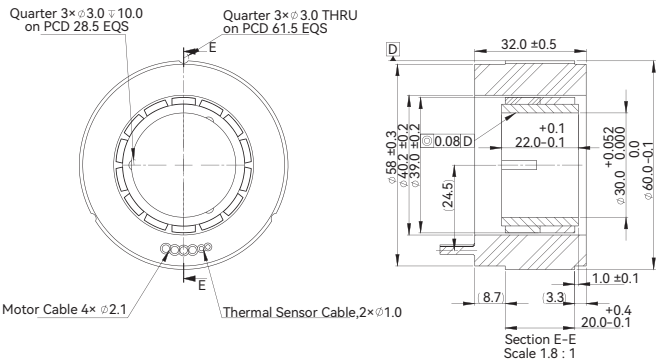
❷Resistance is measured by DC current with standard 0.5 m cable.

❸Inductance is measured by current frequency of 1 kHz.

❹The value is based on max. bus voltage.

The contents of datasheet are subject to change without prior notice.

Dimension



Note:

❶ The concentricity of stator and rotor to be within 0.1mm when mounted;

❷ User to ensure flatness of mounting surface within 0.01/300mm;

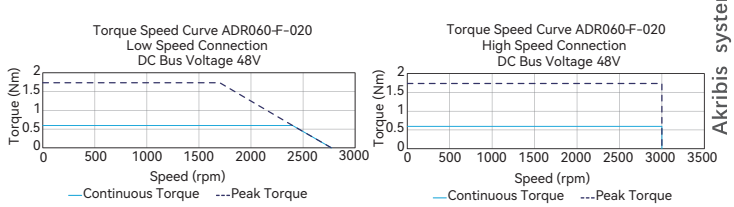
❸ With temperature sensor;

❹ Motor must be used with a Variable Frequency Driver;

❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;

❻ Certain specifications in the drawing are subject to change.

Torque-Speed Curve

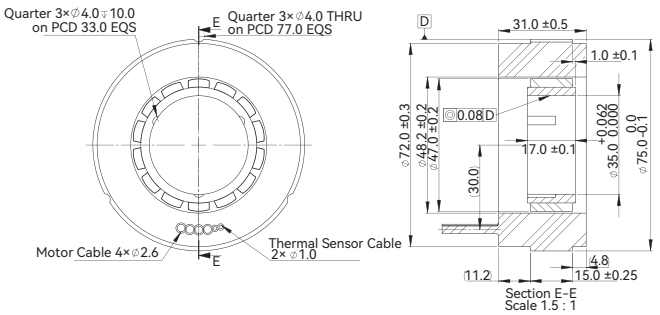


ADR075-F-015

ADR075-F-015				
Performance Parameters	Symbol	Unit	L	H
Continuous Torque (NC) @100°C ❶	T_{cn}	Nm	0.80	0.80
Peak Torque	T_{pk}	Nm	2.41	2.41
Torque Constant ±10%	K_t	Nm/Arms	0.12	0.06
Back EMF Constant ±10%	K_e	Vpeak/rpm	1.03E-02	5.13E-03
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.20	0.20
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	0.25	0.06
Inductance (L-L) ±20% ❸	L	mH	0.40	0.10
Electrical Time Constant	τ_e	ms	1.60	1.60
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	6.7	13.4
Peak Current	I_{pk}	Arms	20.1	40.2
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	21.8	21.8
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.29	0.29
Max. Bus Voltage	U_{bus}	Vdc	48	48
Pole Number	2_p	-	14	14
Max. Speed @continuous torque ❹	Ω_{max}	rpm	3000	3000
Max. Speed @peak torque ❹	Ω_{max}	rpm	3000	3000
Mechanical Parameters				
Overall Mass (NC)	m_n	kg	0.46	0.46
Rotor Inertia	J_r	kg·m²	3.25E-05	3.25E-05
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

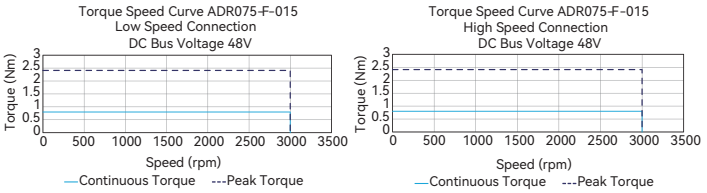
❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling
❷Resistance is measured by DC current with standard 0.5 m cable.
❸Inductance is measured by current frequency of 1 kHz.
❹The value is based on max. bus voltage.
The contents of datasheet are subject to change without prior notice.

Dimension



Note:
❶ The concentricity of stator and rotor to be within 0.1mm when mounted;
❷ User to ensure flatness of mounting surface within 0.01/300mm;
❸ With temperature sensor;
❹ Motor must be used with a Variable Frequency Driver;
❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;
❻ Certain specifications in the drawing are subject to change.

Torque-Speed Curve

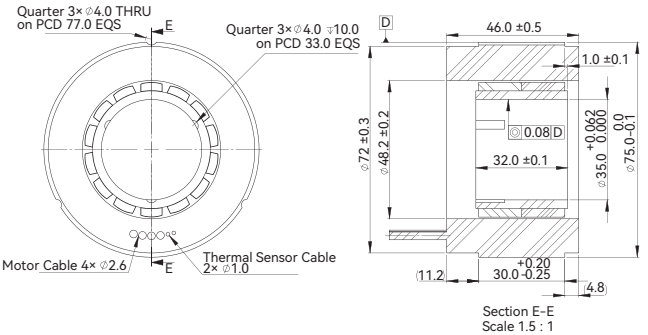


ADR075-F-030

ADR075-F-030				
Performance Parameters	Symbol	Unit	L	H
Continuous Torque (NC) @100°C ❶	T_{cn}	Nm	1.61	1.61
Peak Torque	T_{pk}	Nm	4.82	4.82
Torque Constant ±10%	K_t	Nm/Arms	0.24	0.12
Back EMF Constant ±10%	K_e	Vpeak/rpm	2.05E-02	1.03E-02
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.32	0.32
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	0.38	0.10
Inductance (L-L) ±20% ❸	L	mH	0.70	0.18
Electrical Time Constant	τ_e	ms	1.84	1.84
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	6.7	13.4
Peak Current	I_{pk}	Arms	20.1	40.2
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	33.1	33.1
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.44	0.44
Max. Bus Voltage	U_{bus}	Vdc	48	48
Pole Number	2_p	-	14	14
Max. Speed @continuous torque ❹	Ω_{max}	rpm	1900	3000
Max. Speed @peak torque ❹	Ω_{max}	rpm	1500	3000
Mechanical Parameters				
Overall Mass (NC)	m_n	kg	0.80	0.80
Rotor Inertia	J_r	kg·m²	6.47E-05	6.47E-05
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

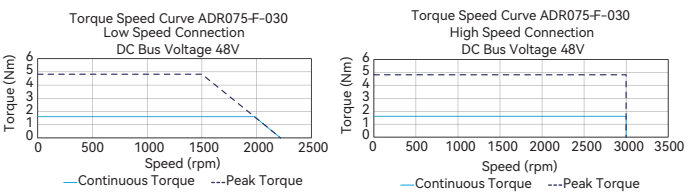
❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling
❷Resistance is measured by DC current with standard 0.5 m cable.
❸Inductance is measured by current frequency of 1 kHz.
❹The value is based on max. bus voltage.
The contents of datasheet are subject to change without prior notice.

Dimension



Note:
❶ The concentricity of stator and rotor to be within 0.1mm when mounted;
❷ User to ensure flatness of mounting surface within 0.01/300mm;
❸ With temperature sensor;
❹ Motor must be used with a Variable Frequency Driver;
❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;
❻ Certain specifications in the drawing are subject to change.

Torque-Speed Curve



ADR080-F-020

ADR080-F-020				
Performance Parameters	Symbol	Unit	L	H
Continuous Torque (NC) @100°C ❶	T_{cn}	Nm	1.41	1.41
Peak Torque	T_{pk}	Nm	4.22	4.22
Torque Constant ±10%	K_t	Nm/Arms	0.32	0.16
Back EMF Constant ±10%	K_e	Vpeak/rpm	2.74E-02	1.37E-02
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.27	0.26
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	0.95	0.25
Inductance (L-L) ±20% ❸	L	mH	1.15	0.29
Electrical Time Constant	τ_e	ms	1.21	1.16
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	4.4	8.8
Peak Current	I_{pk}	Arms	15.2	30.4
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	39	41
Max. Coil Temperature	t_{max}	℃	130	130
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.37	0.39
Max. Bus Voltage	U_{bus}	Vdc	48	48
Pole Number	2_P	-	16	16
Max. Speed @continuous torque ❹	Ω_{max}	rpm	1350	3000
Max. Speed @peak torque ❹	Ω_{max}	rpm	850	2285
Mechanical Parameters				
Overall Mass (NC)	m_n	kg	0.58	0.58
Rotor Inertia	J_r	kg m²	8.27E-05	8.27E-05
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling

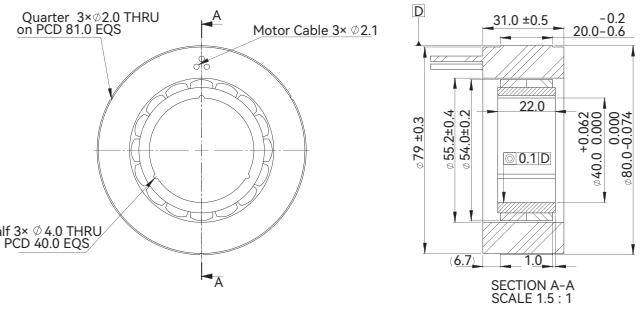
❷Resistance is measured by DC current with standard 0.5 m cable.

❸Inductance is measured by current frequency of 1 kHz.

❹The value is based on max. bus voltage.

The contents of datasheet are subject to change without prior notice.

Dimension



Note:

❶ The concentricity of stator and rotor to be within 0.08mm when mounted;

❷ User to ensure flatness of mounting surface within 0.01/300mm;

❸ Comes without temperature sensor;

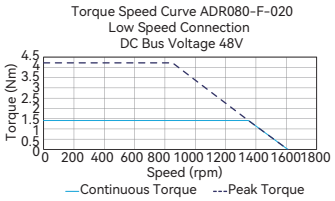
❹ Motor must be used with a Variable Frequency Driver;

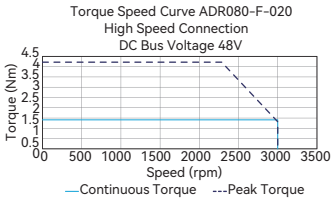
❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;

❻ Certain specifications in the drawing are subject to change;

❼ Customers need to connect ground wire by themselves.

Torque-Speed Curve





ADR090-F-020

ADR090-F-020				
Performance Parameters	Symbol	Unit	L	H
Continuous Torque (NC) @100°C ❶	T_{cn}	Nm	1.88	1.88
Peak Torque	T_{pk}	Nm	5.61	5.61
Torque Constant ±10%	K_t	Nm/Arms	0.28	0.14
Back EMF Constant ±10%	K_e	Vpeak/rpm	2.39E-02	1.20E-02
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.38	0.38
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	0.37	0.09
Inductance (L-L) ±20% ❸	L	mH	0.80	0.20
Electrical Time Constant	τ_e	ms	2.16	2.16
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	6.7	13.4
Peak Current	I_{pk}	Arms	22.5	45.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	32.2	32.2
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.43	0.43
Max. Bus Voltage	U_{bus}	Vdc	48	48
Pole Number	2_P	-	14	14
Max. Speed @continuous torque ❹	Ω_{max}	rpm	1500	3000
Max. Speed @peak torque ❹	Ω_{max}	rpm	1200	2800
Mechanical Parameters				
Overall Mass (NC)	m_n	kg	0.85	0.85
Rotor Inertia	J_r	kg m²	1.03E-04	1.03E-04
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling

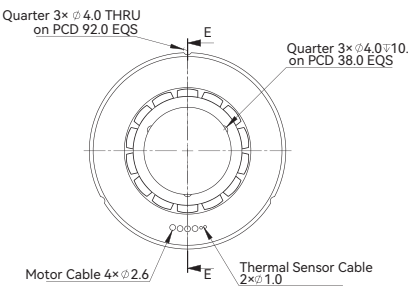
❷Resistance is measured by DC current with standard 0.5 m cable.

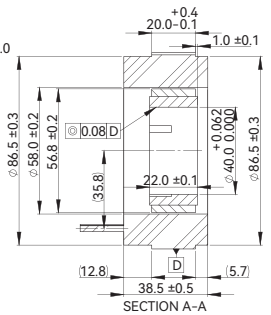
❸Inductance is measured by current frequency of 1 kHz.

❹The value is based on max. bus voltage.

The contents of datasheet are subject to change without prior notice.

Dimension





Note:

❶ The concentricity of stator and rotor to be within 0.1mm when mounted;

❷ User to ensure flatness of mounting surface within 0.01/300mm;

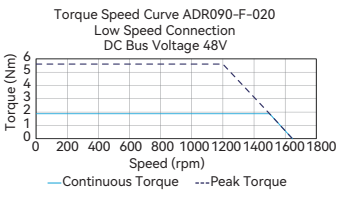
❸ With temperature sensor;

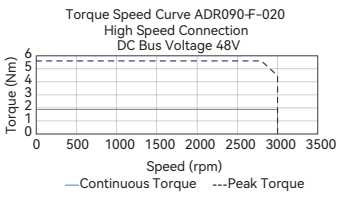
❹ Motor must be used with a Variable Frequency Driver;

❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;

❻ Certain specifications in the drawing are subject to change.

Torque-Speed Curve



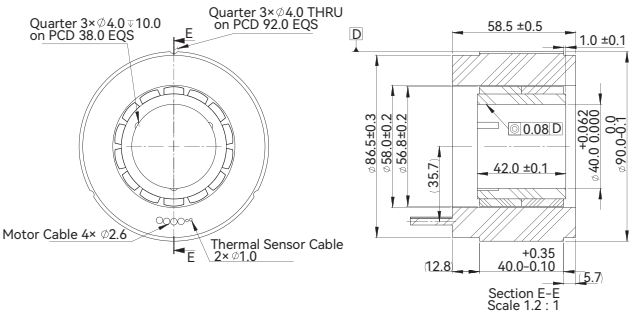


ADR090-F-040

ADR090-F-040				
Performance Parameters	Symbol	Unit	L	H
Continuous Torque (NC) @100°C ❶	T_{cn}	Nm	3.75	3.75
Peak Torque	T_{pk}	Nm	11.22	11.22
Torque Constant ±10%	K_t	Nm/Arms	0.56	0.28
Back EMF Constant ±10%	K_e	Vpeak/rpm	4.79E-02	2.39E-02
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.61	0.61
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	0.57	0.14
Inductance (L-L) ±20% ❸	L	mH	1.45	0.36
Electrical Time Constant	τ_e	ms	2.54	2.54
Continuous Current (NC) @100°C ❶	I_{cn}	Arms	6.7	13.4
Peak Current	I_{pk}	Arms	22.5	45.0
Continuous Power Dissipation (NC) @100°C ❶	P_{cn}	W	49.7	49.7
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.66	0.66
Max. Bus Voltage	U_{bus}	Vdc	48	48
Pole Number	2_p	-	14	14
Max. Speed @continuous torque ❹	Ω_{max}	rpm	800	1500
Max. Speed @peak torque ❹	Ω_{max}	rpm	550	1350
Mechanical Parameters				
Overall Mass (NC)	m_n	kg	1.49	1.49
Rotor Inertia	J_r	kg·m²	2.04E-04	2.04E-04
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

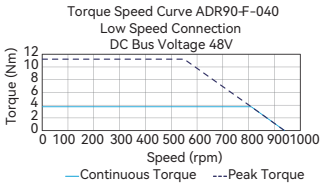
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling
❷ Resistance is measured by DC current with standard 0.5 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ The value is based on max. bus voltage.
The contents of datasheet are subject to change without prior notice.

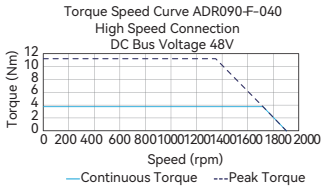
Dimension



Note:
❶ The concentricity of stator and rotor to be within 0.1mm when mounted;
❷ User to ensure flatness of mounting surface within 0.01/300mm;
❸ With temperature sensor;
❹ Motor must be used with a Variable Frequency Driver;
❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;
❻ Certain specifications in the drawing are subject to change.

Torque-Speed Curve

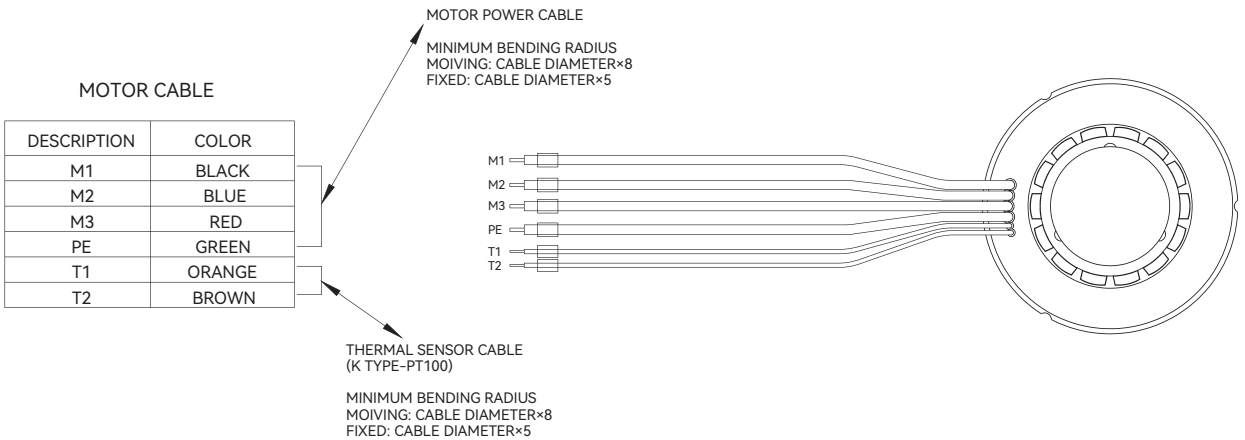




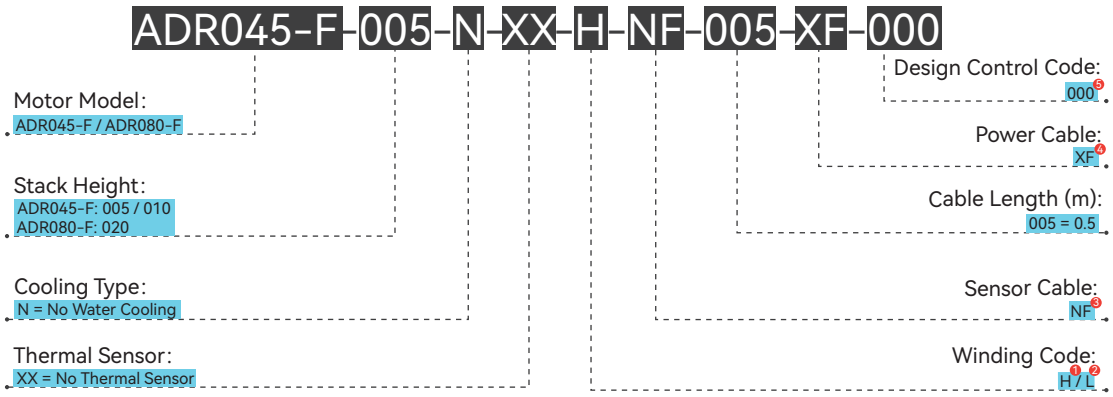
Motor Cable Connection

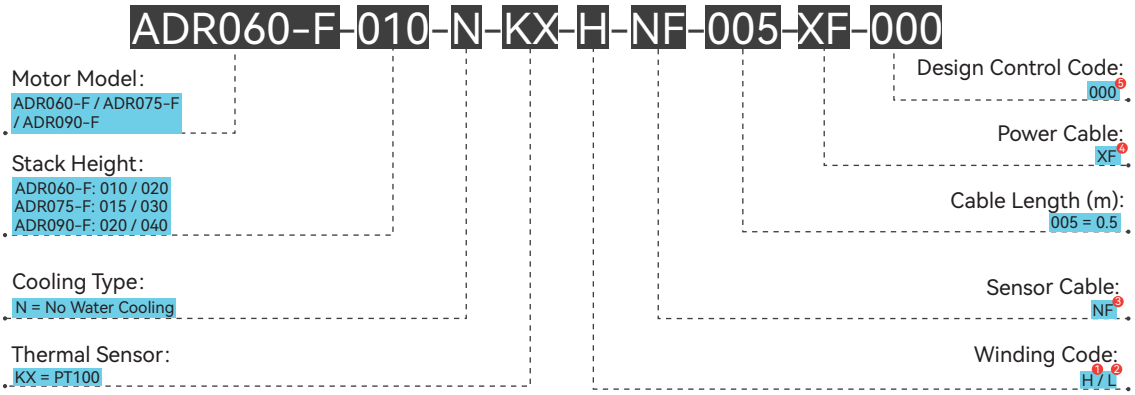
MOTOR CABLE

DESCRIPTION	COLOR
M1	BLACK
M2	BLUE
M3	RED
PE	GREEN
T1	ORANGE
T2	BROWN

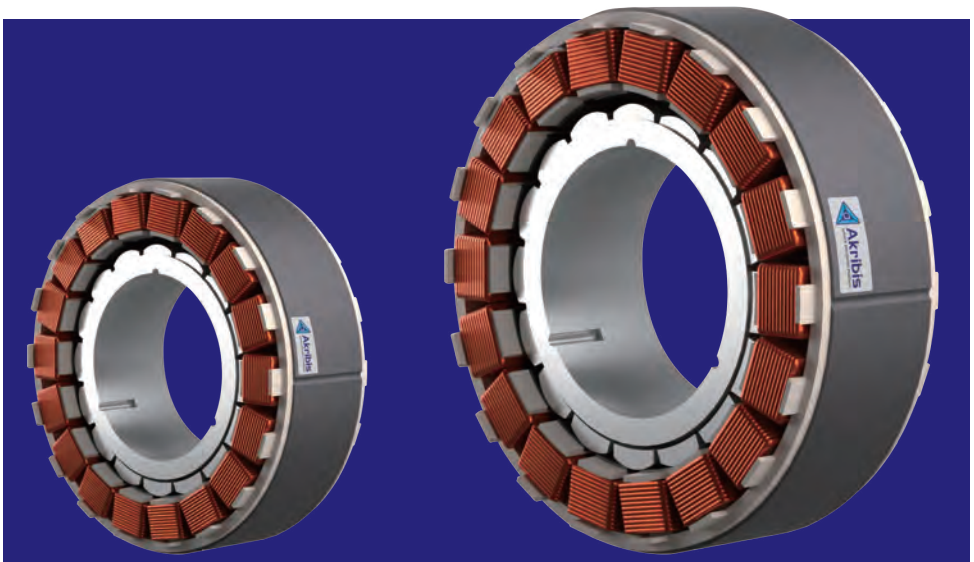


Part Numbering





1 H = High Speed Winding
2 L = Low Speed Winding
3 NF = Without Built-in Hall Sensor C/W Flying Leads
4 XF = Without Ferrite Bead C/W Flying Leads
5 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)



ADR-T SERIES

- Compact design
- Large center bore
- Direct drive technology
- High torque density
- Low cogging effect
- High rotating speed
- Cost effective

EN-26.3.1

Akribis systems

ADR050-T-014

ADR050-T-014				
Performance Parameters	Symbol	Unit	L	H
Continuous Torque (NC) @130°C ❶	T_{cn}	Nm	0.48	0.48
Peak Torque	T_{pk}	Nm	1.44	1.44
Torque Constant ±10%	K_t	Nm/Arms	0.21	0.11
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.018	0.009
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.10	0.09
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	3.30	0.86
Inductance (L-L) ±20% ❸	L	mH	1.25	0.32
Electrical Time Constant	τ_e	ms	0.38	0.37
Continuous Current (NC) @130°C ❶	I_{cn}	Arms	2.3	4.5
Peak Current	I_{pk}	Arms	7.9	15.8
Continuous Power Dissipation (NC) @130°C ❶	P_{cn}	W	35	37
Max. Coil Temperature	t_{max}	℃	130	130
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.34	0.35
Max. Bus Voltage	U_{bus}	Vdc	48	48
Pole Number	2_P	-	20	20
Max. Speed @continuous torque ❹	Ω_{max}	rpm	1750	3000
Max. Speed @peak torque ❹	Ω_{max}	rpm	600	2500
Mechanical Parameters				
Overall Mass (NC)	m_n	kg	0.12	0.12
Rotor Inertia	J_r	kg·m²	1.12E-05	1.12E-05
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling

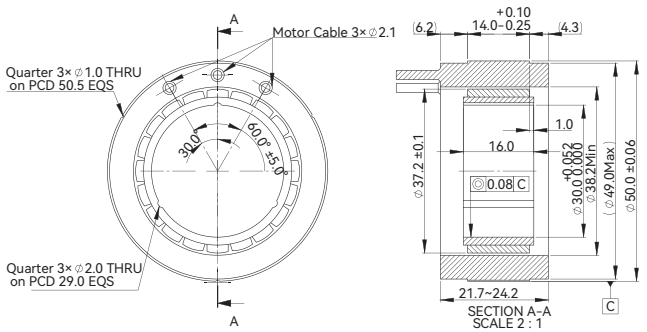
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

❹ The value is based on max. bus voltage.

The contents of datasheet are subject to change without prior notice.

Dimension



Note:

❶ The concentricity of stator and rotor to be within 0.08mm when mounted;

❷ User to ensure flatness of mounting surface within 0.01/300mm;

❸ Comes without temperature sensor;

❹ Motor must be used with a Variable Frequency Driver;

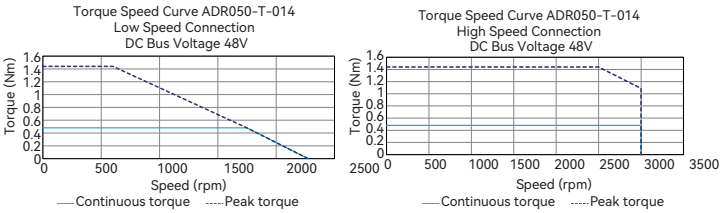
❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;

❻ Certain specifications in the drawing are subject to change;

❼ Customers need to connect ground wire by themselves;

❽ No epoxy on either end.

Torque-Speed Curve



ADR080-T-020

ADR080-T-020				
Performance Parameters	Symbol	Unit	L	H
Continuous Torque (NC) @130°C ❶	T_{cn}	Nm	1.41	1.41
Peak Torque	T_{pk}	Nm	4.22	4.22
Torque Constant ±10%	K_t	Nm/Arms	0.32	0.16
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.027	0.014
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.27	0.26
Resistance (L-L) 25°C ±10% ❷	R_{25}	Ω	0.95	0.25
Inductance (L-L) ±20% ❸	L	mH	1.15	0.29
Electrical Time Constant	τ_e	ms	1.21	1.16
Continuous Current (NC) @130°C ❶	I_{cn}	Arms	4.4	8.8
Peak Current	I_{pk}	Arms	15.2	30.4
Continuous Power Dissipation (NC) @130°C ❶	P_{cn}	W	39	41
Max. Coil Temperature	t_{max}	℃	130	130
Thermal Dissipation Constant (NC) ❶	K_{thn}	W/℃	0.37	0.39
Max. Bus Voltage	U_{bus}	Vdc	48	48
Pole Number	2_P	-	16	16
Max. Speed @continuous torque ❹	Ω_{max}	rpm	1350	3000
Max. Speed @peak torque ❹	Ω_{max}	rpm	850	2285
Mechanical Parameters				
Overall Mass (NC)	m_n	kg	0.58	0.58
Rotor Inertia	J_r	kg·m²	8.27E-05	8.27E-05
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. NC-Natural cooling

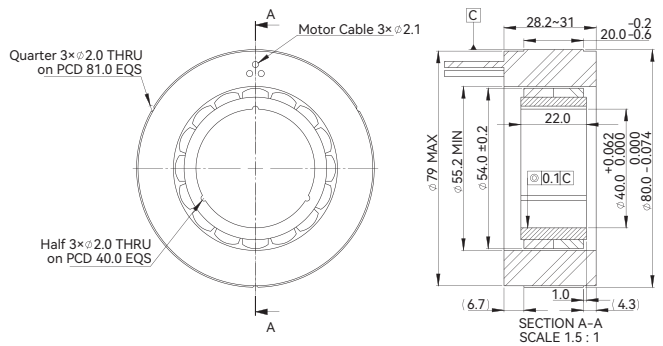
❷ Resistance is measured by DC current with standard 0.5 m cable.

