Cartridge Direct Drive Rotary Motors

Three-Phase AC Permanent Magnet Servo Motor

Catalog

KOLLMORGEN

A REGAL REXNORD BRAND

Kollmorgen: Your Partner, In Motion.

Every solution comes from a real understanding of the challenges facing machine designers and users.

Innovators consistently rate Kollmorgen as one of their best motion systems manufacturing partners. Whether you are looking for classic servo motors, direct-drive servo motors, stepper motors, drives & amplifiers, gearing, actuation, or multi-axis motion controllers, Kollmorgen is one of the few companies in the world that actually designs and manufactures all of these products.

Our customers are leaders in many industries such as Aerospace & Defense, Printing, Packaging & Converting, Food & Beverage Processing, Medical Imaging, In Vitro Diagnostics & Laboratory Automation, Pharmaceutical Manufacturing, Material Forming and Cutting, Oil & Gas, and Robotics. Kollmorgen is also a leader in Warehouse Automation, including complete AGV systems, software, awareness and autonomy.

Our Automation Solutions can be found on Mars and in space, ships and submarines, O&G drilling and metrology, surgical robots and laser eye surgery, even inside artificial hearts. These are just a few applications that demand high-performance and high-quality while satisfying their specific needs.

Because motion matters, it's our focus: Motion can distinctly differentiate a specific machine and deliver a marketplace advantage by increasing its performance and dramatically improving Overall Equipment Effectiveness (OEE).

High-performance motion can make your customer's machine more reliable and energy-efficient, enhance accuracy and improve operator safety. Motion also represents endless possibilities for innovation.

We've always understood this potential, and thus have kept motion at our core and in our Vision, Mission & Values, relentlessly developing products that offer precise control of torque, velocity and position accuracy in machines that rely on complex motion.

Removing the Barriers of Design, Sourcing, and Time
At Kollmorgen, we know that OEM engineers can achieve a lot more when obstacles aren't in the way. So, we clear obstacles in three important ways:

Integrating Standard and Custom Products
The optimal solution is often not clear-cut. Our application expertise allows us to modify standard products or develop totally custom solutions across our whole product portfolio so that designs can take flight.

Providing Motion Solutions, Not Just Components
As companies reduce their supplier base and focus their engineering manpower on the product design, they need a total system supplier with a wide range of integrated solutions. Kollmorgen offers complete solutions as well as motion subsystems that combine programming software, engineering services and best-in-class motion components.

Global Footprint
With direct sales, engineering support, manufacturing facilities, and distributors spanning the Americas, Europe, the Middle East, and Asia, we're close to OEMs worldwide. Our proximity helps speed delivery and lend support where and when they're needed.

Financial and Operational Stability
Kollmorgen is part of Regal Rexnord. A key driver in the growth of all Regal Rexnord segments is the Regal Rexnord Business System, which relies on the principle of "kaizen" – or continuous improvement. Using world-class tools, cross-disciplinary teams of exceptional people evaluate processes and develop plans that result in superior performance.

Kollmorgen: Your partner. In Motion.

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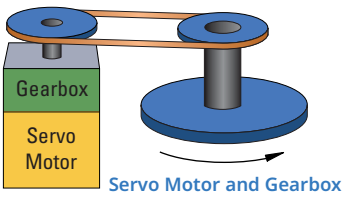
Direct Drive Motor Overview

Conventional servo systems commonly have a mechanical transmission which can consist of gears, gearboxes, belts/pulleys or cams connected between the motor and the load. With Direct Drive Motors, the mechanical transmission is eliminated and the motor is coupled directly to the load.



Servo Motor and Gearbox

Why Use Direct Drive Motors?

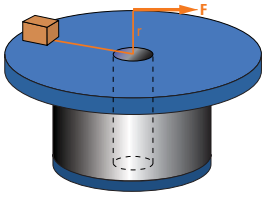
Increased Accuracy and Repeatability

A "precision" planetary gearbox could have a backlash of 1 arc-minute. This can result in the load moving by 1 arc-minute with an absolutely stationary drive motor. Kollmorgen's standard direct drive rotary (DDR) and direct drive linear (DDL) servo motors have repeatability better than 1 arc-second. Therefore, a direct drive motor can hold a position 60 times better than a conventional motor/gearbox.

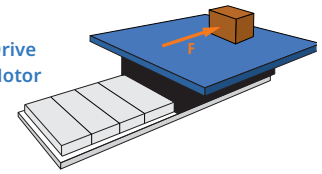
The increased accuracy of direct drive rotary motors results in a higher quality product out of the machine:

- Print registration is more accurate
- Cut or feed lengths can be held more precisely
- Coordination with other machine axes is more accurate
- Indexing location is more exact
- Tuning issues due to backlash are eliminated

Direct Drive Rotary Motor



Direct Drive Linear Motor

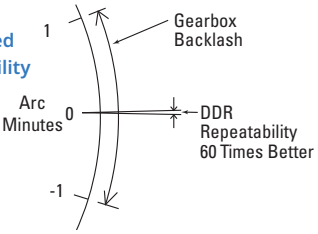


Higher Bandwidth

Mechanical transmission components impose a limit on how fast a machine can start and stop and also extend the required settling time. These factors limit the possible throughput of a machine.

Direct drive rotary motors remove these limitations and allows for much faster start/stop cycles and also provide greatly reduced settling time. Users of direct drive systems have reported up to a 2X increase in throughput.

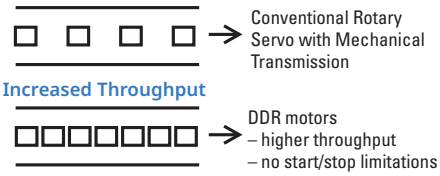
Improved Repeatability



Improved Reliability and Zero Maintenance

Gears, belts, and other mechanical transmission parts break. By eliminating these parts and using DDR and DDL motors, the reliability of the machine is improved. Gearboxes require periodic lubrication and/or replacement in aggressive start/stop applications. Belts require periodic tightening. There are no time-wear components in a direct drive motor and consequently they require zero maintenance.

Increased Throughput



Fewer Parts

With direct drive motors, all you need is the motor and the mounting bolts. This often replaces many parts including brackets, guards, belts, pulleys, tensioners, couplings, and bolts, resulting in:

- Fewer parts on the BOM. Less parts to purchase, schedule, inventory and control, and less parts to assemble.
- Assembly time of the servo drops from several hours with the mechanical transmission to several minutes with the DDR.
- Reduced cost. Although a direct drive motor may carry a small price-premium compared to a motor/gearbox with the same torque, consider that there is an overall cost reduction when eliminating the parts and labor of all the extra components required in a servo system with mechanical transmission.

No Inertia Matching

Servo systems with mechanical transmissions require inertia matching that limits the reflected load inertia at 5 to 10 times the motor inertia. If this limitation is not met, the system becomes difficult to control due to instability issues. Inertia matching limitations of mechanical transmission systems often force machine designers to use a larger motor than would otherwise be required just to satisfy the inertia matching requirement.

Such sizing conventions are not required with direct drive rotary motors. Since the motor is directly connected to the load, the inertia of the motor and the load become a common inertia. Therefore, no inertia matching is required when using DDR and DDL. DDR and DDL applications have run with inertia ratios greater than 1,000:1.

Reduced Audible Noise

Machines with DDR motors have audible noise levels as low as 20 dB less than the same machine with a mechanical transmission.

Which Direct Drive Motor is Right for Your Application?

Kollmorgen's 70 years of electromagnetic and electromechanical design experience combined with our quality and service, allowed us to refine and expand DDR motors into three product categories for easy installation, use, and short lead times: Frameless DDR, Housed DDR, and the Cartridge DDR. This allows you to select the right DDR solution for your application.

Applications where the load rides on the motor's bearings such as indexing or rate tables

Cartridge DDR Motor

This motor is the first in the industry to combine the space-saving and performance advantages of Frameless DDR motors with the ease of installation of a full-frame motor. Consisting of a rotor, stator, and factory-aligned high-resolution feedback device, the motor uses the machine's bearings to support the rotor. An innovative compression coupling engages the rotor to the load and the frame of the motor mounts to the machine with a bolt circle and pilot diameter just like a conventional servo motor, saving space and design time and simplifying the overall system.

Any application with existing bearings

Housed DDR Motor

The Housed DDR is a housed motor assembly featuring a factory aligned high-resolution feedback device and precision bearings, allowing it to function as the core of rotary indexing and rate table applications. The system can also be used as a flexible indexer, providing programmable, rapid indexing far exceeding the throughput and accuracy of conventional mechanical or variable reluctance indexers.

Applications where size and weight must be absolutely minimized

Frameless DDR Motors

Frameless motors include a rotor and stator as separate components which are integrated into, ride on the bearings of, and become a part of the driven load. Frameless motors offer the most compact and lightweight DDR solution available. The KBM™ and TBM series are Kollmorgen's Frameless DDR products. The KBM provides excellent torque/volume with the use of a proprietary neodymium-iron magnet rotor structure and skewed armature assembly. The KBM series is the first UL recognized parts set available on the market. This provides OEMs with the benefits of UL component ratings for easier agency approval on their machines. The TBM frameless motor is a series of direct drive torque motors designed for applications that require high power in a small, compact form factor with minimized weight and inertia.

Applications where linear motion is required

Direct Drive Linear (DDL) Motor

Directly coupling a linear motor to the driven load offers many advantages, including eliminating all mechanical transmissions, such as ball/lead screws, rack & pinions, belts/pulleys, and eliminating gearboxes. This in turn also eliminates backlash and compliance, and other problems associated with these mechanical transmissions.

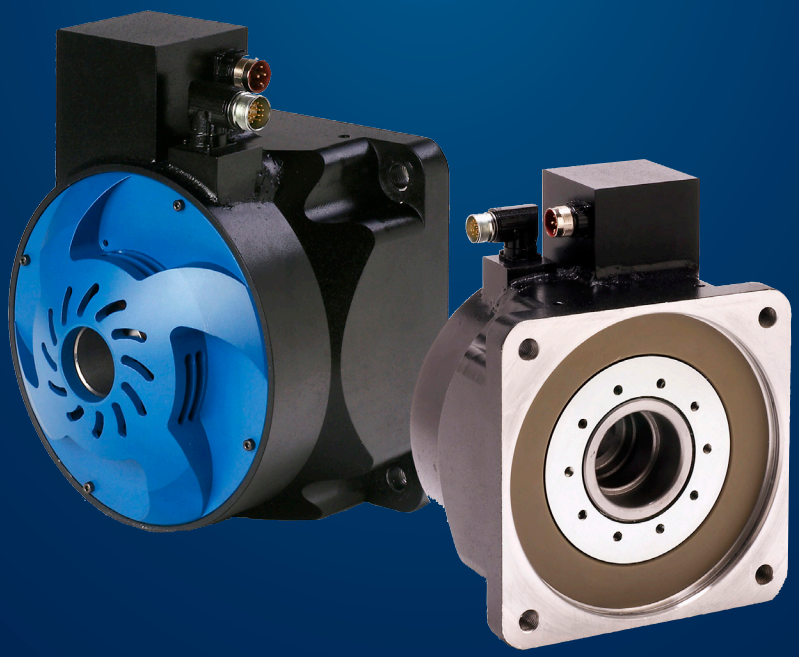
Cartridge Direct Drive Rotary (DDR) Motor

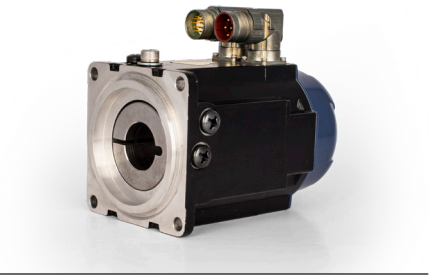
The Cartridge DDR Motor is the first in the industry to combine the space-saving and performance advantages of frameless DDR technology with the ease of installation of a full-frame motor.

Cartridge DDR motors also feature an advanced electromagnetic design that provides up to 50% more torque density than comparably sized conventional servo motors.

Consisting of a rotor, stator, factory-aligned high-resolution feedback device, the Cartridge DDR motor uses the machine's bearings to support the rotor.

An innovative compression coupling secures the Cartridge DDR's rotor to the machine shaft, and the Cartridge DDR's housing is bolted to the machine frame with a bolt circle and pilot – just like a conventional servo motor. Also, mechnical transmission components are eliminated, saving space and design time while simplifying the overall system.





Cartridge DDR Motor Features	Benefits
» **Integrated compression coupling and shipping hardware**	» Eliminate parts and labor for a faster and lower cost machine build » Assembles in 5 minutes
» **5 frame sizes, multiple lengths** » **230 / 400 / 480 VAC windings available (high and low)** » **Continuous torque range: 4.57 N-m (3.37 lb-ft) to 510 N-m (373 lb-ft)** » **Speeds up to 2,500 RPM** » **Optimized torque output with high-pole count efficient electromagnetic design** » **Hollow shaft available on C09x and C13x models, provides a 1.26 inch (32 mm) through bore to allow process or wiring to run through the center of the motor. Provision for mounting a rotary union to the shaft and housing is included.**	» Satisfies a wide range of machine requirements and configurations
» **Integrated high-resolution sine encoder** » **134,217,728 counts / rev** » **Low cogging for smooth low-speed rotation** » **Zero backlash and compliance**	» Increased accuracy and higher throughput
» **Direct load connection eliminates gearboxes, belts, or pulleys**	» Greater machine reliability and reduced maintenance » Reduced audible noise, fewer parts and lower cost of ownership » More compact machine and reduced design time

Cartridge DDR Motor

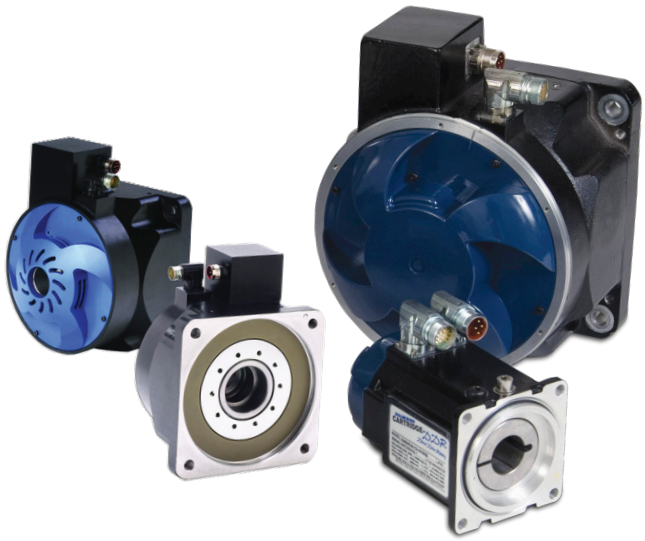
Cartridge DDR Application Considerations

Inertia Matching

Since the Cartridge DDR motor is directly connected to the machine, inertial matching is not required as it is on a conventional motor. With direct drive, inertia miss match of 250 to 1 is common and miss match of 1000 to 1 has been demonstrated.

Mounting Orientation

The Cartridge DDR motor can be mounted with any orientation including either a horizontal or vertical shaft.

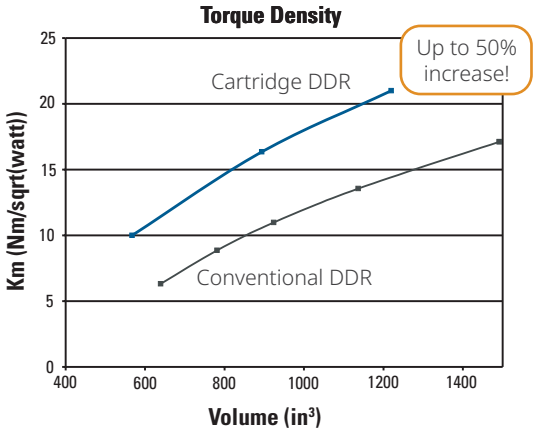


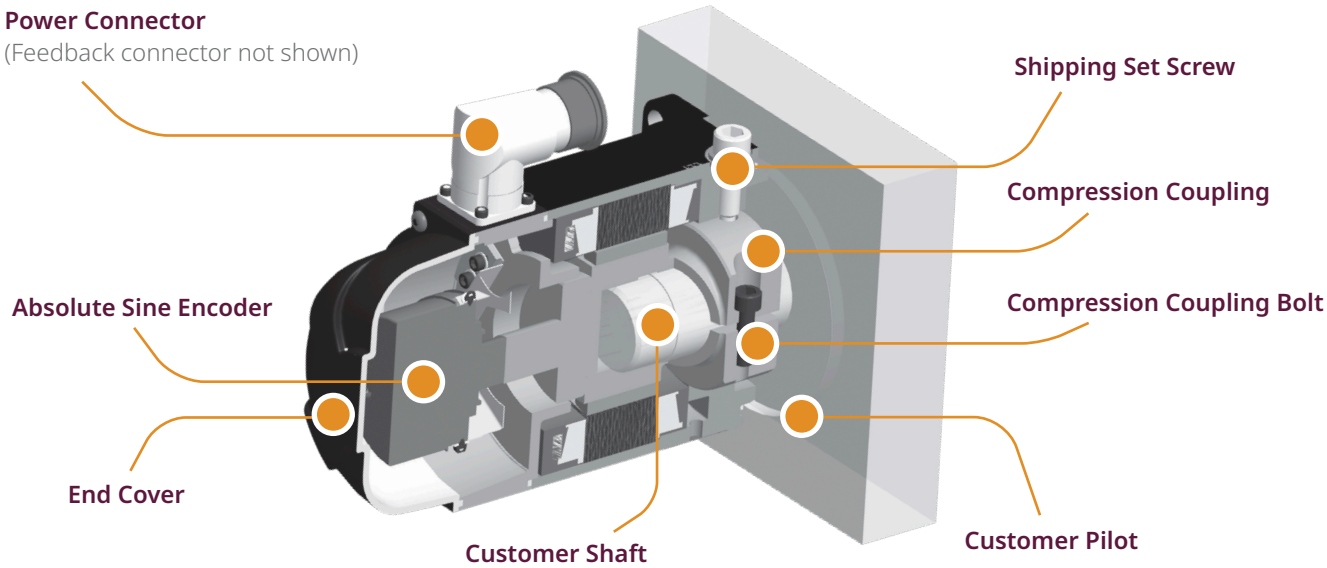
Mounting Cartridge DDR to Machine

Simple and quick procedures to mount:

- Slide the Cartridge DDR motor onto machine shaft
- Bolt Cartridge DDR motor housing to machine frame
- Torque compression coupling
- Remove/store shipping hardware
- Connect cables and run the motor

Proprietary electromagnetic design gives Cartridge DDR motors more torque per volume than conventional DDR technology.





The Cartridge DDR Advantage – Press Feed Machine

Consider how Cartridge DDR technology improves a Press Feed machine:

Reduced Assembly Time

The assembly time for the original mechanical transmission system was 4 hours. In contrast, the Cartridge DDR motor is installed in less than 5 minutes, resulting in a significant cost savings in labor.