❸ Inductance is measured by current frequency of 1 kHz.

❹ The value is based on max. bus voltage.

The contents of datasheet are subject to change without prior notice.

Dimension



Note:

❶ The concentricity of stator and rotor to be within 0.1mm when mounted;

❷ User to ensure flatness of mounting surface within 0.01/300mm;

❸ Comes without temperature sensor;

❹ Motor must be used with a Variable Frequency Driver;

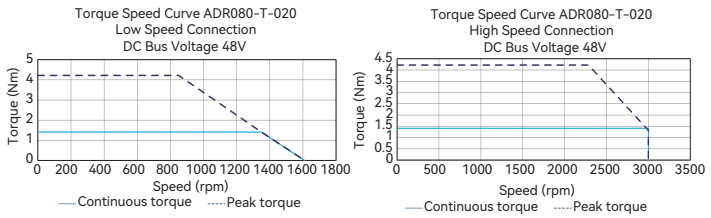
❺ Cable diameter within +/-0.3mm tolerance, cable length within +/-30.0mm tolerance;

❻ Certain specifications in the drawing are subject to change;

❼ Customers need to connect ground wire by themselves;

❽ No epoxy on either end.

Torque-Speed Curve



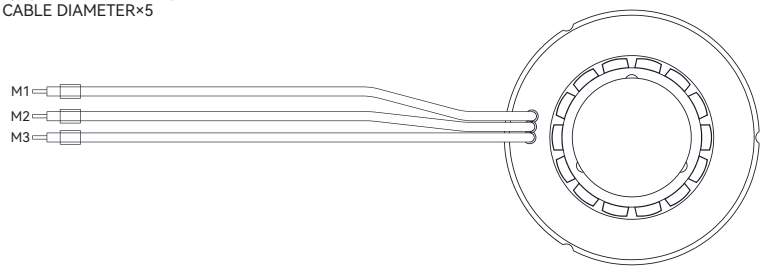
Motor Cable Connection

MOTOR CABLE

DESCRIPTION	COLOR
M1	BLACK
M2	BLUE
M3	RED

MOTOR POWER CABLE

MINIMUM BENDING RADIUS
MOIVING: CABLE DIAMETER×8
FIXED: CABLE DIAMETER×5



Part Numbering

ADR050-T-014-N-XX-H-NF-005-XF-000

Motor Model:
ADR050-T / ADR080-T

Stack Height:
ADR050-T: 014
ADR080-T: 020

Cooling Type:
N = No Water Cooling

Thermal Sensor:
XX = No Thermal Sensor

Design Control Code:
000[5]

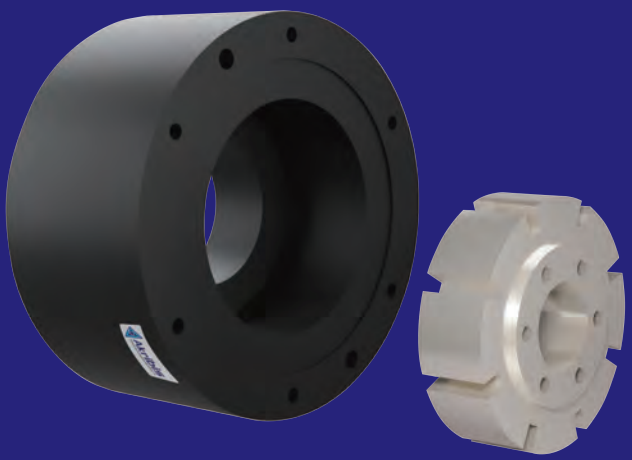
Power Cable:
XF[4]

Cable Length (m):
005 = 0.5

Sensor Cable:
NF[3]

Winding Code:
H / L[1][2]

1. H = High Speed Winding
2. L = Low Speed Winding
3. NF = Without Built-in Hall Sensor C/W Flying Leads
4. XF = Without Ferrite Bead C/W Flying Leads
5. 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)



ACD-P SERIES

- No cogging torque
- Direct drive rotary motor with ironless technology
- Low speed ripple, suitable for inspection application

EN-26.3.1

Akribis systems

ACD62-P-10

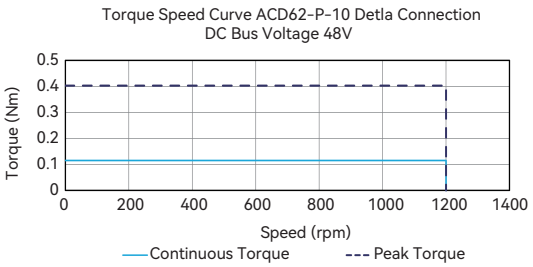
ACD62-P-10				
Performance Parameters	Symbol	Unit	D	Y
Continuous Torque @100°C ❶	T_{cn}	Nm	0.115	0.115
Peak Torque	T_{pk}	Nm	0.40	0.40
Torque Constant ±10%	K_t	Nm/Arms	0.024	0.042
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.002	0.004
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.023	0.028
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	0.73	1.51
Inductance (L-L) ±20% ❸	L	mH	0.073	0.195
Electrical Time Constant	τ_e	ms	0.10	0.13
Continuous Current @100°C ❶	I_{cn}	Arms	4.8	2.8
Peak Current	I_{pk}	Arms	16.8	9.7
Continuous Power Dissipation @100°C ❶	P_{cn}	W	32.6	22.4
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{thn}	W/℃	0.435	0.298
Max. Bus Voltage	U_{bus}	Vdc	48.0	48.0
Pole Number	2P	-	8	8
Mechanical Parameters				
Overall Mass	m_n	kg	0.5	0.5
Rotor Inertia	J_r	kg·m²	9.714E-06	9.714E-06
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

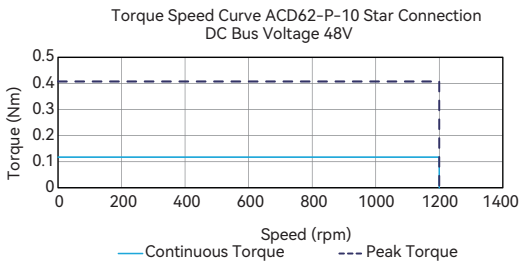
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Mounting Illustration



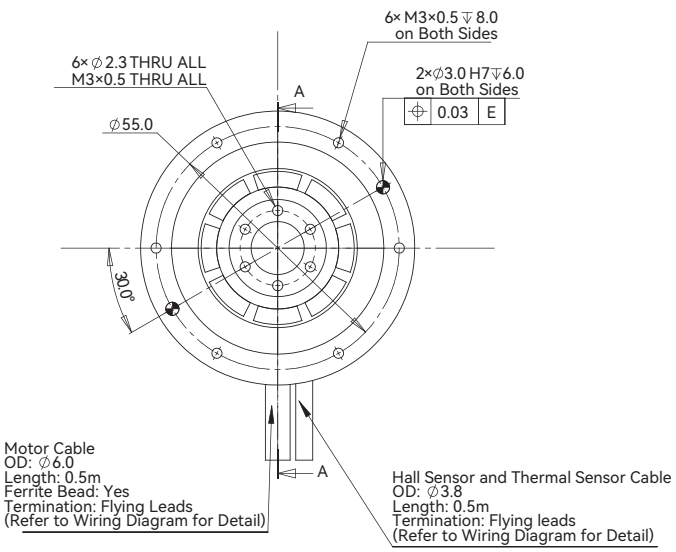
Torque-Speed Curve

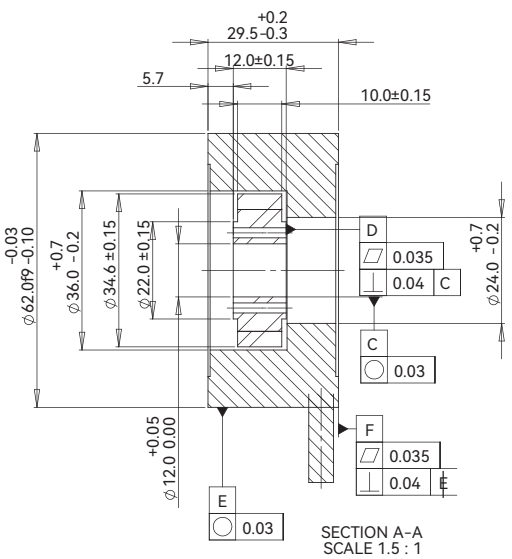




Note:
The maximum speed shown does not take into account bearing and encoder selection, and other factor that could restrict the speed limit.

Dimension





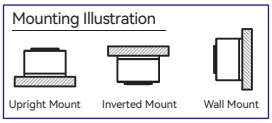
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

ACD62-P-30

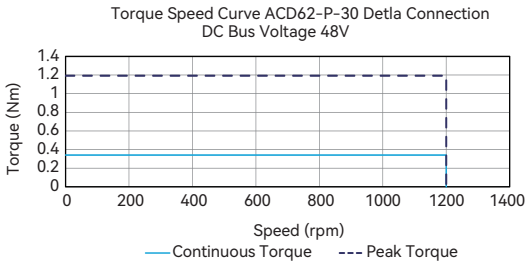
ACD62-P-30				
Performance Parameters	Symbol	Unit	D	Y
Continuous Torque @100°C ❶	T_{cn}	Nm	0.341	0.341
Peak Torque	T_{pk}	Nm	1.19	1.19
Torque Constant ±10%	K_t	Nm/Arms	0.071	0.123
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.006	0.011
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.058	0.068
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	1.01	2.21
Inductance (L-L) ±20% ❸	L	mH	0.144	0.316
Electrical Time Constant	τ_e	ms	0.14	0.14
Continuous Current @100°C ❶	I_{cn}	Arms	4.8	2.8
Peak Current	I_{pk}	Arms	16.8	9.7
Continuous Power Dissipation @100°C ❶	P_{cn}	W	44.8	32.7
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{thn}	W/℃	0.597	0.436
Max. Bus Voltage	U_{bus}	Vdc	48.0	48.0
Pole Number	2P	-	8	8
Mechanical Parameters				
Overall Mass	m_n	kg	0.8	0.8
Rotor Inertia	J_r	kg·m²	2.883E-05	2.883E-05
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

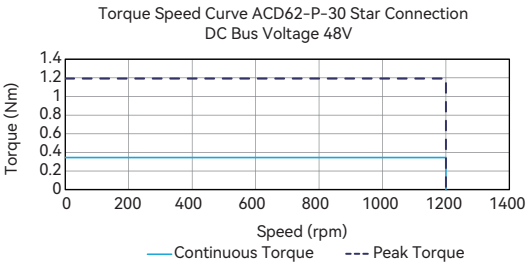
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Mounting Illustration



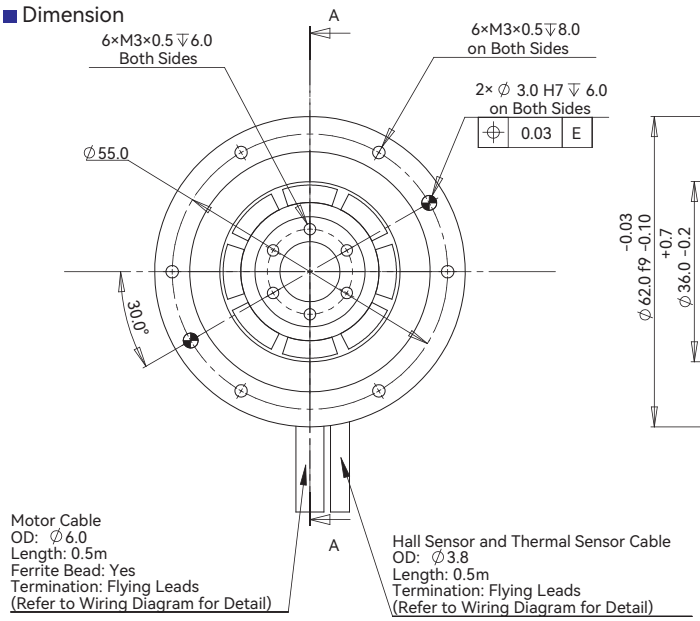
Torque-Speed Curve

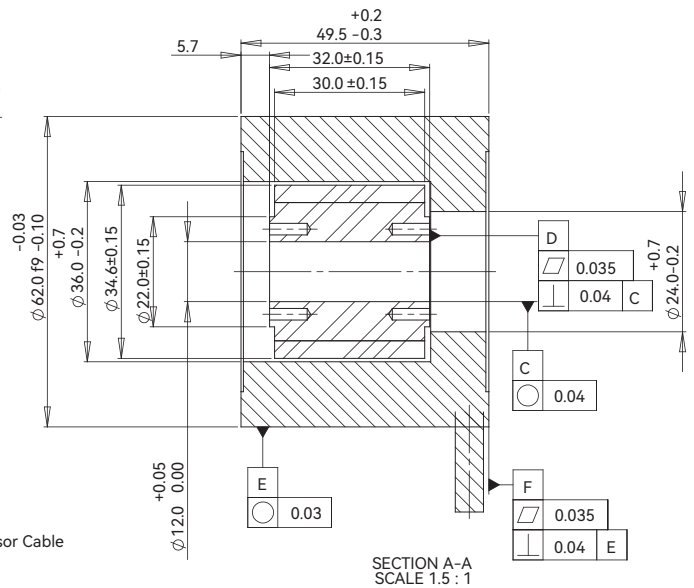




Note:
The maximum speed shown does not take into account bearing and encoder selection, and other factor that could restrict the speed limit.

Dimension





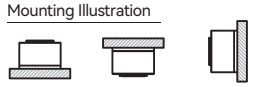
Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

ACD85-P-15

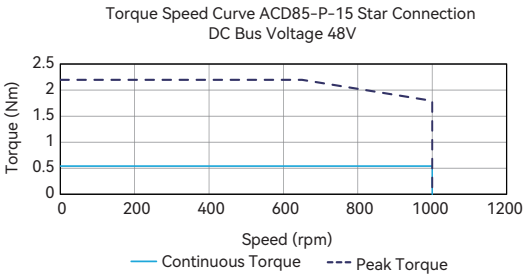
ACD85-P-15			
Performance Parameters	Symbol	Unit	Y
Continuous Torque @100°C ❶	T_{cn}	Nm	0.54
Peak Torque	T_{pk}	Nm	2.19
Torque Constant ±10%	K_t	Nm/Arms	0.18
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.015
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.106
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	1.92
Inductance (L-L) ±20% ❸	L	mH	0.54
Electrical Time Constant	τ_e	ms	0.28
Continuous Current @100°C ❶	I_{cn}	Arms	3.8
Peak Current	I_{pk}	Arms	12.2
Continuous Power Dissipation @100°C ❶	P_{cn}	W	53.6
Max. Coil Temperature	t_{max}	℃	100
Thermal Dissipation Constant ❶	K_{thn}	W/℃	0.715
Max. Bus Voltage	U_{bus}	Vdc	48.0
Pole Number	2_P	-	8
Mechanical Parameters			
Overall Mass	m_n	kg	0.47
Rotor Inertia	J_r	kg·m²	8.144E-05
Other Information			
Insulation Class		Class B (130°C)	
Protection Grade		IP01	
Compliance with Global Standards		RoHS, CE	
Ambient Temperature	Operation	0°C to 40°C (non-freezing)	
	Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)	
	Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.2m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Mounting Illustration

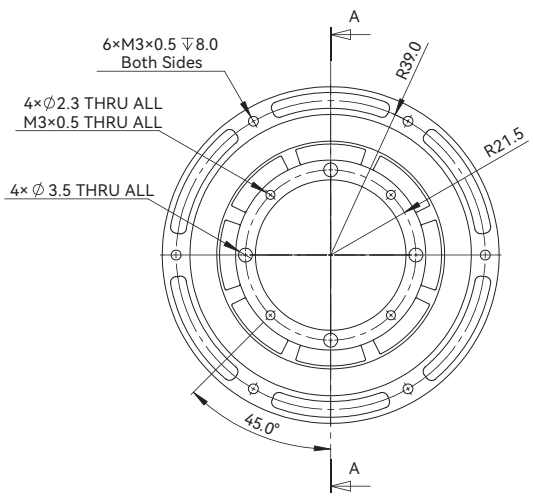


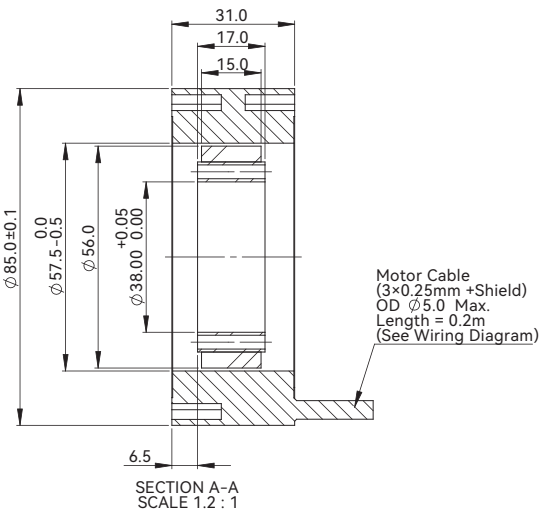
Torque-Speed Curve



Note:
The maximum speed shown does not take into account bearing and encoder selection, and other factor that could restrict the speed limit.

Dimension





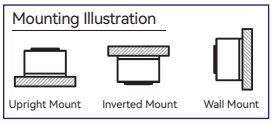
Note:
❶ Cable diameter within +/-0.3 tolerance, cable length within +/-5.0 tolerance.

ACD120-P-20

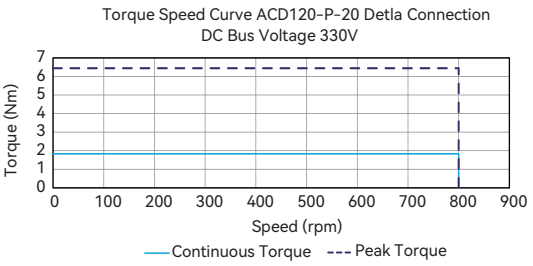
ACD120-P-20				
Performance Parameters	Symbol	Unit	D	Y
Continuous Torque @100°C ❶	T_{cn}	Nm	1.85	1.85
Peak Torque	T_{pk}	Nm	6.46	6.46
Torque Constant ±10%	K_t	Nm/Arms	0.36	0.63
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.031	0.054
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.220	0.238
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	1.80	4.64
Inductance (L-L) ±20% ❸	L	mH	0.628	1.900
Electrical Time Constant	τ_e	ms	0.35	0.41
Continuous Current @100°C ❶	I_{cn}	Arms	5.1	2.9
Peak Current	I_{pk}	Arms	17.9	10.3
Continuous Power Dissipation @100°C ❶	P_{cn}	W	90.4	77.7
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{thn}	W/℃	1.205	1.036
Max. Bus Voltage	U_{bus}	Vdc	330.0	330.0
Pole Number	2p	-	12	12
Mechanical Parameters				
Overall Mass	m_n	kg	1.8	1.8
Rotor Inertia	J_r	kg·m²	5.950E-04	5.950E-04
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP00		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

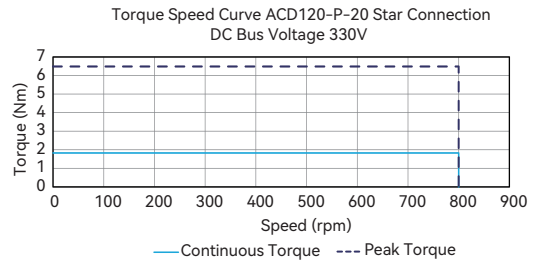
❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
The contents of datasheet are subject to change without prior notice.

Mounting Illustration



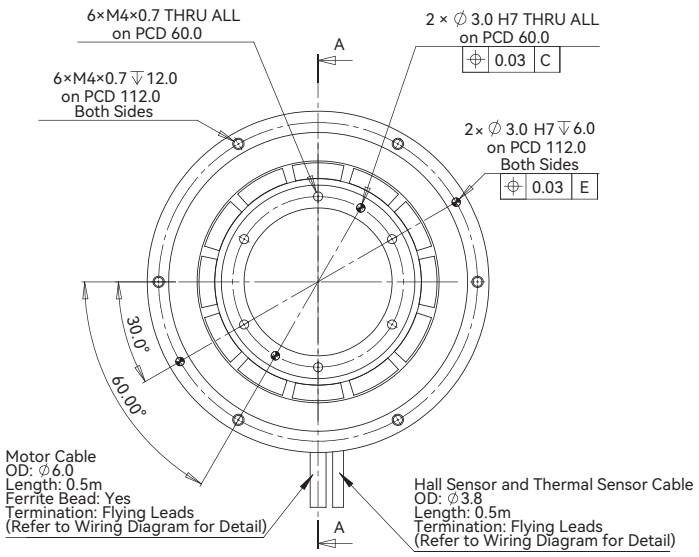
Torque-Speed Curve

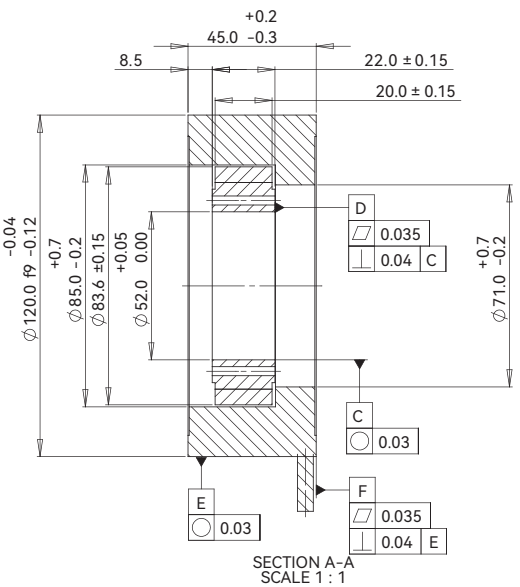




Note:
The maximum speed shown does not take into account bearing and encoder selection, and other factor that could restrict the speed limit.

Dimension





Note:
❶ User to ensure the concentricity of stator and rotor to be within 0.15mm when mounted;
❷ User to ensure flatness of mounting surface within 0.015/300mm;
❸ User to ensure perpendicularity of rotor inner bore relative to datum F within 0.1mm when mounted;
❹ The cable diameter tolerance +0.3, and cable length tolerance +60.0

Part Numbering

ACD62-P-10-D-K-NH-0.5-FB

- Motor Model: ACD62-P-10 / ACD62-P-30
- Winding Code: D = Delta / Y = Wye
- Thermal Sensor: K = PT100 (RTD)
- Sensor Cable: NH[1] / H9D[2]
- Cable Length (m): 0.5
- Power Cable: FB[3] / 9W4M[4]

ACD85-P-15-Y-NH-0.2-NFB

- Motor Model: ACD85-P-15
- Winding Code: Y = Wye
- Sensor Cable: NH[1]
- Cable Length (m): 0.2
- Power Cable: NFB[5]

ACD120-P-20-Y-J-NH-0.5-FB

- Motor Model: ACD120-P-20
- Winding Code: D = Delta / Y = Wye
- Thermal Sensor: J = Thermostat / K = PT100 (RTD)
- Sensor Cable: NH[1] / H9D[2]
- Cable Length (m): 0.5
- Power Cable: FB[3] / 9W4M[4]

1. NH = Without Built-in Hall Sensor C/W Flying Leads
2. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
3. FB = With Ferrite Bead C/W Flying Leads
4. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
5. NFB = Without Ferrite Bead C/W Flying Leads

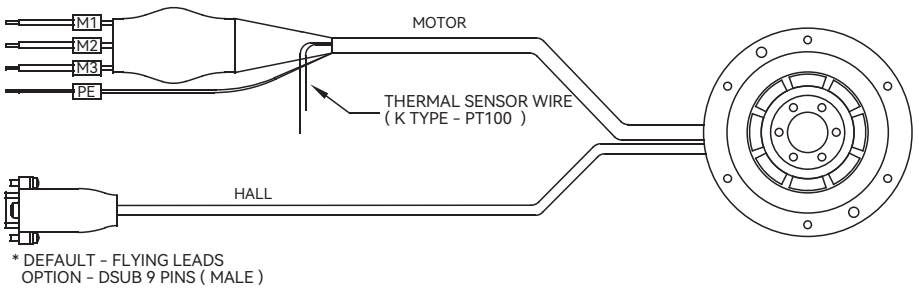
Motor Cable Connection

MOTOR CABLE

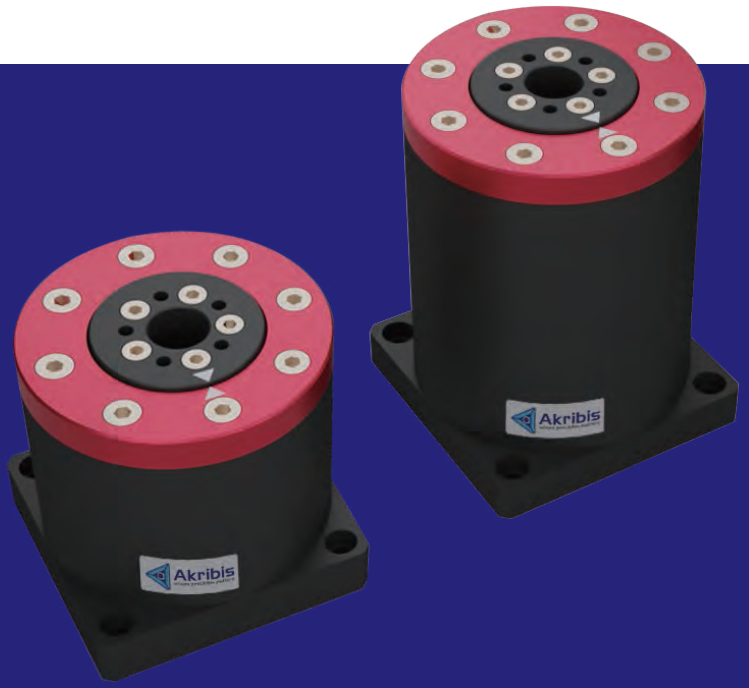
PIN	DESCRIPTION	COLOR
-	M1	YELLOW / GREY
-	M2	BLUE / ORANGE
-	M3	RED / GREEN
-	PE	YELLOW / GREEN

HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREY
2	HB	YELLOW
3	HC	BLUE
4	5VDC	RED
5	0VDC	BLACK



* DEFAULT - FLYING LEADS
OPTION - DSUB 9 PINS (MALE)



ACD SERIES

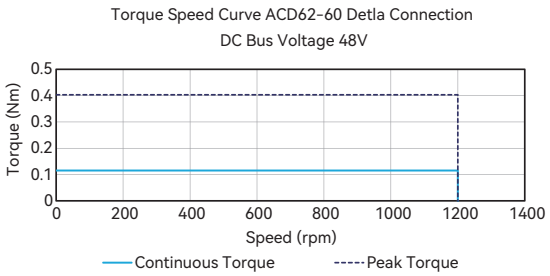
- No cogging torque
- Direct drive zero cogging coreless motor
- Low speed ripple, suitable for inspection application
- Built-in grating position feedback and precision bearings, precise reset through optical zero position

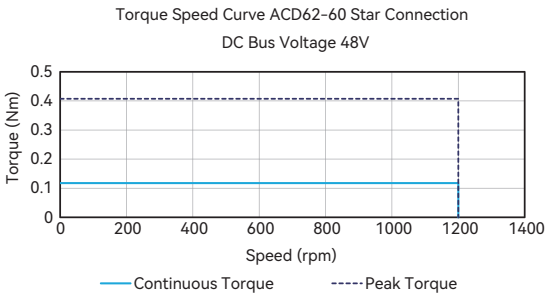
ACD62-60

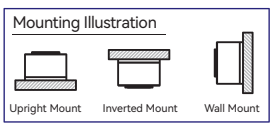
ACD62-60					
Performance Parameters		Symbol	Unit	D	Y
Continuous Torque @100°C ❶		T_{cn}	Nm	0.115	0.115
Peak Torque		T_{pk}	Nm	0.40	0.40
Torque Constant ±10%		K_t	Nm/Arms	0.024	0.042
Back EMF Constant ±10%		K_e	Vpeak/rpm	0.002	0.004
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.023	0.028
Resistance (L-L) @25°C ±10% ❷		R_{25}	Ω	0.73	1.51
Inductance (L-L) ±20% ❸		L	mH	0.073	0.233
Electrical Time Constant		τ_e	ms	0.10	0.15
Continuous Current @100°C ❶		I_{cn}	Arms	4.8	2.8
Peak Current		I_{pk}	Arms	16.8	9.7
Continuous Power Dissipation @100°C ❶		P_{cn}	W	32.5	22.4
Max. Coil Temperature		t_{max}	°C	100	100
Thermal Dissipation Constant ❶		K_{thn}	W/°C	0.434	0.298
Max. Bus Voltage		U_{bus}	Vdc	48.0	48.0
Pole Number		2P	-	8	8
Rec. Max. Speed @48 VDC (Digital / SINCOS) ❹		Ω_{max}	rpm	1200	1200
Mechanical Parameters					
Overall Mass		m_n	kg	1.00	1.00
Rotor Inertia		J_r	kg·m²	2.157E-05	2.157E-05
Axial Runout ❺		-	μm	12	12
Radial Runout ❺		-	μm	10	10
Max. Axial Load (Upright Mounting) ❻		-	N	50	50
Max. Axial Load (Inverted / Wall Mounting)		-	N	5	5
Max. Moment Load (Upright Mounting)		-	Nm	0.3	0.3
Max. Moment Load (Inverted / Wall Mounting)		-	Nm	0.05	0.05
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	1620	1620
ABI Optical Incremental Encoder (80x)		-	counts / rev	129600	129600
ABI Optical Incremental Encoder (160x)		-	counts / rev	259200	259200
ABI Optical Incremental Encoder (400x)		-	counts / rev	648000	648000
Accuracy after Error Mapping ❼		-	arc sec	+/-6	+/-6
Repeatability ❼		-	arc sec	+/-3	+/-3
Other Information					
Insulation Class			Class B (130°C)		
Protection Grade			IP40		
Compliance with Global Standards			RoHS, CE		
Ambient Temperature	Operation		0°C to 40°C (non-freezing)		
	Storage		-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subjected to change without prior notice.

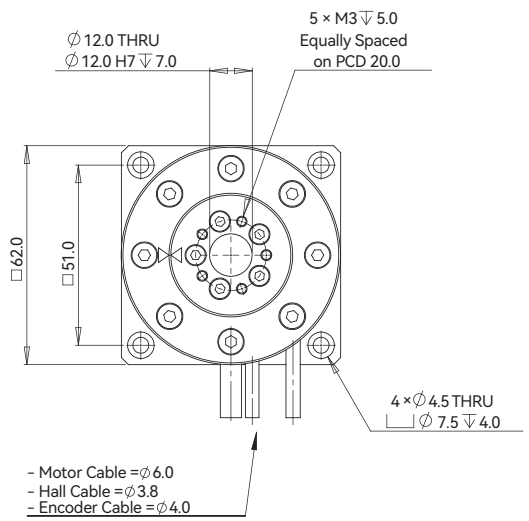
■ Torque-Speed Curve

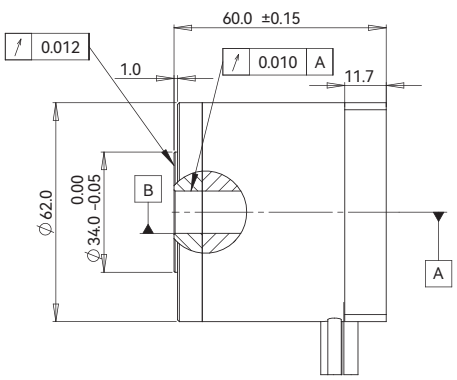






■ Dimension



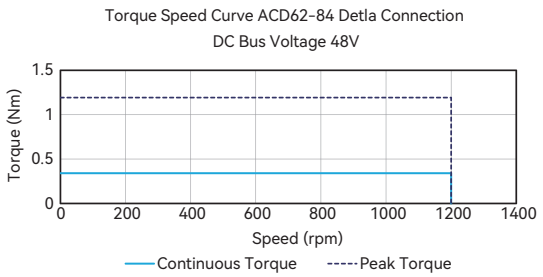


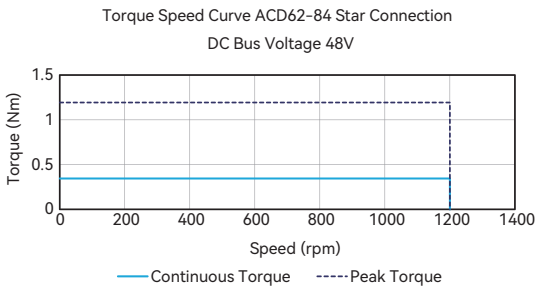
ACD62-84

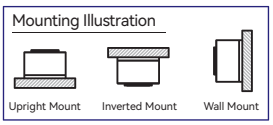
ACD62-84				
Performance Parameters	Symbol	Unit	D	Y
Continuous Torque @100°C ❶	T_{cn}	Nm	0.341	0.341
Peak Torque	T_{pk}	Nm	1.19	1.19
Torque Constant ±10%	K_t	Nm/Arms	0.071	0.123
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.006	0.011
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.055	0.068
Resistance (L-L) @25°C ±10% ❷	R_{25}	Ω	1.12	2.21
Inductance (L-L) ±20% ❸	L	mH	0.155	0.420
Electrical Time Constant	τ_e	ms	0.14	0.19
Continuous Current @100°C ❶	I_{cn}	Arms	4.8	2.8
Peak Current	I_{pk}	Arms	16.8	9.7
Continuous Power Dissipation @100°C ❶	P_{cn}	W	49.9	32.7
Max. Coil Temperature	t_{max}	℃	100	100
Thermal Dissipation Constant ❶	K_{thn}	W/℃	0.665	0.436
Max. Bus Voltage	U_{bus}	Vdc	48.0	48.0
Pole Number	2P	-	8	8
Rec. Max. Speed @48 VDC (Digital / SINCOS) ❹	Ω_{max}	rpm	1200	1200
Mechanical Parameters				
Overall Mass	m_n	kg	1.40	1.40
Rotor Inertia	J_r	kg·m²	3.944E-05	3.944E-05
Axial Runout ❺	-	μm	12	12
Radial Runout ❺	-	μm	10	10
Max. Axial Load (Upright Mounting) ❻	-	N	50	50
Max. Axial Load (Inverted / Wall Mounting)	-	N	5	5
Max. Moment Load (Upright Mounting)	-	Nm	0.3	0.3
Max. Moment Load (Inverted / Wall Mounting)	-	Nm	0.05	0.05
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	1620	1620
ABI Optical Incremental Encoder (80x)	-	counts / rev	129600	129600
ABI Optical Incremental Encoder (160x)	-	counts / rev	259200	259200
ABI Optical Incremental Encoder (400x)	-	counts / rev	648000	648000
Accuracy after Error Mapping ❼	-	arc sec	+/-6	+/-6
Repeatability ❼	-	arc sec	+/-3	+/-3
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP40		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subjected to change without prior notice.

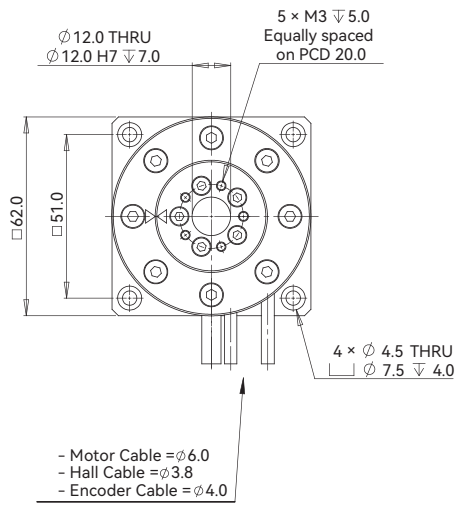
Torque-Speed Curve

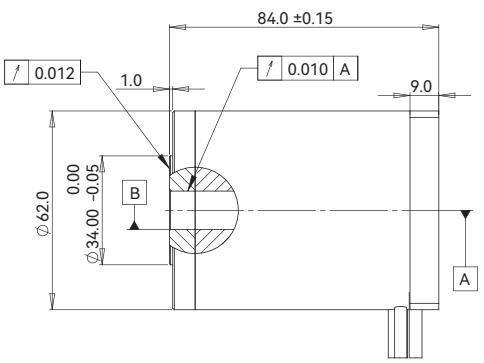






Dimension



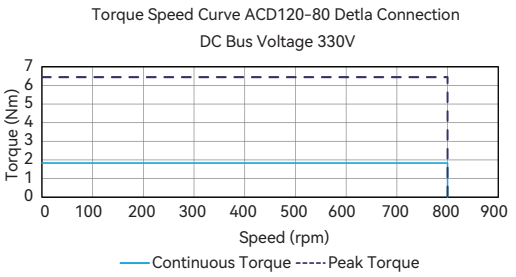


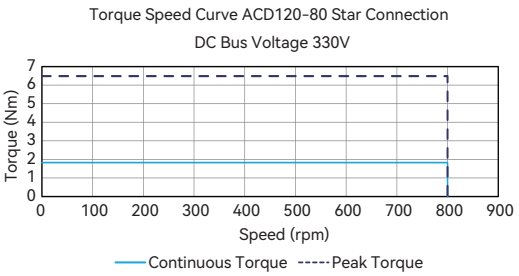
ACD120-80

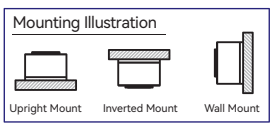
ACD120-80					
Performance Parameters		**Symbol**	**Unit**	**D**	**Y**
Continuous Torque @100°C ❶		T_{cn}	Nm	1.85	1.85
Peak Torque		T_{pk}	Nm	6.46	6.46
Torque Constant ±10%		K_t	Nm/Arms	0.36	0.63
Back EMF Constant ±10%		K_e	Vpeak/rpm	0.031	0.054
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.220	0.238
Resistance (L-L) @25°C ±10% ❷		R_{25}	Ω	1.80	4.64
Inductance (L-L) ±20% ❸		L	mH	0.675	1.900
Electrical Time Constant		τ_e	ms	0.38	0.41
Continuous Current @100°C ❶		I_{cn}	Arms	5.1	2.9
Peak Current		I_{pk}	Arms	17.9	10.3
Continuous Power Dissipation @100°C ❶		P_{cn}	W	90.4	77.7
Max. Coil Temperature		t_{max}	℃	100	100
Thermal Dissipation Constant ❶		K_{thn}	W/℃	1.205	1.036
Max. Bus Voltage		U_{bus}	Vdc	330.0	330.0
Pole Number		2P	-	12	12
Rec. Max. Speed @230 VAC (Digital / SINCOS) ❹		Ω_{max}	rpm	800	800
Mechanical Parameters					
Overall Mass		m_n	kg	3.2	3.2
Rotor Inertia		J_r	kg·m²	1.08E-03	1.08E-03
Axial Runout ❺		-	μm	15	15
Radial Runout ❺		-	μm	10	10
Max. Axial Load (Upright Mounting) ❻		-	N	150	150
Max. Axial Load (Inverted / Wall Mounting)		-	N	15	15
Max. Moment Load (Upright Mounting)		-	Nm	10	10
Max. Moment Load (Inverted / Wall Mounting)		-	Nm	1.0	1.0
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	2868	2868
ABI Optical Incremental Encoder (80x)		-	counts / rev	229440	229440
ABI Optical Incremental Encoder (160x)		-	counts / rev	458880	458880
ABI Optical Incremental Encoder (400x)		-	counts / rev	1147200	1147200
Accuracy after Error Mapping ❼		-	arc sec	+/-6	+/-6
Repeatability ❼		-	arc sec	+/-3	+/-3
Other Information					
Insulation Class			Class B (130°C)		
Protection Grade			IP40		
Compliance with Global Standards			RoHS, CE		
Ambient Temperature	Operation		0°C to 40°C (non-freezing)		
	Storage		-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25℃. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subjected to change without prior notice.

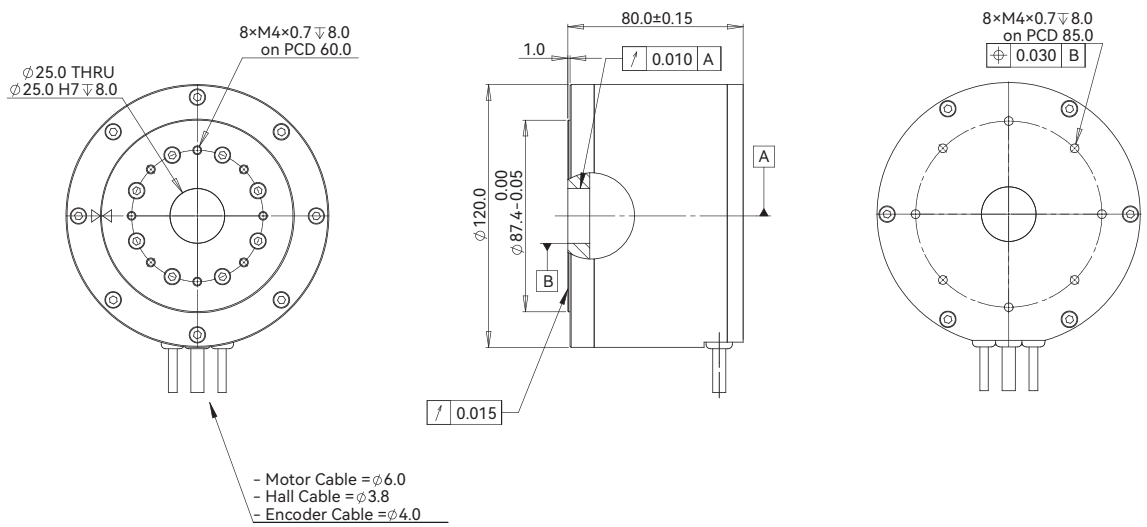
■ Torque-Speed Curve







■ Dimension

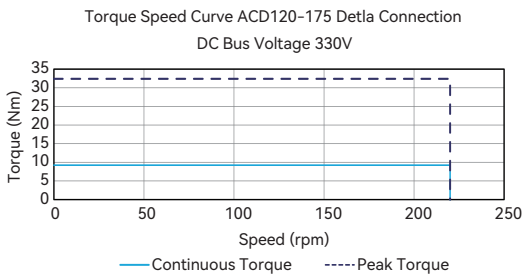


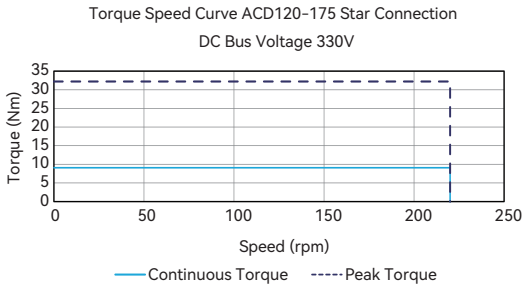
ACD120-175

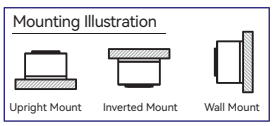
ACD120-175					
Performance Parameters		Symbol	Unit	D	Y
Continuous Torque @100°C ❶		T_{cn}	Nm	9.22	9.22
Peak Torque		T_{pk}	Nm	32.25	32.25
Torque Constant ±10%		K_t	Nm/Arms	1.81	3.13
Back EMF Constant ±10%		K_e	Vpeak/rpm	0.154	0.268
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.736	0.736
Resistance (L-L) @25°C ±10% ❷		R_{25}	Ω	4.02	12.07
Inductance (L-L) ±20% ❸		L	mH	2.000	5.619
Electrical Time Constant		τ_e	ms	0.50	0.47
Continuous Current @100°C ❶		I_{cn}	Arms	5.1	2.9
Peak Current		I_{pk}	Arms	17.9	10.3
Continuous Power Dissipation @100°C ❶		P_{cn}	W	202.4	202.1
Max. Coil Temperature		t_{max}	℃	100	100
Thermal Dissipation Constant ❶		K_{thn}	W/℃	2.698	2.695
Max. Bus Voltage		U_{bus}	Vdc	330.0	330.0
Pole Number		2P	-	12	12
Rec. Max. Speed @230 VAC (Digital / SINCOS) ❹		Ω_{max}	rpm	220	220
Mechanical Parameters					
Overall Mass		m_n	kg	7.0	7.0
Rotor Inertia		J_r	kg·m²	3.21E-03	3.21E-03
Axial Runout ❺		-	μm	15	15
Radial Runout ❺		-	μm	10	10
Max. Axial Load (Upright Mounting) ❻		-	N	150	150
Max. Axial Load (Inverted / Wall Mounting)		-	N	15	15
Max. Moment Load (Upright Mounting)		-	Nm	10	10
Max. Moment Load (Inverted / Wall Mounting)		-	Nm	1.0	1.0
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	2868	2868
ABI Optical Incremental Encoder (80x)		-	counts / rev	229440	229440
ABI Optical Incremental Encoder (160x)		-	counts / rev	458880	458880
ABI Optical Incremental Encoder (400x)		-	counts / rev	1147200	1147200
Accuracy after Error Mapping ❼		-	arc sec	+/-6	+/-6
Repeatability ❼		-	arc sec	+/-3	+/-3
Other Information					
Insulation Class		Class B (130°C)			
Protection Grade		IP40			
Compliance with Global Standards		RoHS, CE			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)			
	Storage	-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subjected to change without prior notice.

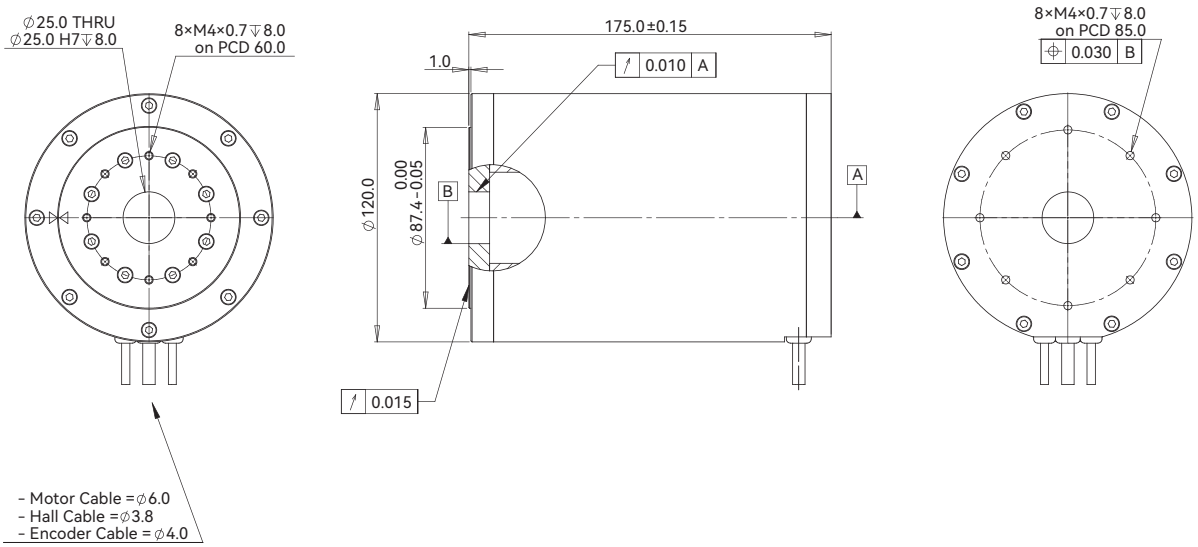
Torque-Speed Curve







Dimension



Part Numbering

ACD62-84-D-K-NH-0.5-FB-AB-1620-160X

- Motor Model: ACD62-60 / 84
- Winding Code: D = Delta / Y = Wye
- Thermal Sensor: K = PT100 (RTD)
- Sensor Cable: NH[1] / H9D[2]
- Cable Length (m): 0.5
- Power Cable: FB[3] / 9W4M[4]
- Encoder: AB-1620
- Interpolation: SINCOS / 80X / 160X / 400X

ACD120-80-Y-J-H9D-0.5-FB-AB-2868-SINCOS

- Motor Model: ACD120-80 / 175
- Winding Code: D = Delta / Y = Wye
- Thermal Sensor: J = Thermostat / K = PT100 (RTD)
- Sensor Cable: NH[1] / H9D[2]
- Cable Length (m): 0.5
- Power Cable: FB[3] / 9W4M[4]
- Encoder: AB-2868
- Interpolation: SINCOS / 80X / 160X / 400X

1. NH = Without Built-in Hall Sensor C/W Flying Leads
2. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
3. FB = With Ferrite Bead C/W Flying Leads
4. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector

Motor Cable Connection

MOTOR CABLE

PIN	DESCRIPTION	NO FERRITE BEAD	FERRITE BEAD
-	M1	YELLOW / GREY	BLACK 1
-	M2	BLUE / ORANGE	BLACK 2
-	M3	RED / GREEN	BLACK 3
-	PE	YELLOW / GREEN	YELLOW/GREEN

HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREY
2	HB	YELLOW
3	HC	BLUE
4	5VDC	RED
5	0VDC	BLACK

MOTOR CABLE (9W4M)

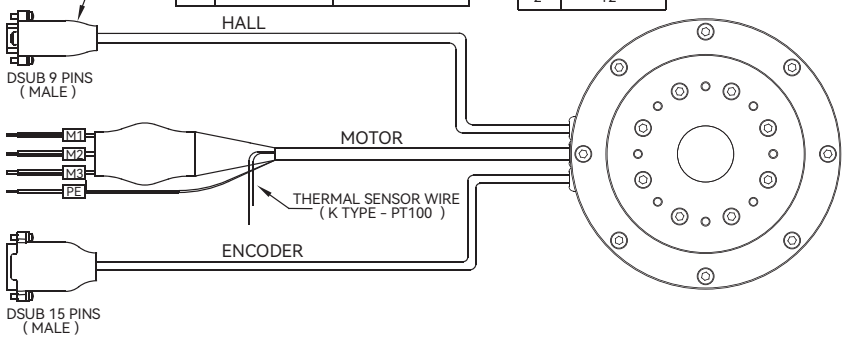
PIN	DESCRIPTION
A1	M1
A2	M2
A3	M3
A4	PE
1	T1
2	T2

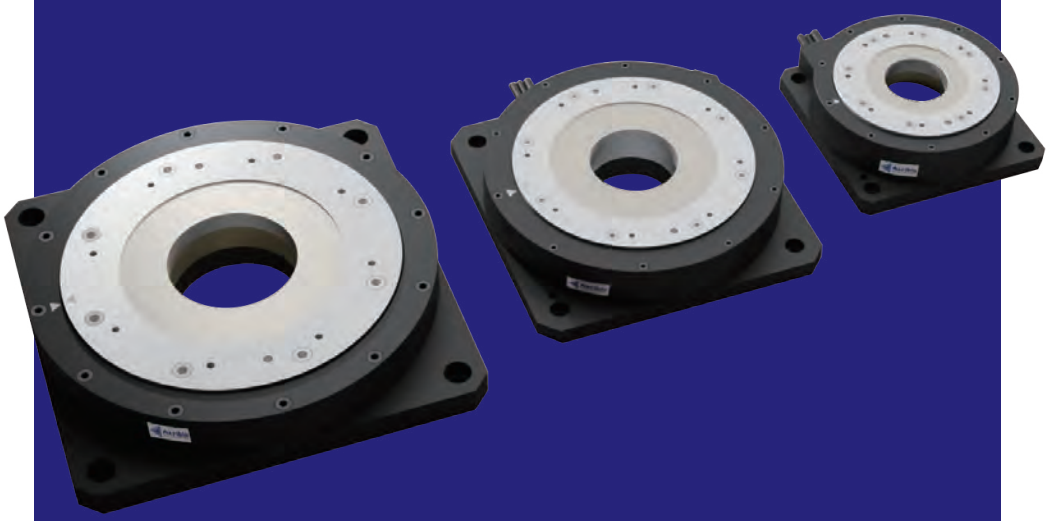
ABI (DIGITAL)

PIN	DESCRIPTION
12	5VDC
5	A+
4	A-
10	B+
9	B-
14	Z+
15	Z-
13	0VDC

ABI (SIN / COS)

PI	DESCRIPTION
12	5VDC
8	SINE+
15	SINE-
7	COSINE+
14	COSINE-
2	INDEX+
1	INDEX-
13	0VDC





ACW SERIES

- Flat design
- Large centre hole
- No cogging torque
- Direct drive brushless motor
- Precise homing through index pulse
- Fully integrated with encoder and bearing

EN-26.3.1

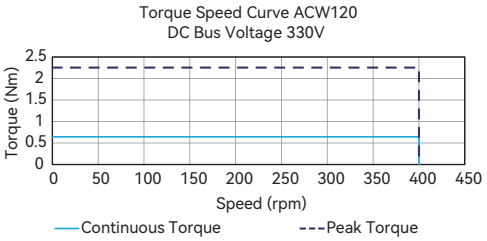
Akribis systems

ACW120

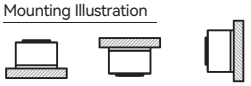
ACW120				
Performance Parameters		Symbol	Unit	Parallel
Continuous Torque @100°C [1]		T_{cn}	Nm	0.6
Peak Torque		T_{pk}	Nm	2.3
Torque Constant ±10%		K_t	Nm/Arms	0.14
Back EMF Constant ±10%		K_e	Vpeak/rpm	0.012
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.10
Resistance (L-L) @25°C ±10% [2]		R_{25}	Ω	1.43
Inductance (L-L) ±20% [3]		L	mH	0.47
Electrical Time Constant		τ_e	ms	0.33
Continuous Current @100°C [1]		I_{cn}	Arms	4.6
Peak Current		I_{pk}	Arms	16.1
Continuous Power Dissipation @100°C [1]		P_{cn}	W	58.5
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant [1]		K_{thn}	W/°C	0.78
Max. Bus Voltage		U_{bus}	Vdc	330.0
Pole Number		2P	-	16
Max. Speed For Standard Axial/Radial Runout @230V AC [4]		Ω_{max}	rpm	400
Max. Speed For Optional Axial/Radial Runout (P10, P5) @230V AC [4]		Ω_{max}	rpm	120
Mechanical Parameters				
Overall Mass		m_n	kg	2.0
Rotor Inertia		J_r	kg.m²	6.584E-04
Axial Runout [5]		-	μm	15 (10,5)
Radial Runout [5]		-	μm	15 (10,5)
Max. Axial Load (Upright Mounting) [6]		-	N	150.0
Max. Axial Load (Inverted / Wall Mounting)		-	N	15.0
Max. Moment Load (Upright Mounting)		-	Nm	14.7
Max. Moment Load (Inverted / Wall Mounting)		-	Nm	1.47
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	3934
ABI Optical Incremental Encoder (80x)		-	counts / rev	314720
ABI Optical Incremental Encoder (160x)		-	counts / rev	629,440
ABI Optical Incremental Encoder (400x)		-	counts / rev	1,573,600
Accuracy after Error Mapping [7]		-	arc sec	+/-8
Repeatability [7]		-	arc sec	+/-4
Other Information				
Insulation Class			Class B (130°C)	
Protection Grade			IP40	
Compliance with Global Standards			RoHS, CE	
Ambient Temperature	Operation		0°C to 40°C (non-freezing)	
	Storage		-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)	
	Storage		10%RH to 90%RH (non-condensing)	
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] Resistance is measured by DC current with standard 0.5m cable.
[3] Inductance is measured by current frequency of 1 kHz.
[4] The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
[5] Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
[6] Please refer to the illustration for different mountings.
[7] Based on ABI optical SIN/COS encoder (4096x interpolation) with P5 runout.
The contents of datasheet are subject to change without prior notice.