Reduced Parts Count

The original mechanical transmission system comprises 2 bracket pieces, 12 bolts, 2 pulleys, 2 set screws, 2 keys, a timing belt, a housing to protect operators from the timing belt, a tension system for the timing belt, and motor/gearbox. With the Cartridge DDR system, this is all replaced by the motor and 4 mounting bolts, resulting in fewer parts to maintain and cost savings.

Improved Accuracy

The best planetary gearboxes have a backlash between 1 and 2 arc-minutes. Over the life of the gearbox, the backlash will increase. The Cartridge DDR system has an absolute accuracy of 26 arc-seconds and a repeatability of 0.7 arc-seconds. The Press Feed machine with the Cartridge DDR has a feed accuracy of +/- 0.0005 inch where the Press Feed machine with the mechanical transmission has a feed accuracy of 0.002 inch. Therefore, there was an overall four times improvement in machine accuracy with the Cartridge DDR system.

Increased Throughput

The cycle rate of the Cartridge DDR system is two times better than the mechanical transmission. This results in an increase in throughput of 100 percent.

Improved Reliability and Simplified Maintenance

The Cartridge DDR system eliminates parts that wear, change over time, or fail. Gearboxes are prone to wear, and backlash increases over time. Belts and pulleys stretch and require maintenance to maintain proper belt tension. By eliminating these components, the Cartridge DDR system delivers greater system reliability.

Press Feed Example

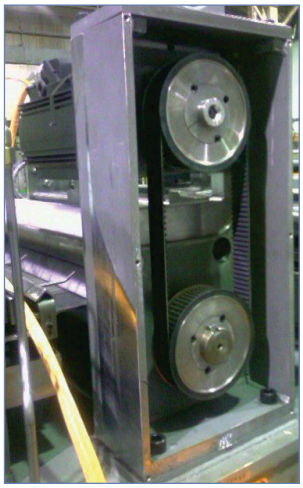
Gearboxes have a finite life span, especially in a demanding cyclic application such as a Press Feed. On this machine, the gearbox must be replaced every 10,000 hours and the belt must be tensioned every 2,000 hours. By contrast, the Cartridge DDR motor has no wear components and requires no maintenance thus simplifying the maintenance schedule for the machine and reducing operating costs.

Reduced Audible Noise

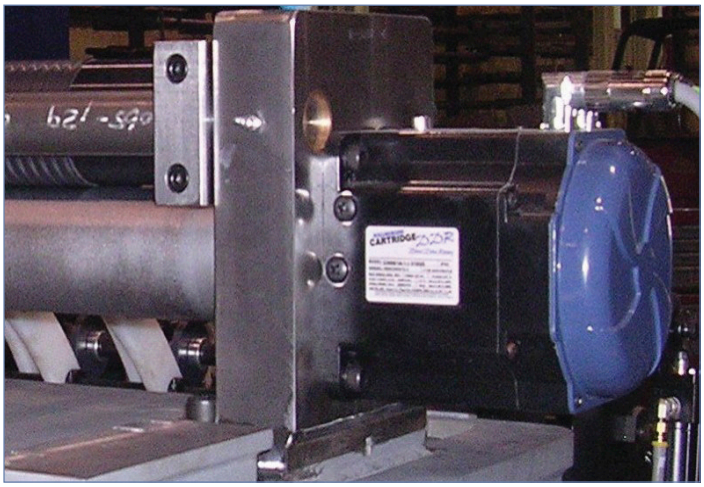
The Cartridge DDR system has as much as a 20 dB reduction in noise compared to a mechanical transmission servo system. This can dramatically reduce the overall noise level of the machine. A quieter machine gives the perception of quality. This is rightfully so as the noise emitted by gears and belts is caused by the wearing of the parts.

Total Reduced Cost

A Cartridge DDR motor typically costs 20 percent more than a comparable motor/gearbox combination. However, the elimination of parts and assembly time typically results in a lower total cost for the Cartridge DDR solution.v



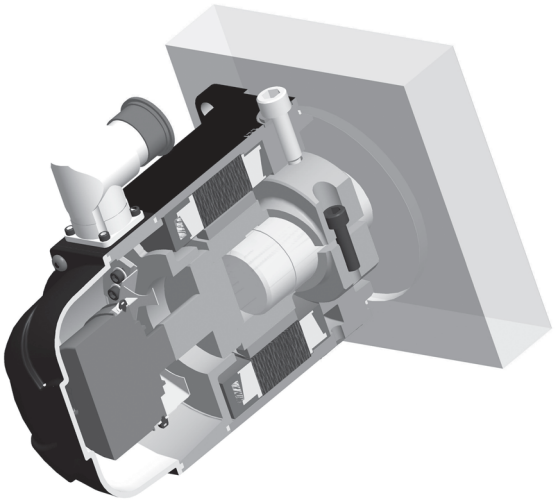
Press feed machine built with a conventional servo motor, gearbox, belt and pulleys.



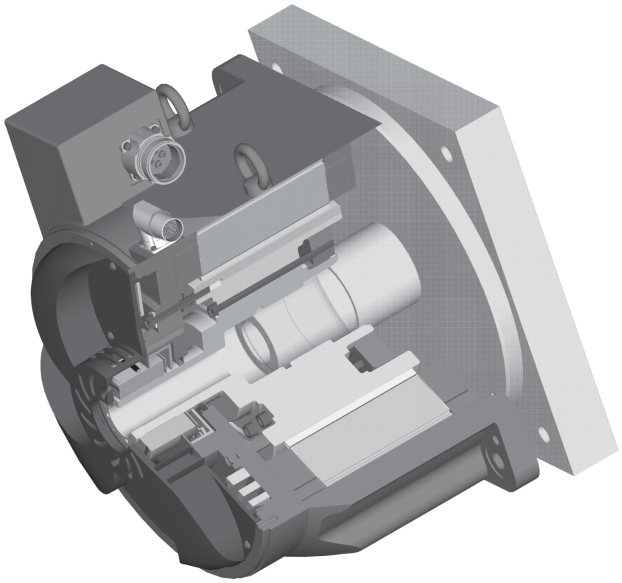
Same machine with a Cartridge DDR motor installed. Here, the shaft of the driven roll is extended into the Cartridge DDR motor and the motor applies torque directly to the driven roll.

Cartridge DDR System Summary

Due to the large range of continuous and peak torques for the Cartridge DDR series, the mechanical mounting and coupling to the machine varies.



Cross Section of C(H)04x, C(H)05x, C(H)06x



Cross Section of C(H)09x, C(H)13x

Machine Interface Summary

Parameter	C(H)04x, C(H)05x, C(H)06x	C(H)09x, C(H)13x
Coupling Technology	Single bolt split hub, access front motor	Multi-bolt compression, access from rear of motor
Mounting Requirements Shaft TIR	.005" (.13 mm)	.0015" (.038 mm)
Perpendicularity of Machine Mounting Face	.004" (.10 mm)	.002" (.051 mm)
Concentricity of Machine Pilot to Shaft	.004" (.10 mm)	.002" (.051 mm)
Shipping Hardware	Alignment bolt and cap screw	4 set screws and 4 shipping bolts
Mounting Procedure	Procedure # 903-700001-99	Procedure # 903-700001-99

Performance Summary

			AKD Family Servo Drive					Performance				
								Cont. Torque		Peak Torque		Maximum Speed
			3 Amp	6 Amp	12 Amp	24 Amp*	48 Amp*	(N-m)	lb-ft	(N-m)	lb-ft	
Cartridge DDR Motors	240 Volt Systems	C041A	•					4.6	3.4	12.3	9.1	1700
		C041B		•				4.5	3.3	12.2	9.0	2500
		C042A		•				8.3	6.1	22.3	16.4	1650
		C042B		•				8.5	6.3	22.8	16.8	2500
		C043A		•				11.1	8.2	30.0	22.1	1250
		C043B			•			11.2	8.2	30.1	22.2	2500
		C044A		•				13.9	10.2	37.3	27.5	1000
		C044B			•			14.1	10.4	37.9	28.0	2100
		C051A		•				11.7	8.7	30.2	22.2	1150
		C051B			•			11.9	8.8	30.5	22.5	2450
		C052C		•				17.1	12.6	43.6	32.1	950
		C052D			•			16.5	12.2	42.3	31.5	2050
		C053A			•			21.0	15.5	54.1	39.9	1350
		C053B				•		20.1	14.8	50.0	36.9	2500
		C054A			•			24.9	18.4	63.9	47.1	1200
		C054B				•		23.8	17.6	61.2	45.1	2300
		C061A			•			33.7	24.9	86.7	63.9	900
		C061B				•		32.6	24.1	75.7	55.9	1900
		C062C			•			48.3	35.6	117.2	86.4	700
		C062B				•		44.6	32.9	101.9	75.2	1400
		C063C			•			61.8	45.6	156.6	115.5	550
		C063B				•		59.0	43.5	136.0	100.3	1050
		C091A				•		50.2	37.0	120.0	88.3	600
		C092C				•		101.4	74.8	227.6	167.9	600
		C093C				•		137	101	308.2	227.3	350
		C131C				•		188.5	139.0	390.8	288.2	600
		C131B					•	189.8	140.0	396.1	292.2	450
		C132C				•		360.6	266.0	644.7	475.5	150
		C132B					•	360.6	266.0	759.3	560.0	225
		C133C				•		500	370	1017.8	750.7	120
		C133B					•	509.8	376.0	1017.3	750.3	175
	400 / 480 Volt Systems	CH041A	•					4.6	3.4	12.3	9.1	2500
		CH042A		•				8.3	6.1	22.3	16.4	2500
		CH043A		•				11.1	8.2	30.0	22.1	2500
		CH044A		•				13.9	10.2	37.3	27.5	2200
		CH051A		•				11.7	8.7	30.2	22.2	2500
		CH052C		•				17.1	12.6	43.6	32.1	2100
		CH053A			•			21.0	15.5	54.1	39.9	2500
		CH054A			•			24.9	18.4	63.8	47.1	2500
		CH061A			•			33.7	24.9	86.7	63.9	1900
		CH062C			•			48.3	35.6	117.2	86.4	1550
		CH063C			•			61.8	45.6	156.6	115.5	1150
		CH063B				•		59.0	43.5	136.0	100.3	2200
		CH091A				•		50.2	37.0	120.0	88.3	1500
		CH092C				•		101.4	74.8	227.6	167.9	900
		CH093C				•		145.1	107.0	308.2	227.3	720
		CH131C				•		188.5	139.0	390.8	288.2	650
		CH131B					•	189.8	140.0	396.1	292.2	1000
		CH132C				•		360.6	266.0	644.7	475.5	350
		CH132B					•	360.6	266.0	759.3	560.0	500
		CH133C				•		504.4	372.0	1017.8	750.7	275
		CH133B					•	509.8	376.0	1017.3	750.3	400

*AKD2G drives are not available in 24 and 48 amps.

Cartridge DDR Nomenclature

Cartridge DDR Motor

C 09 1 A - 1 1 - 1 1 0 5 - xxx

CDDR Series

C 230 Vac

CH 400/480 Vac

Frame Size

04 108 mm [4.25 in.] sq. housing

05 138 mm [5.43 in.] sq. housing

06 188 mm [7.40 in.] sq. housing

09 246 mm [9.68 in.] sq. housing

13 350 mm [13.78 in.] sq. housing

Stack Length

1 Short stack

2 Mid stack

3 Long stack

4 Extra long stack
(04 and 05 frames only

Winding Type

A Standard winding

B High-speed winding (C04x, C05x, C06x, C13x)

C Standard winding (C052, C062, C063, C092, C093, C13x)

D High-speed winding (C052 only)

Mounting

1 Standard flange mount

Connector

1 Side Facing, IP65 (09 and 13 frames only)

2 Rear Facing, IP65 (09 and 13 frames only)

3 90° Rotatable connectors (04, 05, and 06 frames only)

Shaft

1 Hollow with compression coupling and key (09 and 13 frames only)

2 Solid with compression coupling and key (09 and 13 frames only)

3 Solid with split-ring coupling and no key (04, 05, and 06 frames only)

Feedback

1 EnDat single-turn absolute sine encoder (2048 line)

3 BiSS single-turn absolute sine encoder (2048 line)

4 BiSS multi-turn absolute sine encoder (2048 line)

5 EnDat multi-turn absolute sine encoder (2048 line)

Bearing

0 No bearing option

(Standard - integral shipping clamp provided)

Seal

5 Sealed

(Shaft option "1" - IP64 rating when customer seals interface side)

(Shaft option "2" or "3" - IP65 when customer seals interface side)

Customization

Note: Options shown in blue text are considered standard.

CDDR Feedback Option Specifications

Absolute Sine Encoder Options

EnDat Optical

Type		FB Option 1 - Single-Turn	FB Option 5 - Multi-Turn
Cycles per Revolution (# of abs. revs.)	-	2048 (1)	2048 (4096)
Input Voltage	VDC	3.6 to 14	3.6 to 14
Current Consumption	mA Typical	85 (no load)	105 (no load)
Feedback Operating Temperature	°C MIN./MAX.	-40/100	-40/115
Inertia	kg-cm²	0.026	0.026
Output Interface		HEIDENHAIN EnDat 2.2/01	
Manufacturer Product Type		ECN113	EQN1325

Encoder Alignment: With positive DC current into phase W and out of phase V (U floats) the encoder is aligned to ±1 electrical degree.

BiSS Optical

Type		FB Opton 2 - Single-Turn	FB Option 3 - Multi-Turn
Cycles per Revolution (# of abs. revs.)	-	2048 (1)	2048 (4096)
Input Voltage	VDC (tolerance)	5 (± 10%)	5 (± 10%)
Current Consumption	mA Typical	100 (without load)	100 (without load)
Feedback Operating Temperature	°C MIN./MAX.	-15/120	-15/120
Inertia	kg-cm²	0.038	0.038
Output Interface		BiSS B	
Manufacturer Product Type		AD58	AD58

Encoder Alignment: With positive DC current into phase W and out of phase V (U floats) the encoder is aligned to ±1 electrical degree.

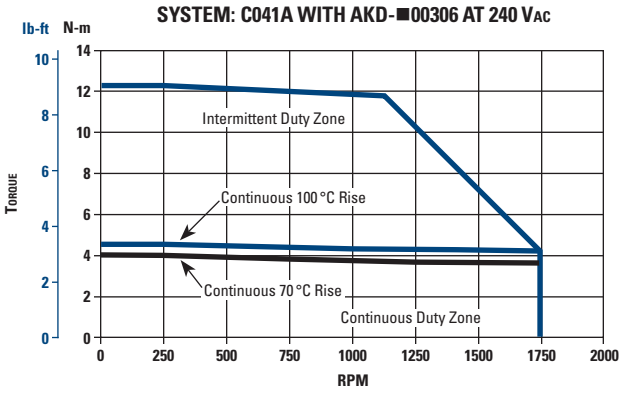
Feedback Device	Feedback Options	Vibration Resistance EN 60068-2-6	Shock Resistance EN 60068-2-27
Heidenhain 113 Hollow shaft Encoder	EnDat/BiSS Single and Multiturn Absolute Sine Encoders	<20 g [200 m/s²] 55 to 2000 Hz	≤102 [1000 m/s²] 6 ms
Heidenhain 1300 Solid shaft Encoder		<15 g [150 m/s²] @115°C 55 to 2000 Hz	≤204 g [2000 m/s²] 6 ms

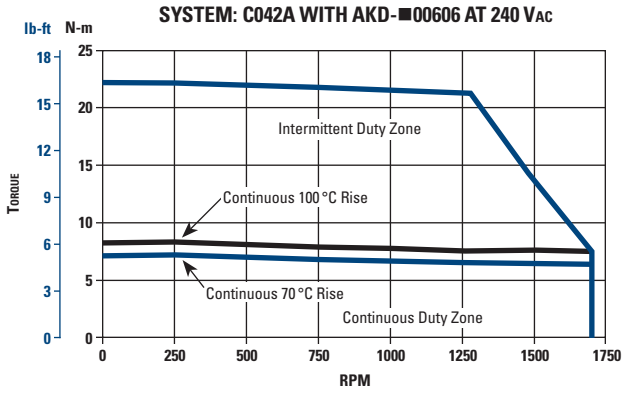
Cartridge DDR Performance Data

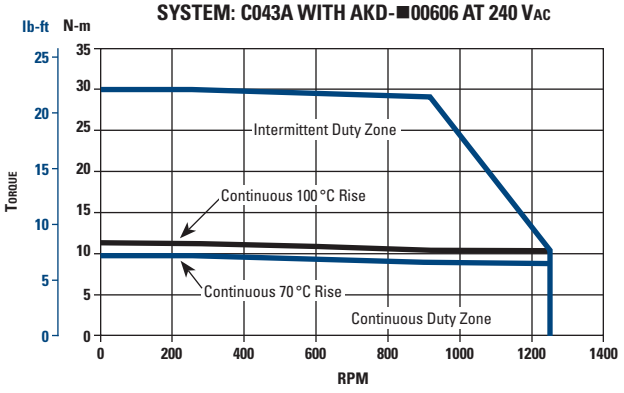
C04xA

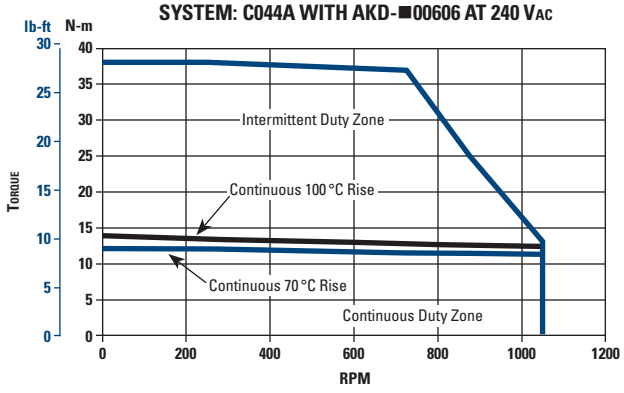
System Performance at 240 VAC C04xA Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	C041A	C042A	C043A	C044A
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	4.6 3.4	8.3 6.1	11.1 8.2	13.9 10.2
Cont. Line Current	Ic	Amps RMS @ 100 °C	2.7	4.7	4.7	4.9
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	4.0 2.9	7.2 5.3	9.7 7.1	12.3 9.1
Cont. Line Current	Ic	Amps RMS @ 70 °C	2.4	4.1	4.1	4.4
Peak Torque	Tp	Nm Lb-ft	12.3 9.1	22.3 16.4	30.0 22.1	37.3 27.5
Peak Line Current	Ip	Amps RMS	8.2	14.0	14.2	14.7
Maximum Speed	N max	RPM	1700	1650	1250	1000
Weight	Wt	kg lb	4.08 9.00	5.67 12.5	7.26 16.0	8.84 19.5
Rotor Inertia	Jm	kg-cm² oz-in-sec²	5.86 0.083	8.87 0.126	11.9 0.168	14.9 0.211