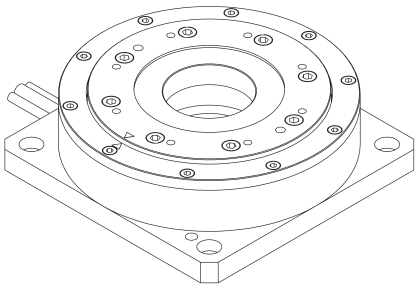
Torque-Speed Curve

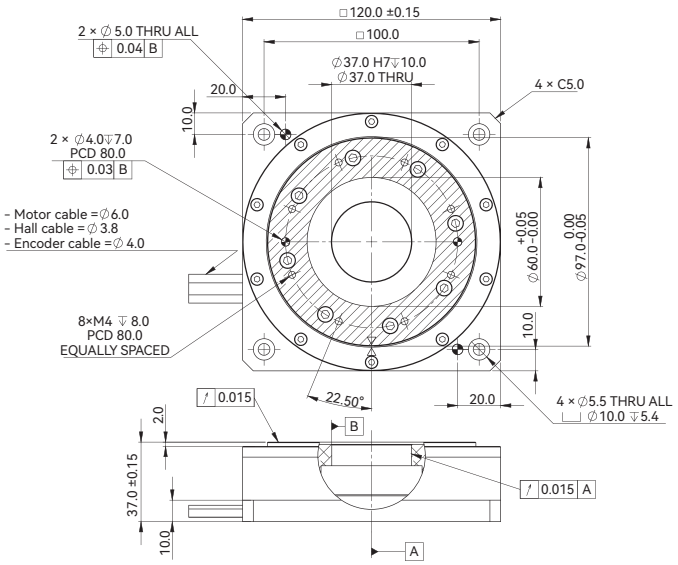


Mounting Illustration



Dimension





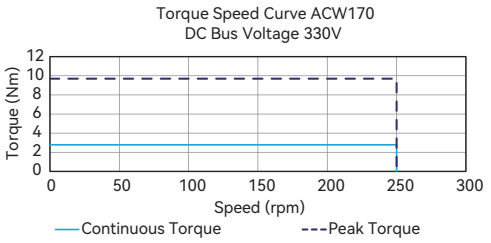
Note:
[1] 37mm diameter through hole
[2] Shaded area, mounting surface

ACW170

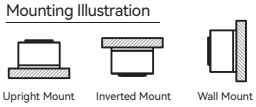
ACW170				
Performance Parameters		**Symbol**	**Unit**	**Parallel**
Continuous Torque @100°C ❶		T_{cn}	Nm	2.8
Peak Torque		T_{pk}	Nm	9.7
Torque Constant ±10%		K_t	Nm/Arms	0.66
Back EMF Constant ±10%		K_e	Vpeak/rpm	0.056
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.32
Resistance (L-L) @25°C ±10% ❷		R_{25}	Ω	2.76
Inductance (L-L) ±20% ❸		L	mH	1.65
Electrical Time Constant		τ_e	ms	0.60
Continuous Current @100°C ❶		I_{cn}	Arms	4.2
Peak Current		I_{pk}	Arms	14.7
Continuous Power Dissipation @100°C ❶		P_{cn}	W	94.1
Max. Coil Temperature		t_{max}	°C	100
Thermal Dissipation Constant ❶		K_{thn}	W/°C	1.26
Max. Bus Voltage		U_{bus}	Vdc	330.0
Pole Number		2P	-	16
Max. Speed For Standard Axial/Radial Runout @230V AC ❹		Ω_{max}	rpm	250
Max. Speed For Optional Axial/Radial Runout (P10, P5) @230V AC ❹		Ω_{max}	rpm	120
Mechanical Parameters				
Overall Mass		m_n	kg	3.7
Rotor Inertia		J_r	kg.m²	2.020E-03
Axial Runout ❺		-	μm	18 (10,5)
Radial Runout ❺		-	μm	18 (10,5)
Max. Axial Load (Upright Mounting) ❻		-	N	230.0
Max. Axial Load (Inverted / Wall Mounting)		-	N	23.0
Max. Moment Load (Upright Mounting)		-	Nm	31.7
Max. Moment Load (Inverted / Wall Mounting)		-	Nm	3.17
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	5560
ABI Optical Incremental Encoder (80x)		-	counts / rev	444800
ABI Optical Incremental Encoder (160x)		-	counts / rev	889,600
ABI Optical Incremental Encoder (400x)		-	counts / rev	2,224,000
Accuracy after Error Mapping ❼		-	arc sec	+/-6
Repeatability ❼		-	arc sec	+/-3
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP40		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with P5 runout.
The contents of datasheet are subject to change without prior notice.

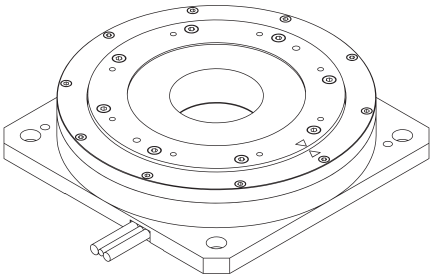
Torque-Speed Curve

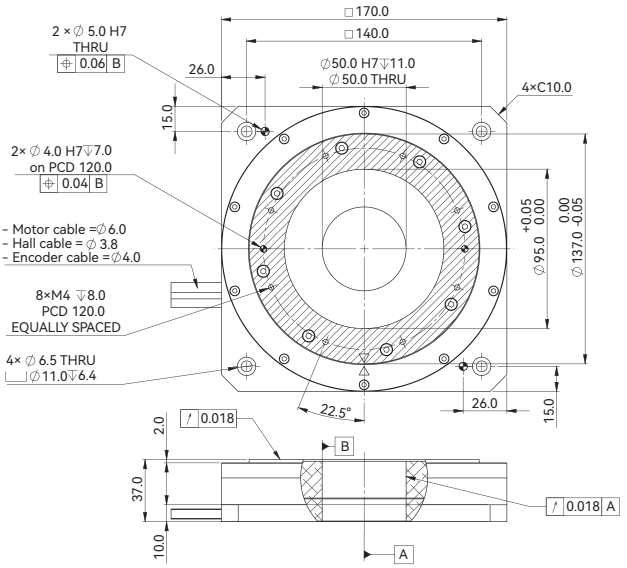


Mounting Illustration



Dimension



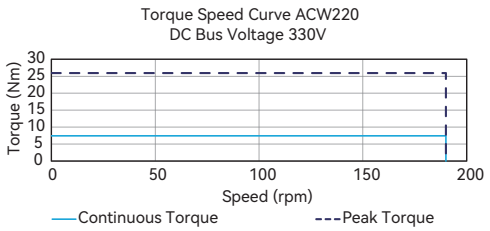


Note:
❶ 50mm diameter through hole
❷ Shaded area, mounting surface

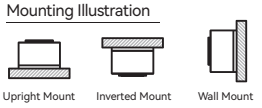
ACW220

ACW220			
Performance Parameters	**Symbol**	**Unit**	**Parallel**
Continuous Torque @100°C [1]	T_{cn}	Nm	7.4
Peak Torque	T_{pk}	Nm	25.9
Torque Constant ±10%	K_t	Nm/Arms	1.95
Back EMF Constant ±10%	K_e	Vpeak/rpm	0.167
Motor Constant @25°C	K_m	Nm/Sqrt(W)	0.71
Resistance (L-L) @25°C ±10% [2]	R_{25}	Ω	5.06
Inductance (L-L) ±20% [3]	L	mH	4.72
Electrical Time Constant	τ_e	ms	0.93
Continuous Current @100°C [1]	I_{cn}	Arms	3.8
Peak Current	I_{pk}	Arms	13.3
Continuous Power Dissipation @100°C [1]	P_{cn}	W	141.3
Max. Coil Temperature	t_{max}	°C	100
Thermal Dissipation Constant [1]	K_{thn}	W/°C	1.88
Max. Bus Voltage	U_{bus}	Vdc	330.0
Pole Number	2P	-	16
Max. Speed For Standard Axial/Radial Runout @230V AC [4]	Ω_{max}	rpm	190
Max. Speed For Optional Axial/Radial Runout (P10, P5) @230V AC [4]	Ω_{max}	rpm	120
Mechanical Parameters			
Overall Mass	m_n	kg	7.0
Rotor Inertia	J_r	kg.m²	8.354E-03
Axial Runout [5]	-	μm	18 (10,5)
Radial Runout [5]	-	μm	18 (10,5)
Max. Axial Load (Upright Mounting) [6]	-	N	300.0
Max. Axial Load (Inverted / Wall Mounting)	-	N	30.0
Max. Moment Load (Upright Mounting)	-	Nm	55.2
Max. Moment Load (Inverted / Wall Mounting)	-	Nm	5.52
Encoder Parameters			
ABI Optical Incremental Encoder (SIN/COS)	-	lines / rev	7500
ABI Optical Incremental Encoder (80x)	-	counts / rev	600000
ABI Optical Incremental Encoder (160x)	-	counts / rev	1,200,000
ABI Optical Incremental Encoder (400x)	-	counts / rev	3,000,000
Accuracy after Error Mapping [7]	-	arc sec	+/-6
Repeatability [7]	-	arc sec	+/-3
Other Information			
Insulation Class		Class B (130°C)	
Protection Grade		IP40	
Compliance with Global Standards		RoHS, CE	
Ambient Temperature	Operation	0°C to 40°C (non-freezing)	
	Storage	-15°C to 70°C (non-freezing)	
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)	
	Storage	10%RH to 90%RH (non-condensing)	
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.	

Torque-Speed Curve



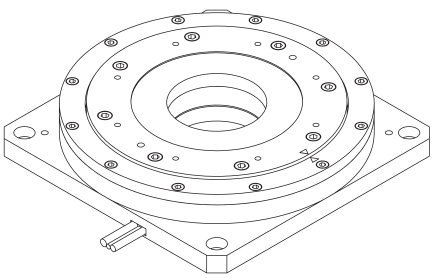
Mounting Illustration

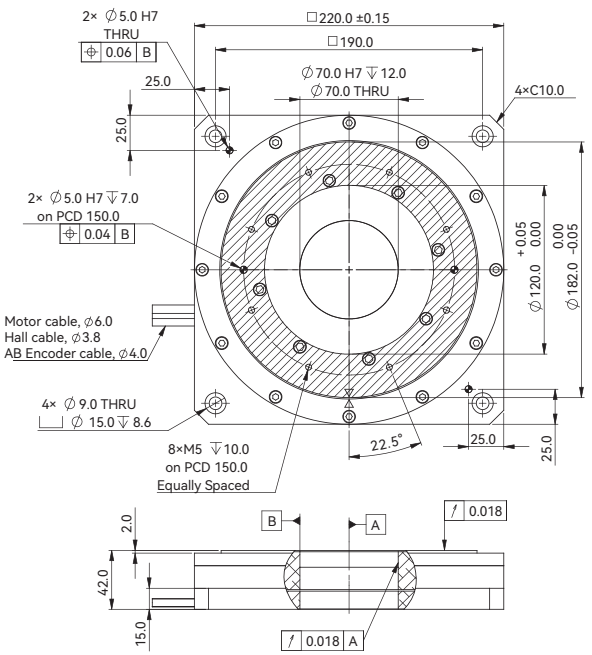


[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] Resistance is measured by DC current with standard 0.5m cable.
[3] Inductance is measured by current frequency of 1 kHz.
[4] The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
[5] Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
[6] Please refer to the illustration for different mountings.
[7] Based on ABI optical SIN/COS encoder (4096x interpolation) with P5 runout.

The contents of datasheet are subject to change without prior notice.

Dimension





Note:
[1] 70mm diameter through hole
[2] Shaded area, mounting surface

Motor Cable Connection Diagram

MOTOR CABLE (9W4M)

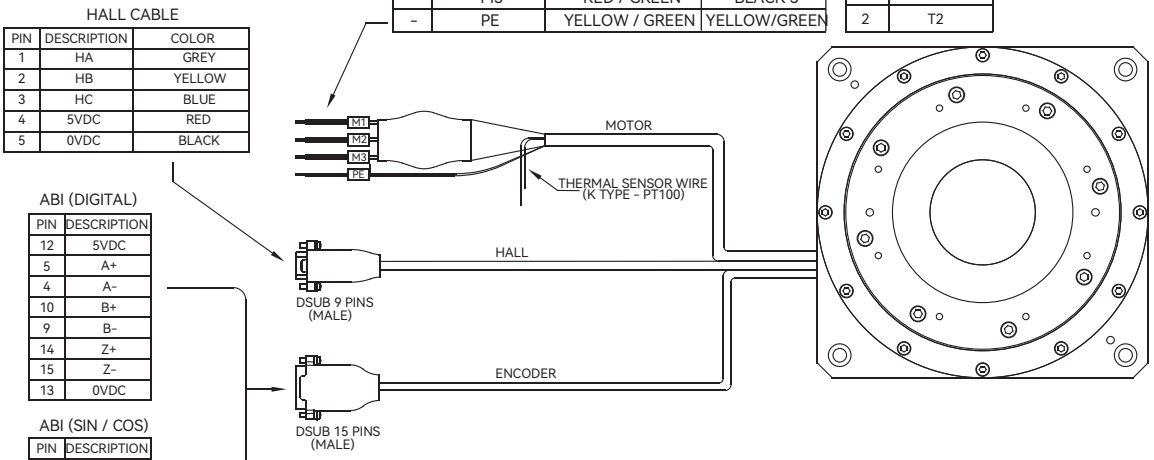
PIN	DESCRIPTION
A1	M1
A2	M2
A3	M3
A4	PE
1	T1
2	T2

MOTOR CABLE

PIN	DESCRIPTION	NO FERRITE BEAD	FERRITE BEAD
-	M1	YELLOW / GREY	BLACK 1
-	M2	BLUE / ORANGE	BLACK 2
-	M3	RED / GREEN	BLACK 3
-	PE	YELLOW / GREEN	YELLOW/GREEN

HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREY
2	HB	YELLOW
3	HC	BLUE
4	5VDC	RED
5	0VDC	BLACK



ABI (DIGITAL)

PIN	DESCRIPTION
12	5VDC
5	A+
4	A-
10	B+
9	B-
14	Z+
15	Z-
13	0VDC

ABI (SIN / COS)

PIN	DESCRIPTION
12	5VDC
8	SINE+
15	SINE-
7	COSINE+
14	COSINE-
2	INDEX+
1	INDEX-
13	0VDC

Part Numbering

ACW170-37-P-K-NH-0.5-FB-AB-5560-SINCOS-P18

Motor Model:
ACW120-37
ACW170-37
ACW220-42

Winding Code:
P = Parallel

Thermal Sensor:
K = PT100 (RTD)

Sensor Cable:
NH ❶ / H9D ❷

Cable Length (m):
0.5

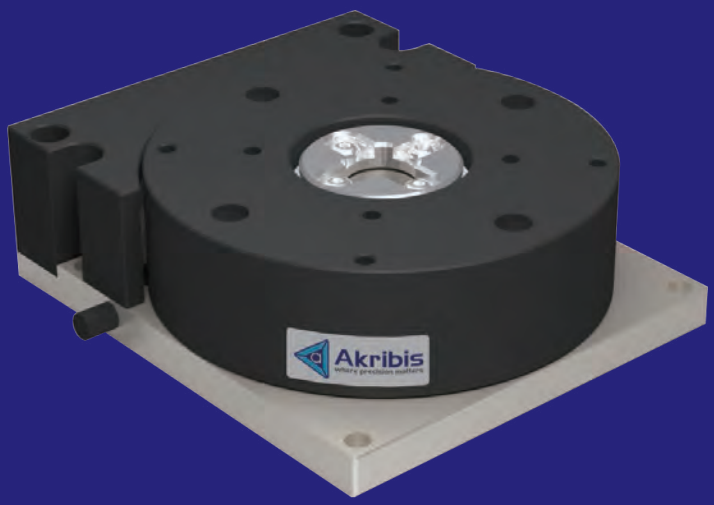
Runout: ❺
P5
P10
P15
P18

Interpolation:
SINCOS / 80X / 160X / 400X

Encoder:
ACW120:AB-3934
ACW170:AB-5560
ACW220:AB-7500

Power Cable:
FB ❸ / 9W4M ❹

❶ NH = Without Built-in Hall Sensor C/W Flying Leads
❷ H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
❸ FB = With Ferrite Bead C/W Flying Leads
❹ 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
❺ ACW120 / ACW170 / ACW220:P5= Axial Runout 5μm, Radial Runout is 5μm
ACW120 / ACW170 / ACW220:P10= Axial Runout 10μm, Radial Runout is 10μm
ACW120:P15= Axial Runout 15μm, Radial Runout is 15μm
ACW170 / ACW220:P18= Axial Runout 18μm, Radial Runout is 18μm



AMR SERIES

- Compact design
- Direct drive technology
- Cogging free
- High precision optical encoder
- Stackable configuration

EN-26.3.1

Introduction

The AMR series of micro rotary motors consist of a micro non-core motor, micro bearings, high-precision optical encoders, and a structural base. The internal structure is extremely compact and offers high-precision positioning.

There are two standard product specifications: AMR65D and AMR80D. According to actual technical requirements, different encoder position feedback options can be selected, and customized demands can also be met.

Continuous Torque Tcn = 0.13Nm~0.2Nm
Peak Torque Tpk = 0.51Nm~0.79Nm

Features

- Micro direct-drive rotary motor
- Design without iron core, no cogging torque
- Dimensions: Length × Width × Height = 76 × 65 × 25 mm
- Rotation angles: 50°, 100°, other angles can be customized

Applications

Precision rotation correction positioning, optical alignment stage.

Applicable to point-to-point high-speed rotation positioning/correcting, optical alignment, micro assembly and fiber optical alignment for automation equipment of all industries.

Miniature Modules	■ Continuous Torque (T_{cn}) ■ Peak Torque (T_{pk}) Unit: Nm 0.1 | 0.2 | 0.4 | 0.6 | 0.8 | 1.0	Stroke[1] (degree)	Repeatability (arcsec)
 AMR65	0.13 — 0.51	50	up to ±5
 AMR80	0.2 — 0.79	100	

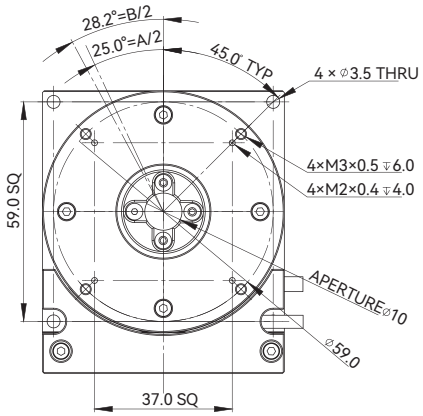
Note:
[1] Longer stroke available upon request.
★ Products can be customized to meet specific working environments, please contact cust-service@akribis-sys.com.

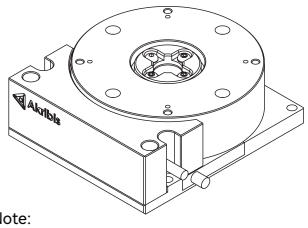
AMR65

Motor Specifications	Unit	Value	
Motor	-	AMR65D-50	
Continuous Torque (NC) @100°C [1]	Nm	0.13	
Peak Torque	Nm	0.51	
Torque Constant ±10%	Nm/Arms	0.12	
Back EMF Constant ±10%	Vpeak/rpm	1.00E-02	
Resistance (L-L) @25°C ±10% [2]	Ω	8	
Inductance (L-L) ± 20% [3]	mH	0.75	
Continuous Current (NC) @100°C [1]	Arms	1.1	
Peak Current	Arms	4.4	
Max. Bus Voltage	Vdc	48	
Pole Number	-	16	
Mechanical Specifications	**Unit**	**Value**	
Precision Grade	-	P	N
Effective Stroke	degree	50	
Resolution	μm	SINCOS/0.05	0.2
Repeatability	arcsec	±5	±5
Max. Speed	degree/s	720	
Rotor Inertia	kg.m²	0.0014	
No-load Total Mass	kg	0.52	
Max. Static Axial Load	N	30	
Max. Static Moment [4]	Nm	0.84	

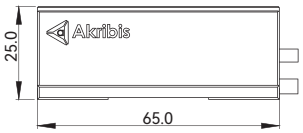
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC=Natural Cooling.
[2] Resistance is measured by DC current with standard 0.5m cable.
[3] Inductance is measured by current frequency of 1kHz.
[4] This value is based on providing a higher control bandwidth, please contact cust-service@akribis-sys.com for higher load requirements.
The contents of datasheet are subject to change without prior notice.

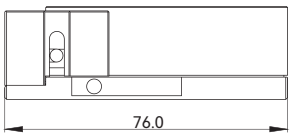
Dimensional Drawing





Note:
- A=Effective stroke
- B=Hardstop stroke
- Home index near center of stroke
- To maintain accuracy, mounting surface must be flat within 5μm over stage entire footprint



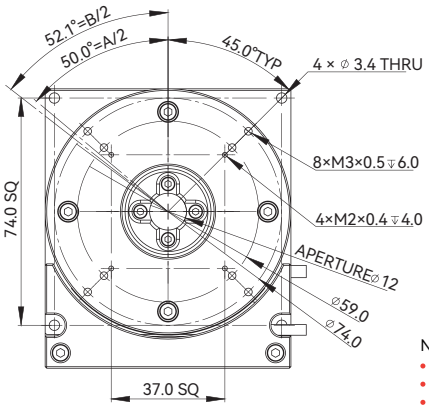


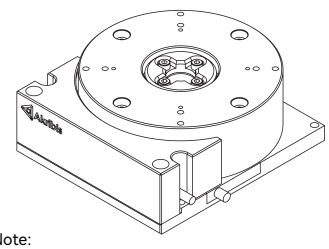
AMR80

Motor Specifications	Unit	Value	
Motor	-	AMR80D-100	
Continuous Torque (NC) @100°C [1]	Nm	0.2	
Peak Torque	Nm	0.79	
Torque Constant ±10%	Nm/Arms	0.2	
Back EMF Constant ±10%	Vpeak/rpm	1.69E-02	
Resistance (L-L) @25°C ±10% [2]	Ω	9.3	
Inductance (L-L) ±20% [3]	mH	1	
Continuous Current (NC) @100°C [1]	Arms	1	
Peak Current	Arms	4	
Max. Bus Voltage	Vdc	48	
Pole Number	-	16	
Mechanical Specifications	**Unit**	**Value**	
Precision Grade	-	P	N
Effective Stroke	degree	100	
Resolution	μm	SINCOS/0.05	0.2
Repeatability	arcsec	±5	±5
Max. Speed	degree/s	720	
Rotor Inertia	kg.m²	0.0016	
No-load Total Mass	kg	1.1	
Max. Static Axial Load	N	60	
Max. Static Moment [4]	Nm	2.0	

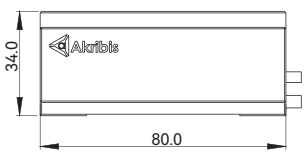
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment. Abbreviations: NC=Natural Cooling.
[2] Resistance is measured by DC current with standard 0.5m cable.
[3] Inductance is measured by current frequency of 1kHz.
[4] This value is based on providing a higher control bandwidth, please contact cust-service@akribis-sys.com for higher load requirements.
The contents of datasheet are subject to change without prior notice.

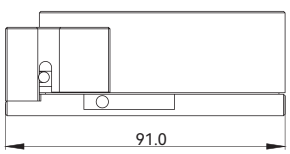
Dimensional Drawing





Note:
- A=Effective stroke
- B=Hardstop stroke
- Home index near center of stroke
- To maintain accuracy, mounting surface must be flat within 5μm over stage entire footprint





Ordering Part Number (OPN)

AMR65-T50-A0G4-A1

Model:
AMR65/AMR80

Precision Grade:
Unmarked: Normal

Cover Type:
T: Standard (Black Anodized)[1]
E: EN[2]

Effective Stroke (Corresponding Models):
50: 50deg (AMR65)
100: 100deg (AMR80)

Termination:
1: Motor: Flying Leads/Encoder: DSUB 15
2: Motor: TYCO4/Encoder: DSUB 15

Cable Length:
A: 0.5m
B: 3.0m

Scale Type:
4: Nickel, 14ppm/K

Encoder Type:
A0G: ABI-21, TTL (0.2μm)

AMR65P-T50-R0A1-A1

Model:
AMR65/AMR80

Precision Grade:
P: Precision

Cover Type:
T: Standard (Black Anodized)[1]
E: EN[2]

Effective Stroke (Corresponding Models):
50: 50deg (AMR65)
100: 100deg (AMR80)

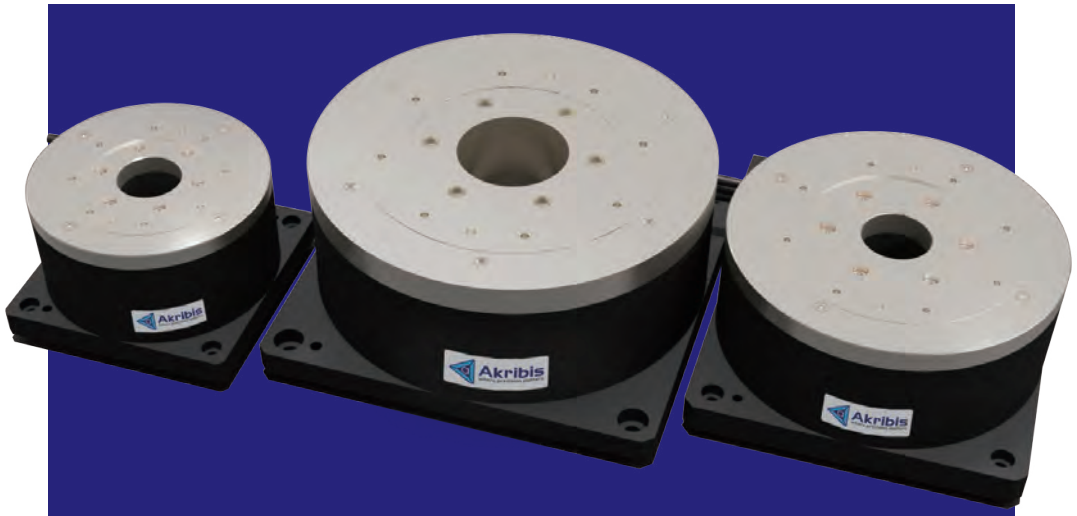
Termination:
1: Motor: Flying Leads/Encoder: DSUB 15
2: Motor: TYCO4/Encoder: DSUB 15

Cable Length:
A: 0.5m
B: 3.0m

Scale Type:
1: Steel Tape, 11ppm/K

Encoder Type:
R0A: ATOM2, SINCOS (1Vpp)
R0J: ATOM2, TTL (0.05μm)

Note:
[1] Black anodized AMR is used with AML and AMZ.
[2] Nickel plated AMR is used with AMS.
★ Default mounting orientation for this motor is horizontal. For other mounting orientations, please contact cust-service@akribis-sys.com.



AXD SERIES

- Direct drive brushless motor
- Strong resistance to contamination
- Fully integrated with encoder and bearing
- Low cogging torque
- Precise homing through index pulse
- Optional for low speed and high speed windings
- High torque density
- Low profile with large centre hole

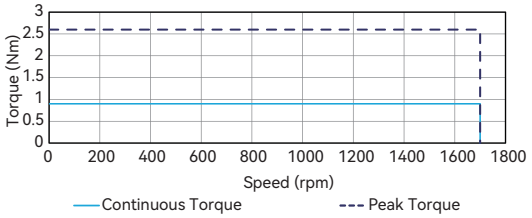
AXD80-56

AXD80-56					
Performance Parameters		Symbol	Unit	Series	Parallel
Continuous Torque (NC) @100°C [1]		Tcn	Nm	0.9	0.9
Peak Torque		Tpk	Nm	2.6	2.6
Torque Constant ±10%		Kt	Nm/Arms	0.91	0.46
Back EMF Constant ±10%		Ke	Vpeak/rpm	0.078	0.039
Motor Constant @25°C		Km	Nm/Sqrt(W)	0.25	0.25
Resistance (L-L) @25°C ±10% [2]		R25	Ω	9.1	2.3
Inductance (L-L) ±20% [3]		L	mH	28.1	7.0
Electrical Time Constant		τe	ms	3.1	3.1
Continuous Current (NC) @100°C [1]		Icn	Arms	0.9	1.9
Peak Current		Ipk	Arms	3.4	6.8
Continuous Power Dissipation (NC) @100°C [1]		Pcn	W	15.6	15.6
Max. Coil Temperature		tmax	°C	100	100
Thermal Dissipation Constant (NC) [1]		Kthn	W/°C	0.2	0.2
Max. Bus Voltage		Ubus	Vdc	600	600
Pole Number		2p	-	14	14
Max. Speed @Continuous Torque(600V) [4]		Ωmax	rpm	1700	1700
Max. Speed @Peak Torque(600V) [4]		Ωmax	rpm	1700	1700
Mechanical Parameters					
Overall Mass (NC)		mn	kg	1.5	1.5
Rotor Inertia		Jr	kg·m²	1.82E-04	1.82E-04
Axial Runout [5]		-	μm	15 (10)	15 (10)
Radial Runout [5]		-	μm	15 (10)	15 (10)
Max Axial Load (Upright Mounting) [6]		-	N	350	350
Max Axial Load (Inverted / Wall Mounting)		-	N	100	100
Max Moment Load (Upright Mounting)		-	Nm	10	10
Max Moment Load (Inverted / Wall Mounting)		-	Nm	3	3
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines/rev	1062	1062
ABI Optical Incremental Encoder (80x)		-	counts/rev	84960	84960
ABI Optical Incremental Encoder (160x)		-	counts/rev	169920	169920
ABI Optical Incremental Encoder (400x)		-	counts/rev	424800	424800
ATOM DX Optical Incremental Encoder		-	lines/rev	2048	2048
ATOM DX Optical Incremental Encoder (200x)		-	counts/rev	409600	409600
Accuracy after Error Mapping [7]		-	arc sec	+/-12	+/-12
Repeatability [7]		-	arc sec	+/-6	+/-6
Other Information					
Insulation Class		Class B (130°C)			
Protection Grade		IP40			
Compliance with Global Standards		RoHS, CE			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)			
	Storage	-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

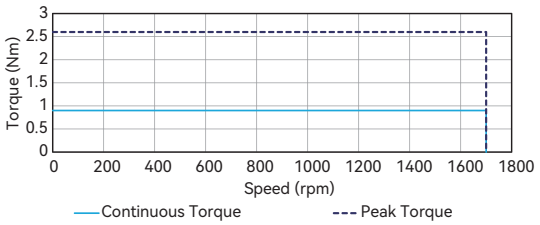
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] Resistance is measured by DC current with standard 0.5m cable.
[3] Inductance is measured by current frequency of 1kHz.
[4] The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
[5] Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
[6] Please refer to the illustration for different mountings.
[7] Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

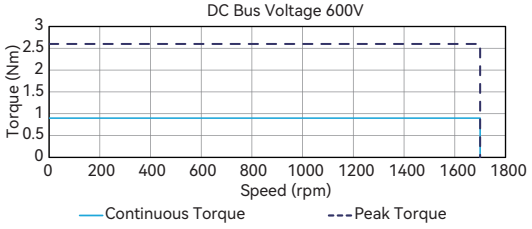
Torque Speed Curve AXD80-56 Series Connection
DC Bus Voltage 330V



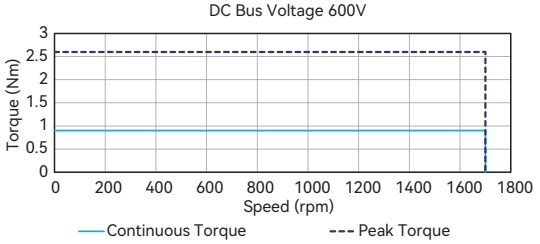
Torque Speed Curve AXD80-56 Parallel Connection
DC Bus Voltage 330V



Torque Speed Curve AXD80-56 Series Connection
DC Bus Voltage 600V



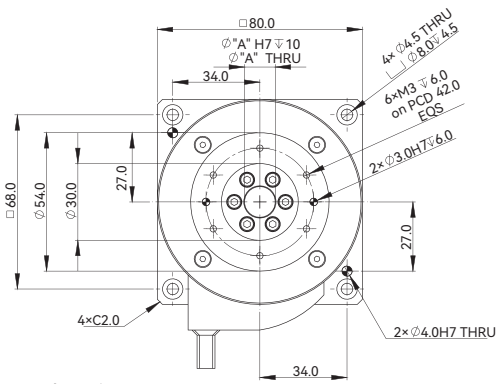
Torque Speed Curve AXD80-56 Parallel Connection
DC Bus Voltage 600V

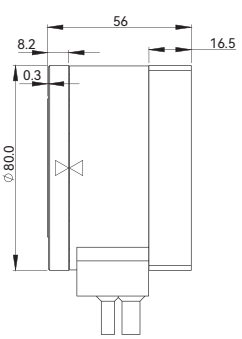


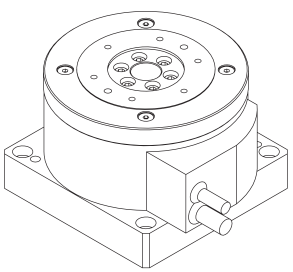
Mounting Illustration



Dimension







Notes:
1.User to ensure flatness of mounting surface within 0.01 / 300mm;
2.Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
3.Certain specifications in the drawing are subject to change;
4.General tolerance
X ± 0.25mm
X.X ± 0.1mm
X.XX ± 0.05mm
X.XXX ± 0.025mm.

Motor cable, ∅7.0
Hall cable, ∅5.2 DSUB 9 PINS(MALE)
Encoder cable, ∅4.0 DSUB 15 PINS(MALE)

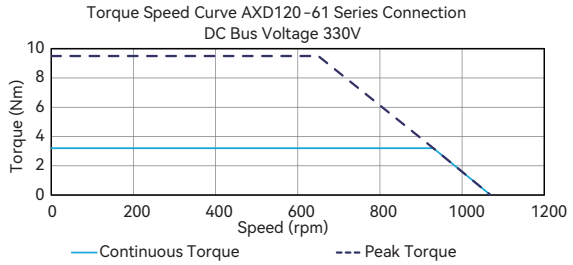
ENCODER	ABI	ATOM DX
Ø"A"	Ø12.0	0

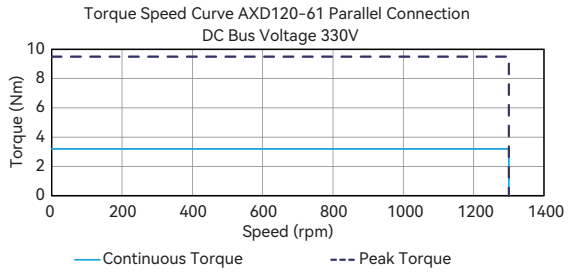
AXD120-61

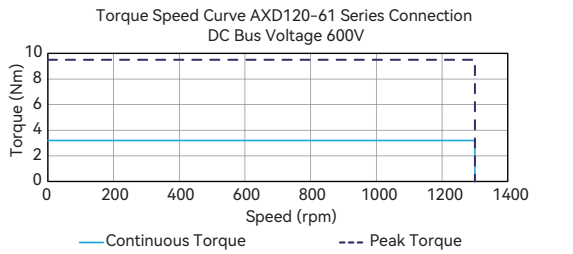
AXD120-61					
Performance Parameters		Symbol	Unit	Series	Parallel
Continuous Torque (NC) @100°C [1]		Tcn	Nm	3.2	3.2
Peak Torque		Tpk	Nm	9.5	9.5
Torque Constant ±10%		Kt	Nm/Arms	2.89	1.44
Back EMF Constant ±10%		Ke	Vpeak/rpm	0.25	0.12
Motor Constant @25°C		Km	Nm/Sqrt(W)	0.60	0.60
Resistance (L-L) @25°C ±10% [2]		R25	Ω	15.2	3.8
Inductance (L-L) ±20% [3]		L	mH	47.7	11.9
Electrical Time Constant		τe	ms	3.1	3.1
Continuous Current (NC) @100°C [1]		Icn	Arms	1.1	2.2
Peak Current		Ipk	Arms	3.9	7.8
Continuous Power Dissipation (NC) @100°C [1]		Pcn	W	36.4	36.4
Max. Coil Temperature		tmax	°C	100	100
Thermal Dissipation Constant (NC) [1]		Kthn	W/°C	0.5	0.5
Max. Bus Voltage		Ubus	Vdc	600	600
Pole Number		2p	-	14	14
Max. Speed @Continuous Torque(600V) [4]		Ωmax	rpm	1300	1300
Max. Speed @Peak Torque(600V) [4]		Ωmax	rpm	1300	1300
Mechanical Parameters					
Overall Mass (NC)		mn	kg	2.7	2.7
Rotor Inertia		Jr	kg·m²	1.02E-03	1.02E-03
Axial Runout [5]		-	μm	20 (10)	20 (10)
Radial Runout [5]		-	μm	20 (10)	20 (10)
Max Axial Load (Upright Mounting) [6]		-	N	500	500
Max Axial Load (Inverted / Wall Mounting)		-	N	150	150
Max Moment Load (Upright Mounting)		-	Nm	30	30
Max Moment Load (Inverted / Wall Mounting)		-	Nm	10	10
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines/rev	2052	2052
ABI Optical Incremental Encoder (80x)		-	counts/rev	164160	164160
ABI Optical Incremental Encoder (160x)		-	counts/rev	328320	328320
ABI Optical Incremental Encoder (400x)		-	counts/rev	820800	820800
ATOM DX Optical Incremental Encoder		-	lines/rev	4306	4306
ATOM DX Optical Incremental Encoder (200x)		-	counts/rev	861200	861200
Accuracy after Error Mapping [7]		-	arc sec	+/-6	+/-6
Repeatability [7]		-	arc sec	+/-3	+/-3
Other Information					
Insulation Class		Class B (130°C)			
Protection Grade		IP40			
Compliance with Global Standards		RoHS, CE			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)			
	Storage	-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

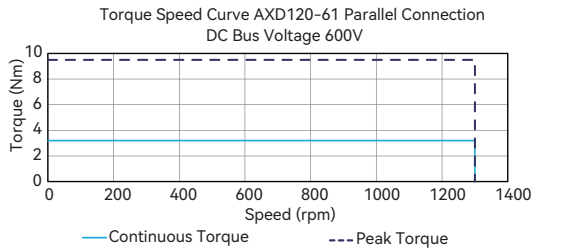
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] Resistance is measured by DC current with standard 0.5m cable.
[3] Inductance is measured by current frequency of 1kHz.
[4] The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
[5] Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
[6] Please refer to the illustration for different mountings.
[7] Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

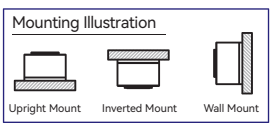
Torque-Speed Curve



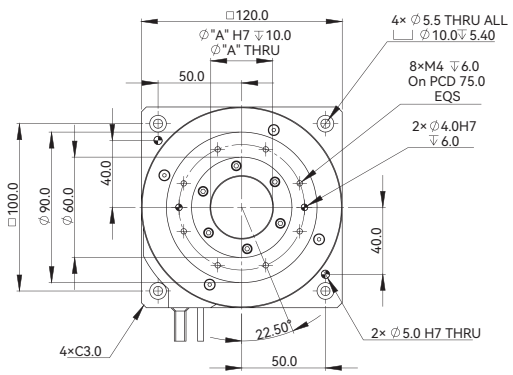


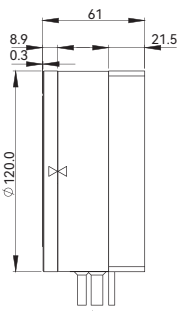


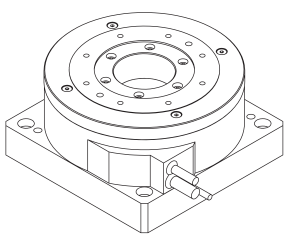




Dimension







Motor cable, ∅7.0
Hall cable, ∅5.2 DSUB 9 PINS(MALE)
Encoder cable, ∅4.0 DSUB 15 PINS(MALE)

ENCODER	ABI	ATOM DX
Ø"A"	Ø37.0	Ø27.0

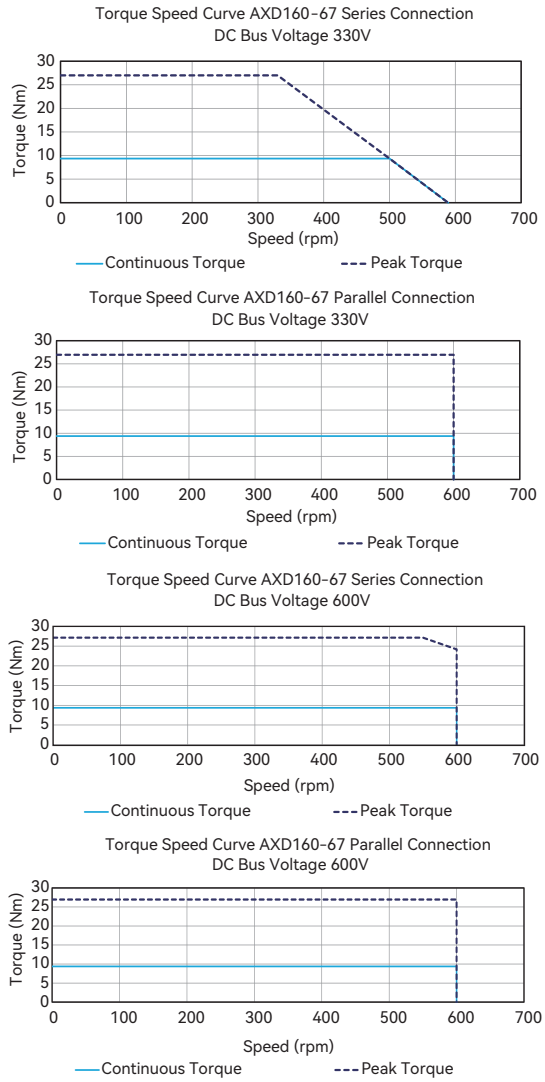
Notes:
1.User to ensure flatness of mounting surface within 0.01 / 300mm;
2.Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
3.Certain specifications in the drawing are subject to change;
4.General tolerance
X ± 0.25mm
X.X ± 0.1mm
X.XX ± 0.05mm
X.XXX ± 0.025mm.

AXD160-67

AXD160-67					
Performance Parameters		Symbol	Unit	Series	Parallel
Continuous Torque (NC) @100°C ❶		Tcn	Nm	9.4	9.4
Peak Torque		Tpk	Nm	27.0	27.0
Torque Constant ±10%		Kt	Nm/Arms	5.85	2.93
Back EMF Constant ±10%		Ke	Vpeak/rpm	0.50	0.25
Motor Constant @25°C		Km	Nm/Sqrt(W)	1.24	1.24
Resistance (L-L) @25°C ±10% ❷		R25	Ω	14.9	3.7
Inductance (L-L) ±20% ❸		L	mH	92.1	23.0
Electrical Time Constant		τe	ms	6.2	6.2
Continuous Current (NC) @100°C ❶		Icn	Arms	1.6	3.2
Peak Current		Ipk	Arms	5.8	11.5
Continuous Power Dissipation (NC) @100°C ❶		Pcn	W	74.0	74.0
Max. Coil Temperature		tmax	°C	100	100
Thermal Dissipation Constant (NC) ❶		Kthn	W/°C	1.0	1.0
Max. Bus Voltage		Ubus	Vdc	600	600
Pole Number		2p	-	14	14
Max. Speed @Continuous Torque(600V) ❹		Ωmax	rpm	600	600
Max. Speed @Peak Torque(600V) ❹		Ωmax	rpm	550	600
Mechanical Parameters					
Overall Mass (NC)		mn	kg	5.6	5.6
Rotor Inertia		Jr	kg·m²	3.72E-03	3.72E-03
Axial Runout ❺		-	μm	30 (10)	30 (10)
Radial Runout ❺		-	μm	30 (10)	30 (10)
Max Axial Load (Upright Mounting) ❻		-	N	750	750
Max Axial Load (Inverted / Wall Mounting)		-	N	225	225
Max Moment Load (Upright Mounting)		-	Nm	40	40
Max Moment Load (Inverted / Wall Mounting)		-	Nm	12	12
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines/rev	2868	2868
ABI Optical Incremental Encoder (80x)		-	counts/rev	229440	229440
ABI Optical Incremental Encoder (160x)		-	counts/rev	458880	458880
ABI Optical Incremental Encoder (400x)		-	counts/rev	1147200	1147200
ATOM DX Optical Incremental Encoder		-	lines/rev	5900	5900
ATOM DX Optical Incremental Encoder (80x)		-	counts/rev	472000	472000
Accuracy after Error Mapping ❼		-	arc sec	+/-5	+/-5
Repeatability ❼		-	arc sec	+/-2.5	+/-2.5
Other Information					
Insulation Class		Class B (130°C)			
Protection Grade		IP40			
Compliance with Global Standards		RoHS, CE			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)			
	Storage	-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

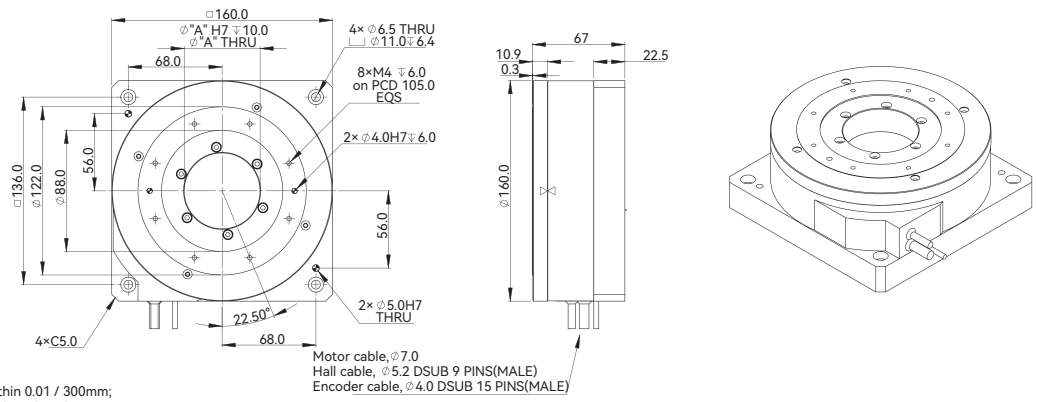
Torque-Speed Curve



Mounting Illustration



Dimension



Notes:
1.User to ensure flatness of mounting surface within 0.01 / 300mm;
2.Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
3.Certain specifications in the drawing are subject to change;
4.General tolerance
X ± 0.25mm
X.X ± 0.1mm
X.XX ± 0.05mm
X.XXX ± 0.025mm.

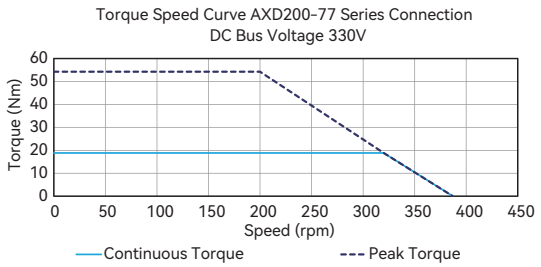
ENCODER	ABI	ATOM DX
Ø"A"	Ø55.0	Ø48.0

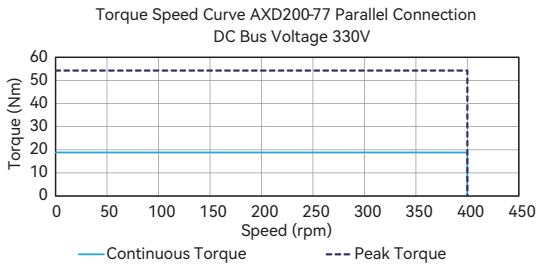
AXD200-77

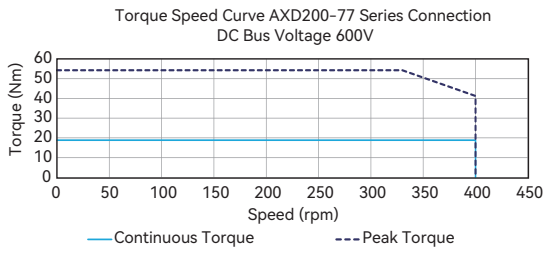
AXD200-77					
Performance Parameters		**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque (NC) @100°C [1]		Tcn	Nm	18.8	18.8
Peak Torque		Tpk	Nm	54.3	54.3
Torque Constant ±10%		Kt	Nm/Arms	9.42	4.71
Back EMF Constant ±10%		Ke	Vpeak/rpm	0.81	0.40
Motor Constant @25°C		Km	Nm/Sqrt(W)	2.13	2.13
Resistance (L-L) @25°C ±10% [2]		R25	Ω	13.0	3.3
Inductance (L-L) ±20% [3]		L	mH	121.0	30.3
Electrical Time Constant		τe	ms	9.3	9.3
Continuous Current (NC) @100°C [1]		Icn	Arms	2.0	4.0
Peak Current		Ipk	Arms	7.2	14.4
Continuous Power Dissipation (NC) @100°C [1]		Pcn	W	100.9	100.9
Max. Coil Temperature		tmax	°C	100	100
Thermal Dissipation Constant (NC) [1]		Kthn	W/°C	1.3	1.3
Max. Bus Voltage		Ubus	Vdc	600	600
Pole Number		2p	-	14	14
Max. Speed @Continuous Torque(600V) [4]		Ωmax	rpm	400	400
Max. Speed @Peak Torque(600V) [4]		Ωmax	rpm	330	400
Mechanical Parameters					
Overall Mass (NC)		mn	kg	8.8	8.8
Rotor Inertia		Jr	kg·m²	1.00E-02	1.00E-02
Axial Runout [5]		-	μm	40 (10)	40 (10)
Radial Runout [5]		-	μm	40 (10)	40 (10)
Max Axial Load (Upright Mounting) [6]		-	N	1000	1000
Max Axial Load (Inverted / Wall Mounting)		-	N	300	300
Max Moment Load (Upright Mounting)		-	Nm	50	50
Max Moment Load (Inverted / Wall Mounting)		-	Nm	15	15
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines/rev	3934	3934
ABI Optical Incremental Encoder (80x)		-	counts/rev	314720	314720
ABI Optical Incremental Encoder (160x)		-	counts/rev	629440	629440
ABI Optical Incremental Encoder (400x)		-	counts/rev	1573600	1573600
ATOM DX Optical Incremental Encoder		-	lines/rev	7900	7900
ATOM DX Optical Incremental Encoder (80x)		-	counts/rev	632000	632000
Accuracy after Error Mapping [7]		-	arc sec	+/-4	+/-4
Repeatability [7]		-	arc sec	+/-2	+/-2
Other Information					
Insulation Class			Class B (130°C)		
Protection Grade			IP40		
Compliance with Global Standards			RoHS, CE		
Ambient Temperature		Operation	0°C to 40°C (non-freezing)		
		Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity		Operation	10%RH to 80%RH (non-condensing)		
		Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

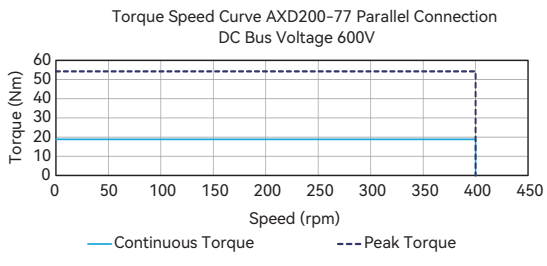
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] Resistance is measured by DC current with standard 0.5m cable.
[3] Inductance is measured by current frequency of 1kHz.
[4] The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
[5] Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
[6] Please refer to the illustration for different mountings.
[7] Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

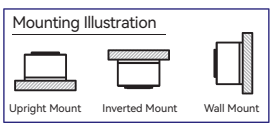
Torque-Speed Curve



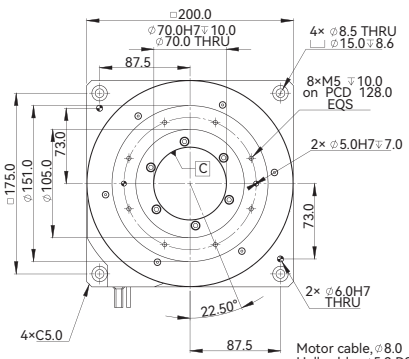


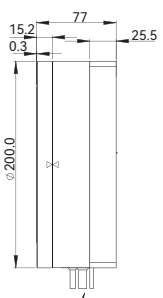


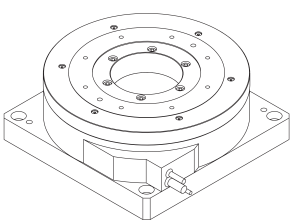




Dimension







Motor cable, ⌀8.0
Hall cable, ⌀5.2 DSUB 9 PINS(MALE)
Encoder cable, ⌀4.0 DSUB 15 PINS(MALE)

Notes:
1.User to ensure flatness of mounting surface within 0.01 / 300mm;
2.Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
3.Certain specifications in the drawing are subject to change;
4.General tolerance
X ± 0.25mm
X.X ± 0.1mm
X.XX ± 0.05mm
X.XXX ± 0.025mm.