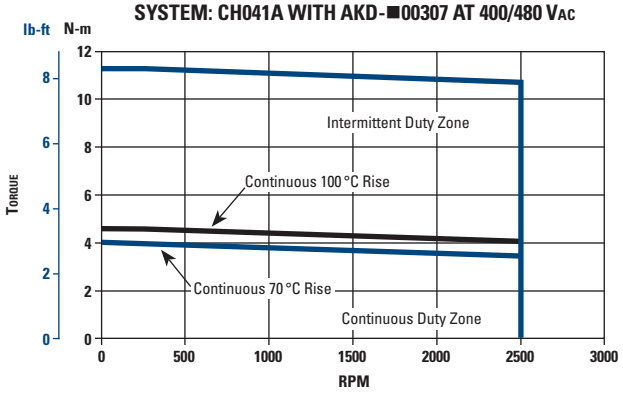
Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

CH04xA

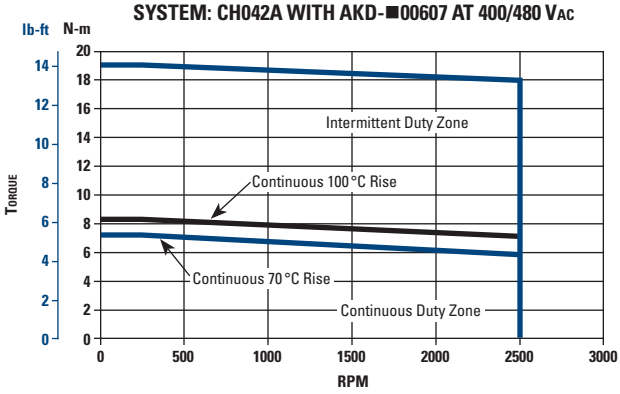
System Performance at 400/480 VAC CH04xA Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	CH041A	CH042A	CH043A	CH044A
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	4.6 3.4	8.3 6.1	11.1 8.2	13.9 10.2
Cont. Line Current	Ic	Amps RMS @ 100 °C	2.7	4.7	4.7	4.9
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	4.0 2.9	7.2 5.3	9.7 7.1	12.3 9.1
Cont. Line Current	Ic	Amps RMS @ 70 °C	2.4	4.1	4.1	4.4
Peak Torque	Tp	Nm Lb-ft	12.3 9.1	22.3 16.4	30.0 22.1	37.3 27.5
Peak Line Current	Ip	Amps RMS	8.2	14.0	14.2	14.7
Maximum Speed	N max	RPM @ 400 VAC RPM @ 480 VAC	2500 2500	2500 2500	2200 2500	1800 2200
Weight	Wt	kg lb	4.08 9.00	5.67 12.5	7.26 16.0	8.84 19.5
Rotor Inertia	Jm	kg-cm² oz-in-sec²	5.86 0.083	8.87 0.126	11.9 0.168	14.9 0.211

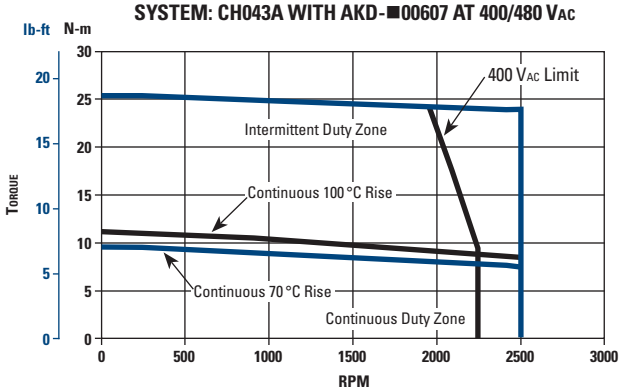
SYSTEM: CH041A WITH AKD-■00307 AT 400/480 VAC



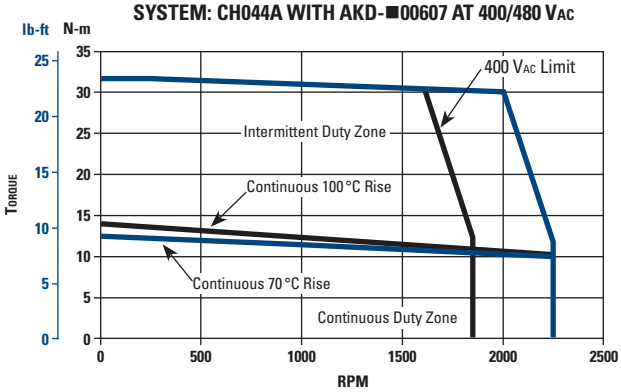
SYSTEM: CH042A WITH AKD-■00607 AT 400/480 VAC



SYSTEM: CH043A WITH AKD-■00607 AT 400/480 VAC



SYSTEM: CH044A WITH AKD-■00607 AT 400/480 VAC



Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

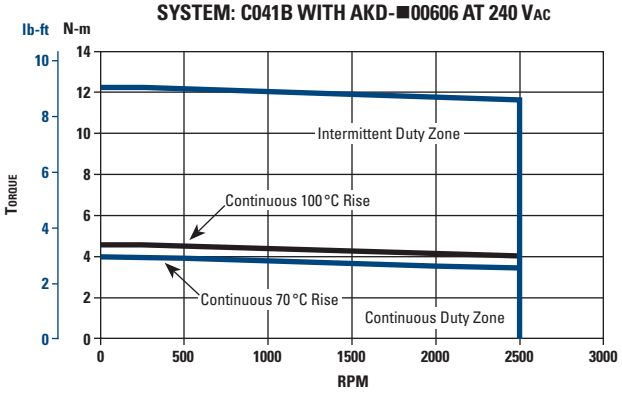
Cartridge DDR Performance Data

C04xB

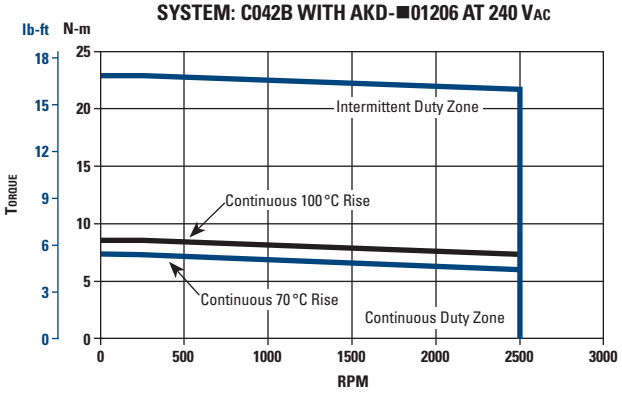
System Performance at 240 VAC C04xB Cartridge DDR Motor (High-Speed Winding) with AKD Family Servo Drives

System Performance	Symbol	Units	C041B	C042B	C043B	C044B
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	4.5 3.3	8.5 6.3	11.2 8.2	14.1 10.4
Cont. Line Current	Ic	Amps RMS @ 100 °C	4.7	9.2	9.2	9.5
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	3.9 2.9	7.4 5.4	9.7 7.2	12.5 9.2
Cont. Line Current	Ic	Amps RMS @ 70 °C	4.1	8.0	8.0	8.5
Peak Torque	Tp	Nm Lb-ft	12.2 9.0	22.8 16.8	30.1 22.2	37.9 28.0
Peak Line Current	Ip	Amps RMS	14.1	27.6	27.5	28.6
Maximum Speed	N max	RPM	2500	2500	2500	2100
Weight	Wt	kg lb	4.08 9.00	5.67 12.5	7.26 16.0	8.84 19.5
Rotor Inertia	Jm	kg-cm² oz-in-sec²	5.86 0.083	8.87 0.126	11.9 0.168	14.9 0.211

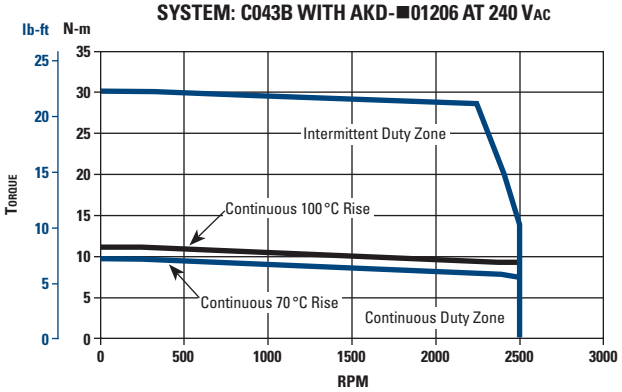
SYSTEM: C041B WITH AKD-■00606 AT 240 VAC



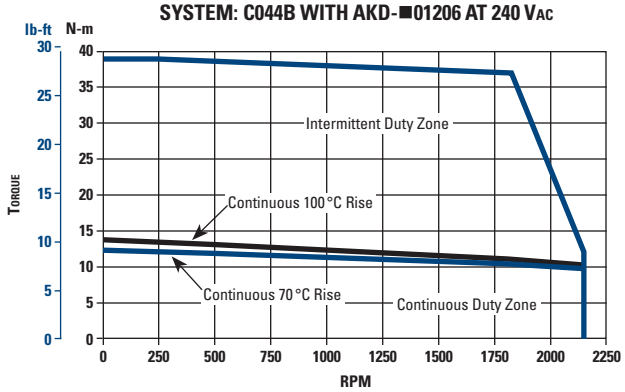
SYSTEM: C042B WITH AKD-■01206 AT 240 VAC



SYSTEM: C043B WITH AKD-■01206 AT 240 VAC



SYSTEM: C044B WITH AKD-■01206 AT 240 VAC

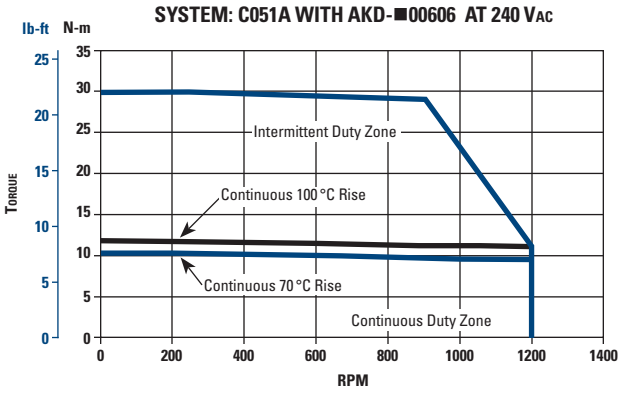


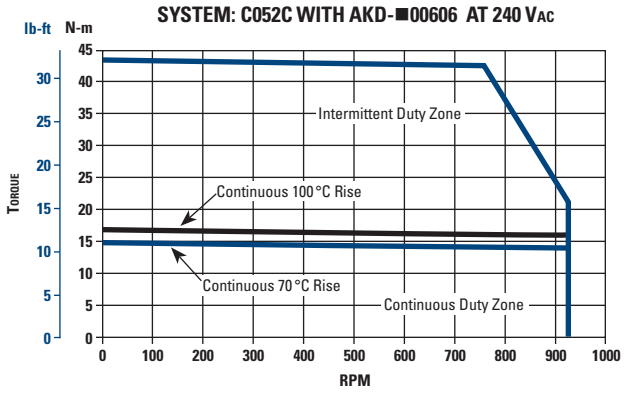
Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

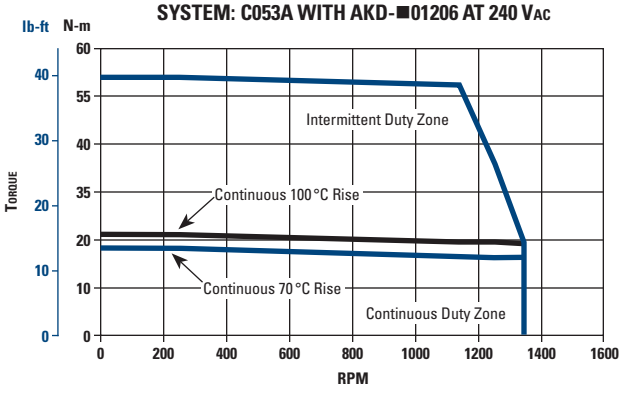
C05xA/C

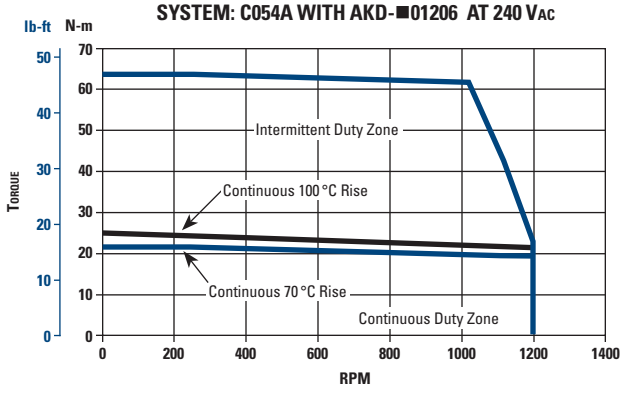
System Performance at 240 VAC C05xA/C Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	C051A	C052C	C053A	C054A
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	11.7 8.7	17.1 12.6	21.0 15.5	24.9 18.4
Cont. Line Current	Ic	Amps RMS @ 100 °C	4.8	5.7	9.3	9.8
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	10.2 7.5	14.9 11.0	18.3 13.5	21.8 16.1
Cont. Line Current	Ic	Amps RMS @ 70 °C	4.2	5.0	8.1	8.6
Peak Torque	Tp	Nm Lb-ft	30.2 22.2	43.6 32.1	54.1 39.9	63.9 47.1
Peak Line Current	Ip	Amps RMS	12.9	15.5	25.1	26.5
Maximum Speed	N max	RPM	1150	1700	1350	1200
Weight	Wt	kg lb	8.39 18.5	10.7 23.5	13.2 29.0	15.4 34.0
Rotor Inertia	Jm	kg-cm² oz-in-sec²	27.4 0.388	35.9 0.508	44.3 0.628	52.8 0.748









Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

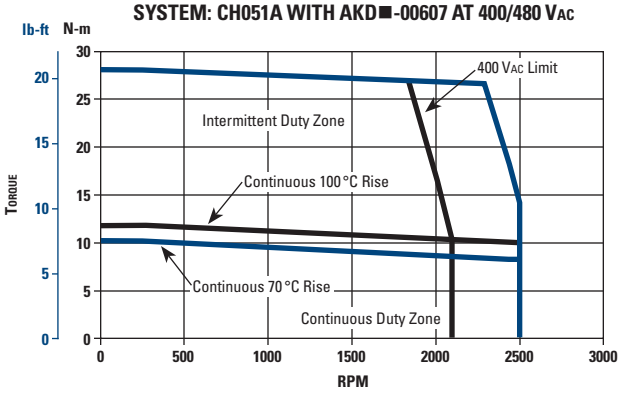
Cartridge DDR Performance Data

CH05xA

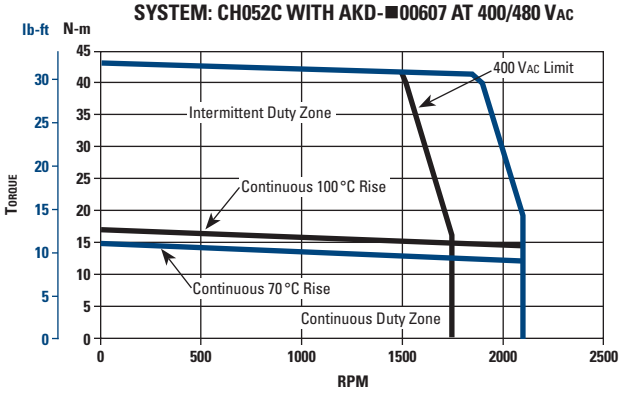
System Performance at 400/480 VAC CH05xA/C Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	CH051A	CH052C	CH053A	CH054A
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	11.7 8.7	17.1 12.6	21.0 15.5	24.9 18.4
Cont. Line Current	Ic	Amps RMS @ 100 °C	4.8	5.7	9.3	9.8
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	10.2 7.5	14.9 11.0	18.3 13.5	21.8 16.1
Cont. Line Current	Ic	Amps RMS @ 70 °C	4.2	5.0	8.1	8.6
Peak Torque	Tp	Nm Lb-ft	30.2 22.2	43.6 32.1	54.1 39.9	63.8 47.1
Peak Line Current	Ip	Amps RMS	12.9	15.5	25.1	26.5
Maximum Speed	N max	RPM @ 400 VAC RPM @ 480 VAC	2100 2500	1700 2100	2300 2500	2050 2500
Weight	Wt	kg lb	8.39 18.5	10.7 23.5	13.2 29.0	15.4 34.0
Rotor Inertia	Jm	kg-cm^2 oz-in-sec^2	27.4 0.388	35.9 0.508	44.3 0.628	52.8 0.748

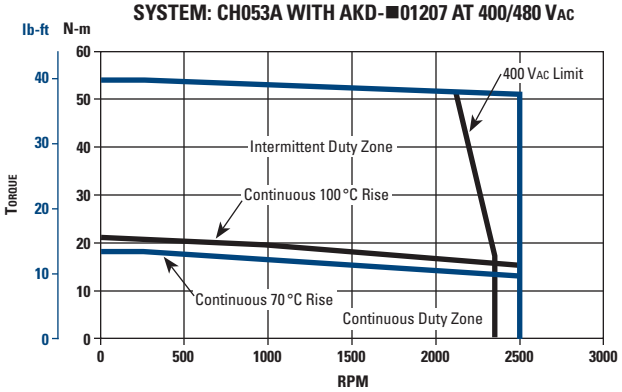
SYSTEM: CH051A WITH AKD■-00607 AT 400/480 VAC



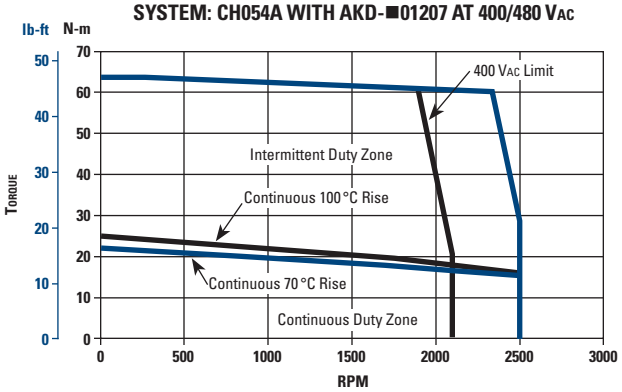
SYSTEM: CH052C WITH AKD-■00607 AT 400/480 VAC



SYSTEM: CH053A WITH AKD-■01207 AT 400/480 VAC



SYSTEM: CH054A WITH AKD-■01207 AT 400/480 VAC



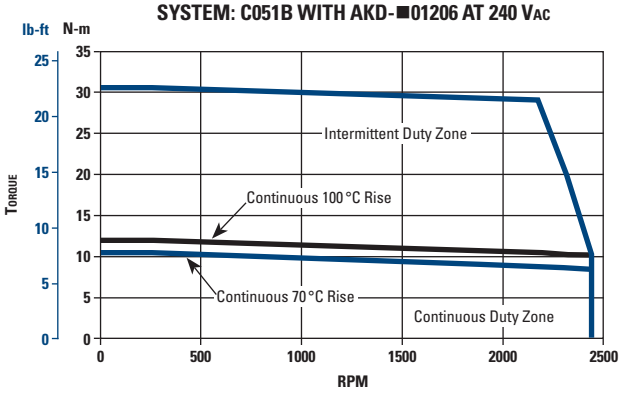
Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