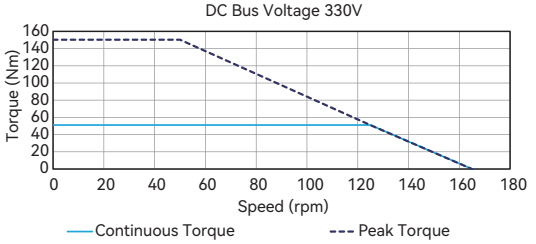
AXD280-100

AXD280-100				
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque (NC) @100°C ❶	Tcn	Nm	51.1	51.1
Peak Torque	Tpk	Nm	150.3	150.3
Torque Constant ±10%	Kt	Nm/Arms	22.23	11.12
Back EMF Constant ±10%	Ke	Vpeak/rpm	1.90	0.95
Motor Constant @25°C	Km	Nm/Sqrt(W)	4.34	4.34
Resistance (L-L) @25°C ±10% ❷	R25	Ω	17.5	4.4
Inductance (L-L) ±20% ❸	L	mH	194.0	48.5
Electrical Time Constant	τe	ms	11.1	11.1
Continuous Current (NC) @100°C ❶	Icn	Arms	2.3	4.6
Peak Current	Ipk	Arms	8.0	16.0
Continuous Power Dissipation (NC) @100°C ❶	Pcn	W	179.7	179.7
Max. Coil Temperature	tmax	°C	100	100
Thermal Dissipation Constant (NC) ❶	Kthn	W/°C	2.4	2.4
Max. Bus Voltage	Ubus	Vdc	600	600
Pole Number	2p	-	28	28
Max. Speed @Continuous Torque(600V) ❹	Ωmax	rpm	210	220
Max. Speed @Peak Torque(600V) ❹	Ωmax	rpm	110	220
Mechanical Parameters				
Overall Mass (NC)	mn	kg	23.0	23.0
Rotor Inertia	Jr	kg·m²	6.00E-02	6.00E-02
Axial Runout ❺	-	μm	50 (15)	50 (15)
Radial Runout ❺	-	μm	50 (15)	50 (15)
Max Axial Load (Upright Mounting) ❻	-	N	1800	1800
Max Axial Load (Inverted / Wall Mounting)	-	N	500	500
Max Moment Load (Upright Mounting)	-	Nm	75	75
Max Moment Load (Inverted / Wall Mounting)	-	Nm	23	23
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines/rev	5560	5560
ABI Optical Incremental Encoder (80x)	-	counts/rev	444800	444800
ABI Optical Incremental Encoder (160x)	-	counts/rev	889600	889600
ABI Optical Incremental Encoder (400x)	-	counts/rev	2224000	2224000
ATOM DX Optical Incremental Encoder	-	lines/rev	11152	11152
ATOM DX Optical Incremental Encoder (80x)	-	counts/rev	892160	892160
Accuracy after Error Mapping ❼	-	arc sec	+/-4	+/-4
Repeatability ❼	-	arc sec	+/-2	+/-2
Other Information				
Insulation Class		Class B (130°C)		
Protection Grade		IP40		
Compliance with Global Standards		RoHS, CE		
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

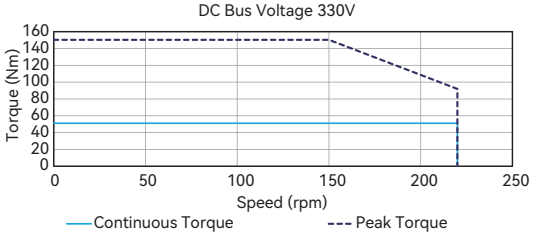
❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.5m cable.
❸ Inductance is measured by current frequency of 1kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

Torque-Speed Curve

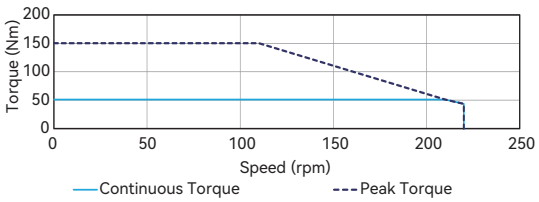
Torque Speed Curve AXD280-100 Series Connection
DC Bus Voltage 330V



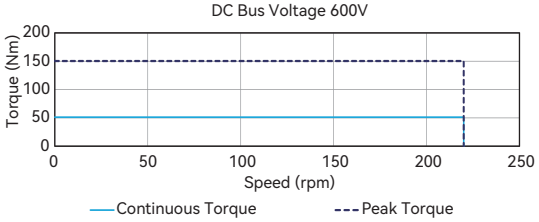
Torque Speed Curve AXD280-100 Parallel Connection
DC Bus Voltage 330V



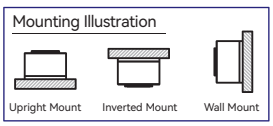
Torque Speed Curve AXD280-100 Series Connection
DC Bus Voltage 600V



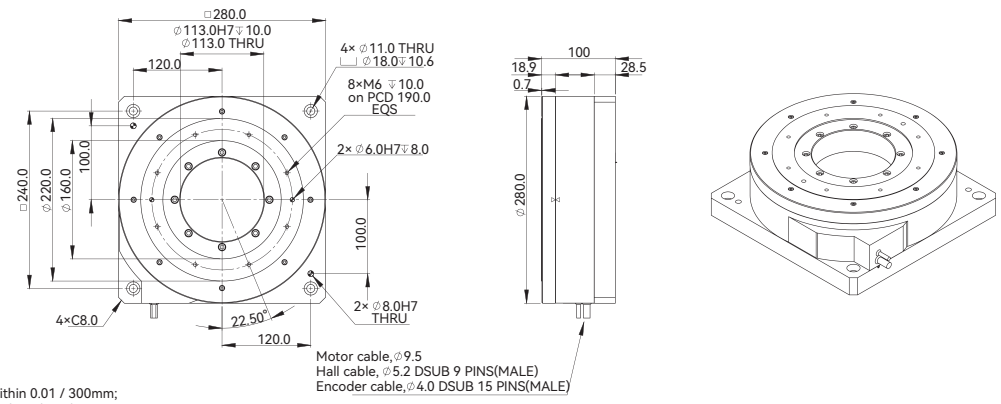
Torque Speed Curve AXD280-100 Parallel Connection
DC Bus Voltage 600V



Mounting Illustration



Dimension



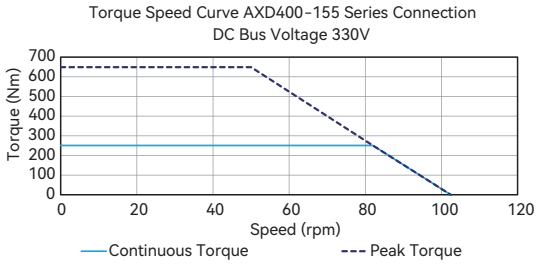
Notes:
1.User to ensure flatness of mounting surface within 0.01 / 300mm;
2.Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
3.Certain specifications in the drawing are subject to change;
4.General tolerance
X ± 0.25mm
X.X ± 0.1mm
X.XX ± 0.05mm
X.XXX ± 0.025mm.

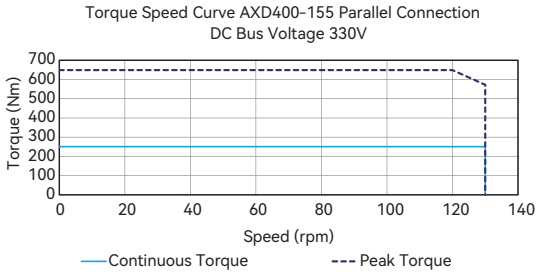
AXD400-155

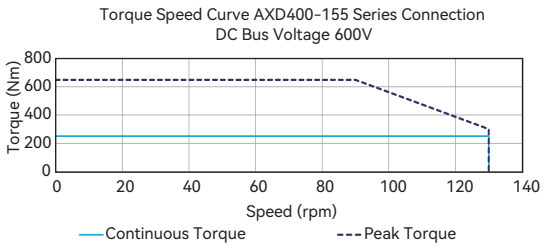
AXD400-155					
Performance Parameters		Symbol	Unit	Series	Parallel
Continuous Torque (NC) @100°C [1]		Tcn	Nm	250.6	250.6
Peak Torque		Tpk	Nm	648.9	648.9
Torque Constant ±10%		Kt	Nm/Arms	35.80	17.90
Back EMF Constant ±10%		Ke	Vpeak/rpm	3.06	1.53
Motor Constant @25°C		Km	Nm/Sqrt(W)	15.62	15.62
Resistance (L-L) @25°C ±10% [2]		R25	Ω	3.5	0.875
Inductance (L-L) ±20% [3]		L	mH	74.0	18.5
Electrical Time Constant		τe	ms	21.1	21.1
Continuous Current (NC) @100°C [1]		Icn	Arms	7.0	14.0
Peak Current		Ipk	Arms	25.0	50.0
Continuous Power Dissipation (NC) @100°C [1]		Pcn	W	332.9	332.9
Max. Coil Temperature		tmax	°C	100	100
Thermal Dissipation Constant (NC) [1]		Kthn	W/°C	4.4	4.4
Max. Bus Voltage		Ubus	Vdc	600	600
Pole Number		2p	-	28	28
Max. Speed @Continuous Torque (600V) [4]		Ωmax	rpm	130	130
Max. Speed @Peak Torque(600V) [4]		Ωmax	rpm	90	130
Mechanical Parameters					
Overall Mass (NC)		mn	kg	80.0	80.0
Rotor Inertia		Jr	kg·m²	5.12E-01	5.12E-01
Axial Runout [5]		-	μm	70 (20)	70 (20)
Radial Runout [5]		-	μm	70 (20)	70 (20)
Max Axial Load (Upright Mounting) [6]		-	N	8000	8000
Max Axial Load (Inverted / Wall Mounting)		-	N	1500	1500
Max Moment Load (Upright Mounting)		-	Nm	100	100
Max Moment Load (Inverted / Wall Mounting)		-	Nm	30	30
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines/rev	7500	7500
ABI Optical Incremental Encoder (80x)		-	counts/rev	600000	600000
ABI Optical Incremental Encoder (160x)		-	counts/rev	1200000	1200000
ABI Optical Incremental Encoder (400x)		-	counts/rev	3000000	3000000
ATOM DX Optical Incremental Encoder		-	lines/rev	15000	15000
ATOM DX Optical Incremental Encoder (80x)		-	counts/rev	1200000	1200000
Accuracy after Error Mapping [7]		-	arc sec	+/-4	+/-4
Repeatability [7]		-	arc sec	+/-2	+/-2
Other Information					
Insulation Class		Class B (130°C)			
Protection Grade		IP40			
Compliance with Global Standards		RoHS, CE			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)			
	Storage	-15°C to 70°C (non-freezing)			
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)			
	Storage	10%RH to 90%RH (non-condensing)			
Recommended Ambience		Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.			

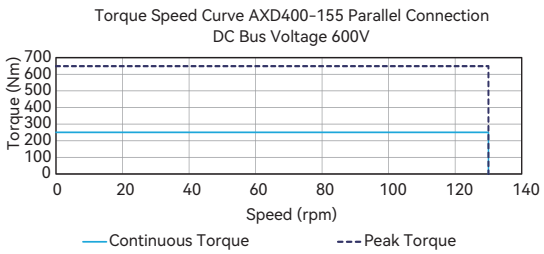
[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] Resistance is measured by DC current with standard 0.5m cable.
[3] Inductance is measured by current frequency of 1kHz.
[4] The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
[5] Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
[6] Please refer to the illustration for different mountings.
[7] Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

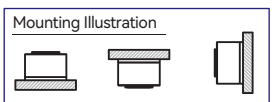
Torque-Speed Curve



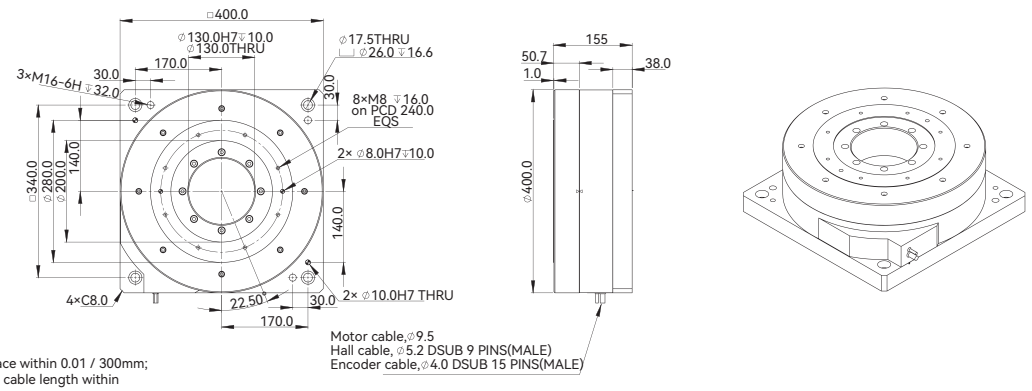








Dimension



Notes:
1.User to ensure flatness of mounting surface within 0.01 / 300mm;
2.Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
3.Certain specifications in the drawing are subject to change;
4.General tolerance
X ± 0.25mm
X.X ± 0.1mm
X.XX ± 0.05mm
X.XXX ± 0.025mm.

Motor Cable Connection

MOTOR CABLE

PIN	DESCRIPTION	COLOR
-	M1	BLACK
-	M2	BLACK
-	M3	BLACK
-	PE	YELLOW / GREEN

HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	5VDC	BROWN
5	0VDC	WHITE
8	T1	PINK
9	T2	BLUE

THERMAL SENSOR WIRE
(K TYPE - PT100)
(J TYPE -THERMOSTAT)

ABI(DIGITAL)

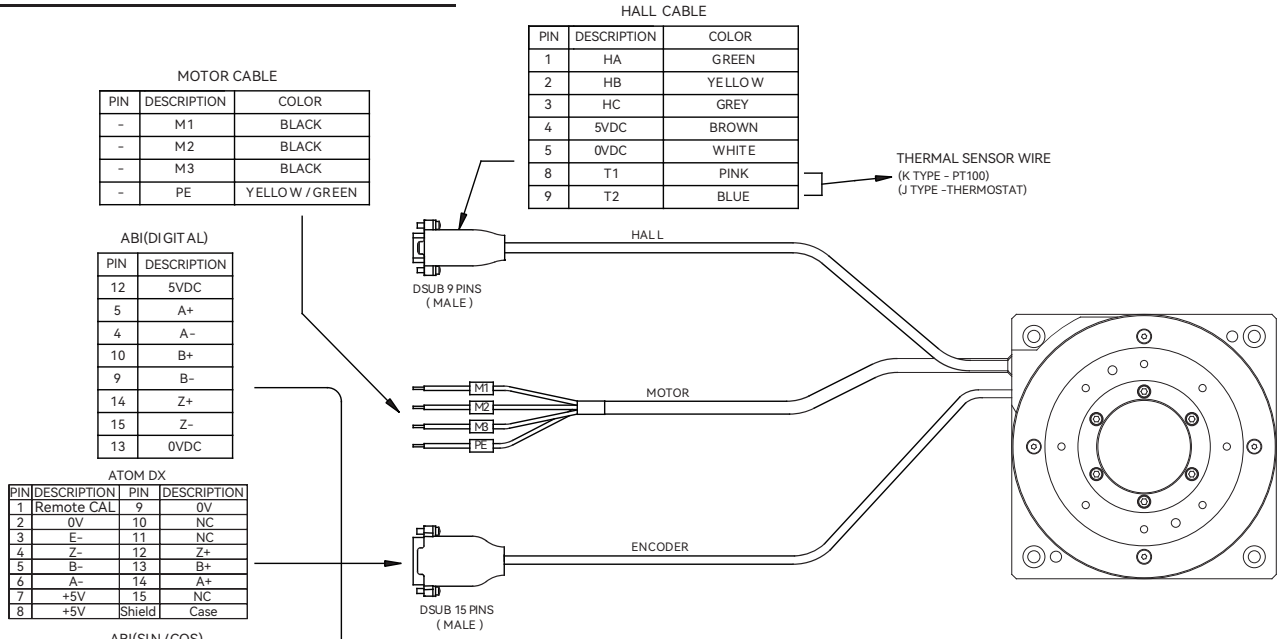
PIN	DESCRIPTION
12	5VDC
5	A+
4	A-
10	B+
9	B-
14	Z+
15	Z-
13	0VDC

ATOM DX

PIN	DESCRIPTION	PIN	DESCRIPTION
1	Remote CAL	9	0V
2	0V	10	NC
3	E-	11	NC
4	Z-	12	Z+
5	B-	13	B+
6	A-	14	A+
7	+5V	15	NC
8	+5V	Shield	Case

ABI(SIN/COS)

PIN	DESCRIPTION
12	5VDC
8	SINE+
15	SINE-
7	COSINE+
14	COSINE-
2	INDEX+
1	INDEX-
13	0VDC



Part Numbering

AXD160-67-P-J-H9D-0.5-NFB-AB-2868-400X-P30-0RB

Motor Model:
AXD80-56 / AXD120-61
AXD160-67 / AXD200-77
AXD280-100 / AXD400-155

Winding Code:
S = Low Speed Winding /
P = High Speed Winding

Thermal Sensor:
J = Thermostat
K = PT100(RTD)

Sensor Cable:
NH[1] / H9D[2]

Cable length (m):
0.5

Design Control Code:
0RB

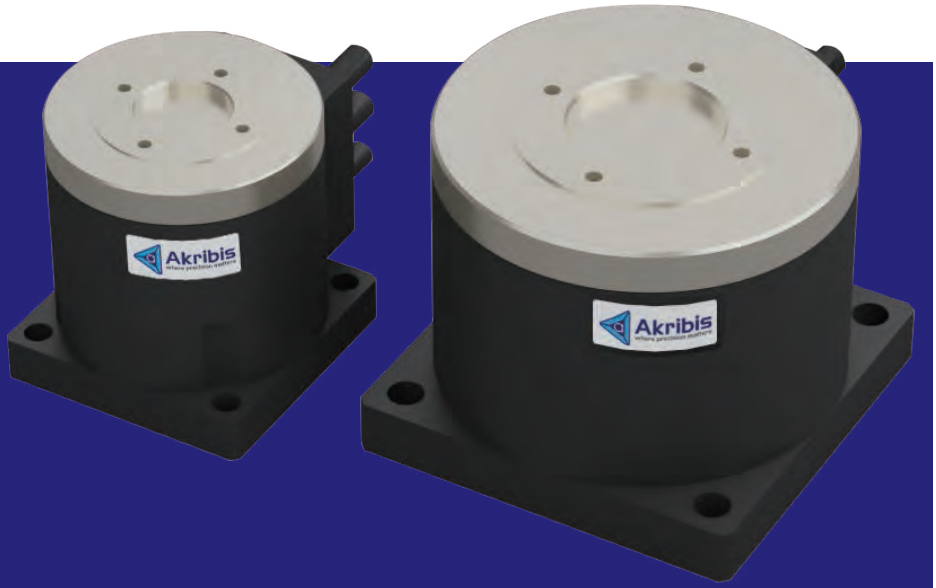
Runout:[6]
P15 / P20 / P30
P40 / P50 / P70

Interpolation:[5]
80X / 160X / 400X / SINCOS

Encoder:
AXD80-56: AB-1062 / R5G2
AXD120-61: AB-2052 / R5G2
AXD160-67: AB-2868 / R5F2
AXD200-77: AB-3934 / R5F2
AXD280-100: AB-5560 / R5F2
AXD400-155: AB-7500 / R5F2

Power Cable:
NFB[3] / 9W4M[4]

1. NH = Without Built-in Hall Sensor C/W Flying Leads
2. H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
3. NFB = Without Ferrite Bead C/W Flying Leads
4. 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
5. This item should be empty when ATOM encoder is selected
6. AXD80:P15 = Axial Runout 15μm, Radial Runout is 15μm;P10 = Axial Runout 10μm, Radial Runout is 10μm
   AXD120:P20 = Axial Runout 20μm, Radial Runout is 20μm;P10 = Axial Runout 10μm, Radial Runout is 10μm
   AXD160:P30 = Axial Runout 30μm, Radial Runout is 30μm;P10 = Axial Runout 10μm, Radial Runout is 10μm
   AXD200:P40 = Axial Runout 40μm, Radial Runout is 40μm;P10 = Axial Runout 10μm, Radial Runout is 10μm
   AXD280:P50 = Axial Runout 50μm, Radial Runout is 50μm;P15 = Axial Runout 15μm, Radial Runout is 15μm
   AXD400:P70 = Axial Runout 70μm, Radial Runout is 70μm;P20 = Axial Runout 20μm, Radial Runout is 20μm



AXM SERIES

- Compact size
- Direct drive brushless motor
- Fully integrated with encoder and bearing
- Low cogging torque
- Optional for low speed and high speed windings
- High torque density
- Built-in high precision grating scale

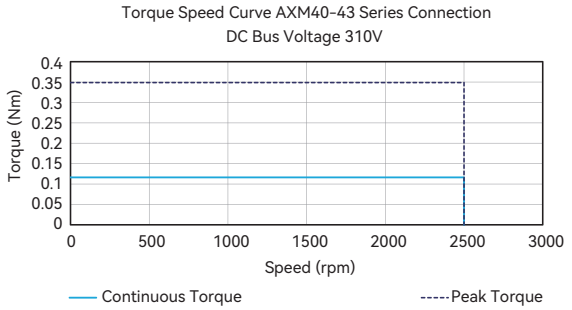
EN-26.3.1

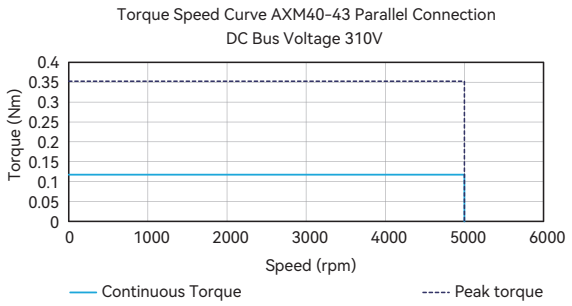
AXM40-43

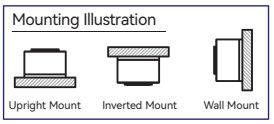
AXM40-43					
Performance Parameters		**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque (NC) @100°C[1]		T_{cn}	Nm	0.11	0.11
Peak Torque		T_{pk}	Nm	0.30	0.30
Torque Constant ±10%		K_t	Nm/Arms	0.09	0.05
Back EMF Constant ±10%		K_e	Vpeak/rpm	0.008	0.004
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.03	0.03
Resistance (L-L) @25°C ±10% [2]		R_{25}	Ω	7.6	1.9
Inductance (L-L) ±20% [3]		L	mH	6.8	1.7
Electrical Time Constant		τ_e	ms	0.9	0.9
Continuous Current (NC) @100°C[1]		I_{cn}	Arms	1.2	2.4
Peak Current		I_{pk}	Arms	4.9	9.8
Continuous Power Dissipation (NC) @100°C [1]		P_{cn}	W	22.0	22.0
Max. Coil Temperature		t_{max}	°C	100	100
Thermal Dissipation Constant (NC) [1]		K_{thn}	W/°C	0.29	0.29
Max. Bus Voltage		U_{bus}	Vdc	330	330
Pole Number		2P	-	10	10
Max Speed[4]		Ω_{max}	rpm	2500	5000
Mechanical Parameters					
Overall Mass (NC)		m_n	kg	0.24	0.24
Rotor Inertia		J_r	kg·m²	1.18E-05	1.18E-05
Axial Runout[5]		-	μm	25	25
Radial Runout[5]		-	μm	25	25
Max Axial Load (Upright Mounting)[6]		-	N	20	20
Max Axial Load (Inverted / Wall Mounting)		-	N	6	6
Max Moment Load (Upright Mounting)		-	Nm	0.3	0.3
Max Moment Load (Inverted / Wall Mounting)		-	Nm	0.1	0.1
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	650	650
ABI Optical Incremental Encoder (80x)		-	counts / rev	52000	52000
ABI Optical Incremental Encoder (160x)		-	counts / rev	104000	104000
ABI Optical Incremental Encoder (400x)		-	counts / rev	260000	260000
Accuracy after Error Mapping[7]		-	arc sec	+/-20	+/-20
Repeatability [7]		-	arc sec	+/-10	+/-10
Other Information					
Insulation Class			Class A (105°C)		
Protection Grade			IP40		
Compliance with Global Standards			Chinese RoHS, CE		
Ambient Temperature	Operation		0°C to 40°C (non-freezing)		
	Storage		-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

[1] Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
[2] Resistance is measured by DC current with standard 0.2 m cable.
[3] Inductance is measured by current frequency of 1 kHz.
[4] The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
[5] Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
[6] Please refer to the illustration for different mountings.
[7] Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

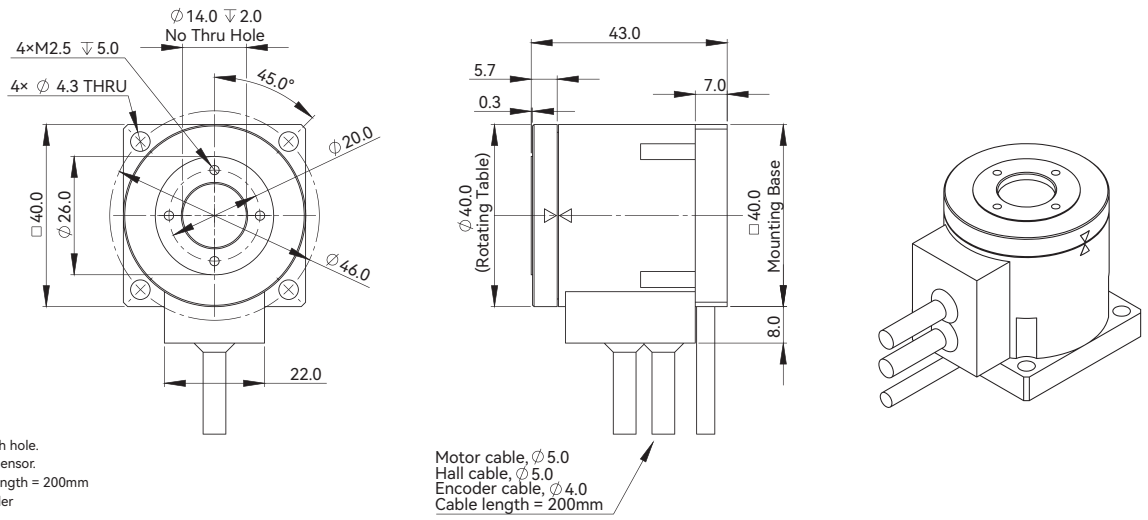
Torque-Speed Curve







Dimension



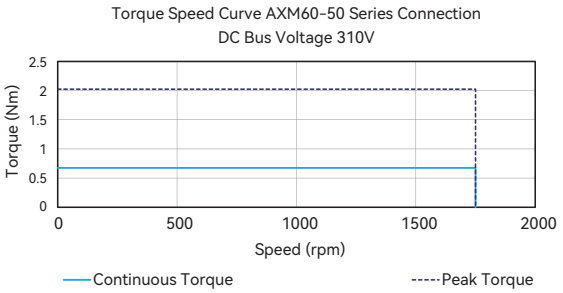
Note:
[1] No centre through hole.
[2] No temperature sensor.
[3] Standard cable length = 200mm
[4] ABI analog encoder

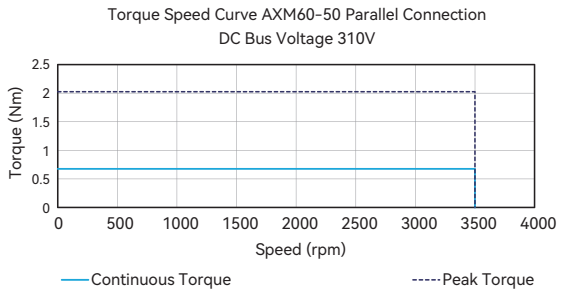
AXM60-50

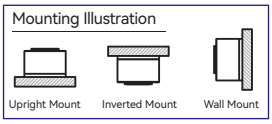
AXM60-50					
Performance Parameters		**Symbol**	**Unit**	**Series**	**Parallel**
Continuous Torque (NC) @100°C❶		T_{cn}	Nm	0.71	0.71
Peak Torque		T_{pk}	Nm	2.00	2.00
Torque Constant ±10%		K_t	Nm/Arms	0.47	0.24
Back EMF Constant ±10%		K_e	Vpeak/rpm	0.040	0.020
Motor Constant @25°C		K_m	Nm/Sqrt(W)	0.11	0.11
Resistance (L-L) @25°C ±10% ❷		R_{25}	Ω	12.8	3.2
Inductance (L-L) ±20% ❸		L	mH	28.5	7.1
Electrical Time Constant		τ_e	ms	2.2	2.2
Continuous Current (NC) @100°C❶		I_{cn}	Arms	1.5	3.0
Peak Current		I_{pk}	Arms	6.0	12.0
Continuous Power Dissipation (NC) @100°C ❶		P_{cn}	W	55.9	55.9
Max. Coil Temperature		t_{max}	°C	100	100
Thermal Dissipation Constant (NC) ❶		K_{thn}	W/°C	0.75	0.75
Max. Bus Voltage		U_{bus}	Vdc	330	330
Pole Number		2P	-	10	10
Max Speed❹		Ω_{max}	rpm	1750	3500
Mechanical Parameters					
Overall Mass (NC)		m_n	kg	0.64	0.64
Rotor Inertia		J_r	kg·m²	7.38E-05	7.38E-05
Axial Runout❺		-	μm	25	25
Radial Runout❺		-	μm	25	25
Max Axial Load (Upright Mounting)❻		-	N	50	50
Max Axial Load (Inverted / Wall Mounting)		-	N	15	15
Max Moment Load (Upright Mounting)		-	Nm	0.7	0.7
Max Moment Load (Inverted / Wall Mounting)		-	Nm	0.2	0.2
Encoder Parameters					
ABI Optical Incremental Encoder (SIN/COS)		-	lines / rev	650	650
ABI Optical Incremental Encoder (80x)		-	counts / rev	52000	52000
ABI Optical Incremental Encoder (160x)		-	counts / rev	104000	104000
ABI Optical Incremental Encoder (400x)		-	counts / rev	260000	260000
Accuracy after Error Mapping❼		-	arc sec	+/-20	+/-20
Repeatability ❼		-	arc sec	+/-10	+/-10
Other Information					
Insulation Class			Class A (105°C)		
Protection Grade			IP40		
Compliance with Global Standards			Chinese RoHS, CE		
Ambient Temperature	Operation		0°C to 40°C (non-freezing)		
	Storage		-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation		10%RH to 80%RH (non-condensing)		
	Storage		10%RH to 90%RH (non-condensing)		
Recommended Ambience			Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust.		