C05xB/D

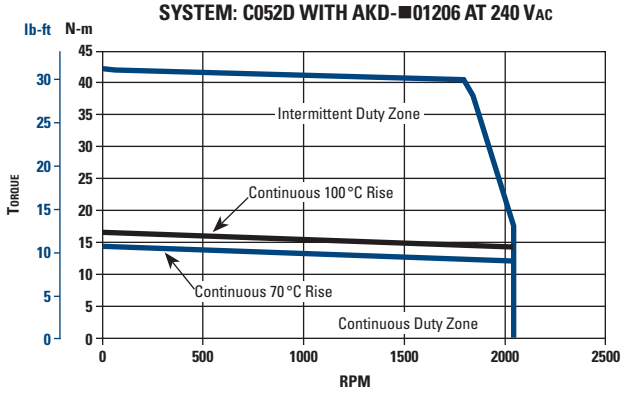
System Performance at 240 VAC C05xB/D Cartridge DDR Motor (High-Speed Winding) with AKD Family Servo Drives

System Performance	Symbol	Units	C051B	C052D	C053B	C054B
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	11.9 8.8	16.5 12.2	20.1 14.8	23.8 17.6
Cont. Line Current	Ic	Amps RMS @ 100 °C	9.3	10.9	18.4	17.4
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	10.3 7.6	14.4 10.6	17.5 12.9	20.9 15.4
Cont. Line Current	Ic	Amps RMS @ 70 °C	8.1	9.6	16.0	15.3
Peak Torque	Tp	Nm Lb-ft	30.5 22.5	42.3 31.2	50.0 36.9	61.2 45.1
Peak Line Current	Ip	Amps RMS	25.2	29.6	48.0	47.0
Maximum Speed	N max	RPM	2450	2050	2500	2300
Weight	Wt	kg lb	8.39 18.5	10.7 23.5	13.2 29.0	15.4 34.0
Rotor Inertia	Jm	kg-cm² oz-in-sec²	27.4 0.388	35.9 0.508	44.3 0.628	52.8 0.748

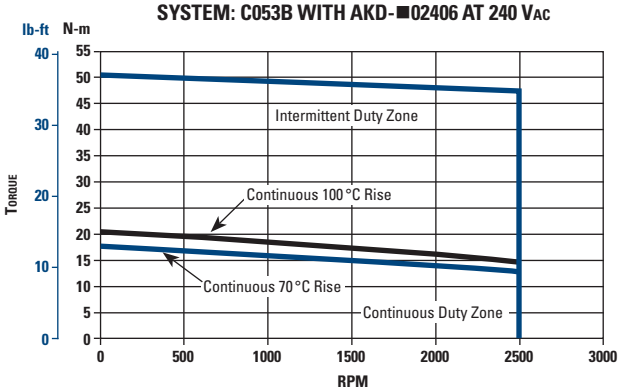
SYSTEM: C051B WITH AKD-■01206 AT 240 VAC



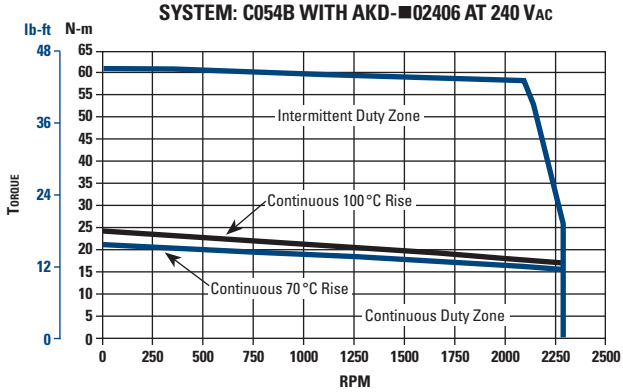
SYSTEM: C052D WITH AKD-■01206 AT 240 VAC



SYSTEM: C053B WITH AKD-■02406 AT 240 VAC



SYSTEM: C054B WITH AKD-■02406 AT 240 VAC



Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

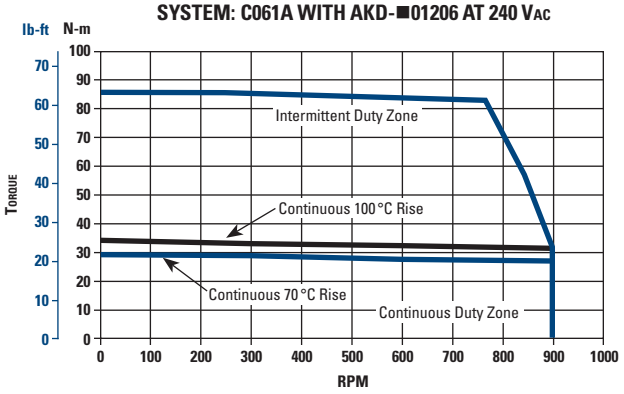
Cartridge DDR Performance Data

C06xA/C

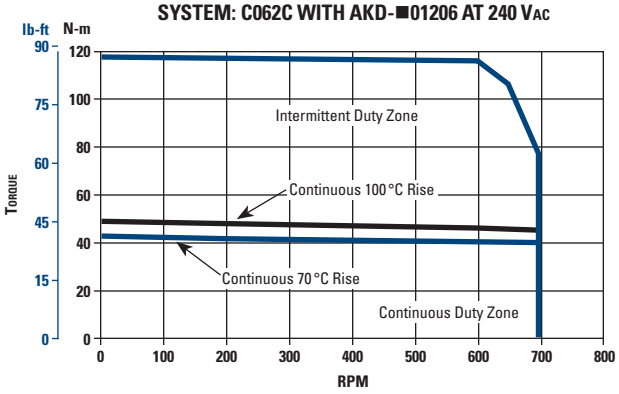
System Performance at 240 VAC C06xA/C Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	C061A	C062C	C063C
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	33.7 24.9	48.3 35.6	61.8 45.6
Cont. Line Current	Ic	Amps RMS @ 100 °C	10.0	11.8	11.3
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	29.4 21.7	42.1 31.0	53.9 39.7
Cont. Line Current	Ic	Amps RMS @ 70 °C	8.7	10.3	9.8
Peak Torque	Tp	Nm Lb-ft	86.7 63.9	117.2 86.4	156.6 115.5
Peak Line Current	Ip	Amps RMS	27.0	30.0	30.0
Maximum Speed	N max	RPM @ 400V	900	700	550
Weight	Wt	kg lb	18.6 41.0	23.6 52.0	29.0 63.0
Rotor Inertia	Jm	kg-cm² oz-in-sec²	94.1 1.33	126 1.78	157 2.23

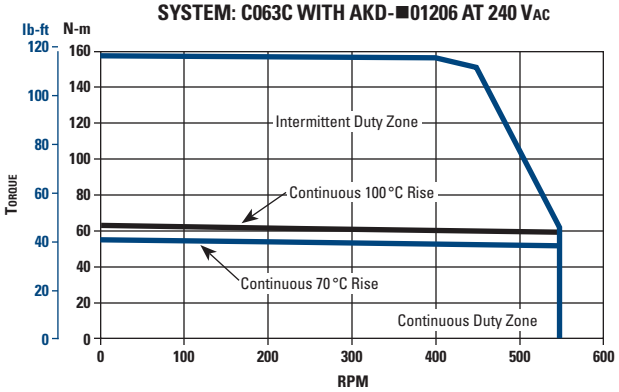
SYSTEM: C061A WITH AKD-■01206 AT 240 VAC



SYSTEM: C062C WITH AKD-■01206 AT 240 VAC



SYSTEM: C063C WITH AKD-■01206 AT 240 VAC

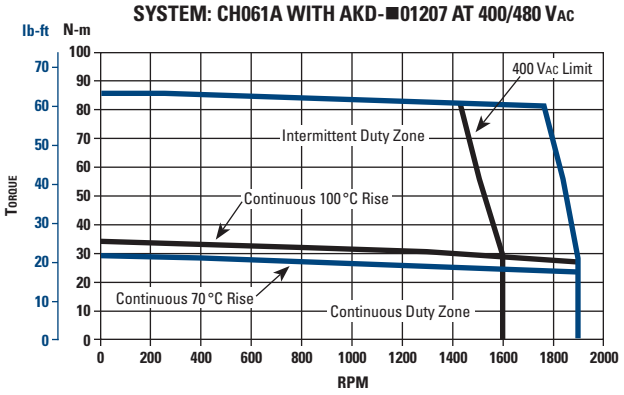


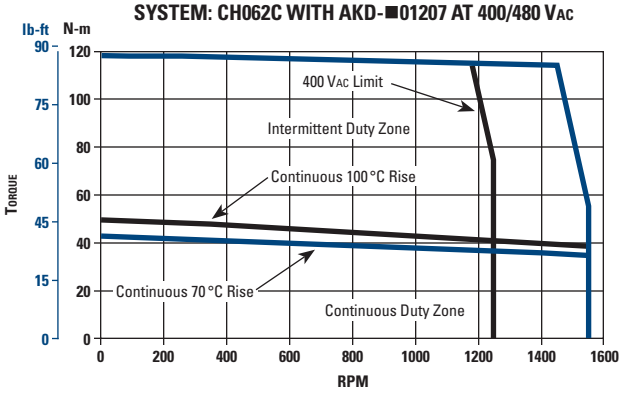
Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

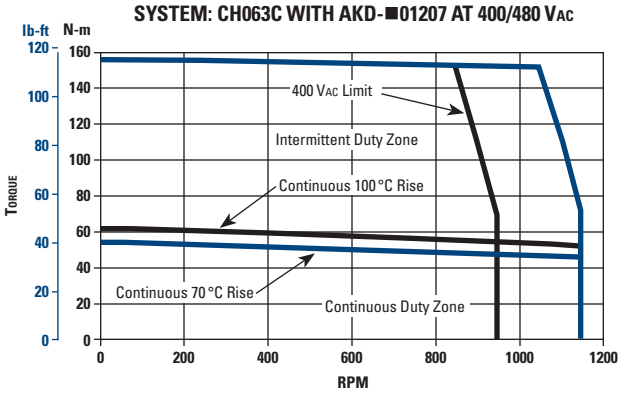
CH06x

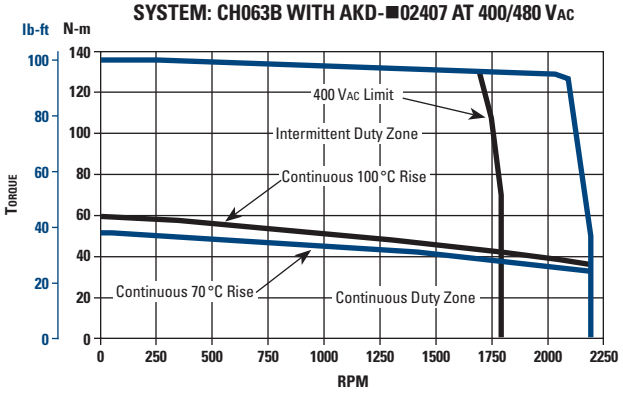
System Performance at 400 / 480 VAC CH06x Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	CH061A	CH062C	CH063C	CH063B
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	33.7 24.9	48.3 35.6	61.8 45.6	59.0 43.5
Cont. Line Current	Ic	Amps RMS @ 100 °C	10.0	11.8	11.3	19.8
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	29.4 21.7	42.1 31.0	53.9 39.7	51.4 37.9
Cont. Line Current	Ic	Amps RMS @ 70 °C	8.7	10.3	9.8	17.3
Peak Torque	Tp	Nm Lb-ft	86.7 63.9	117.2 86.4	156.6 115.5	136.0 100.3
Peak Line Current	Ip	Amps RMS	27.0	30.0	30.0	48.0
Maximum Speed	N max	RPM @ 400 VAC RPM @ 480 VAC	1550 1900	1250 1550	950 1150	1800 2200
Weight	Wt	kg lb	18.6 41.0	23.6 52.0	29.0 63.0	29.0 63.0
Rotor Inertia	Jm	kg-cm² oz-in-sec²	94.1 1.33	126 1.78	157 2.23	157 2.23









Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

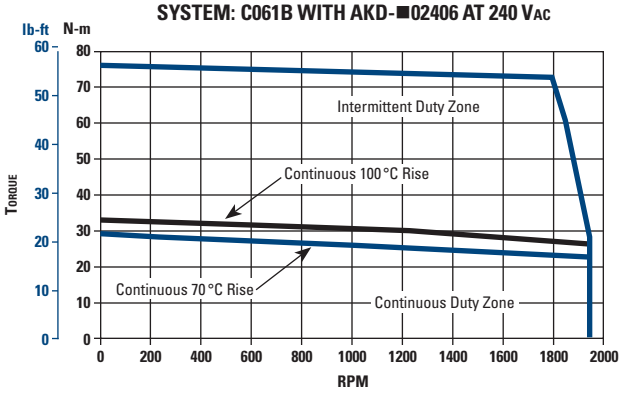
Cartridge DDR Performance Data

C06xB

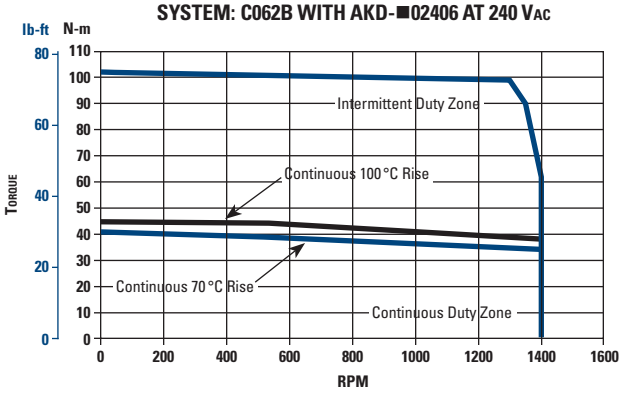
System Performance at 240 VAC C06xB Cartridge DDR Motor (High-Speed Winding) with AKD Family Servo Drives

System Performance	Symbol	Units	C061B	C062B	C063B
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	32.6 24.1	44.6 32.9	59.0 43.5
Cont. Line Current	Ic	Amps RMS @ 100 °C	19.7	20.0	19.8
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	28.4 21.0	40.5 29.9	51.4 37.9
Cont. Line Current	Ic	Amps RMS @ 70 °C	17.2	18.2	17.3
Peak Torque	Tp	Nm Lb-ft	75.7 55.9	101.9 75.2	136.0 100.3
Peak Line Current	Ip	Amps RMS	48.0	48.0	48.0
Maximum Speed	N max	RPM @ 400V	1900	1400	1050
Weight	Wt	kg lb	18.6 41.0	23.6 52.0	29.0 63.0
Rotor Inertia	Jm	kg-cm^2 oz-in-sec^2	94.1 1.33	126 1.78	157 2.23

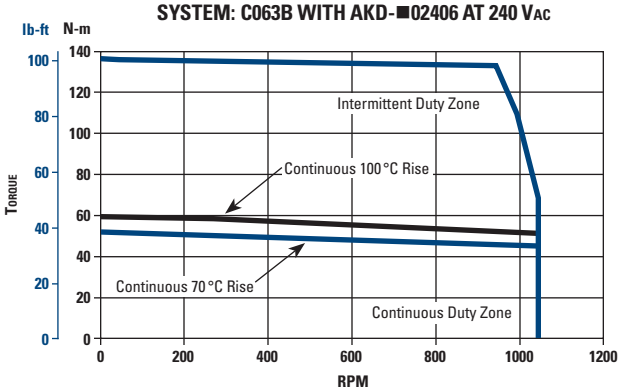
SYSTEM: C061B WITH AKD-■02406 AT 240 VAC



SYSTEM: C062B WITH AKD-■02406 AT 240 VAC



SYSTEM: C063B WITH AKD-■02406 AT 240 VAC

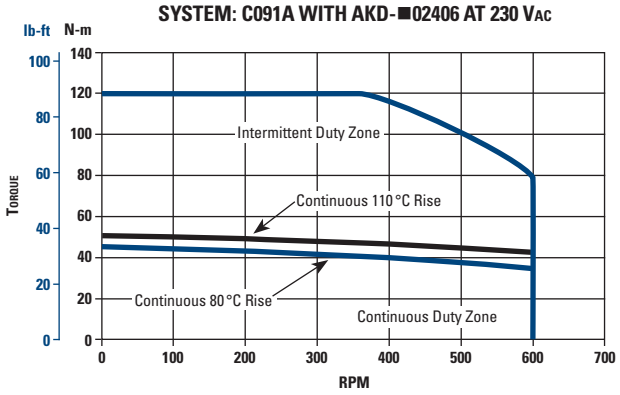


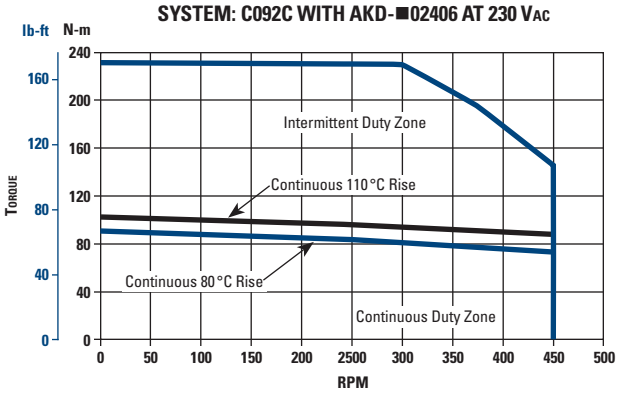
Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

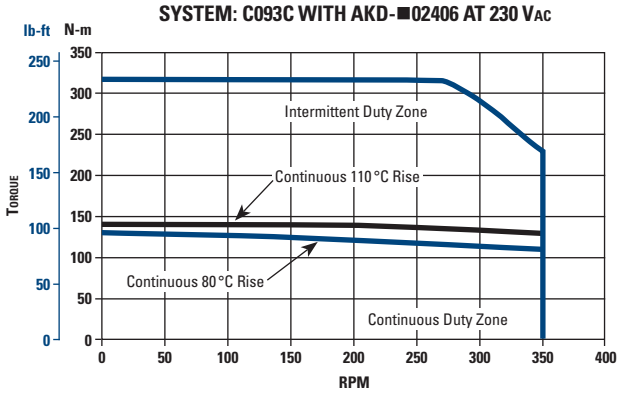
C09xA/C

System Performance at 230 VAC C09xA/C Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	C091A	C092C	C093C
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	50.2 37.0	101.4 74.8	137.0 101.0
Cont. Line Current	Ic	Amps RMS @ 100 °C	12.8	18.4	20.0
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	33.0 44.7	90.2 66.5	128.8 95.0
Cont. Line Current	Ic	Amps RMS @ 70 °C	11.4	16.4	18.9
Peak Torque	Tp	Nm Lb-ft	120.0 88.3	227.6 167.9	308.2 227.3
Peak Line Current	Ip	Amps RMS	40.0	48.0	48.5
Maximum Speed	N max	RPM @ 400V	600	600	350
Weight	Wt	kg lb	27.7 61.0	41.3 91.0	54.4 120
Rotor Inertia	Jm	kg-cm² oz-in-sec²	280 3.97	470 6.66	660 9.35







Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

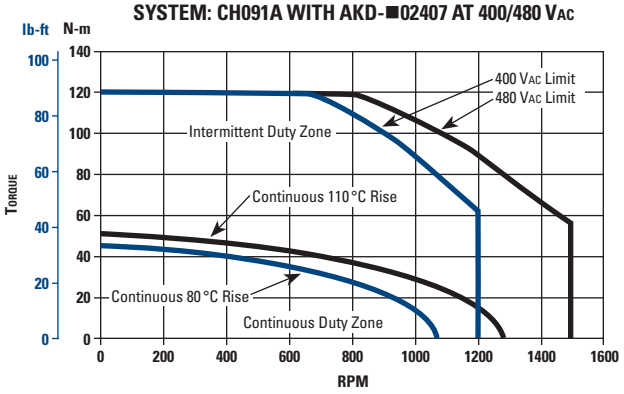
Cartridge DDR Performance Data

CH09xA/C

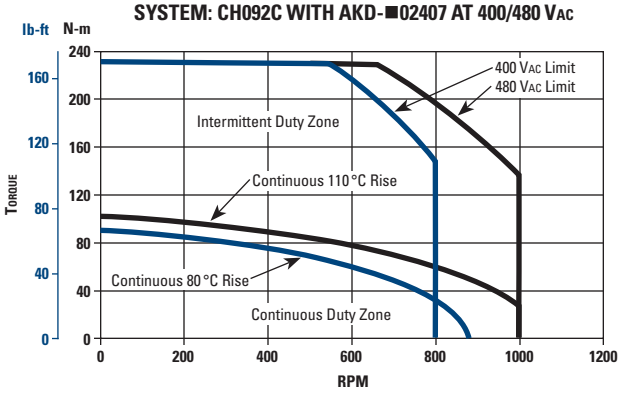
System Performance at 400 /480 VAC CH09xA/C Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	CH091A	CH092C	CH093C
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	50.2 37.0	101.4 74.8	137.0 101.0
Cont. Line Current	Ic	Amps RMS @ 100 °C	12.8	18.4	20.0
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	33.0 44.7	90.2 66.5	128.8 95.0
Cont. Line Current	Ic	Amps RMS @ 70 °C	11.4	16.4	18.9
Peak Torque	Tp	Nm Lb-ft	120.0 88.3	227.6 167.9	308.2 227.3
Peak Line Current	Ip	Amps RMS	40.0	48.0	48.5
Maximum Speed	N max	RPM @ 400V RPM @ 480V	1200 1500	800 900	720 720
Weight	Wt	kg lb	27.7 61.0	41.3 91.0	54.4 120
Rotor Inertia	Jm	kg-cm² oz-in-sec²	280 3.97	470 6.66	660 9.35

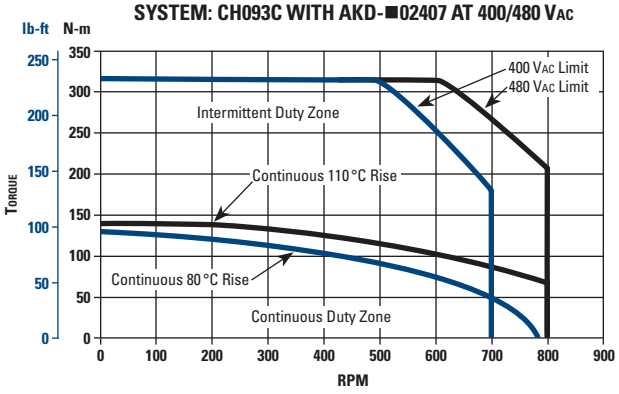
SYSTEM: CH091A WITH AKD-■02407 AT 400/480 VAC



SYSTEM: CH092C WITH AKD-■02407 AT 400/480 VAC



SYSTEM: CH093C WITH AKD-■02407 AT 400/480 VAC



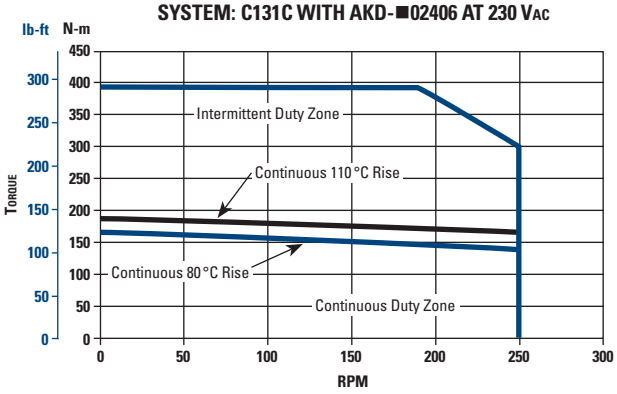
Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

C13xC

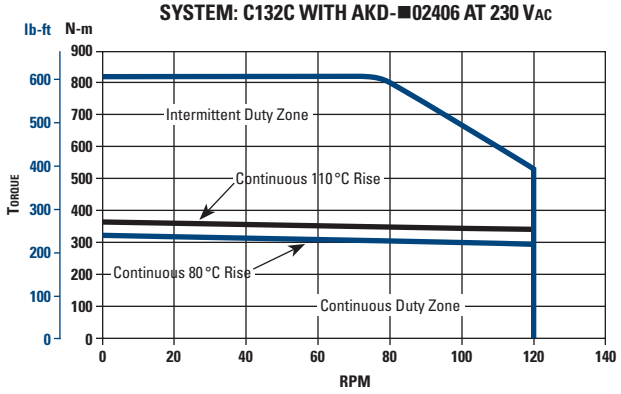
System Performance at 230 VAC C13xC Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	C131C	C132C	C133C
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	188.5 139.0	360.6 266.0	500.0 370.0
Cont. Line Current	Ic	Amps RMS @ 100 °C	18.7	16.8	20.0
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	166.8 123.0	320.0 236.0	447.4 330.0
Cont. Line Current	Ic	Amps RMS @ 70 °C	16.6	15.0	17.9
Peak Torque	Tp	Nm Lb-ft	390.8 288.2	644.7 475.5	1017.8 750.7
Peak Line Current	Ip	Amps RMS	48.0	37.2	48.0
Maximum Speed	N max	RPM	600	150	120
Weight	Wt	kg lb	63.5 140	101 223	132 292
Rotor Inertia	Jm	kg-cm² oz-in-sec²	124 1.76	225 3.19	302 4.28

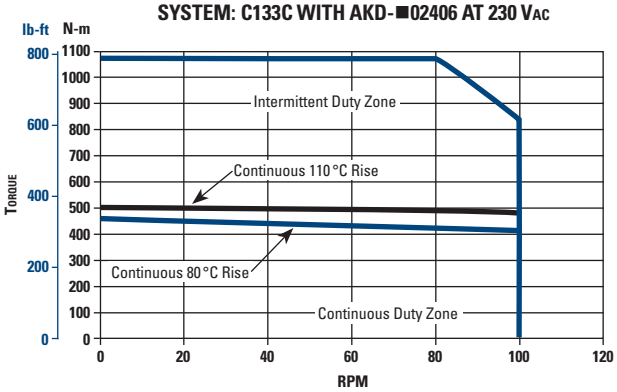
SYSTEM: C131C WITH AKD-■02406 AT 230 VAC



SYSTEM: C132C WITH AKD-■02406 AT 230 VAC



SYSTEM: C133C WITH AKD-■02406 AT 230 VAC



Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

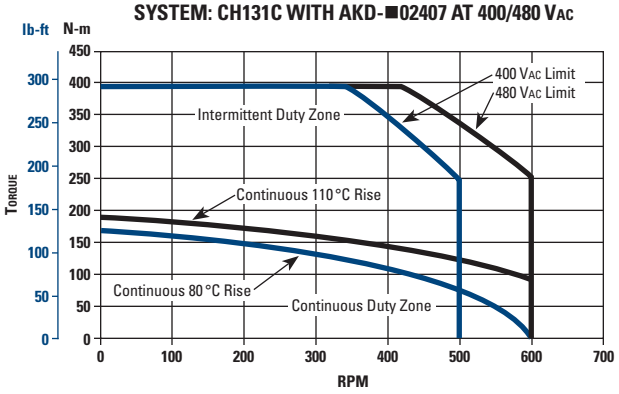
Cartridge DDR Performance Data

CH13xC

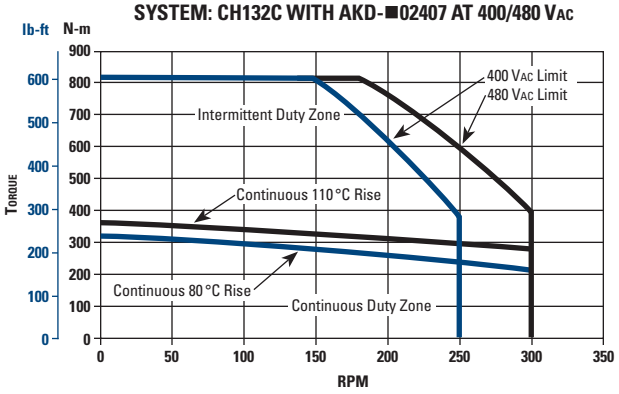
System Performance at 400 /480 VAC CH13xC Cartridge DDR Motor with AKD Family Servo Drives

System Performance	Symbol	Units	CH131C	CH132C	CH133C
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	188.5 139.0	360.6 266.0	500.0 370.0
Cont. Line Current	Ic	Amps RMS @ 100 °C	18.7	16.8	20.0
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	166.8 123.0	320.0 236.0	447.4 330.0
Cont. Line Current	Ic	Amps RMS @ 70 °C	16.6	15.0	17.9
Peak Torque	Tp	Nm Lb-ft	390.8 288.2	644.7 475.5	1017.8 750.7
Peak Line Current	Ip	Amps RMS	48.0	37.2	48.0
Maximum Speed	N max	RPM @ 400V	620	275	210
		RPM @ 480V	650	350	275
Weight	Wt	kg lb	63.5 140	101 223	132 292
Rotor Inertia	Jm	kg-cm² oz-in-sec²	1240 17.56	2250 31.86	3020 42.77

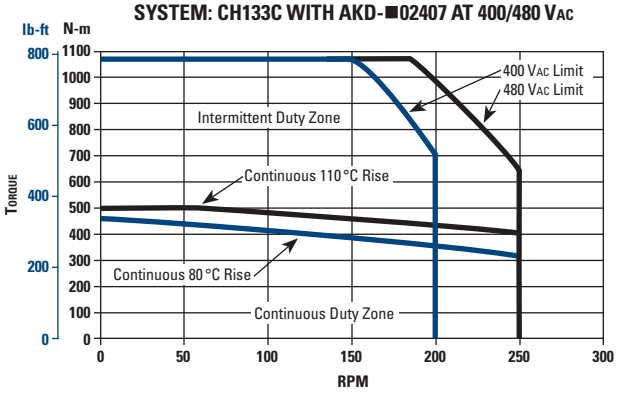
SYSTEM: CH131C WITH AKD-■02407 AT 400/480 VAC



SYSTEM: CH132C WITH AKD-■02407 AT 400/480 VAC



SYSTEM: CH133C WITH AKD-■02407 AT 400/480 VAC



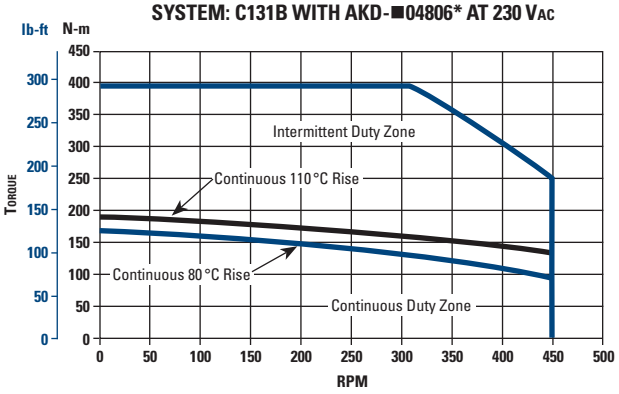
Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

C13xB

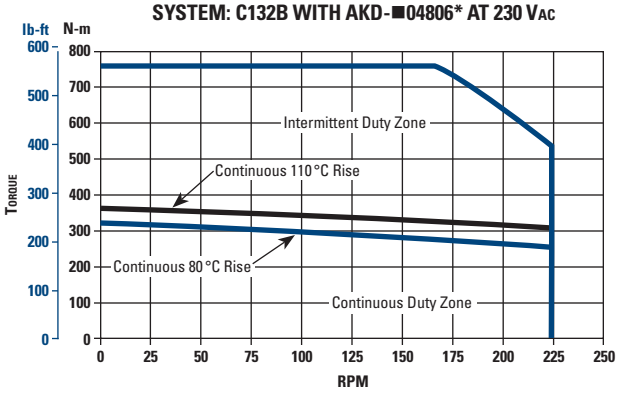
System Performance at 230 VAC C13xB Cartridge DDR Motor (High-Speed Winding) with AKD Family Servo Drives

System Performance	Symbol	Units	C131B	C132B	C133B
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	189.8 140.0	360.6 266.0	509.8 376.0
Cont. Line Current	Ic	Amps RMS @ 100 °C	29.2	29.6	32.7
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	168.1 124.0	320.0 236.0	451.5 333.0
Cont. Line Current	Ic	Amps RMS @ 70 °C	25.9	26.3	29.0
Peak Torque	Tp	Nm Lb-ft	396.1 292.2	759.3 560.0	1017.3 750.3
Peak Line Current	Ip	Amps RMS	75.4	77.1	77.1
Maximum Speed	N max	RPM	450	225	175
Weight	Wt	kg lb	63.5 140	101 223	132 292
Rotor Inertia	Jm	kg-cm² oz-in-sec²	1240 17.56	2250 31.86	3020 42.77

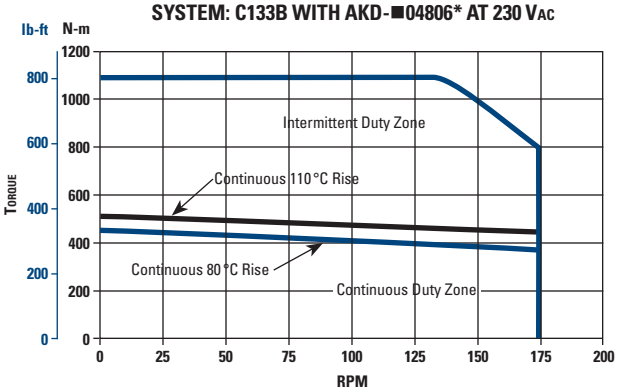
SYSTEM: C131B WITH AKD-■04806* AT 230 VAC



SYSTEM: C132B WITH AKD-■04806* AT 230 VAC



SYSTEM: C133B WITH AKD-■04806* AT 230 VAC



Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

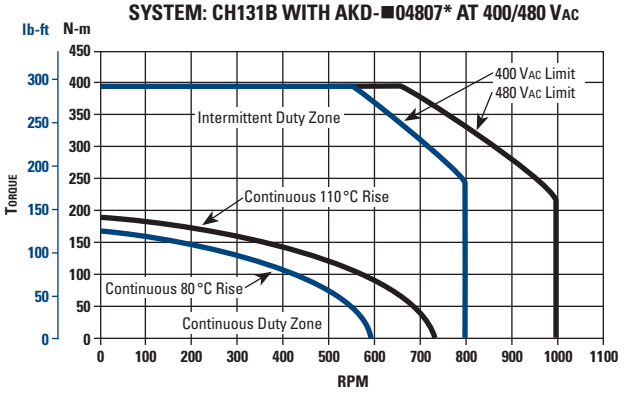
Cartridge DDR Performance Data

CH13xB

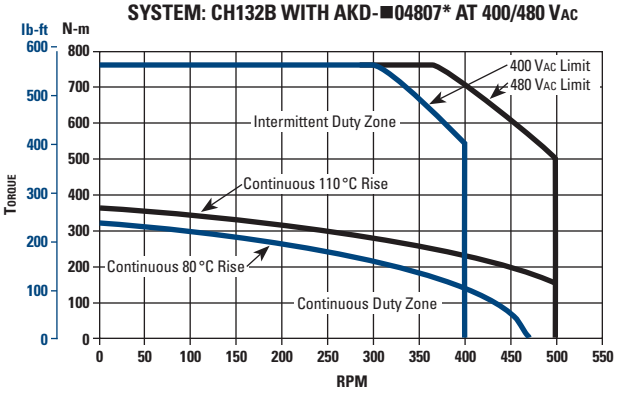
System Performance at 400/480 VAC CH13xB Cartridge DDR Motor (High-Speed Winding) with AKD Family Servo Drives

System Performance	Symbol	Units	CH131B	CH132B	CH133B
Continuous Torque 100 °C Rise[1,2,3]	Tc	Nm @ 100 °C Lb-ft @ 100 °C	189.8 140.0	360.6 266.0	509.8 376.0
Cont. Line Current	Ic	Amps RMS @ 100 °C	29.2	29.6	32.7
Continuous Torque 70 °C Rise[1,2,3]	Tc	Nm @ 70 °C Lb-ft @ 70 °C	168.1 124.0	320.0 236.0	451.5 333.0
Cont. Line Current	Ic	Amps RMS @ 70 °C	25.9	26.3	29.0
Peak Torque	Tp	Nm Lb-ft	396.1 292.2	759.3 560.0	1017.3 750.3
Peak Line Current	Ip	Amps RMS	75.4	77.1	77.1
Maximum Speed	N max	RPM @ 400V	800	400	350
		RPM @ 480V	1000	500	400
Weight	Wt	kg lb	63.5 140	101 223	132 292
Rotor Inertia	Jm	kg-cm² oz-in-sec²	1240 17.56	2250 31.86	3020 42.77

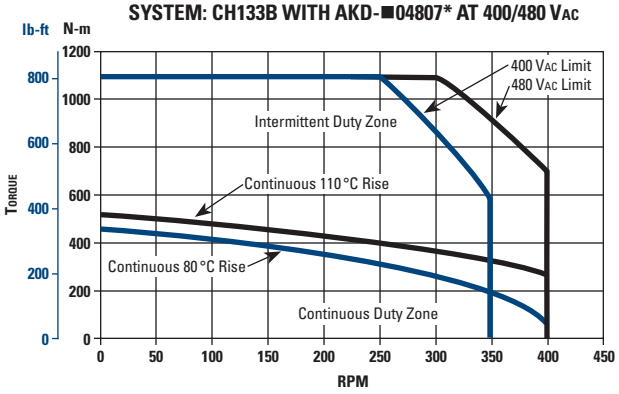
SYSTEM: CH131B WITH AKD-■04807* AT 400/480 VAC



SYSTEM: CH132B WITH AKD-■04807* AT 400/480 VAC



SYSTEM: CH133B WITH AKD-■04807* AT 400/480 VAC



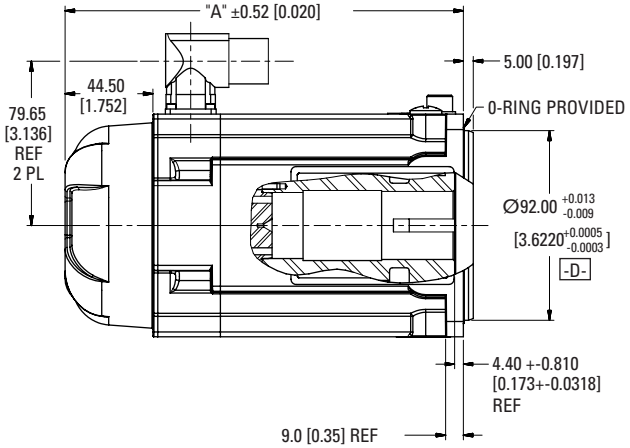
Notes:
1. At 40 °C ambient.
2. Increase Tc by 1.06 times for 25 °C ambient.
3. Temperature rise assumes a 12 x 12 x 0.50 inch aluminum mounting plate or equivalent.

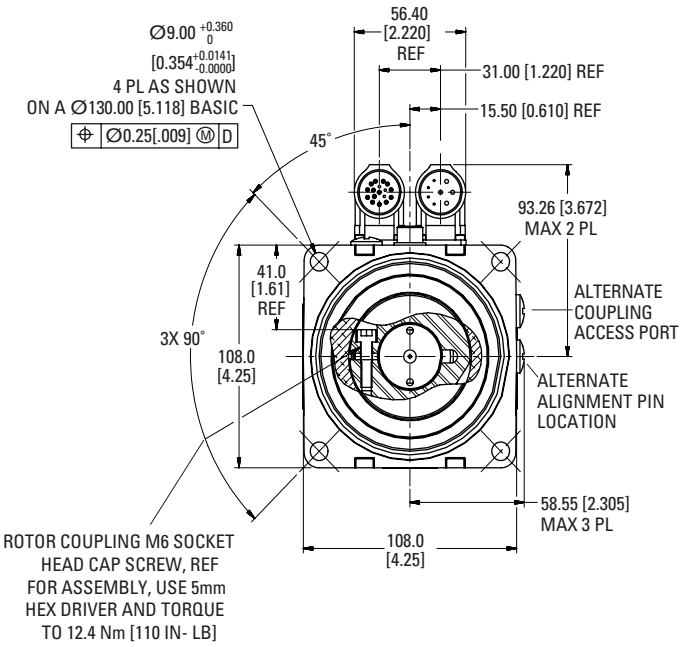
Notes

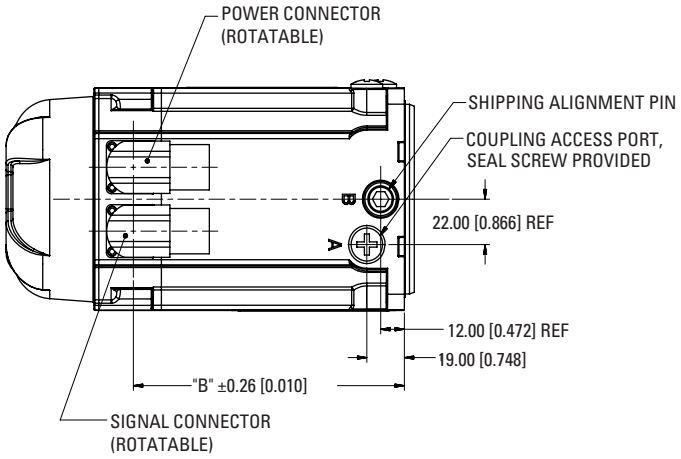
0.125 inch divisions

Cartridge DDR Outline Drawings

C(H)04x





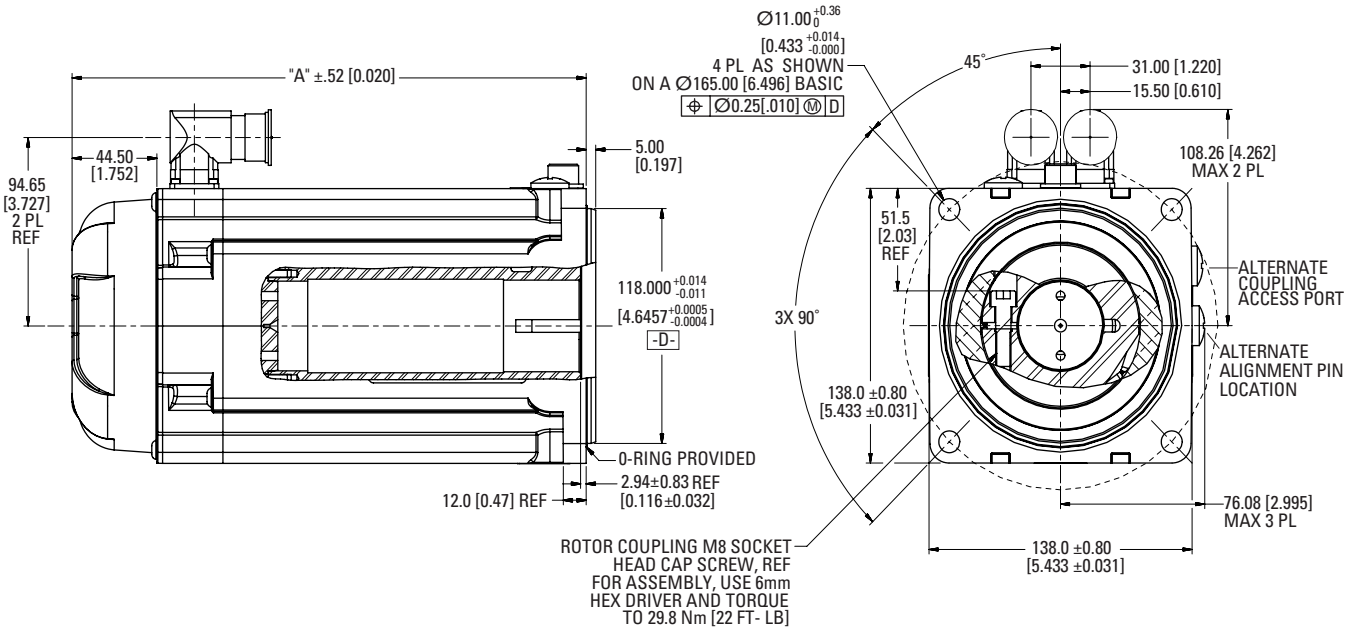


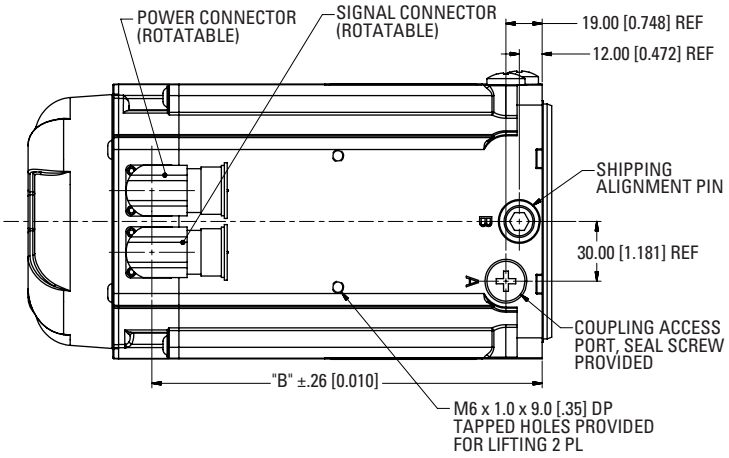
DIMENSION	C041	C042	C043	C044
"A"	171 [6.72]	202 [7.94]	233 [9.16]	264 [10.4]
"B"	107 [4.22]	138 [5.44]	169 [6.66]	200 [7.88]

Dimensions in mm [inches]

For machine interface detail, see page 36

C(H)05x





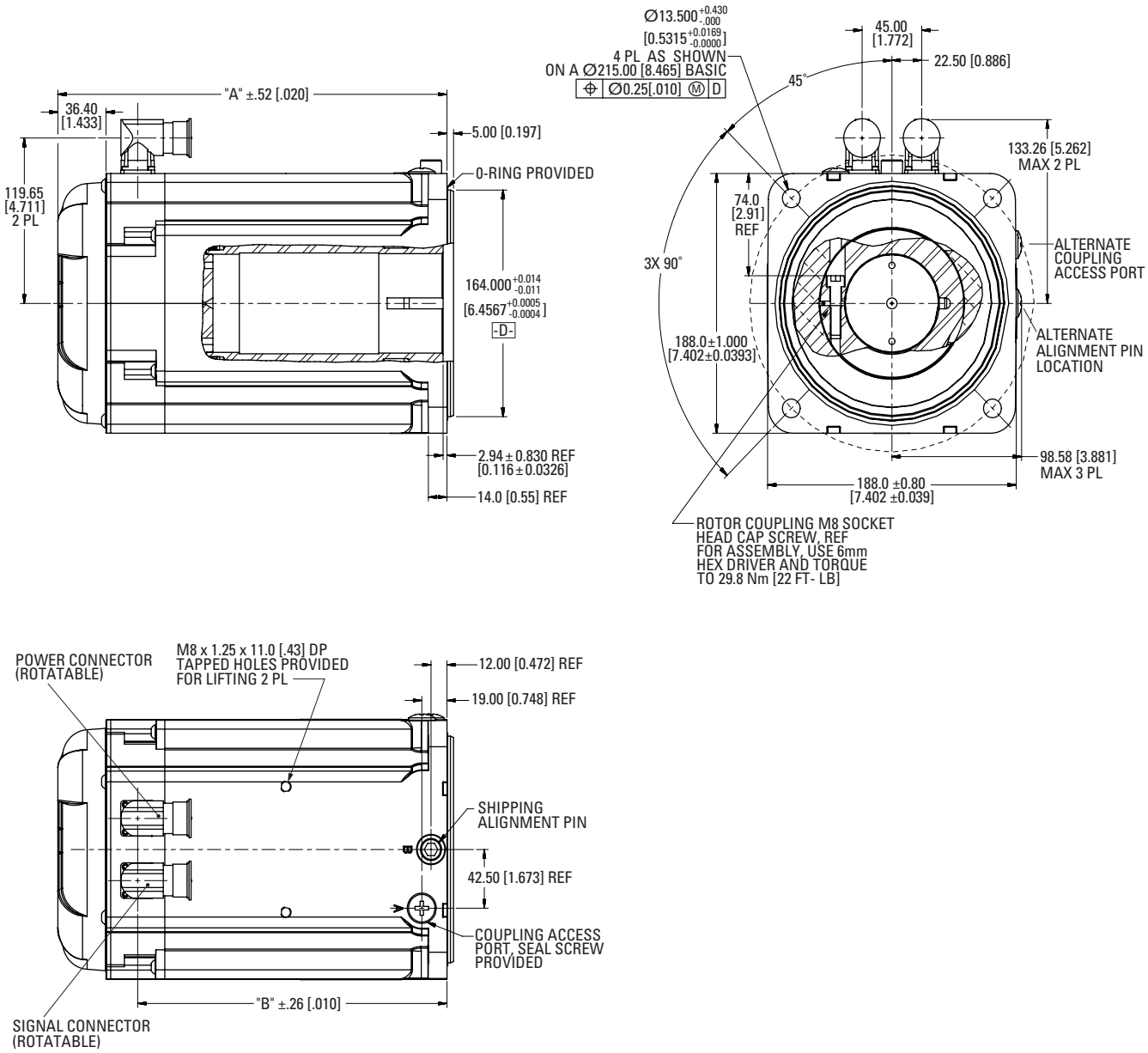
DIMENSION	C051	C052	C053	C054
"A"	195 [7.67]	220 [8.65]	245 [9.63]	270 [10.6]
"B"	131 [5.14]	156 [6.12]	181 [7.11]	206 [8.09]

Dimensions in mm [inches]

For machine interface detail, see page 36

Cartridge DDR Outline Drawings

C(H)06x

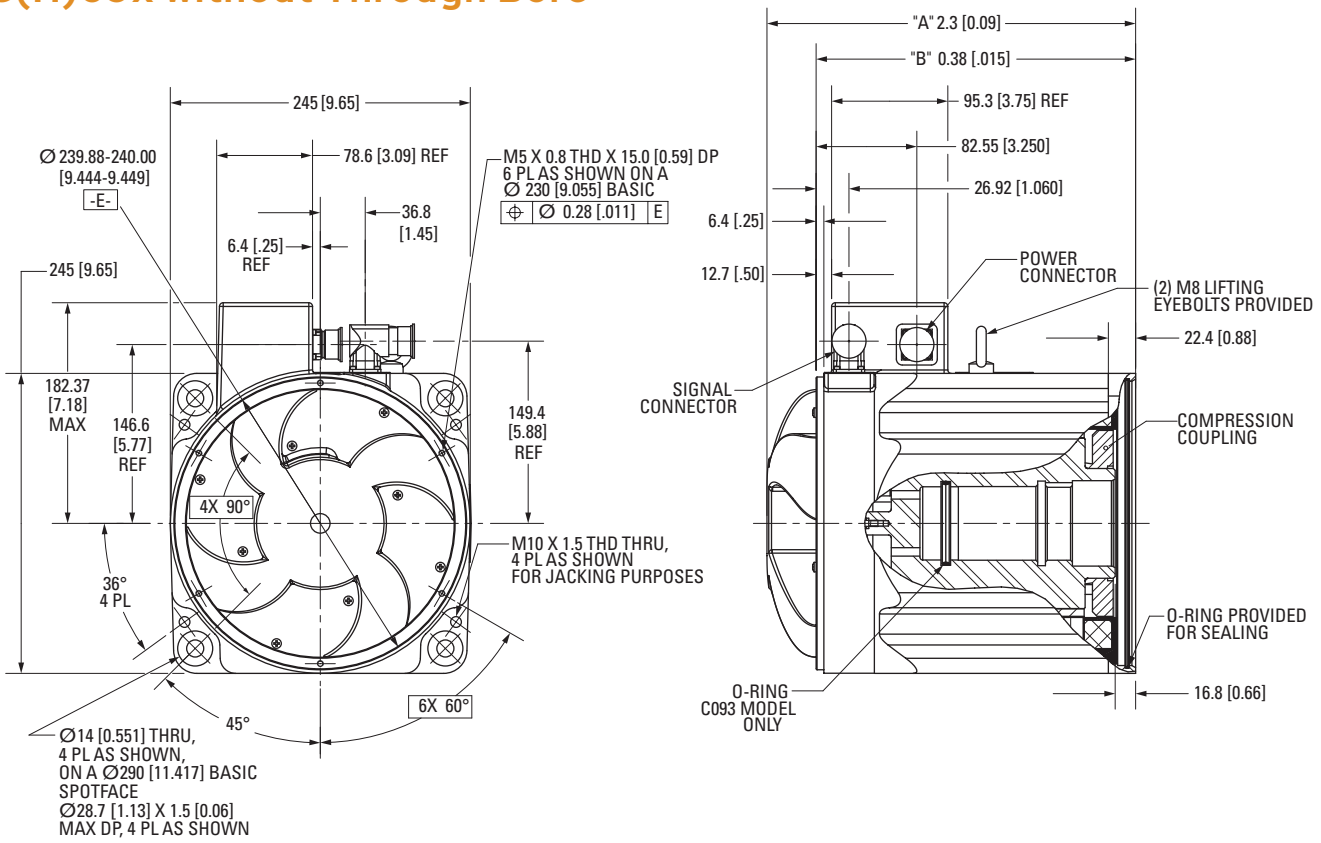


Dimension	C061	C062	C063
"A"	226 [8.90]	260 [10.2]	294 [11.6]
"B"	166 [6.52]	200 [7.86]	234 [9.20]

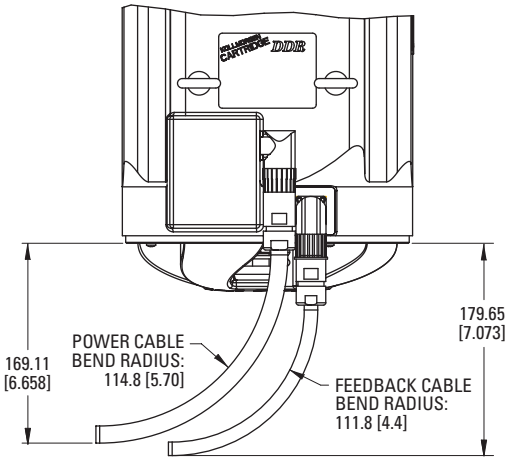
Dimensions in mm [inches]