❶ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
❷ Resistance is measured by DC current with standard 0.2 m cable.
❸ Inductance is measured by current frequency of 1 kHz.
❹ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
❺ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
❻ Please refer to the illustration for different mountings.
❼ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
The contents of datasheet are subject to change without prior notice.

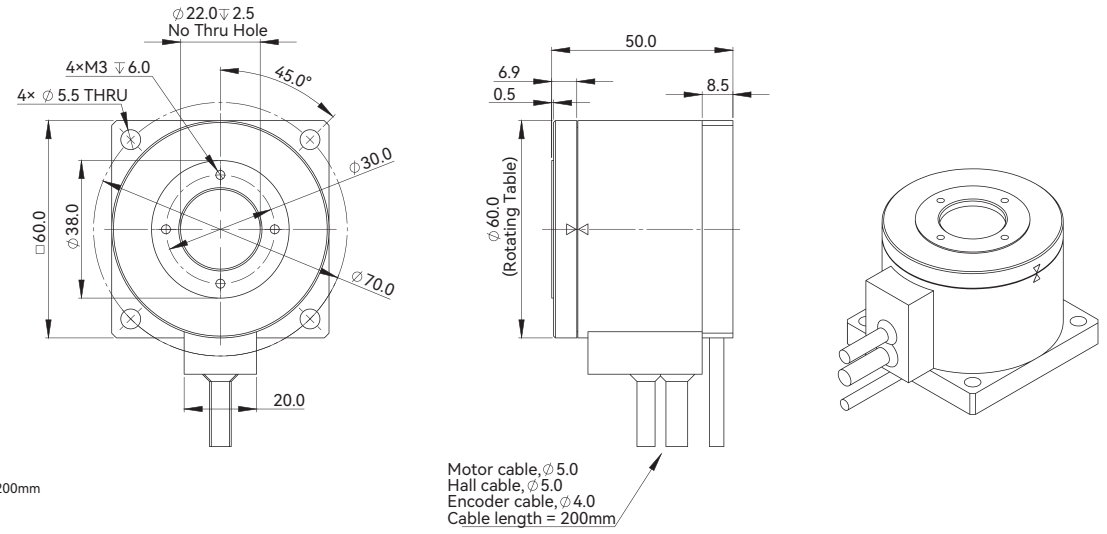
■ Torque-Speed Curve







■ Dimension



Note:
❶ No centre through hole.
❷ No temperature sensor.
❸ Standard cable length = 200mm
❹ ABI analog encoder

Motor Cable Connection

HALL CABLE

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	5VDC	BROWN
5	0VDC	WHITE
6	SHIELD	BLACK
Connector	MINI UNIVERSAL MATE-N-LOK PLUG HOUSING 6POS. UL94V-0 (P/N: 172168-1) with PIN CONTACT X6 (P/N: 170359-1)	

MOTOR CABLE

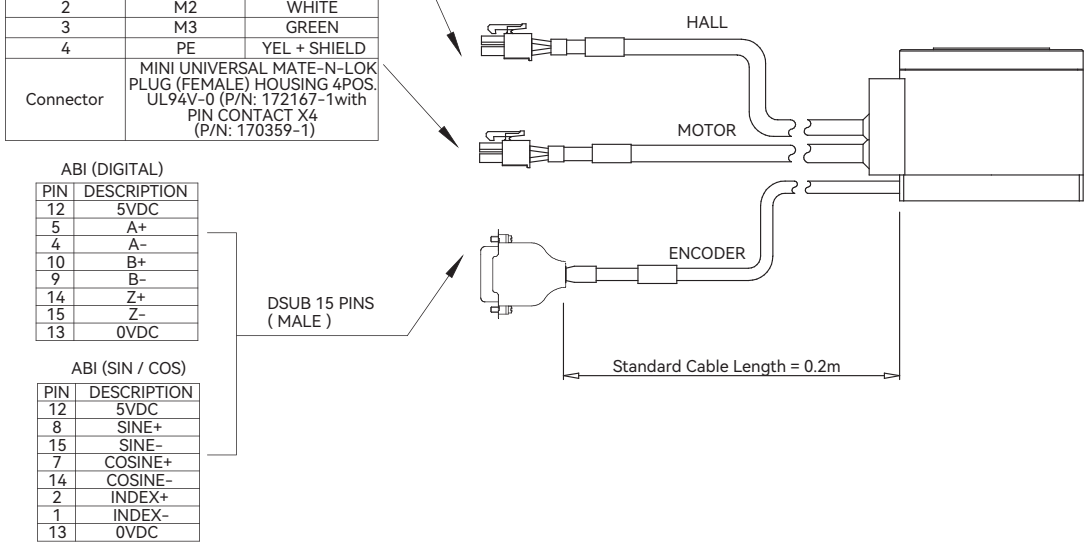
PIN	DESCRIPTION	COLOR
1	M1	BROWN
2	M2	WHITE
3	M3	GREEN
4	PE	YEL + SHIELD
Connector	MINI UNIVERSAL MATE-N-LOK PLUG (FEMALE) HOUSING 4POS. UL94V-0 (P/N: 172167-1with PIN CONTACT X4 (P/N: 170359-1)	

ABI (DIGITAL)

PIN	DESCRIPTION
12	5VDC
5	A+
4	A-
10	B+
9	B-
14	Z+
15	Z-
13	0VDC

ABI (SIN / COS)

PIN	DESCRIPTION
12	5VDC
8	SINE+
15	SINE-
7	COSINE+
14	COSINE-
2	INDEX+
1	INDEX-
13	0VDC



Part Numbering

AXM60-50-P-0.2-AB-650-SINCOS-P25

Motor Model:
AXM40-43 / AXM60-50

Winding Code:
S = Series / P = Parallel

Cable Length (m):
0.2

Runout:[1]
P25

Interpolation:
SINCOS / 80X / 160X / 400X

Encoder:
AB-650

[1] P25 = Axial Runout 25μm, Radial Runout is 25μm

Motor & Encoder & Hall Cable Specifications

Motor Cable Specifications

Motor Type	Outer Diameter (mm)	Min.Bending Radius (Flexible Use)	Min.Bending Radius (Fixed Laying)
ADR45	1.2	8×outer diameter ❶	5×outer diameter ❶
ADR50	2.1	8×outer diameter ❶	5×outer diameter ❶
ADR60	2.1	8×outer diameter ❶	5×outer diameter ❶
ADR75	2.6	8×outer diameter ❶	5×outer diameter ❶
ADR80	2.1	8×outer diameter ❶	5×outer diameter ❶
ADR90	2.6	8×outer diameter ❶	5×outer diameter ❶
AXM	5.0	12×outer diameter	6×outer diameter
ACD/ACD-P	6.0	10×outer diameter	5×outer diameter
ACW	6.0	10×outer diameter	5×outer diameter
AXD80	7.0	12×outer diameter	6×outer diameter
ADR110	7.0	12×outer diameter	6×outer diameter
ADR135	7.0	12×outer diameter	6×outer diameter
AXD120	7.0	12×outer diameter	6×outer diameter
AXD160	7.0	12×outer diameter	6×outer diameter
ADR175	8.0	12×outer diameter	6×outer diameter
AXD200	8.0	12×outer diameter	6×outer diameter
ADR220	9.5	12×outer diameter	6×outer diameter
AXD280	9.5	12×outer diameter	6×outer diameter
ADR360	9.5	12×outer diameter	6×outer diameter
AXD400	9.5	12×outer diameter	6×outer diameter
AMR65/80	3.5	-	5×outer diameter

❶Robot specific cable, small bending radius

Hall and Temperature Sensor Cable Specifications

Motor Type	Outer Diameter (mm)	Min.Bending Radius (Flexible Use)	Min.Bending Radius (Fixed Laying)
ADR-F	1.0	8×outer diameter ❶	5×outer diameter ❶
ACD	3.8	10×outer diameter	5×outer diameter
ACD-P	3.8	12×outer diameter	6×outer diameter
ACW	3.8	10×outer diameter	5×outer diameter
AXM	5.0	12×outer diameter	6×outer diameter
ADR	5.2	12×outer diameter	6×outer diameter
AXD	5.2	12×outer diameter	6×outer diameter

❶Robot specific cable, small bending radius

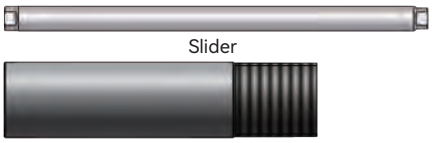
Encoder Cable Specifications

Motor Type	Outer Diameter (mm)	Min.Bending Radius (Flexible Use)	Min.Bending Radius (Fixed Laying)
ACD	4.0	12×outer diameter	6×outer diameter
ACW	4.0	12×outer diameter	6×outer diameter
ADR	4.0	12×outer diameter	6×outer diameter
AXM	4.0	12×outer diameter	6×outer diameter
AXD	4.0	12×outer diameter	6×outer diameter
AMR	4.0	12×outer diameter	6×outer diameter

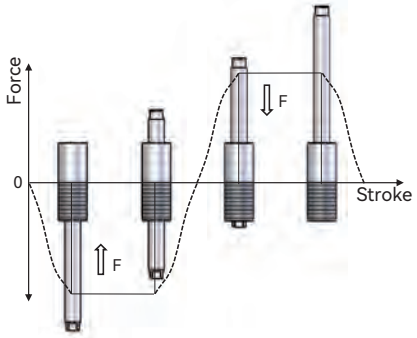
MAGNET SPRING

MAGNET SPRING

The magnetic spring of MSP-A series, consists of a slider and a stator. The bushing is installed inside the stator, guiding the relative movement between slider and stator.



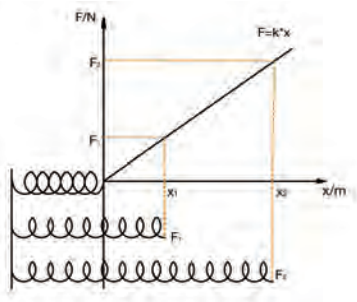
The principle of the magnetic spring is to use the interaction of the permanent magnets inside the slider and stator to generate a force. The force is free of external power source and control. It maintains a constant direction and magnitude within the specific travel range. The figure below illustrates the relationship between the force vector and the stroke.



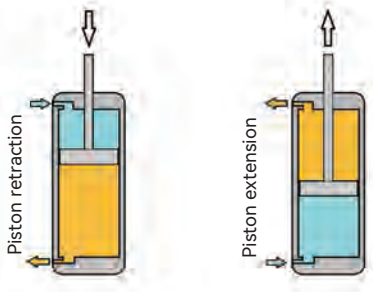
There are two common problems in the application of Z-axis direct drive modules. Firstly, if there is no external force to balance the gravity of the moving parts, the motor has to provide an additional current input during the upward acceleration. This results in an increase of motor temperature. Secondly, in the event of sudden power cutoff, the moving components will fall due to gravity, causing damage.

Presently, mechanical springs or air cylinders are often used in the market to balance the gravity. However, for the mechanical spring, its stiffness is not good and its force is not consistent. In addition, it can only be perfectly maintained at a fixed position as shown in the schematic diagram of mechanical spring. Whereas, for the air cylinder, an external pipeline is essential. An external power supply is required for controlling the pressure and pressure difference, where the problem of moving parts falling and crashing potentially exists. However, the magnetic spring has obvious advantages in performance, structure and response speed. The following table compares the differences among mechanical springs, air cylinders, and magnetic springs over several dimensions. In addition, the magnetic spring can also be flexibly installed in series or parallel in the module, so as to provide several times of the force that a single magnetic spring can achieve under heavy load conditions.

	Mechanical spring	Air cylinder	Magnetic spring
Performance	F=k*x, not constant (k: elastic coefficient x: deformation)	Constant force controlled by the pressure or pressure difference	Constant force within specific stroke
Structure	No guiding effect	Requiring external gas pipeline, with guiding effect	Guiding effect (MSP-A)
Maintenance	Inspection & lubrication	Depending on the air cylinder type	Inspection & lubrication (MSP-A)
Response speed	Affecting by natural frequency	Time consuming to balance the air pressure, non-instant response	Instant response

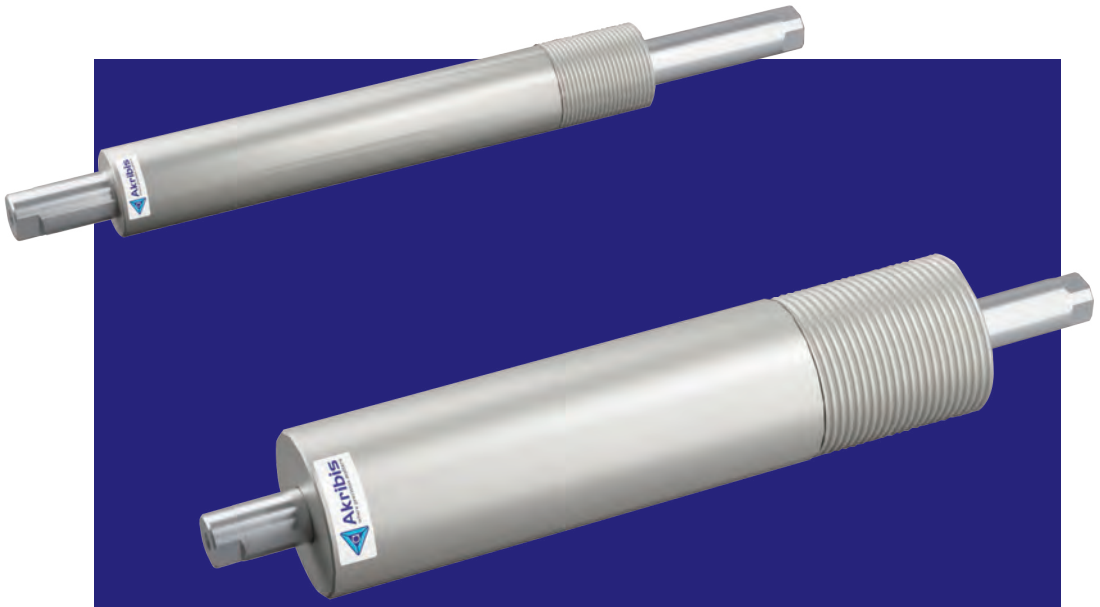


Schematic diagram of mechanical spring



Schematic diagram of air cylinder

The key to select a proper magnetic spring mainly depends on stroke and force output. The stroke is related to the relative position between slider and stator, as well as their lengths. The force range is related to the diameter of the slider and stator. With the help of proper sizing, the magnetic spring provides a stable gravity compensation during the reciprocating motion of the Z-axis direct drive module, and the moving parts are immediately hovered when the power is cutoff.



MSP-A SERIES

- Simple structure
- Constant force
- Instant response
- Free of power supply
- Free of linear guide
- Simple maintenance

EN-26.3.1

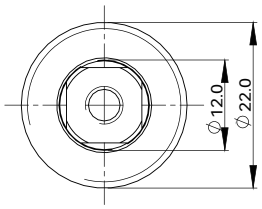
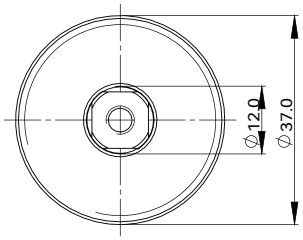
Akribis systems

Features

- Simple structure
- Constant force
- Instant response
- Free of power supply
- Free of linear guide
- Simple maintenance

Applications

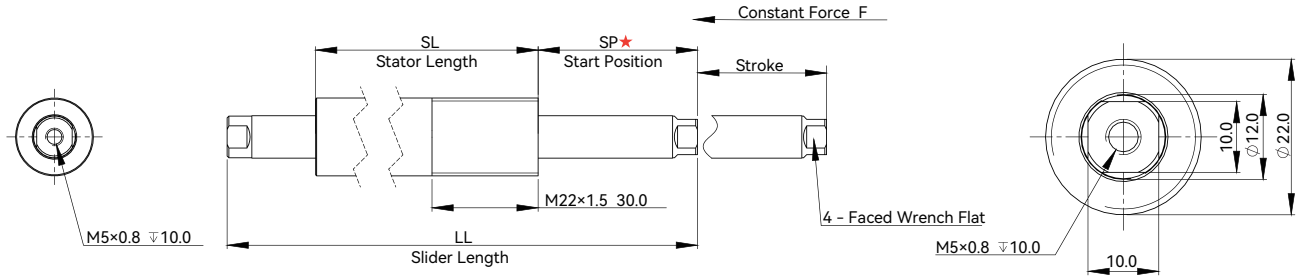
Based on the features of magnetic springs, it can be used in many application scenarios, including but not limited to gravity compensation, ensuring Z-axis module self-locking when power off, and supplying constant force within specific travel range.

Dimension	Stroke (mm)	Constant force F (N) ±10%	Combination
	40-280	15	MSP-A-S022-XXX★-H-000
			MSP-A-L012-XXX★-A-000
	40-280	20	MSP-A-S022-XXX-H-000
			MSP-A-L012-XXX-B-000
	40-280	25	MSP-A-S022-XXX-H-000
			MSP-A-L012-XXX-C-000
	50-275	40	MSP-A-S037-XXX-A-000
			MSP-A-L012-XXX-A-000
	50-275	50	MSP-A-S037-XXX-A-000
			MSP-A-L012-XXX-B-000
	50-350	60	MSP-A-S037-XXX-A-000
			MSP-A-L012-XXX-C-000

★ XXX means slider or stator length. Please refer to the part numbering for specific instructions.

Combination parameters

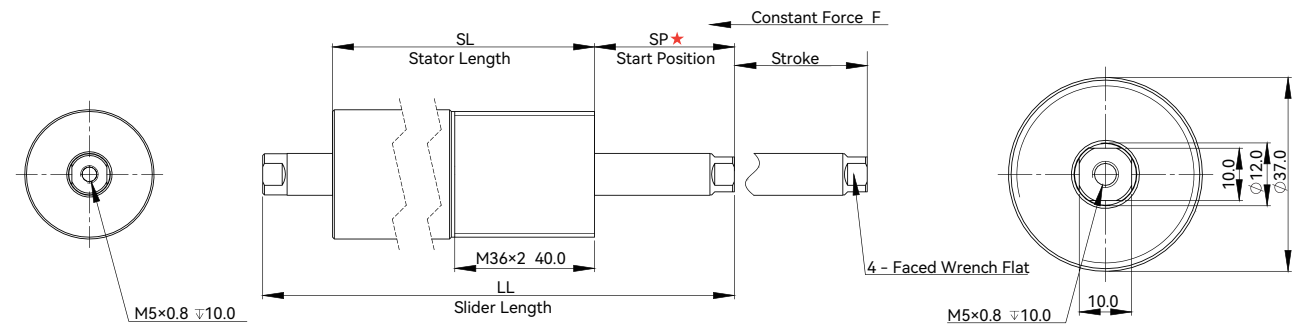
■ Dimension



★ The distance SP is measured between the end of slider (4 - faced wrench flat) and the end of stator (threaded end)

Combination Parameters				Stator			Slider		
NO.	Stroke (mm)	F(N)±10%	SP(mm)	Part Number	SL (mm)	m_{Stator}(g) ±10%	Part Number	LL (mm)	m_{Slider}(g) ±10%
1	40	15	45	MSP-A-S022-060-H-000	60	72	MSP-A-L012-130-A-000	130	106
2	40	20	45	MSP-A-S022-060-H-000			MSP-A-L012-130-B-000		
3	40	25	45	MSP-A-S022-060-H-000			MSP-A-L012-130-C-000		
4	120	15	45	MSP-A-S022-140-H-000	140	173	MSP-A-L012-210-A-000	210	174
5	120	20	45	MSP-A-S022-140-H-000			MSP-A-L012-210-B-000		
6	120	25	45	MSP-A-S022-140-H-000			MSP-A-L012-210-C-000		
7	200	15	45	MSP-A-S022-220-H-000	220	274	MSP-A-L012-290-A-000	290	242
8	200	20	45	MSP-A-S022-220-H-000			MSP-A-L012-290-B-000		
9	200	25	45	MSP-A-S022-220-H-000			MSP-A-L012-290-C-000		
10	280	15	45	MSP-A-S022-300-H-000	300	375	MSP-A-L012-370-A-000	370	310
11	280	20	45	MSP-A-S022-300-H-000			MSP-A-L012-370-B-000		
12	280	25	45	MSP-A-S022-300-H-000			MSP-A-L012-370-C-000		

Dimension

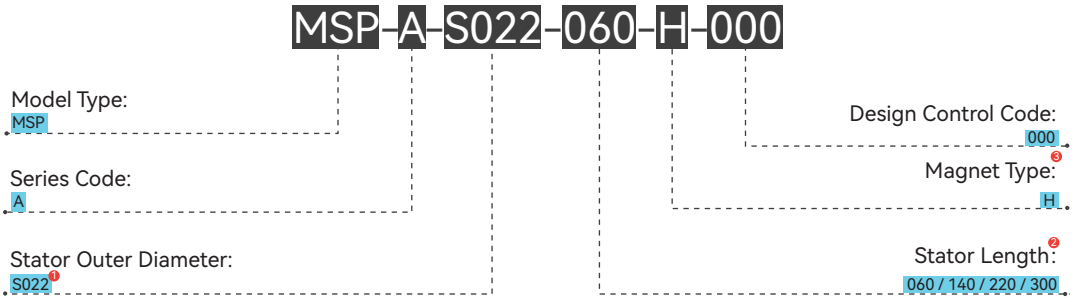


★ The distance SP is measured between the end of slider (4 - faced wrench flat) and the end of stator (threaded end)

Combination Parameters				Stator			Slider		
NO.	Stroke (mm)	F(N)±10%	SP(mm)	Part Number	SL (mm)	m_{Stator}(g) ±10%	Part Number	LL (mm)	m_{Slider}(g) ±10%
1	50	40	30	MSP-A-S037-080-A-000	80	456	MSP-A-L012-130-A-000	130	106
2	50	50	30	MSP-A-S037-080-A-000			MSP-A-L012-130-B-000		
3	50	60	30	MSP-A-S037-080-A-000			MSP-A-L012-130-C-000		
4	125	40	35	MSP-A-S037-155-A-000	155	919	MSP-A-L012-210-A-000	210	174
5	125	50	35	MSP-A-S037-155-A-000			MSP-A-L012-210-B-000		
6	125	60	35	MSP-A-S037-155-A-000			MSP-A-L012-210-C-000		
7	200	40	40	MSP-A-S037-230-A-000	230	1382	MSP-A-L012-290-A-000	290	242
8	200	50	40	MSP-A-S037-230-A-000			MSP-A-L012-290-B-000		
9	200	60	40	MSP-A-S037-230-A-000			MSP-A-L012-290-C-000		
10	275	40	45	MSP-A-S037-305-A-000	305	1845	MSP-A-L012-370-A-000	370	310
11	275	50	45	MSP-A-S037-305-A-000			MSP-A-L012-370-B-000		
12	275	60	45	MSP-A-S037-305-A-000			MSP-A-L012-370-C-000		
13	350	60	50	MSP-A-S037-380-A-000	380	2308	MSP-A-L012-450-C-000	450	378

Part Numbering

Stator

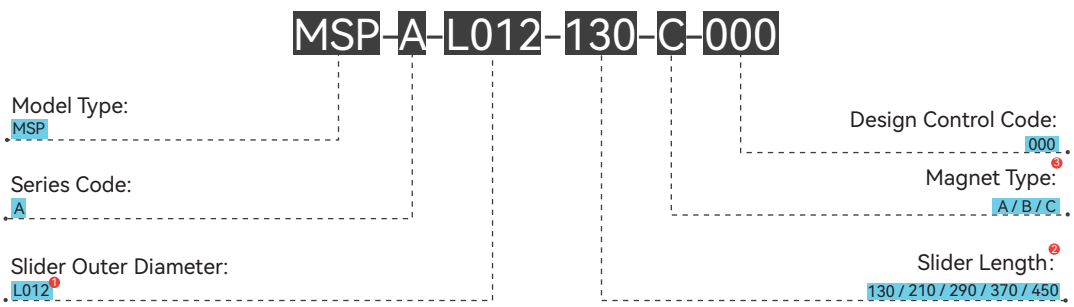


1. S022 = Stator Outer Diameter 22mm
2. E.g. 060 = 60mm
3. Magnet Type = Different Magnet Designs



1. S037 = Stator Outer Diameter 37mm
2. E.g. 080 = 80mm
3. Magnet Type = Different Magnet Designs

Slider

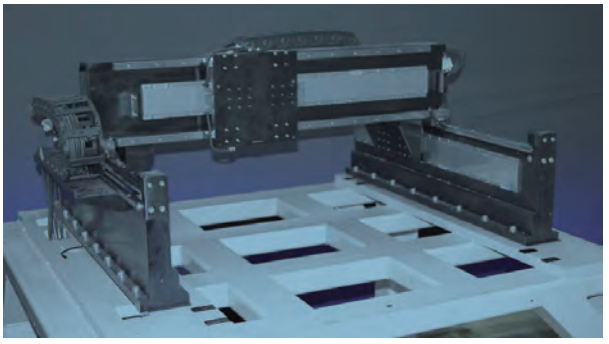


1. L012 = Slider Outer Diameter 12mm
2. E.g. 130 = 130mm
3. Magnet Type = Different Magnet Designs

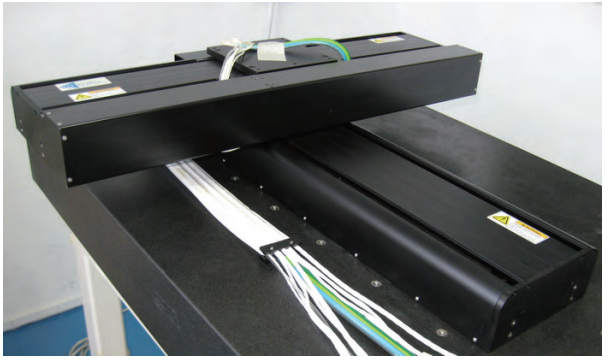
The stator and slider shall be used in pairs according to the combination parameters to achieve the specific performance (stroke & force).

Motion Control of Gantry Stages

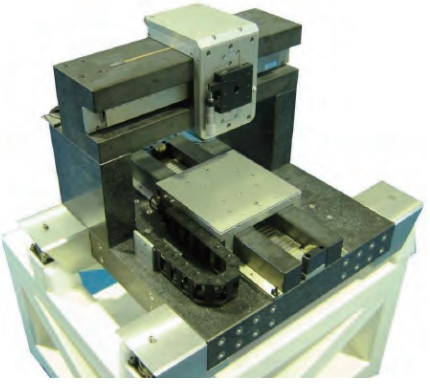
A gantry stage is basically an XY table where the top axis is supported by 2 axes at the bottom. The top axis and its payload is supported by 2 parallel linear bearings at the 2 sides of the stage. See picture on the right. This configuration allows the top axis to carry an end effector (like pick and place mechanism, camera, etc.) to access the work piece at any XY positions from the top.



A standard stacked XY table will usually have to move the work piece while the end effector is fixed on top. This is usually not recommended if the work piece is very big and heavy, or if the top axis stroke is very long. Since the top axis is only supported at the middle, it would deflect downwards at the 2 ends (more significant as the top axis length increases), resulting in poor flatness specifications. (See picture on the right.)



A nice hybrid configuration is to separate the X and Y where the top axis is mounted on a stationary bridge. In this case, the bottom axis carries the workpiece in one direction and the top axis carries the end effector to move in the orthogonal direction. (See picture on the right.)



In motion control, we are more concerned on the bottom axis of the first type of configuration (moving bridge). The load is supported at the 2 sides, it can easily creates yaw error if the driving force is not in line with the CG (center of gravity) of the moving load.

In motion control, we call the bottom axis of such configuration as gantry axis.

1.Types of gantry axis configuration

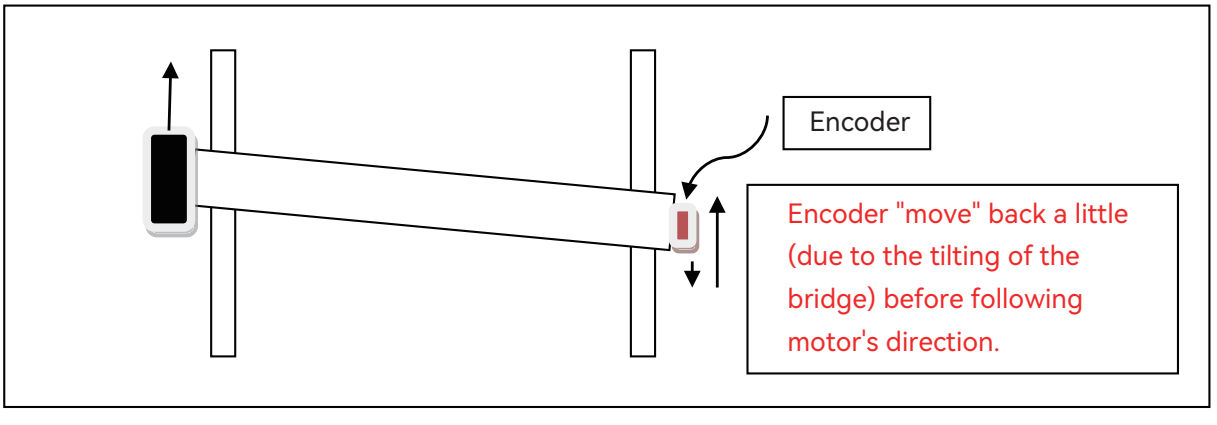
1.1 T-drive

T-drive is consists of a motor driving at one side, and linear bearing guiding the opposite site for the bottom axis, forming a T shaped configuration. This configuration requires only one driver and one encoder. It is the most cost effective gantry configuration.The ideal location for the encoder to be mounted is at the center of the gantry. However, this is hard to achieve. Most of the designs will have the encoder mounted on one side of the T-drive configuration.

The main disadvantage of this configuration is the unbalanced driving force. It is almost impossible to drive in line with the CG of load. This will result in high yaw error. The side without motor will always be dragged behind by the motor at the other side. When the motor changes direction, there will be big yaw error which result in high reversal error. In other words, the side without motor will remain stationary until the motor side has moved enough to drag it along.

To improve repeatability of this configuration, the recommended approach is to have the critical positions always in the same direction of the motion. This could mean over travelling in one direction then move back to the required direction. This would produce similar yaw error every time so that this yaw error doesn't contribute to the repeatability error of the gantry axis.

One important consideration in a T-drive configuration is the location of encoder with respect to the motor driving force. If it is opposite to the motor driving force, the encoder may register an opposite direction motion before it starts to follow the motor direction (see illustration below). This is, in a way, like a positive feedback situation that could affect servo performance. So, it is recommended to have the encoder at the same side of the motor.



1.2 H-drive

H-drive is consists of 2 motors, 1 driving each side of the gantry, forming a H shaped configuration. This would provide a more balanced driving force and minimize the problems experienced in T-drive configuration.

2.Encoder configurations

For H-drive configuration, there are options to use 1 or 2 encoders.

2.1 Single encoder

In single encoder configuration (again, usually mounted at one side of the gantry), both motors would receive the same feedback signal and have the same position error all the time. Essentially, both motors will output the same force all the time. However, this doesn't guarantee that there will be no yaw error because the load inertia and friction experienced at the 2 sides will not be the same. But generally, having motors driving at both sides would reduce the reversal error significantly as compared to T-drive configuration.

In this configuration, it is possible to use only one driver if the driver's current rating can drive the 2 motors connected in parallel. However, there will be only one hall sensors port in the driver, so the 2 motors must be aligned exactly to their respective magnetic tracks to ensure accurate commutation.

2.2 Dual encoders – one on each side of gantry

Having encoders at both sides of the gantry would provide actual position difference between the 2 motors.
However, this would require 2 separate position loops to control the 2 motors, it would require 2 drivers.
With 2 encoders, the stopping position can be controlled to the accuracy and repeatability of the encoders.

3.Rigid vs flexible link between the bridge and the gantry axis

In single encoder system, either T-drive or H-drive configuration, the bridge should be rigidly mounted on the gantry axis to minimize yaw error.

However, there are important factors for consideration in rigid link design.

3.1 Bridge length is fixed and fully constrained when rigidly mounted at the 2 ends

If the environment temperature changes, the top axis bridge will expand or contract. More importantly, the moving axis mounted on the bridge will generate heat and dissipate through the bridge. As the bridge length changes (it will be more significant if the bridge is long), the stress on the 2 linear bearings will increase, resulting in higher friction on the gantry axis. The bridge itself may also bend and twist which will affect the top axis as well.

3.2 Mechanical alignment of the 2 linear bearings

If the 2 bearings are not parallel or their straightness and/or flatness are not controlled, it would result in uneven friction across the full stroke of the gantry axis. Some part of the stroke will have higher friction than other parts.
This could affect servo performance and require higher driving force from the motors than the calculated force requirement.
It can be very costly to machine the base support of the gantry stage to the required accuracy if the gantry is big (sometimes may not be possible at all).
On the other hand, most rigidly mounted bearings will still have some small degree of compliance to allow some displacement in the orthogonal directions. So the performance (or if it is functional at all) depends on the machining accuracy, bearings clearance, gantry size, etc.

3.3 Rigid link with dual encoders

With 2 encoders, it will provide the Yaw error (position difference between the 2 motors) to the controller. However, the assembly error of the 2 encoder scales and the scales' error itself could result in similar effect as misaligned bearings. In this case, the controller will try to servo the 2 motors to the commanded position. So if there is encoder scale error and bridge length is fully constrained, the controller will output very high current to the motors trying to stretch, bend or twist the bridge in order minimize their respective position errors. The 2 motors will be fighting each other and result in instability and higher continuous force.

One way to handle the difference in encoder scale error (including assembly alignment tolerance) is to map the differential error in one of the driver to match the encoder reading of the other. In this case, the bridge will be at their naturally "relax" orientation (no fighting between the gantry motors). But this doesn't mean that the yaw error is zero. In fact, it is impossible to achieve zero yaw error all the time in rigid gantry unless the mechanical setup (parallelism, straightness, flatness, etc.) is perfect.

3.4 Flexible link

Flexible link means allowing some freedom in yaw direction at one side (usually called the gantry master), and on the other side, allow translational freedom in the top axis direction and yaw rotation (to allow expansion/contraction of bridge and rotation due to straightness error in gantry bearings and encoder scale error).

It requires 2 encoders and 2 controller axes (2 drivers) in order to control the yaw direction.
This is more costly in terms of the number of control components, but allows higher tolerance in the mechanical parts fabrication and assembly.

4.Controller configuration

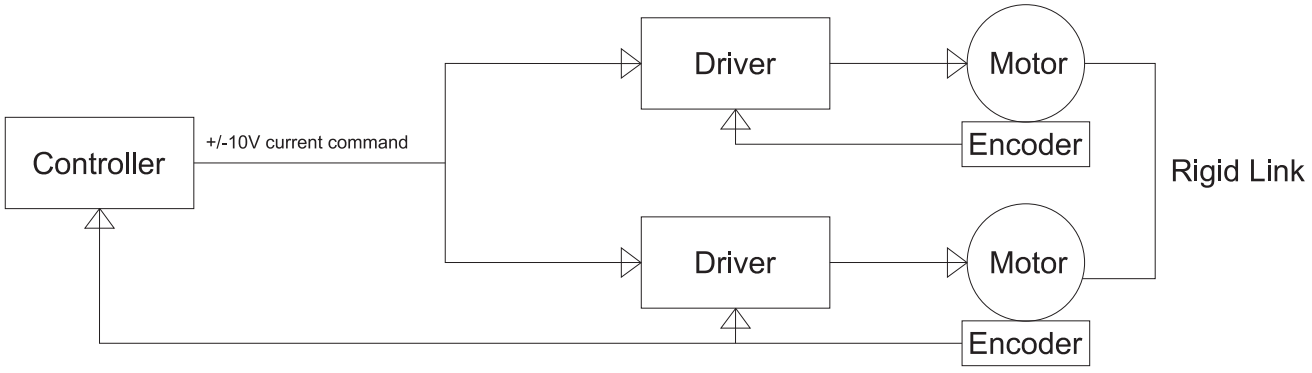
In single driver configuration, the controller will see the gantry as one motor and everything behave like a conventional axis. It is more important to size the driver and power supply based on the combined motor current and back EMF.
In dual-driver configuration, there are a few options.

4.1 Shared current command

This is similar to connecting the 2 gantry motors in parallel to a single driver with 1 encoder feedback. In the case when the driver's current or voltage rating could not support the 2 motors in parallel connection, it will be necessary to drive the motor separately with 2 drivers.

The controller treats the gantry as a single motor with only 1 position loop. The encoder feedback is used to compute current command and converted to a +/-10V analog signal, which is connected in parallel to the 2 drivers. Both motors should output the same force if their commutation alignment is the same.

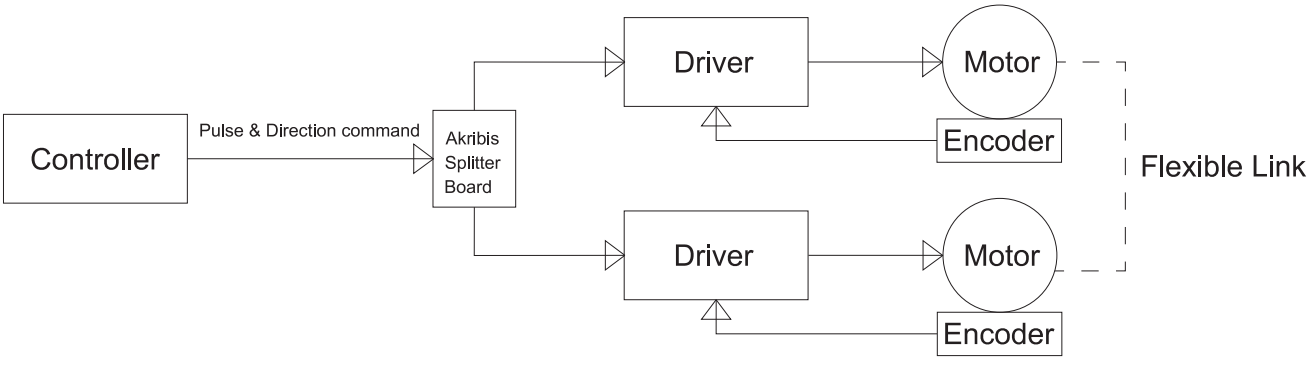
In the case when it is not easy to ensure good commutation alignment by mechanical design, it is possible to use separate encoders connected to their respective drivers for commutation purpose. Only one of the encoders will be connected to the controller since there is only 1 position loop.



4.2 Shared position command

Similar to shared current command, in this case, the 2 drivers are operating in position mode. The position command can be sent in pulse & direction or other equivalent formats. To ensure strong pulse signals are received at the 2 drivers, it is recommended to use a splitter circuit board from Akribis to split the signals.

Again, the controller treats this as a single motor and generate one motion path profile. Position control is done in the drivers, so it is possible to apply encoder error compensation separately in each driver to avoid fighting between the 2 motors.

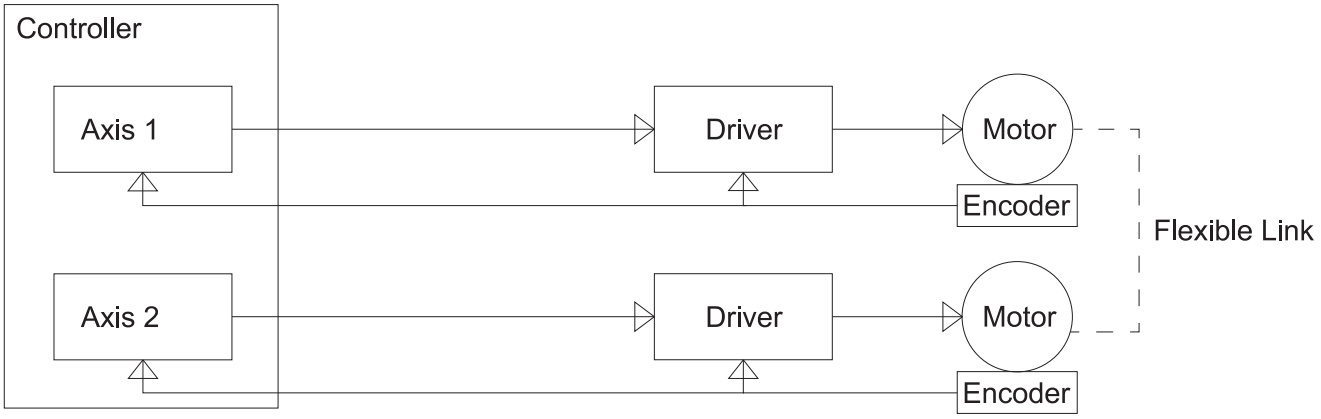


4.3 Vector mode or gear mode with 1:1 ratio

When the 2 drivers are connected to separate axes in the controller (this will take up 2 controller axes), it is possible to control the 2 motors separately. This may be necessary if the application requires some movement in the yaw axis (not always orthogonal to the main gantry axis). Of course, this would require a flexible link gantry design.

When moving in the main gantry direction, it is advisable to group the 2 axes in vector mode or gear mode because most controller has special error handling in such mode to decelerate and stop both motors together even if only one of the motors encountered an error condition.

If there isn't such protection in place, when one motor encountered error and stopped, the other may continue to move and could cause damage to the gantry mechanism.

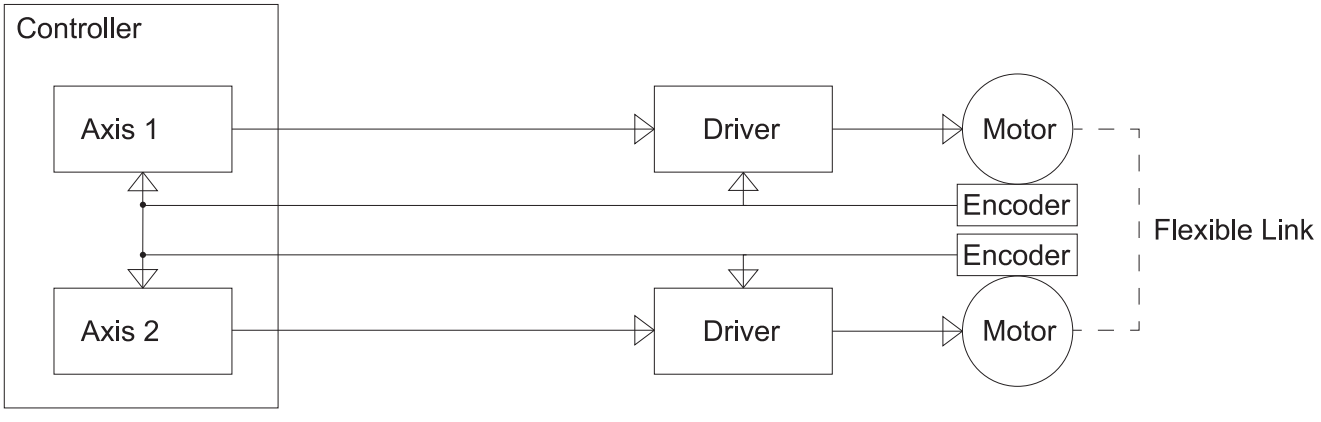


4.4 Active yaw control

With 2 complete sets of motor, encoder, driver and controller axis, it would be better to share both encoder signals among the 2 position loops so that each motor is aware of the actual position of the other motor.

For example, when one motor is slowed down by high friction, the other motor can also slow down to reduce the yaw error. The controller is actively trying to correct the yaw error at all time, hence the name "active yaw control".

Most advanced controllers like Elmo, ACS and Polaris support active yaw control, refer to next section for more description.



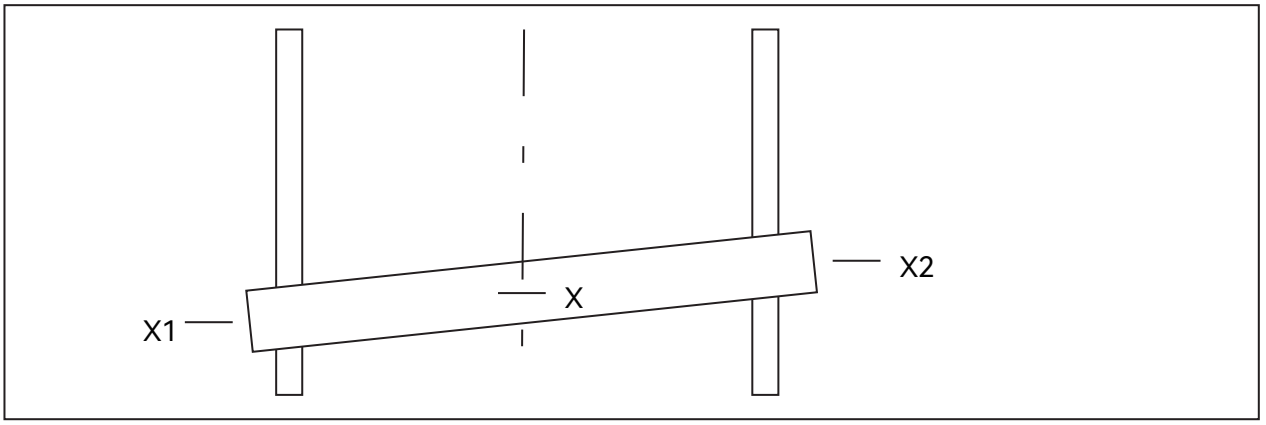
5.Active yaw control

Active yaw control requires 2 sets of motor, encoder, driver and controller axis.

The controller transforms the 2 physical gantry axes (X1 and X2) into gantry main axis (X-axis) and a Yaw-axis based on the following equations.

X = (X1 + X2) / 2

Yaw = X1 - X2



The controller generates motion profile to X axis (which is effectively the desired position at the mid-point of the bridge) while the yaw command should always be zero (that means the bridge is orthogonal to X-axis).

After transforming the X1 and X2 encoder values into X and Yaw's feedback values, the position and velocity control loops (PID, PIP or any other control structure) are processed to output the required current command to X and Yaw axis. These current commands will be transformed back to X1 and X2 axis and send to the current loop of their respective driver.

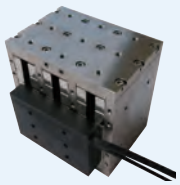
In this way, X1 and X2 motor will output different force to correct any yaw error while moving the gantry according to the required X-axis profile.

In case of rigid gantry (or less flexible gantry link), it is recommended to set a weak yaw controller by reducing the control gains for Yaw-axis or limit the current command to Yaw-axis. It will be useless (or even harmful) to output strong yaw control to a rigid gantry as the motors will not be able to correct the yaw error due to the rigidity of the gantry.

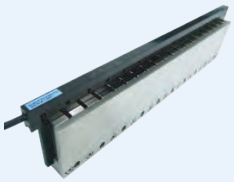
Other Direct Drive Products

Special Motors

AHM series



ALM series



ACM-D series



ATA series



ADR-H series



AKD-A series



Motor with carbon fibre coil plate

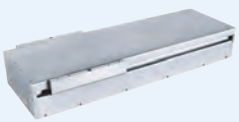


Water cooled moving magnet linear motor

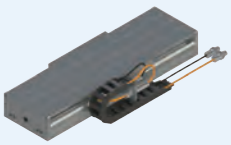


Standard Stages

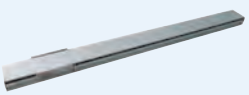
DGL series



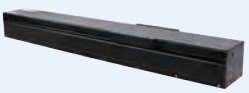
DGH-S series



DGC series



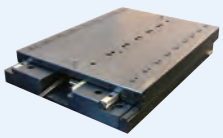
SGL series



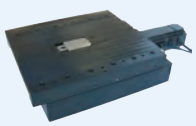
VPL series



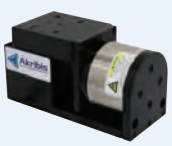
XRL series



XRB250 series



XMGV series



XRV series



DGV series



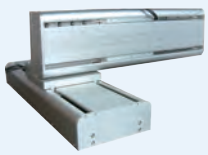
TGV series



APC series



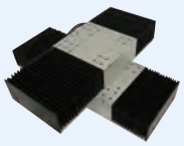
DGL XY series



DGL XY series



DGL XY series



VRG series



Direct Drive Products for CNC

AKM series water-cooled linear motor



AKH series water-cooled linear motor



ADR-C series water-cooled direct drive rotary motor



AER-F series water-cooled direct drive outer rotor rotary motor



ARH series horizontal CNC turntable



ARV series vertical CNC turntable



ATRT series Dual-axis CNC turntable



AMH series Dual-axis milling head



Five-axis tool grinding machine turntable



Double-axis single-arm turntable



Customized Stages for Industries

5-axis XYZT for 3D measurement



XYZ stage for wafer microscope



XYZ stage for mobile phone parts assembly



XYZ stage for glue dispensing



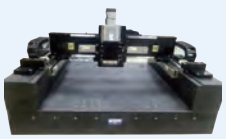
XYZ stage for optical system assembly



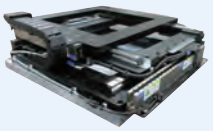
XYZ stage for laser application



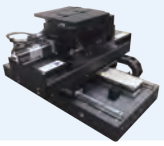
H-drive gantry stage



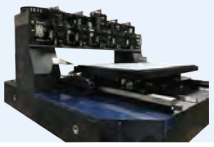
Hollow XY stage for wafer detection



XYZ stage for wafer detection



G6 FPD stage for laser application with 14 axis



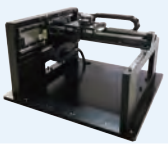
6 DOF mini stage for optical alignment



XYZ stage for fiber optic alignment



XY stage for glue dispensing



H-drive gantry stage for assembly and testing



XYT stage for glass laser cutting



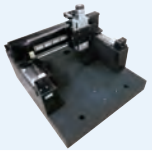
XYZ stage for PCB exposure



XYZ stage for wafer testing



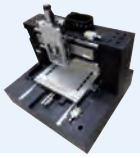
H-drive gantry stage for testing and laser application



LX1030Z gantry machining center



XYZ stage for laser marking and precision parts assembly



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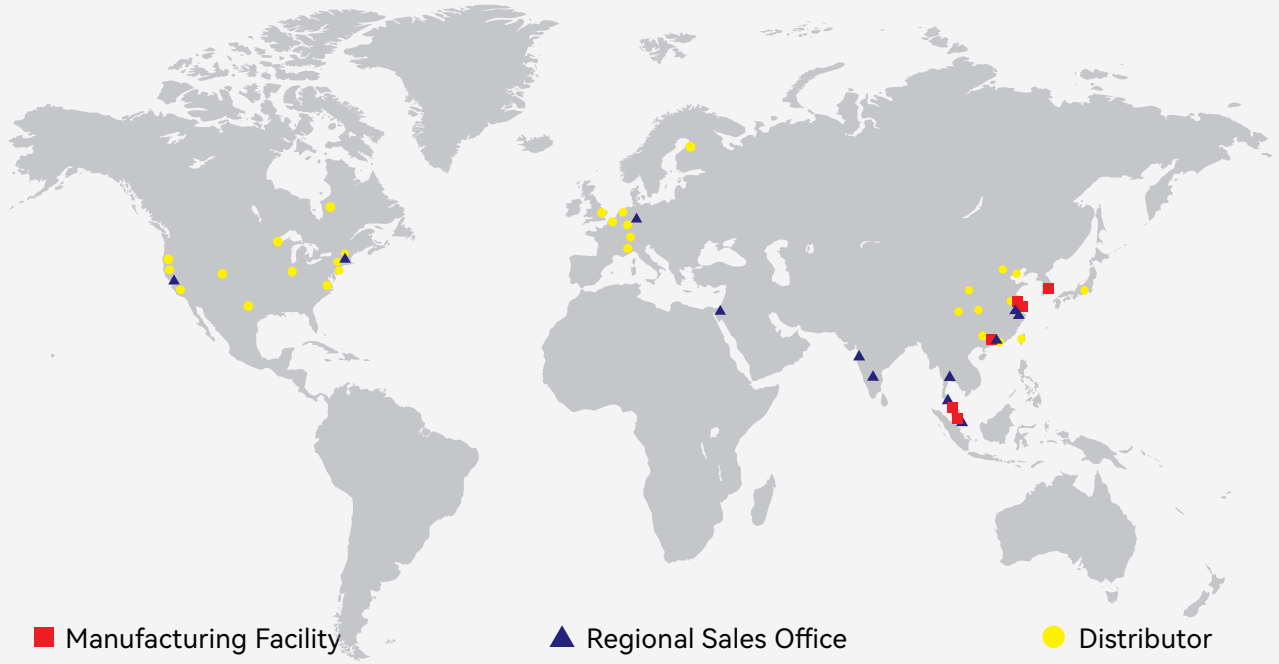

Manufacturing Facilities

Akribis Systems Pte Ltd
56 Serangoon North Avenue 4
Singapore 555851
Tel: +65 6484 3357
www.akribis-sys.com
cust-service@akribis-sys.com

Akribis Systems (Shanghai) Co., Ltd
C4, No.6999, Chuan Sha Rd, Pudong New Area, Shanghai, 201202
Tel: +86 21 5859 5800
www.akribis-sys.cn
cust-service@akribis-sys.cn

Akribis Systems (Nantong) Co., Ltd
Floor 2, Building 7, Boding Machinery, Industrial Park, Xingyuan Road, Tongzhou, Nantong, Jiangsu Province, 226000
Tel: +86 0513 8655 1333
www.akribis-sys.cn
cust-service@akribis-sys.cn

Akribis Systems Sdn Bhd (Selangor)
Lot 5815-A, Jalan Mawar, Taman Bukit Serdang, Seksyen 9, 43300 Seri Kembangan, Selangor D.E.
Tel: +603 8957 5815
www.akribis-sys.com
cust-service@akribis-sys.com

Akribis Systems (Shanghai) Co., Ltd Dongguan Branch
1F, Building B, No.12, Guliao 1st Road, Tianxin Village, Tangxia Town, Dongguan City, Guangdong Province, China, 523000
Tel: +86 0755 23777203
www.akribis-sys.cn
cust-service@akribis-sys.cn

Akribis Systems Korea Co., Ltd (Siheung)
1F/2F, 50, Maehwasandan 3-gil, Siheung-si, Gyeonggi-do, Republic of Korea, 14931
Tel: +82 31 509 5033
www.akribis-sys.co.kr
cust-service@akribis-sys.co.kr

Branches

Asia

Bangkok
Tel: +668 5151 0088
www.akribis-sys.com
bancha@akribis.co.th

Hangzhou
Tel: +86 0571 86513821
www.akribis-sys.cn
cust-service@akribis-sys.cn

Kfar-Saba
Tel: +972 9 8909797
www.agito-akribis.com
agito.info@akribis-sys.com

Mumbai/Bangalore
Tel: +91 022 68629000
www.akribis-sys.com
cust-service@akribis-sys.com

Penang
www.akribis-sys.com
cust-service@akribis-sys.com

North America

Franklin
www.akribis-sys.com
cust-service@akribis-sys.com

San Jose
Tel: +1 408 913 1300
www.akribis-sys.com
cust-service@akribis-sys.com

Europe

Erlangen
Tel: +49 9131 81179 0
www.akribis-sys.de
sales@akribis-sys.de

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