For machine interface detail, see page 36

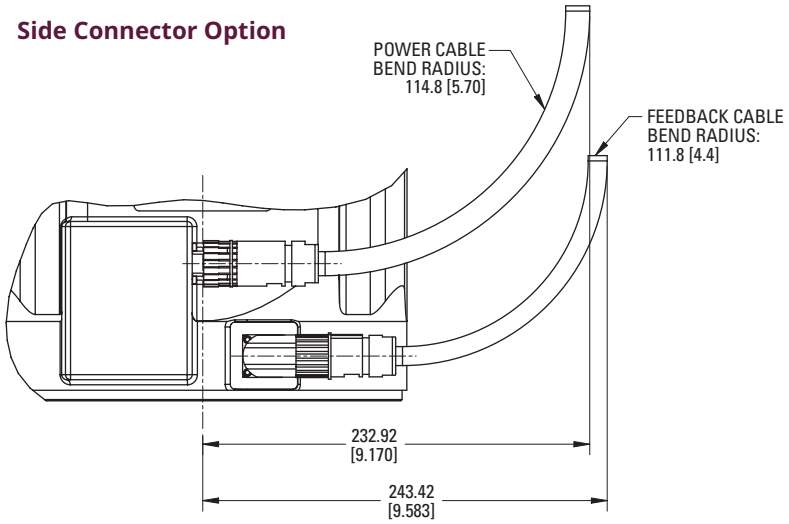
C(H)09x without Through Bore



Rear Connector Option



Side Connector Option



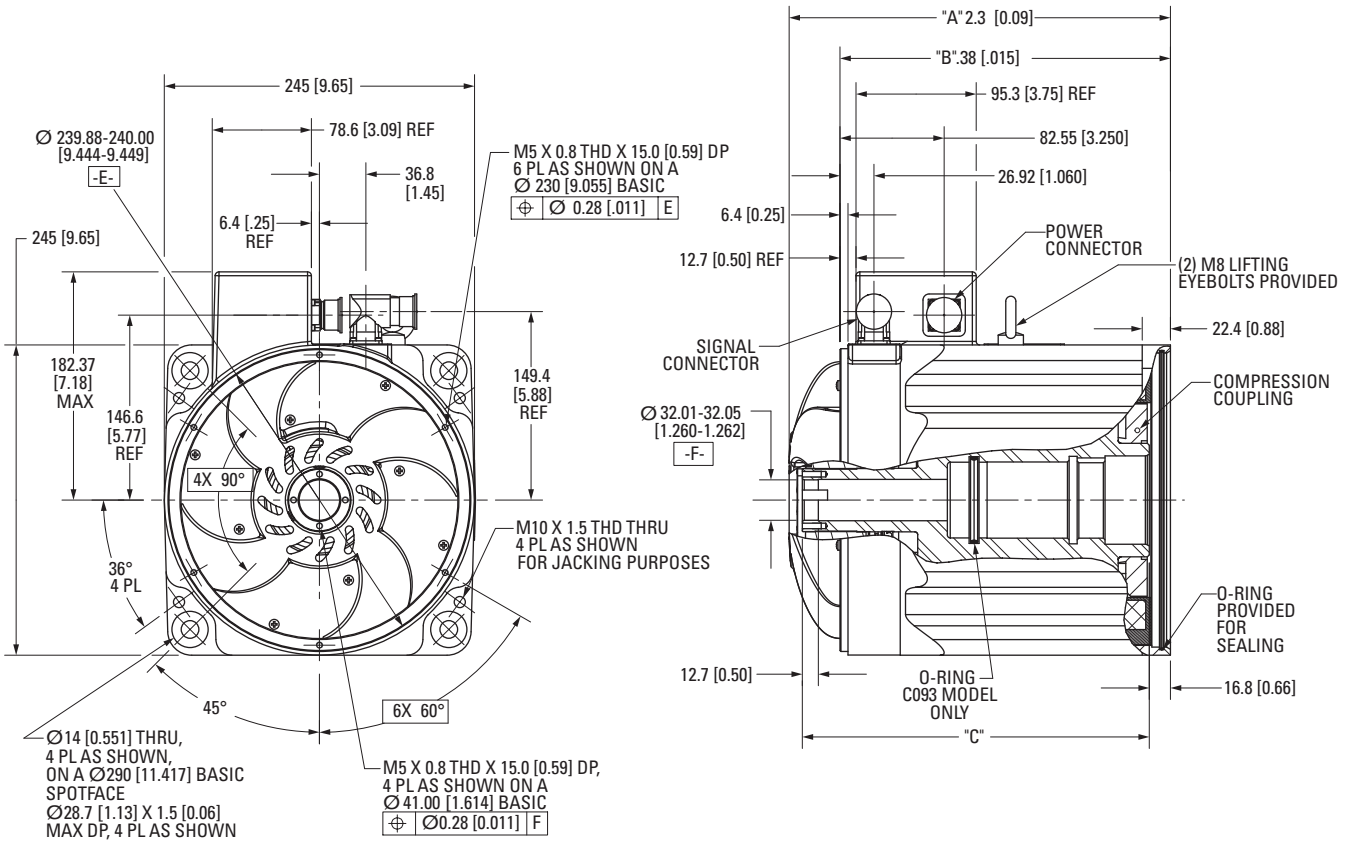
Dimension	C(H)091	C(H)092	C(H)093
"A"	204 [7.99]	253 [9.94]	302 [11.9]
"B"	163 [6.40]	212 [8.36]	262 [10.3]

Dimensions in mm [inches]

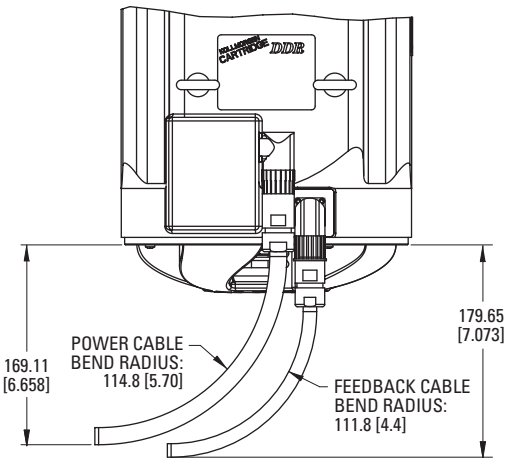
For machine interface detail, see page 37

Cartridge DDR Outline Drawings

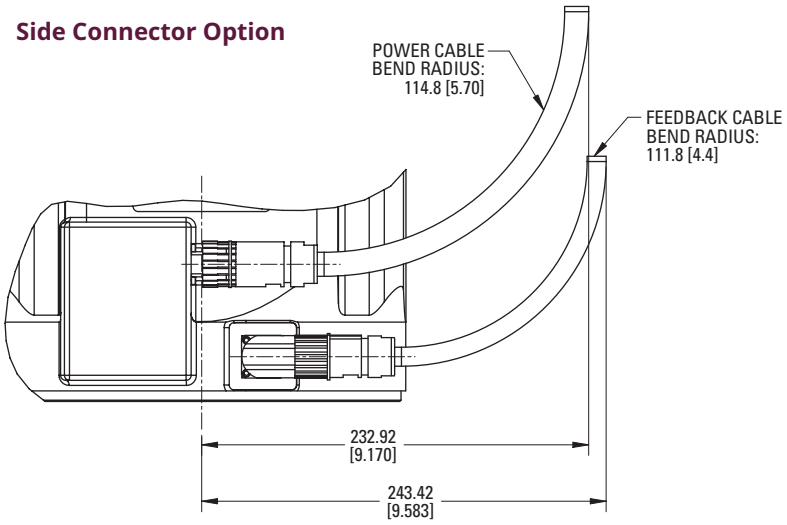
C(H)09X with Through Bore



Rear Connector Option



Side Connector Option

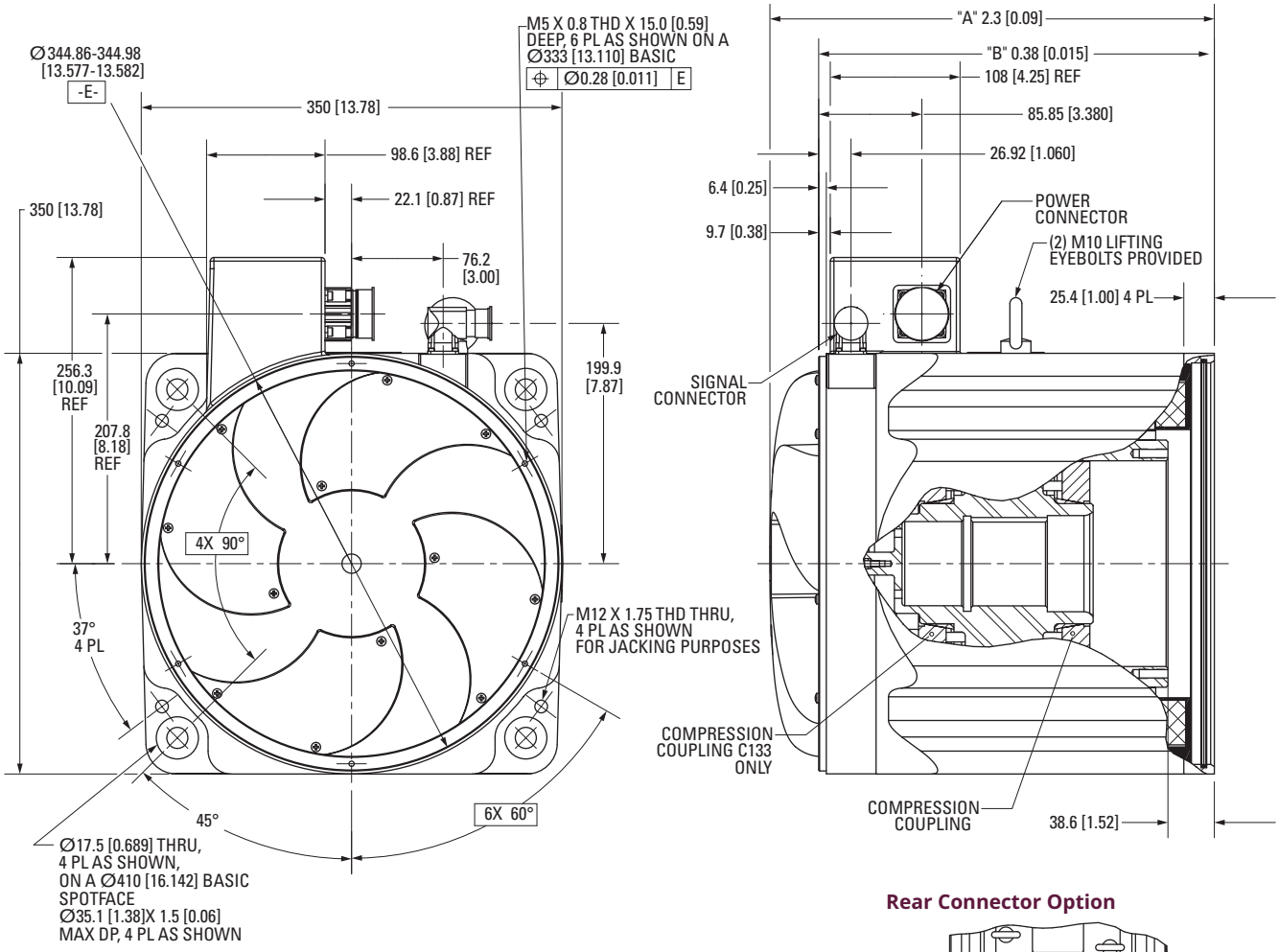


DIMENSION	C(H)091	C(H)092	C(H)093
"A"	204 [7.99]	253 [9.94]	302 [11.9]
"B"	163 [6.40]	212 [8.36]	262 [10.3]
"C"	176 [6.92]	225 [8.87]	275 [10.8]

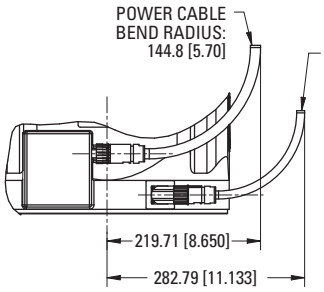
Dimensions in mm [inches]

For machine interface detail, see page 37

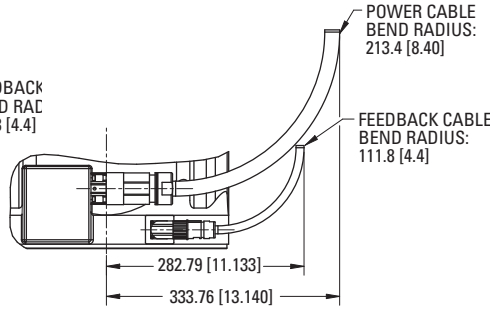
C(H)13X without Through Bore



Side Connector Option

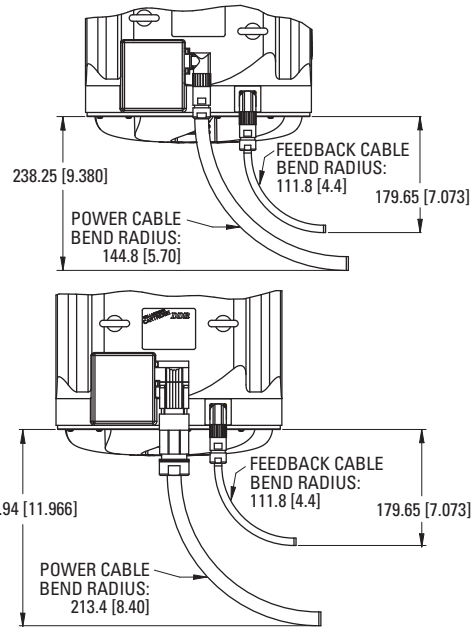


C13x Low Current



C13x High Current

Rear Connector Option



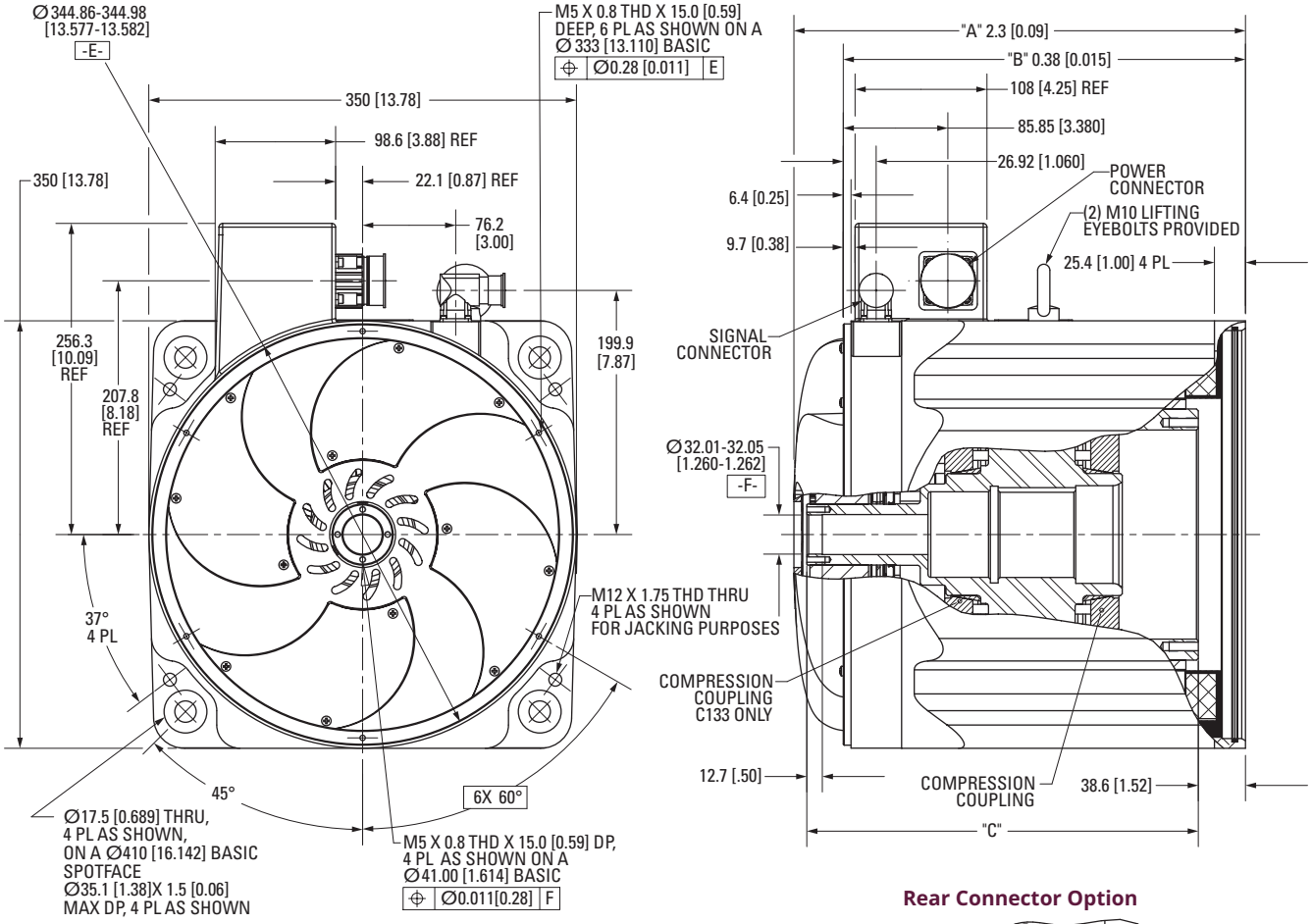
DIMENSION	C(H)131	C(H)132	C(H)133
"A"	231 [9.11]	301 [11.8]	370 [14.6]
"B"	191 [7.52]	260 [10.2]	329 [13.0]

Dimensions in mm [inches]

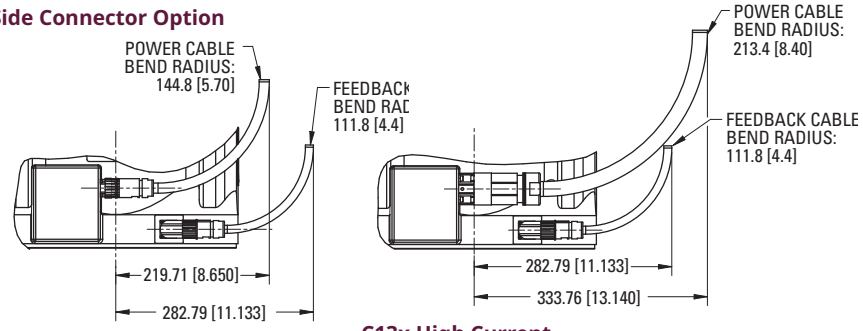
For machine interface detail, see page 37

Cartridge DDR Outline Drawings

C(H)13x with Through Bore



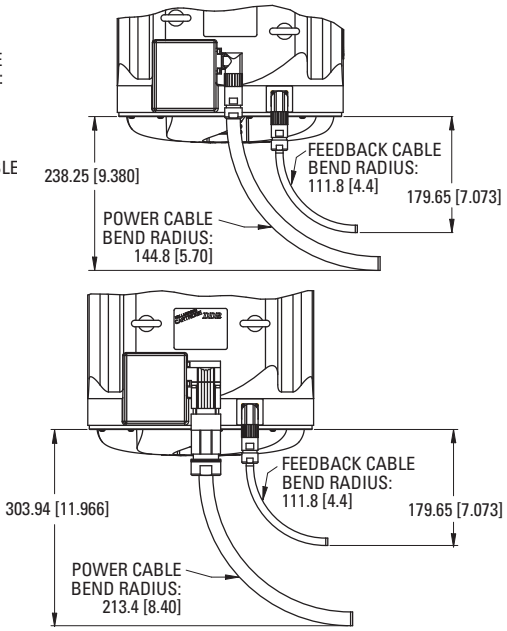
Side Connector Option



C13x Low Current

C13x High Current

Rear Connector Option



DIMENSION	C(H)131	C(H)132	C(H)133
"A"	231 [9.11]	301 [11.8]	370 [14.6]
"B"	191 [7.52]	260 [10.2]	329 [13.0]
"C"	182 [7.18]	251 [9.90]	320 [12.6]

For machine interface detail, see page 37

Dimensions in mm [inches]

Notes

0.125 inch divisions

Cartridge DDR Mounting Requirements

Machine Mounting Requirements for C(H)04x, C(H)05x and C(H)06x

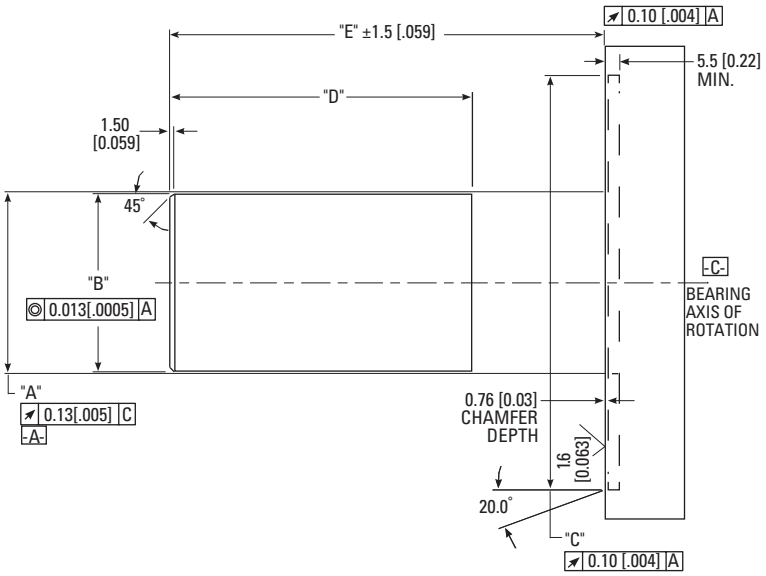
This drawing details the machine interface configuration for mounting the C[H]04, C[H]05 and C[H]06 Cartridge DDR motors. It is important to maintain specified tolerance, concentricity and run out to ensure proper operation and longevity of the Cartridge DDR motor.

Axial Shaft Movement

During operation, the shaft which the Cartridge DDR motor is mounted to shall not move axially more than +/- 0.13 mm (0.005 inch).

Shaft Material

The shaft material can be steel or stainless steel.



Machine Dimensions

Model	Dimensions				
	A Min. Max.	B Min. Max	C Min. Max	D Min. Max.	E Min. Max.
C[H]041	32.985 - 33.000 [1.2987 - 1.2992]	31.985 - 32.000 [1.2593 - 1.2598]	92.040 - 92.090 [3.6237 - 3.6255]	16.6 - 17.4 [0.655 - 0.685]	59.8 - 62.8 [2.351 - 2.469]
C[H]042	32.985 - 33.000 [1.2987 - 1.2992]	31.985 - 32.000 [1.2593 - 1.2598]	92.040 - 92.090 [3.6237 - 3.6255]	47.6 - 48.4 [1.875 - 1.905]	90.8 - 93.8 [3.571 - 3.689]
C[H]043	32.985 - 33.000 [1.2987 - 1.2992]	31.985 - 32.000 [1.2593 - 1.2598]	92.040 - 92.090 [3.6237 - 3.6255]	78.6 - 79.4 [3.095 - 3.125]	121.8 - 124.8 [4.791 - 4.909]
C[H]044	32.985 - 33.000 [1.2987 - 1.2992]	31.985 - 32.000 [1.2593 - 1.2598]	92.040 - 92.090 [3.6237 - 3.6255]	109.6 - 110.4 [4.315 - 4.345]	152.8 - 155.8 [6.011 - 6.129]
C[H]051	45.985 - 46.000 [1.8105 - 1.8110]	44.985 - 45.000 [1.7712 - 1.7717]	118.040 - 118.090 [4.6473 - 4.6492]	34.6 - 35.4 [1.365 - 1.395]	80.5 - 83.5 [3.171 - 3.289]
C[H]052	45.985 - 46.000 [1.8105 - 1.8110]	44.985 - 45.000 [1.7712 - 1.7717]	118.040 - 118.090 [4.6473 - 4.6492]	59.6 - 60.4 [2.345 - 2.375]	105.5 - 108.5 [4.151 - 4.269]
C[H]053	45.985 - 46.000 [1.8105 - 1.8110]	44.985 - 45.000 [1.7712 - 1.7717]	118.040 - 118.090 [4.6473 - 4.6492]	84.6 - 85.4 [3.335 - 3.365]	130.5 - 133.5 [5.141 - 5.259]
C[H]054	45.985 - 46.000 [1.8105 - 1.8110]	44.985 - 45.000 [1.7712 - 1.7717]	118.040 - 118.090 [4.6473 - 4.6492]	109.6 - 110.4 [4.315 - 4.345]	155.5 - 158.5 [6.121 - 6.239]
C[H]061	71.985 - 72.000 [2.8341 - 2.8346]	70.985 - 71.000 [2.7948 - 2.7953]	164.040 - 164.090 [6.4583 - 6.4602]	48.6 - 49.4 [1.915 - 1.945]	102.5 - 105.5 [4.031 - 4.149]
C[H]062	71.985 - 72.000 [2.8341 - 2.8346]	70.985 - 71.000 [2.7948 - 2.7953]	164.040 - 164.090 [6.4583 - 6.4602]	82.6 - 83.4 [3.255 - 3.285]	136.5 - 139.5 [5.371 - 5.489]
C[H]063	71.985 - 72.000 [2.8341 - 2.8346]	70.985 - 71.000 [2.7948 - 2.7953]	164.040 - 164.090 [6.4583 - 6.4602]	116.6 - 117.4 [4.595 - 4.625]	170.5 - 173.5 [6.711 - 6.829]

Dimensions in mm [inches]

Machine Mounting Requirements for C(H)09x and C(H)13x

This drawing details the machine interface configuration for mounting the C[H]09 and C[H]13 Cartridge DDR motors. It is important to maintain specified tolerance, concentricity, and run out to ensure proper operation and longevity of the Cartridge DDR motor.

Axial Shaft Movement

Note there is a static and dynamic call out for axial length. The static tolerance is the allowable variance of the shaft before the motor is mounted. The dynamic tolerance is the allowable movement of the shaft after the motor is mounted and during operation.

Shaft Material

The shaft material must have a minimum yield strength of 55,000 PSI. This suggests the material shall be cold rolled steel with a minimum 0.30% carbon content.

Shaft Key

The C09x and C13x Cartridge DDR motors are provided with a key. If the materials and dimensions on this page and the compression coupling torque procedure are strictly followed, then the key is not needed. The key is provided as a safety precaution to avoid severe damage to the Cartridge DDR motor and to the machine it is mounted to that can result if the compression coupling is not properly engaged during operation. No key is used on the C04x, C05x and C06x.

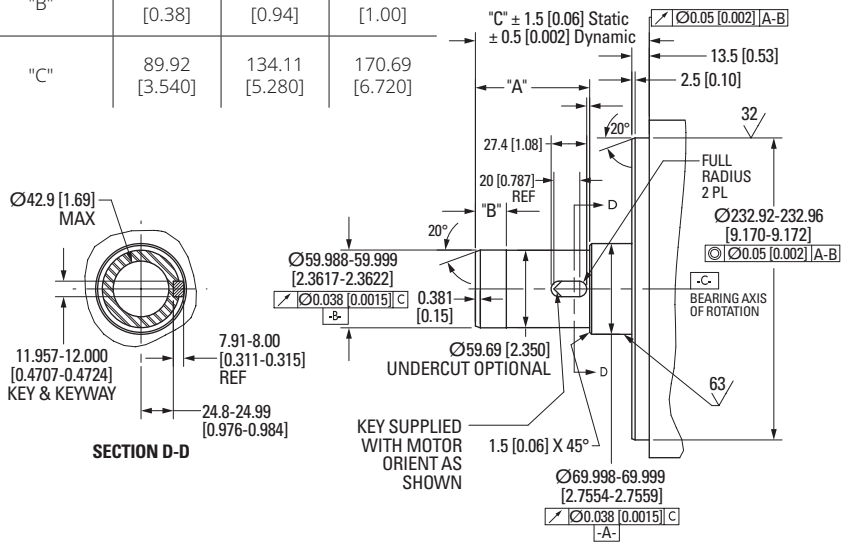
Heat Dissipation

The Cartridge DDR motor is a source of heat connected directly to the machine frame. For applications which are sensitive to heat generation, the continuous torque rating of the Cartridge DDR must be reduced. To facilitate heat sensitive applications, Cartridge DDR motors have dual continuous torque ratings, 110 °C rise for maximum capacity and 80 °C rise for de-rated capacity.

Dimensions in mm [inches]

C(H)09x

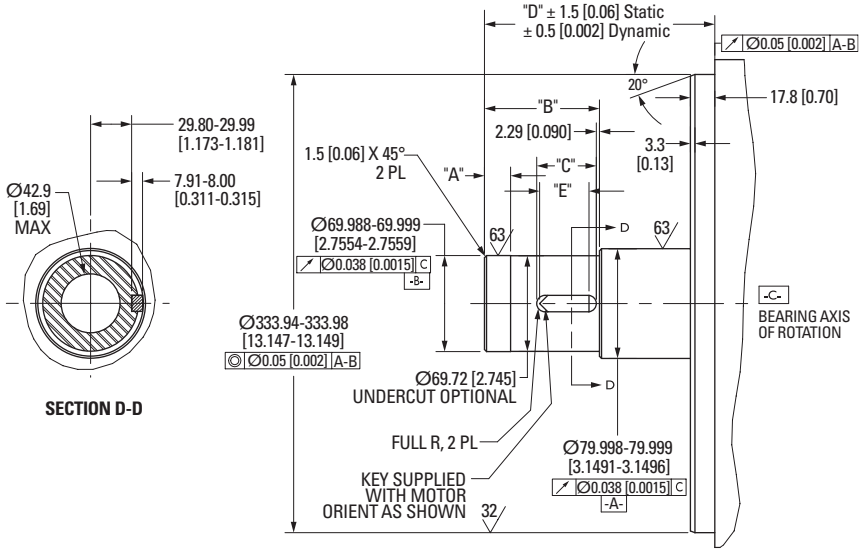
Dimension	C(H)091	C(H)092	C(H)093
"A"	43.94 [1.730]	83.14 [3.470]	124.71 [4.910]
"B"	9.65 [0.38]	23.88 [0.94]	25.4 [1.00]
"C"	89.92 [3.540]	134.11 [5.280]	170.69 [6.720]



C(H)13x

Dimension	C(H)131	C(H)132	C(H)133
"A"	9.40 [0.37]	19.05 [0.75]	40.64 [1.6]
"B"	40.39 [1.590]	83.82 [3.300]	118.62 [4.670]
"C"	27.43 [1.08]	43.43 [1.71]	57.40 [2.26]
"D"	114.05 [4.490]	167.89 [6.610]	253.49 [9.980]
"E"	19.99 [0.787]	35.99 [1.417]	50.01 [1.969]

Dimensions in mm [inches]

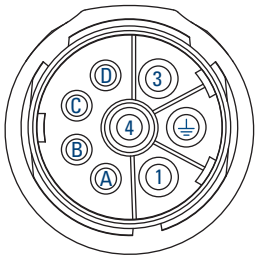


Cartridge DDR Connector Pinouts

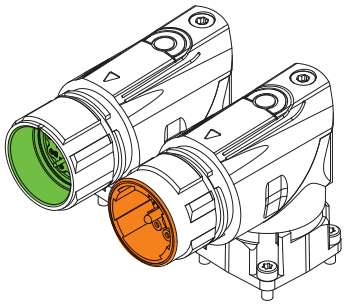
1-, 2-, 3- Power Connector Pinouts

Size 1.0 M23 Connector

Ic < 20 A



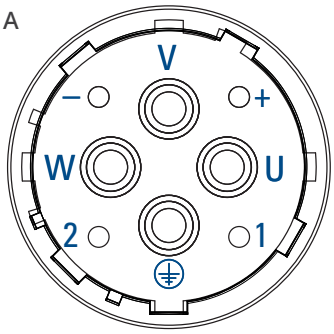
Pin	Function
1	U
‡	PE
3	W
4	V
A	Brake +
B	Brake -
C	N/C
D	N/C



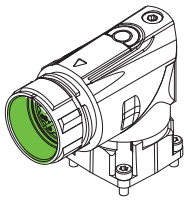
3- Connectors

Size 1.5 M40 Connector

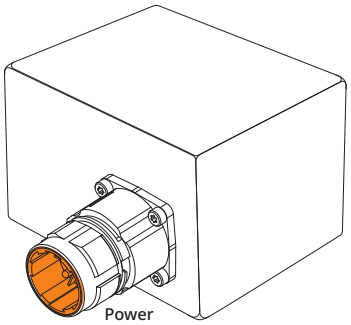
Ic > 20 A



Pin	Function
U	U
‡	PE
W	W
V	V
+	Brake +
–	Brake -
1	N/C
2	N/C



Feedback

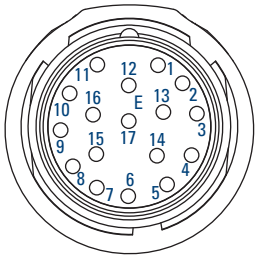


Power

1-, 2- Connectors

1-, 2-, 3- Feedback Connector Pinouts

Feedback Connector



EnDat/BiSS Feedback

Pin	Function
1	B –
2	GND
3	A –
4	Vcc
5	DATA
6	N/C
7	Thermal Sensor +
8	Clock
9	B +
10	Un Sense (Common)
11	A +
12	Up Sense (VCC)
13	$\overline{\text{DATA}}$
14	Thermal Sensor –
15	$\overline{\text{Clock}}$
16	N/C
17	N/C

Cartridge DDR to AKD Drive Cables

AKD Value Line Cables

Value Line Cables are alternative cable options suitable for most applications. These cables separate power and feedback. Options included in this catalog support Single-turn (GJ) and Multi-turn (GK) for AKD.

Motor	Power Cable	EnDat 2.2, 01 & BiSS
CDDR < 12 A	VP-507BEAN	VF-SB7374N
12 A ≤ CDDR < 20 A	VP-508CEAN	VF-SB7374N
20 A ≤ CDDR < 48 A	VP-508DEAN	VF-SB7374N

AKD Performance Cables

Dual Cables

Dual cables are used to separate power and feedback. Options included in this catalog support:

- EnDat (Single-turn, LA option)
- EnDat (Multi-turn, LB option)
- BiSS (Single-turn absolute, AA option)
- BiSS (Multi-turn absolute, AB option)

Motor	Power Cable	EnDat 2.2, 01 & BiSS
CDDR < 12 A	CP-507CCAN	CF-SB7374N
12 A ≤ CDDR < 20 A	CP-508DCAN	CF-SB7374N
20 A ≤ CDDR < 48 A	CM-13A4-010	CF-SB7374N

Kollmorgen 2G Performance Cables – AKD2G to CDDR

Dual Cables

Dual cables are used to separate power and feedback. Options included in this catalog support:

- EnDat (Single-turn, LA option)
- EnDat (Multi-turn, LB option)
- BiSS (Single-turn absolute, AA option)
- BiSS (Multi-turn absolute, AB option)

Motor	Power Cable	EnDat 2.2, 01 & BiSS
CDDR < 12 A	P1-21-015-A5-00	F1-12-FB4-A3
12 A ≤ CDDR < 20 A	P1-21-025-A5-00	F1-12-FB4-A3
20 A ≤ CDDR < 48 A	P1-21-060-UF-00	F1-12-FB4-A3

Kollmorgen Servo Drive Solutions

AKD Product Family

Kollmorgen offers an extensive range of servo drives, designed to provide precise control, optimum torque and a rich feature set to complement our wide range of rotary servo motors and linear positioning systems. The AKD product family of servo drives offer the broadest connectivity with the most advanced control technology, simplified commissioning and compact packaging available in the global marketplace.

AKD Product Family

Parameter	AKD2G	AKD	AKD BASIC	AKD PDMM	AKD-N/AKD-C
Base I/O	12 digital 2 analog	11 digital 2 analog	11 digital 2 analog	17 digital 2 analog	5 digital
Expansion I/O[1]	8 digital 2 analog *Drive size is the same	No	20 digital 2 analog *adds 30 mm to the drive width for drives up to 12A	Up to 1000+ remote I/O via EtherCAT	No
Safe I/O	2 digital inputs for Safey option 1 4 digital inputs for SafeMotion options	No	No	No	No
SafeMotion[2]	Yes	STO only	STO only	STO only	STO only
Optimized for single cable[3]	Yes	No	No	No	Yes
Continuous current limit[4]	24A	48A	48A	48A	12A
Connectivity[5]	Analog, EtherCAT, CANopen, Profinet IRT, Ethernet/IP, TCP/IP, Modbus/TCP	Analog, EtherCAT, CANopen, Profinet RT, Ethernet/IP, TCP/IP, Modbus/TCP	Analog	EtherCAT, CANopen, Profinet RT, Ethernet/IP, TCP/IP, Modbus/TCP	EtherCAT
Axis Configuration	single or dual	single	single	single	single
Drive-resident controller	No	No	No	Yes	No
Programmability	parameterized, 2 axes control loops, actlon table	parameterized	parameterized, BASIC programmable	parameterized, IEC 61131-3 via PLCo-pen or Pipe Network	parameterized
Graphical Display	160x128-pixel display	2 digit LED	2 digit LED	3 digit LED	Status LED
Removeable Memory[6]	Yes	No	Yes	Yes	No
System Architecture	Centralized	Centralized	Centralized	Centralized	Decentralized
IP Rating	IP20	IP20	IP20	IP20	IP67 (AKD-N)

Notes:
1: Add EtherCAT multi-axis master, PCMM, to the AKD drive family to enable remote I/O expansion via EtherCAT. PCMM controller functionality is built into the PDMM
2: SafeMotion includes FSoE, STO, SS1, SS2, SOS, SDB, SBC/SBT, SLS, SSR, SSM, SDI, SAR, SLA, SLI, SLP, SCA up to SIL3 / PLe
3: Single cable optimized means one single cable for power & motor feedback with 1 connector at motor end and 1 connector at drive end
4: Higher power variants under development in some models. Consult factory for availability.
5: Consult factory on connectivity options for AKD2G.
6: Optional integrated SD card for easy backup and drive cloning

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- Kollmorgen Essentials Drive
- Kollmorgen Essentials Motor
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- AKD2G
- AKD PDMM
- AKM
- AKMA
- AKME
- AKMH
- BLM
- Cartridge DDR
- DDL
- DDR
- GoldLine
- Kollmorgen Automation Suite
- KAS
- Kollmorgen Visualization Builder
- KVB
- MKD
- Motioneering
- P8000
- PCMM
- PCMM2G
- PowerMax
- SafeMotion Monitor
- Servostar
- SMM
- TBM
- TBM2G
- WorkBench

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- Instapak: Sealed Air Corporation.
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- LOCTITE 640: HenkeAG & CO. KGAA.
- LOCTITE: HenkeAG & CO. KGAA.
- Modbus: Schneider Electric USA, Inc.
- MOLYKOTE: DDP Specialty Electronic Materials US 9, LLC.
- Mylar: DUPONT Teijin Films U.S.
- PHOENIX CONTACT: Phoenix Contact GmbH & Co. KG.
- PROFINET: PROFIBUS Nutzerorganisation e.V.
- Scotch-Weld 2214: 3M Company.
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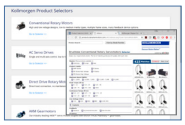

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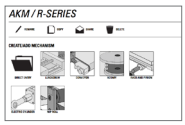

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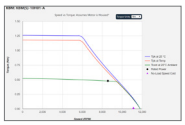

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